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The Role of Institutional Investors as Responsible Investors

Rajna Gibson Brandon and Philipp Krueger

LTI Report II

CENTRE FOR ECONOMIC POLICY RESEARCH

LTI@UniTO
LONG•TERM INVESTORS

THE ROLE OF INSTITUTIONAL INVESTORS AS RESPONSIBLE INVESTORS

LTI Report 2

CENTRE FOR ECONOMIC POLICY RESEARCH

Centre for Economic Policy Research
33 Great Sutton Street
London EC1V 0DX
UK

187 boulevard Saint-Germain
75007, Paris, France

Tel: +44 (20) 7183 8801
Fax: +44 (20) 7183 8820
Email: cepr@cepr.org
Web: www.cepr.org

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LONG-TERM INVESTORS@UNITO

Long-Term Investors@UniTo
Collegio Carlo Alberto
Piazza Vincenzo Arbarello, 8
10122 Torino TO
Italy

Tel: +39 011 15630 822
Fax: +39 011 15630 801
Email: lti@carloalberto.org
Web: https://www.carloalberto.org/research/lti

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Rajna Gibson Brandon
University of Geneva and ECGI

Philipp Krueger
University of Geneva, Swiss Finance Institute and ECGI

LTI@UniTO
LONG-TERM INVESTORS

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Pietro Garibaldi is the Director of LTI@UniTO.

About the authors

Rajna Gibson Brandon is a Full Professor of Finance at the University of Geneva since September 2008. She is the founder and was Director of the Geneva Finance Research Institute (GFRI) at the University of Geneva between 2009 and 2016 and is the Chairwomen and Managing Director of the Geneva Institute of Wealth Management (GIWM) since 2016. From 2007 until 2015, she was Head of Research at the Swiss Finance Institute. She was the Director of the National Centre of Competence in Research Finrisk from 2001 to 2009. She was previously Professor of Finance at the University of Zurich and at the University of Lausanne and she was Assistant Professor in Finance at HEC, Paris. She holds a PhD in Economic Sciences from the University of Geneva. She was also Member of the Board of Directors of Swiss Re from June 2000 to April 2018 and is, since November 2018, a Member of the Board of Directors of Group BNP, France and, since May 2022, a Member of the Board of Directors of the Swiss National Bank (SNB). She is also a Member of the Surveillance Board of Sustainable Finance Geneva, a Member of the Academic Advisory Board of RepRisk and was a Member of the Swiss Federal Banking Commission (currently FINMA) from 1997 to 2004. Her research interests cover asset pricing, as well as experimental and sustainable finance.

Philipp Krueger is a Full Professor of Finance at the University of Geneva and holds a Senior Chair at the Swiss Finance Institute. He is also a Research Member at ECGI. After studying Economics and Finance in Germany, the United States, France, and the United Kingdom, he graduated with a PhD in Economics from the Toulouse School of Economics in 2010. His research interests are in corporate, sustainable, and behavioral finance. His research has been published in the leading scientific and professional finance journals (*Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Financial Analyst Journal*). Professor Krüger is a regular speaker at leading finance conferences worldwide. His research has received numerous awards from organizations like the BSI Gamma Foundation, The Principles for Responsible Investment, the International Centre for Pension Management, or the European Financial Management Association. In 2015, he received the prestigious Moskowitz award for outstanding research in responsible finance. He serves on the board of experts for Inrate AG in Zurich and advises one of the major Swiss banks on ESG investing.

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Contents

List of conference participants

Gianmaria Ajani, *University of Torino*
Laura Alessandrini, *CDP Venture Capital*
Tiziana Allegra, *Istituto Nazionale di Filantropia*
Sergio Allegri, *Ersel Asset Management*
Ambrogio Rinaldi, *COVIP*
Alberto Francesco Anfossi, *Compagnia di San Paolo*
Fausto Artoni, *IMPact SGR*
Salvatore Lenza, *ASR Molise Acque*
Elena Bacarella, *I.C. Granarolo dell'Emilia*
Matteo Basei Fantolino, *S.A.A.T.C.I*
Livio Bastonero, *Politecnico di Torino*
Fulvio Bersanetti, *Compagnia di San Paolo*
Enrico Bertoni, *Equiter*
Marco Biral, *Intesa Sanpaolo*
Matteo Bordone Molini, *Compagnia di San Paolo*
Valentina Bosetti, *Bocconi University and Terna*
Dario Brandolini, *DB&B Consulting*
Flavio Brugnoli, *Centro Studi sul Federalismo*
Federico Buratti, *I.T.I.S. "Majorana"*
Augusto Buscaglia, *Equiter*
Riccardo Calcagno, *Politecnico di Torino*
Angela Castellaneta, *SGSS*
Lucilla Cervigni, *Liceo "Annibal Caro" Fermo*
Gabriella Chiomio, *Collegio Carlo Alberto*
Andrea Ciarmoli, *Marsh McLennan*
Tito Cordella, *The Johns Hopkins University, SAIS*
Andrea Cosentino, *Renovaperform*
Elettra D'Amico, *Politecnico di Torino*
Giovanni Dell'Ariccia, *International Monetary Fund*
Mary Dilo, *MIUR*
Andrea Fabbri, *Fondazione Collegio Universitario Einaudi*
Flavio Fabris, *Intesa Sanpaolo Private Banking*
Serena Fatica, *Joint Research Center*
Pier Marco Ferraresi, *University of Torino*
Carla Patrizia Ferrari, *Compagnia di San Paolo and Equiter*
Pietro Garibaldi, *University of Torino*
Massimo Giorgini, *Borsa Italiana*
Giuseppe Grande, *Bank of Italy*
Gabriele Guzzetti, *Tiresia - Politecnico di Milano*
Verena Lenna, *Vrije Universiteit Brussel*
Giorgio Manassero, *Ingegni*
Antonio Maniscalco, *New Innovation*
Mauro Marè, *Luiss Business School*

Marina Marena, *University of Torino*
Fabio Moneta, *University of Ottawa, Telfer School of Management*
Gianmarco Montanari, *Fineco Bank*
Donatella Mosso, *Intesa Sanpaolo*
Antonella Navarra, *Intesa SanPaolo Vita*
Giovanna Nicodano, *Collegio Carlo Alberto and University of Torino*
Davide Nigro, *Iren Mercato SpA*
Steven Ongena, *University of Zurich*
Vera Palea, *University of Torino*
Ugo Panizza, *IHEID*
Barbara Papuzzi, *Sec Newgate*
Lorenza Patriarca, *Comune di Torino*
Antonio Perrone Congedi, *Intesa Sanpaolo*
Federico Ravenna, *Sveriges Riksbank*
Giancarlo Rizzi, *International law firm*
Anna Maria Rizzi, *Liceo "T. Taramelli" Pavia*
Umberto Rossi, *Leonardo*
Carlotta Savio, *INRAE*
Jose Savoia, *Previc*
Lorenzo Schoenleber, *Collegio Carlo Alberto*
Stefano Serra, *Confindustria*
Gilson Silva Jr , *Visiting researcher, University of Torino*
John Suter, *Consultant*
Sukriye Tuysuz, *Yeditepe University*
Erhan Uluceviz, *Gebze Technical University*
Gianfranco Vecchiet, *Generali*
Viviana Vicario, *Intesa Sanpaolo*
Maria Volpe Rinaldi, *INPS*
Deniz Whittier, *SLR Consulting*

Foreword

This is the second LTI Report, an initiative of the Long-Term Investors (LTI@UniTO) think tank launched by the University of Torino and hosted by Collegio Carlo Alberto since 2017. LTI@UniTO is supported by key financial institutions in Northern Italy such as Compagnia di San Paolo, Equiter, Ersel, Fondaco, Intesa SanPaolo, Reale Mutua Assicurazione and Banor.

The goal of the LTI Report series is to engage leading scholars to address key research topics around the area of long-term investment, so as to make their research results accessible to broader audiences. This second report in the series focuses on the role of institutional investors in 'responsible' financial investing. Interest in incorporating environmental, social and governance (ESG) issues into investment decisions is spreading across institutions, financial advisors and the media. Indeed, the practice has become so widespread that there is a risk of 'greenwashing', whereby investors purport to invest responsibly but do not 'walk the ESG talk'. With climate change and the net zero emissions debate capturing growing attention, many argue that the most relevant dimension of ESG is the 'E' of environment. The authors analyse large sets of ESG scores and institutional investors' portfolios on both sides of the Atlantic to identify key stylised facts, investment patterns and future challenges of this key field in finance. We are very pleased and honoured to have involved Rajna Nicole Gibson Brandon and Philipp Krueger from the University of Geneva, two of the most distinguished researchers on ESG topics, as authors of the 2nd LTI Report.

The report was produced following the "2nd LTI Report Conference Presentation" held at Collegio Carlo Alberto on 30 November 2022, and includes the comments of two academic discussants and three panelists.

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The views expressed in the report are those exclusively of its authors and do not represent those of CEPR, which takes no institutional positions on economic policy matters. CEPR and LTI@UniTO are delighted to provide a platform for an exchange of views on this important topic.

Tessa Ogden
Chief Executive Officer, CEPR

Pietro Garibaldi
Professor of Economics, LTI@UniTO

February 2023

Executive summary

There is growing interest globally in responsible investing, whereby institutional investors incorporate environmental, social, and governance (ESG) issues into their investment processes. In this report we explore a series of issues relating to the responsible equity and fixed-income investment choices of institutional investors.

In Chapter 1, we analyse what motivates institutional investors to act as responsible investors in their equity investments. We also study the extent to which institutional investors use specific responsible investment strategies. We find that geographic and legal aspects play an important role in institutional investors' ESG performance at the equity-portfolio level – for instance, investors located in Europe and investors from civil law countries have better ESG equity portfolio performance. Overall, long-term orientation, specific cultures, norms, and values, as well as legal origins are important drivers of institutional investors' decisions to integrate ESG concerns into their decision making. When it comes to the use of specific responsible investing strategies, institutional investors predominantly use screening, engagement, and ESG integration, while sustainability themed investments are still niche.

In Chapter 2, we examine whether the risk and return characteristics of institutional investors' equity portfolios correlate with the responsible investment strategies that institutions employ. We also study whether the use of specific responsible strategies is related to better ESG portfolio outcomes. We find that most ESG investment strategies enable institutional investors to significantly reduce their total and idiosyncratic risk exposures. However, the strategies do not significantly impact the risk-adjusted returns of their equity portfolios. When it comes to the effect of using specific responsible investment strategies on the ESG performance of investors' equity portfolios, we observe that only screening-based approaches are positively related to the institutions' portfolio-level ESG performance.

In Chapter 3, we rely on our own research as well as on the emerging academic literature on greenwashing to assess whether equity investors who promise to invest responsibly actually do so in practice and 'walk the ESG talk'. That is, we examine if their words translate into more responsible equity portfolio outcomes and also discuss the issue of greenwashing. After all, responsible investment can have a meaningful, positive impact on the world only if investors live up to their ESG promises. We find that there is some evidence that responsible investors align their portfolios with their ESG promises. However, we also emphasise important geographic heterogeneity. When addressing the issue of greenwashing, we highlight several instances of greenwashing practices among different types of institutional investors (e.g., mutual funds or hedge funds) and discuss recent papers that find that greenwashing has increased over time, is more prevalent in some geographic regions, and is likely to have real effects.

In the second part of the report, we focus on fixed-income sustainable markets. Chapter 4 studies the potential of institutions to act as responsible fixed-income investors by examining a new class of sustainability-related fixed-income instruments: sustainability-linked bonds (SLBs). We show that these fixed-income instruments are issued predominantly in Europe and by large, more levered, more profitable, and value firms. In addition, these instruments are complex and often mispriced at issuance. Paradoxically, that may lead to an unintended transfer of wealth from 'sustainable' bondholders to shareholders.

In Chapter 5, we then ask the question if responsible bondholders and shareholders can positively influence the firms in which they invest and push them to adopt effective sustainable policies. We find that investors' ESG engagement and their holdings in sustainability-linked bonds may prompt 'real effects', such as leading the underlying firms in which they invest to significantly improve their ESG policies and curb their CO_2 emissions. However, the real effects of these sustainable investment practices on the underlying firms are still a nascent academic topic that requires further empirical investigation as the sustainable fixed-income market matures and more data become available.

An important concern that we document in the report is greenwashing by certain types of institutional investors. Building on our own recent research findings, we observe that greenwashing is more prominent in some countries than in others. In the United States, for instance, investors adhere more to responsible investing for commercial reasons. In addition, there is more regulatory uncertainty and less ESG market maturity in the United States, which could be another reason that greenwashing is more prominent there. We leave the debate open as to whether market discipline suffices or if regulation is necessary to deter institutional investors from adopting greenwashing practices.

In Chapter 6, which concludes the report, we discuss the challenges and opportunities that institutional investors face when working towards making the firms in which they invest more aligned with sustainable economies. We document that financial and commercial motives that favour firms' ESG adoption, lack of harmonisation and standardisation in ESG measurement, as well as reporting standards and methodological and data-driven issues that lead to ESG rating disagreement represent some of the main challenges for institutional investors who want to invest responsibly. Furthermore, we show that ESG rating disagreement among data vendors can be large, especially for the 'S' and the 'G' pillars. This is a source of concern as ESG rating disagreement increases firms' cost of capital. Finally, we conclude the report by providing an outlook that raises some important questions that may drive the future of ESG and further influence the role of responsible investors..

CHAPTER 1

Why and how do institutional investors act responsibly?

KEY FINDINGS

- Observable institutional investor characteristics such as size and investment horizon correlate positively with institutional investors' ESG portfolio performance.
- Geographic and legal aspects play an import role for institutional investors' ESG performance: investors located in Europe and investors from civil law countries have better ESG portfolio performance. Investors from North America tend to have worse E and S, but better governance performance at the portfolio-level.
- Overall, long-term orientation, a stakeholder approach, specific cultures, norms, values, as well as legal origins are important drivers of institutional investors' decisions to act as responsible investors and integrate ESG concerns into their decision making.
- Institutional investors appear to implement responsible investing predominantly using engagement, integration, and screening approaches. Sustainability themed investments, although growing, are still niche.

In this chapter, we examine several motivations for why institutional investors adopt responsible investing and incorporate environmental, social, and governance (ESG) issues into their decision making. We first discuss responsible investments in institutional investors' equity investments, as historically equity investments have dominated institutional investors' responsible investment strategies. We also study the propensity of institutional investors to use specific responsible investment strategies (screening, ESG engagement, etc.) and examine whether specific institutional investors use some strategies more than others.

1.1 WHY DO INSTITUTIONAL INVESTORS IMPLEMENT RESPONSIBLE INVESTMENT?

There are several non-exclusive explanations for why investors care about responsible investments. Specifically, in this chapter we examine the following possible explanations: universal ownership,[1] long-term orientation, cultural differences, legal origins, stakeholder orientation, and fiduciary duties. We analyse whether observable investor characteristics that proxy for the abovementioned dimensions correlate with institutional investors' ESG performance and choices. This analysis focuses on the equity portfolios of institutional investors and is intended to shed light on institutional investors' preferences for responsible investments. The global sample of institutional investors we study consists of both asset owners (e.g., pension funds, insurance companies) and investment managers (e.g., banks, asset management companies, hedge funds).

To evaluate the relevance of the abovementioned motivations in driving institutional investors' responsible investment decisions, we use a combination of data on institutional investors' equity portfolio holdings and firm-level ESG ratings (or scores) to calculate portfolio measures of institutional investors' ESG performance. Specifically, we follow Gibson Brandon et al. (2021b, 2022) and calculate investors' equity portfolio ESG performance using the weights of the individual stock holdings in their equity portfolios and the ESG score (or ratings) of the stock holdings:

$$Portfolio\ ESG\ performance_{jt} = \sum_{i=1}^{N_{jt}} w_{ijt} \times \quad ESG\ Score_{it} \tag{1.1}$$

In Equation 1.1, *Portfolio ESG performance* captures the institutional investor's overall ESG performance at the equity portfolio-level. Intuitively, this measure quantifies the ESG characteristics of the average holding of an institutional investor's stock portfolio at given time, where the average is calculated using value weights. We also calculate environmental performance, social performance, and governance performance measures individually.

In calculating the portfolio ESG performance measures, the variable w_{ijt} denotes the value weight of stock i in investor j's portfolio at the end of year t. $ESG\ Score_{it}$ is the normalised sustainability score of stock i at the end of year t. As different institutional investors might use different data to evaluate the ESG performance of a given stock, we calculate the normalised ESG score of a stock using the average ESG scores from three leading ESG data providers (MSCI, Refinitiv, and Sustainalytics). In calculating the average $ESG\ Score_{it}$, we individually Z-score in each year the ESG scores from each of the three data providers to have a mean of zero and a standard deviation of one. This allows us to deal with the fact that the different ESG data providers use different scales for their

1 Hawley and Williams (2000) propose the concept of 'universal owners', which they define as large institutional investors who own a broad cross-section of the economy, hold shares for the long term, and do not trade often.

firm-level ESG assessments (see the discussion below for further details on ESG scores). When calculating investors' individual E, S, and G portfolio performance measures, we use the individual firm-level E, S, and G pillar scores instead of the overall ESG score. N_{jt} is the total number of stocks that investor j holds at the end of year t for which stock-level ESG scores are available. The portfolio ESG performance variables quantify the equity portfolio-level sustainability of institutional investor j at the end of year t. Note that these measures are scaled such that higher values correspond to better portfolio-level ESG performance. It is reasonable to assume that institutions that do more in terms of responsible investments will, on average, have better portfolio scores.

As noted above, we rely on firm-level ESG scores issued by different data providers (i.e., MSCI, Refinitiv, or Sustainalytics) to construct our portfolio-level ESG performance measures. The idea behind firm-level ESG scores is to capture the quality of firms' policies regarding ESG issues. Many different information intermediaries (or data providers) nowadays provide ESG scores. The space of data providers is quite heterogeneous, ranging from index providers such as MSCI, to financial data and news companies such as Refinitiv or Bloomberg, to credit rating agencies such as Moody's and S&P. The latter have entered the ESG rating arena more recently.

To construct firm-level ESG scores, ESG data providers rely to a large extent on information obtained from a variety of public sources (e.g., sustainability reports, NGO websites, the press). However, they also use private sources, for example by requesting information from firms through questionnaires. The methodologies used by the different providers can differ and are often proprietary. The information used to construct the scores is mostly of a non-financial nature and often available only in an unstructured way. The unstructuredness of non-financial data stands in contrast to standardised financial information that public firms provide. Note also that ESG data are mostly available for public firms.

ESG scores aim at quantifying a firm's environmental, social, and governance scores. The type of issues that the social scores might capture include the firm's relationship with its workforce, respect of human rights in supply chains, or relations with communities. In a similar spirit, the environmental score captures issues like firms' overall resource use, all sorts of environmental emissions (i.e., including CO_2), and other environmental aspects of the production process such as the use of renewable energy, water efficiency, or biodiversity impact. Some data providers also try to capture environmental innovation by examining the extent to which the company offers environmentally friendly products and services. The governance pillar typically captures traditional corporate governance issues (e.g., board independence, executive compensation, etc.) or the governance of sustainability at the firm level (e.g., the extent to which managers receive monetary incentives to achieve greenhouse gas emissions reductions, whether the firm has a sustainability board sub-committee, or whether a firm issues a sustainability report).

Table 1.1, adapted from Krauss et al. (2016), shows some of the ESG issues that data providers use to construct the individual E, S, and G pillar scores. The list is non-exhaustive. Recent research has shown that while there is some overlap in the issues that individual data providers use to construct the ratings, the set of issues used by different data providers does not overlap perfectly. For instance, Berg et al. (2022) identify more than 700 different issues (or indicators), which they group into about 60 categories, illustrating that there can be considerable disagreement in terms of the issues that the different ESG data providers use to construct their scores. The variety of different issues can also explain why there can be considerable disagreement in ESG ratings (see Gibson Brandon et al., 2021a, and also Chapter 6 of this report).

TABLE 1.1 **ESG ISSUES COMMONLY ANALYSED BY ESG DATA PROVIDERS**

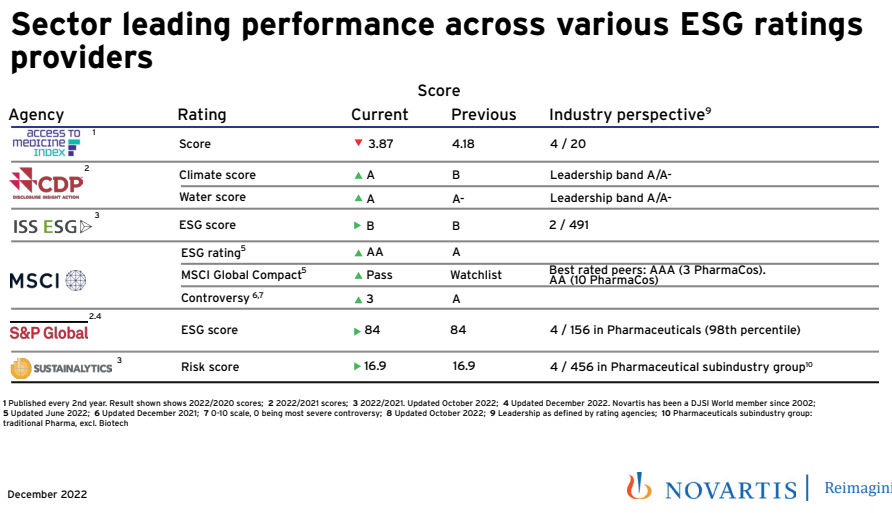
Environmental	Social	Governance
Air and water pollution	Child labour	Audit committee structure
Biodiversity	Community relations	Board composition and independence
Carbon emissions and intensity	Customer and product responsibility	Bribery and corruption
Climate change strategy	Customer satisfaction	Business ethics
Deforestation	Data protection and privacy	ESG Incentives
Energy efficiency	Employee engagement	Executive compensation
Environmental Management systems	Gender and diversity	Lobbying
Waste management	Human rights	Political contributions
Water scarcity and efficiency	Labour standards	Whistleblower schemes

As noted above, the methodologies and inputs that different data providers use can be diverse. Figure 1.1 shows an overview of different ESG scores which different data providers issued for the European pharmaceutical company Novartis. The figure illustrates that ESG scores issued by different data providers use different scales – for instance, some data providers transform numerical scores into credit rating type letter scales, while others do not. The figure also highlights the diversity of different data providers. Another notable aspect of ESG scores generally is that they typically follow a 'user pays model' in which the users (e.g., institutional investors) pay for the use of the data. This model stands in contrast to the 'issuer pay model' typically adopted by credit rating agencies for their assessments of credit quality.

Often ESG scores are not an absolute assessment of a firm's ESG or sustainability performance, as many providers use a 'best in class' methodology. Under this approach, a firm's ESG performance is examined relative to industry and/or country peers – an approach that can potentially explain the unintuitive fact that firms from arguably unsustainable industries (e.g., oil and gas) can obtain high ESG scores. While the exact methods used by the different data providers to construct their scores can remain proprietary, methodologies are increasingly made publicly available, not the least because of regulatory and public pressure. There are also ongoing regulatory efforts

to mandate and standardise ESG information disclosure by firms (e.g., Krueger, 2015; Jouvenot and Krueger, 2021; Krueger et al., 2023). For example, the EU Corporate Sustainability Reporting Directive (CSRD) will require tens of thousands of firms to disclose non-financial information in a standardised way in their financial reports. This development is likely to increase the quality of firm-level ESG scores going forward, an important requirement given that some research has highlighted problems with ESG ratings possibly related to conflicts of interest (Li et al., 2022; Tang et al., 2022) or backfilling issues (Berg et al., 2021).

FIGURE 1.1 **DIFFERENT RATING SCALES USED BY DIFFERENT ESG DATA PROVIDERS**



Sector leading performance across various ESG ratings providers

Agency	Rating	Score: Current	Score: Previous	Industry perspective[9]
access to medicine index [1]	Score	▼ 3.87	4.18	4 / 20
CDP [2]	Climate score	▲ A	B	Leadership band A/A-
	Water score	▲ A	A-	Leadership band A/A-
ISS ESG [3]	ESG score	▶ B	B	2 / 491
MSCI	ESG rating[5]	▲ AA	A	
	MSCI Global Compact[5]	▲ Pass	Watchlist	Best rated peers: AAA (3 PharmaCos). AA (10 PharmaCos)
	Controversy [6,7]	▲ 3	A	
S&P Global [2,4]	ESG score	▶ 84	84	4 / 156 in Pharmaceuticals (98th percentile)
SUSTAINALYTICS [3]	Risk score	▶ 16.9	16.9	4 / 456 in Pharmaceutical subindustry group[10]

1 Published every 2nd year. Result shown shows 2022/2020 scores; 2 2022/2021 scores; 3 2022/2021. Updated October 2022; 4 Updated December 2022. Novartis has been a DJSI World member since 2002; 5 Updated June 2022; 6 Updated December 2021; 7 0-10 scale, 0 being most severe controversy; 8 Updated October 2022; 9 Leadership as defined by rating agencies; 10 Pharmaceuticals subindustry group: traditional Pharma, excl. Biotech

December 2022

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Note: This figure shows an overview of Novartis' ESG scores from some of the major ESG data providers.
Source: https://www.novartis.com/esg/reporting/esg-rating-performance

In our analysis of institutional investors' equity portfolio-level ESG performance, we start by regressing the ESG portfolio performance measures defined in Equation 1.1. on observable variables (e.g., long-term orientation, size, industry concentration) that are likely to capture the dimensions we intend to study. Specifically, we estimate:

$$ESG\ Portfolio\ performance_{jt} = a + b\,X_{jt} + fixed\ effects + e_{jt}, \quad (1.2)$$

where X_{it} is a vector of variables that characterises investors along the dimensions of interest (portfolio size, turnover, etc.). Given the considerable importance of unobservable factors at the country and institution-type levels (i.e., asset owner or investment manager) that explain institutions' ESG performance, we also control for relevant fixed effects, namely, categorical variables capturing the geographic area where the investor is located and the type of institution. The coefficient of interest in this regression is b, which measures the average change in the ESG portfolio performance associated with a unit increase in a given characteristic X, assuming all other characteristics are held constant.

We estimate Equation 1.2 using a global dataset, combining data from several sources. Global institutional equity holdings data are obtained FactSet Ownership (for details on these data, see Ferreira and Matos, 2008). As explained above, we match the institutional investor equity holdings data with ESG scores from MSCI, Refinitiv, and Sustainalytics to calculate ESG portfolio performance. We also match other firm-level data, such as a firm's market capitalisation or its monthly stock returns, which are obtained from Datastream. Among many lesser-known institutional investors, our sample includes some of the largest institutional investors around the world, such as Norges Bank Investment Management, the Vanguard Group, Blackrock, and Nomura Holdings. In total, our global sample contains data for more than 10,000 institutional investors from 46 countries between 2006 and 2017. Appendix A contains further details on empirical issues, such as the exact variable definitions.

1.1.1 Long-term orientation and universal ownership as drivers of investors' ESG performance

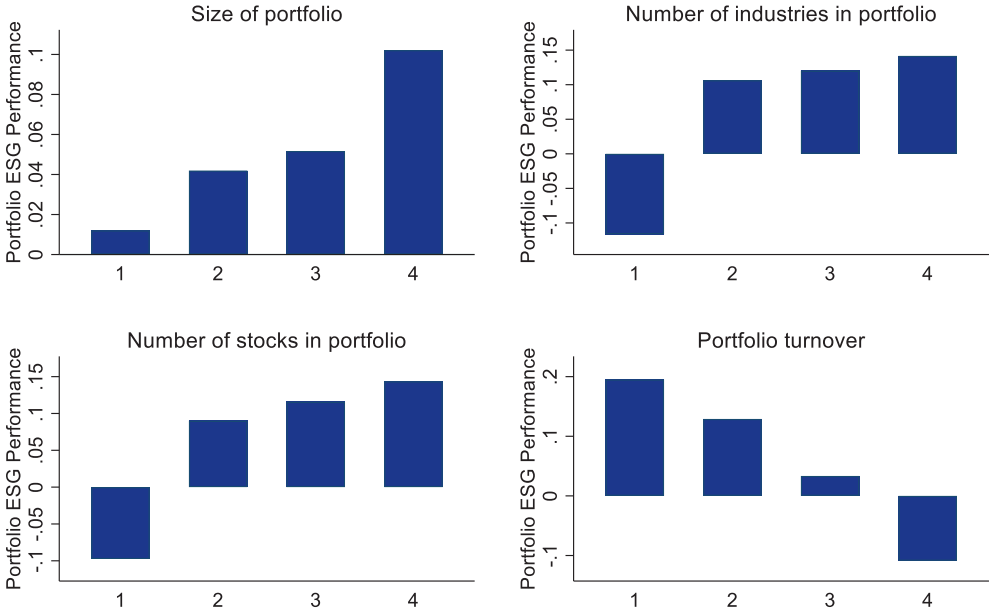
ESG-related issues often concern risks and opportunities with potential long-term implications for investors. For instance, some of the physical risks related to climate change, such as sea level rise, are likely to materialise only at longer horizons. At the same time, many ESG issues are also related to negative externalities that firms impose on their stakeholders (e.g., employees, consumers, civil society, other firms). Christensen et al. (2021) note, for instance, that ESG is related to the externalities caused by firms' business activities. Referring to Howarth and Norgaard (1992), Christensen et al. (2021) also point out that "from a societal perspective, CSR and sustainability are about externalities and the distribution of rights and assets across generations". Given the link between ESG issues on the one hand and long-term orientation and negative externalities on the other, it seems plausible that investors who are potentially more exposed to the costs of such externalities would care more about ESG issues, and thus implement responsible investing more strongly.

Several observable institutional investor characteristics that capture this heightened exposure to negative externalities come to mind. For instance, investors who, by virtue of their broad equity ownership across many firms, face exposure to potentially greater negative externalities should be inclined to invest more responsibly. The basic idea is that when it comes to institutions which own many firms (or entire economies), the negative externalities that some portfolio firms exert (e.g., through pollution or their effect on climate change) are likely to hurt the bottom line of other portfolio firms and investors who own the entire cross-section of firms (i.e., universal owners) are likely to bear the costs associated with these negative externalities. At the same time, more long-term-oriented institutional investors are also likely to be more exposed to the negative ESG-related externalities that firms exert. Hence, long-term-oriented investors are also expected to make greater allocations to high ESG stocks (Starks et al., 2020). Hawley and Williams (2000) propose the concept of 'universal owners', which they define as large

institutional investors who own a broad cross-section of the economy, hold shares for the long term, and do not trade often. We hypothesise that these universal owners and other long-term-oriented investors should care more about the ESG characteristics of their equity portfolios and thus invest more responsibly.

To test these conjectures, and preceding formal estimation of Equation 1.2, we start with some graphical analysis. Figure 1.2 shows the relation between ESG portfolio performance as defined in Equation 1.1 and several portfolio-level characteristics that are proxies capturing whether the institution is (i) a universal owner or (ii) long-term oriented. To construct the figure, we sort institutional investors in each year into quartiles based on the specific portfolio characteristic and then calculate the average ESG portfolio performance for each of the four buckets.

FIGURE 1.2 **ESG PORTFOLIO PERFORMANCE AND INSTITUTIONAL INVESTOR CHARACTERISTICS**



Note: This figure shows the relation between the ESG portfolio performance measure as defined in Equation 1.1 and several portfolio characteristics. In each year, we sort institutional investors into quartiles based on (i) the size of their portfolio in terms of equity AUM, (ii) the number of industries in which the portfolio is invested, (iii) the number of stocks included in the portfolio, and (iv) portfolio turnover as a measure of long-term orientation. We then calculate the average ESG portfolio-performance for each of the four quartiles individually for each of the four characteristics.

We argue that larger investors – in terms of equity assets under management (AUM) – and investors with more diversified holdings across industries are likely to be more universal owner-type investors and thus more concerned with ESG issues. As explained above, larger investors (and also, to some extent, investors holding a larger number of stocks) are likely to incur higher costs resulting from negative externalities related to ESG issues. Hence, we expect these investors to have better ESG portfolio performance. In contrast, investors with holdings concentrated in only a few industries are likely to incur less of the external costs related to ESG issues (e.g., pollution) and thus are

expected to have lower ESG performance. Figure 1.2 shows that this conjecture appears generally to be borne out in the data: investors who are larger in terms of equity AUM (upper-left panel) and invested in a larger number of industries or firms (upper-right and lower-left panels) exhibit better ESG portfolio performance.

In the lower-right panel of Figure 1.2, we explicitly examine the issue of investor horizon. To do so, we sort investors into quartiles based on a commonly used proxy for investor horizon, namely, portfolio turnover (Froot et al., 1992; Gaspar et al., 2005). Indeed, long-term-oriented investors tend to follow more passive buy-and-hold strategies and thus have lower turnover ratios. We then calculate average ESG portfolio performance for each of the four quartiles of turnover. The graph shows a strongly negative association between ESG portfolio performance and turnover, consistent with the notion that investors who trade less and are thus more long-term oriented (i.e., they exhibit lower turnover) care more about the ESG performance of their portfolios.

In Table 1.2 we formally estimate Equation 1.2. In Panel A, we use the overall ESG performance as the dependent variable (as in Figure 1.2). In Panels B to D, we use the separate portfolio E, S, and G performance measures to evaluate if there are differences in terms of the individual E, S, and G pillars. In columns (1) and (2) we focus on proxies for universal owners, and in column (3) we focus on portfolio turnover. The analysis in Panel A globally confirms the graphical evidence in Figure 1.2. As columns (1) and (2) show, the coefficient estimate for equity portfolio AUM is positive and that for industry concertation negative. ESG portfolio performance is also negatively related to portfolio turnover (column (3)). The coefficient estimates do not change much when all three variables are included jointly in the specification (column (4)). Note that all specifications control for year, investor type, and region fixed effects. When it comes to differences across the E, S, and G pillars, the analysis shows somewhat stronger effects for the E and S dimensions (Panels B and C) – dimensions that are perhaps more related to negative externalities – than for the G dimension (Panel D).

TABLE 1.2 **ESG PORTFOLIO PERFORMANCE AND GENERAL INVESTOR CHARACTERISTICS**

Panel A: ESG Performance				
	(1)	**(2)**	**(3)**	**(4)**
	ESG performance	**E performance**	**S performance**	**G performance**
Equity Portfolio AUM	0.023***			0.010***
	(7.89)			(3.30)
Industry concentration		-0.448***		-0.439***
		(-10.19)		(-8.86)
Portfolio turnover			-0.341***	-0.328***
			(-20.95)	(-21.17)
Observations	83,768	76,656	76,452	76,335
Adjusted R-squared	0.120	0.131	0.161	0.179
Panel B: E Performance				
	(1)	**(2)**	**(3)**	**(4)**
Equity Portfolio AUM	0.022***			0.011***
	(8.75)			(3.80)
Industry concentration		-0.448***		-0.437***
		(-8.95)		(-7.88)
Portfolio turnover			-0.332***	-0.319***
			(-20.29)	(-20.47)
Observations	83,768	76,656	76,452	76,335
Adjusted R-squared	0.133	0.143	0.172	0.190
Panel C: S Performance				
	(1)	**(2)**	**(3)**	**(4)**
Equity Portfolio AUM	0.017***			0.006*
	(5.23)			(1.91)
Industry concentration		-0.392***		-0.392***
		(-10.87)		(-10.20)
Portfolio turnover			-0.302***	-0.293***
			(-19.28)	(-21.44)
Observations	83,768	76,656	76,452	76,335
Adjusted R-squared	0.140	0.158	0.187	0.202
Panel D: G Performance				
	(1)	**(2)**	**(3)**	**(4)**
Equity Portfolio AUM	0.011***			0.004***
	(8.29)			(3.03)
Industry concentration		-0.170***		-0.169***
		(-5.50)		(-5.30)
Portfolio turnover			-0.147***	-0.140***
			(-10.07)	(-9.36)
Observations	83,768	76,656	76,452	76,335
Adjusted R-squared	0.225	0.229	0.237	0.241

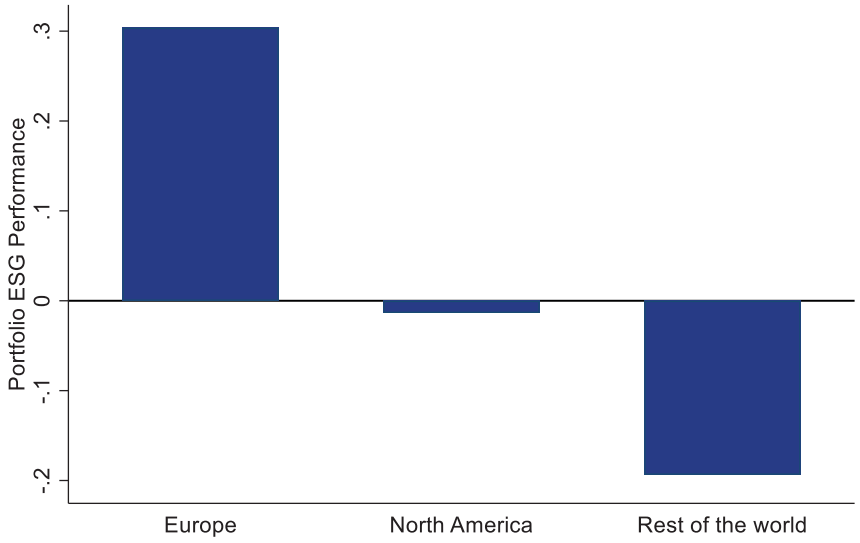
Notes: This table shows the results from OLS regressions in which the portfolio ESG performance measures are related to several investor characteristics. Panel A uses overall ESG performance as the dependent variable. In Panels B–D, we separately use E, S, and G portfolio performance. All specifications include year, investor type, and region fixed effects. t-statistics (in parentheses) are calculated using standard errors clustered at the investor and year levels. * p<0.1, ** p<0.05, *** p<0.01.

1.1.2 Culture, norms and values, legal origins, stakeholder orientation, and fiduciary duties as drivers of investors' ESG performance

Another important driver of institutional investors' responsible investment decisions is their geographic location. Dyck et al. (2019) highlight that societal norms and values regarding social and environmental issues are important determinants of institutions' responsible investment decisions. Using survey research, Amel-Zadeh and Serafeim (2018) point out similar effects. For instance, they provide evidence that ethical issues play an important role in European investors' decisions to consider ESG information, while this is not the case for investors in the United States. Using a mix of archival and survey data and a much larger sample than that used by Amel-Zadeh and Serfafeim (2018), Gibson Brandon et al. (2022) also find strong differences in responsible investment implementation and performance between institutional investors in the United States and investors in other parts of the world. One possible explanation for these differences advanced by the authors is that the compatibility of ESG issues with investors' fiduciary duties appears more settled in Europe than in other parts of the world, particularly the United Sates.

We evaluate in Figure 1.3 whether there are regional differences in terms of institutions' ESG portfolio performance. To do so, we calculate the average of the ESG portfolio performance measure as defined in Equation 1.1 for all institutions located in Europe, North America, and the rest of the world. The graph reveals an interesting pattern: generally, European investors tend to have better ESG portfolio performance relative to investors in other parts of the world.

FIGURE 1.3 **ESG PORTFOLIO PERFORMANCE BY GEOGRAPHICAL AREA**



Note: This figure displays average ESG portfolio performance by geographical area. We calculate the average of the ESG portfolio performance measure as defined in Equation 1.1 for all institutions located in Europe, North America, and the rest of the world.

We now examine the issue of geographical differences in a more formal way. To do so, in Panel A of Table 1.3 we regress the ESG portfolio performance measures on dummy variables that indicate the regional location of the investor. In these regressions, investors in Europe are the base category (i.e., we drop the dummy marking European investors from the equations). We also control for equity portfolio AUM, industry concentration, and portfolio turnover (as in Table 1.2). In line with the graphical evidence, we find that the ESG portfolio performance of investors in North America is worse than that of European investors. Investors in the rest of the world (i.e., outside of Europe and North America) appear to have even worse ESG performance relative investors in North America. When evaluating the E, S, and G separately (columns (2) to (4)), an interesting pattern emerges: while the E and S performance of investors from North America and the rest of the world is virtually identical, North American investors tend to exhibit better governance performance when compared to both European investors and investors from the rest of the world. The latter finding might be due to a more shareholder-centric approach in North America relative to the rest of the world.

Another reason to believe that geographic variation plays a key role in explaining investor choices regarding responsible investing is related to the fact that legal traditions differ around the world. Using differences in legal traditions (or origins) to explain economic outcomes has a long tradition in economics and finance research (La Porta et al., 1998; 2008). We hypothesise that the legal origin of the country in which the investor is headquartered should also have a strong bearing on the relative importance that investors attach to ESG issues. More specifically, civil law countries are known to have stronger concerns for labour issues and social protection (Botero et al., 2004). On the other hand, common law countries are generally regarded as emphasising investor protection, stronger protection of shareholder rights, and a stronger view of other governance issues (e.g., La Porta et al., 1998; Doidge et al., 2007). In other words, civil law countries are closer to being stakeholder oriented; thus, investors in these countries should be more inclined to follow a stakeholder approach (Allen et al., 2015, Magill et al., 2015) and care about E and S matters. In contrast, investors in common law countries tend to be more shareholder centric and probably less concerned with E and S matters but potentially more concerned with G issues. Overall, we expect that institutions' ESG choices and performances depend strongly on the legal origin of the countries in which they are headquartered, with investors from countries of civil law origin being more inclined to invest according to E and S principles than investors from common law countries. In contrast, and somewhat consistent with the evidence presented in Panel A of Table 1.3, we expect that the portfolio G performance of institutions located in common law countries is generally better relative to investors in other parts of the world.

Following La Porta et al. (1998; 2008), Djankov et al. (2008), Spamann (2010), and Liang and Renneboog (2017), we distinguish between five different legal origins (or traditions). Specifically, we categorise countries according to English common law origin, French civil law origin, German civil law origin, Scandinavian civil law origin, and socialist origin (both current and former socialist countries).

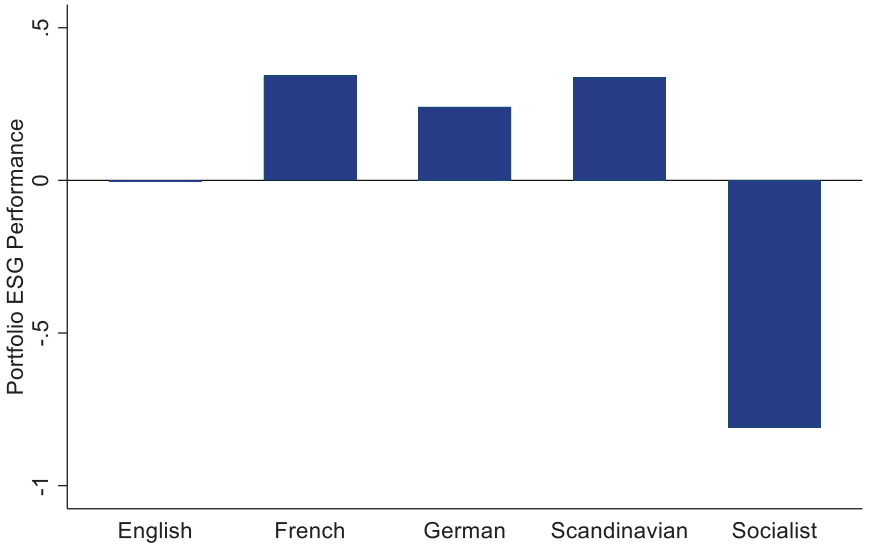
TABLE 1.3 **ESG PORTFOLIO PERFORMANCE, GEOGRAPHIC CHARACTERISTICS, AND INVESTOR TYPES**

	Panel A: Geography			
	(1) ESG performance	**(2) E performance**	**(3) S performance**	**(4) G performance**
North America	-0.321*** (-15.21)	-0.379*** (-18.83)	-0.372*** (-24.02)	0.134** (2.47)
Rest of the world	-0.485*** (-15.80)	-0.408*** (-17.08)	-0.342*** (-13.59)	-0.503*** (-13.92)
Observations	76,335	76,335	76,335	76,335
Adjusted R-squared	0.179	0.190	0.202	0.241
Year fixed effects	Y	Y	Y	Y
Investor type fixed effects	Y	Y	Y	Y
	Panel B: Legal origin			
	(1)	**(2)**	**(3)**	**(4)**
Legalorigin==French	0.365*** (18.25)	0.403*** (15.46)	0.462*** (22.98)	-0.171*** (-4.72)
Legalorigin==German	0.271*** (11.58)	0.378*** (16.82)	0.291*** (17.39)	-0.212*** (-4.31)
Legalorigin==Scandinavian	0.296*** (8.53)	0.346*** (13.50)	0.302*** (9.67)	-0.115* (-1.84)
Legalorigin==Socialist	-0.776*** (-12.26)	-0.582*** (-14.30)	-0.455*** (-7.98)	-1.116*** (-12.80)
Observations	76,335	76,335	76,335	76,335
Adjusted R-squared	0.193	0.208	0.217	0.172
Year fixed effects	Y	Y	Y	Y
Investor type fixed effects	Y	Y	Y	Y
	Panel C: Investor type			
	(1)	**(2)**	**(3)**	**(4)**
Asset Owner	0.101*** (4.98)	0.104*** (4.86)	0.095*** (5.20)	0.048** (2.76)
Observations	76,335	76,335	76,335	76,335
Adjusted R-squared	0.179	0.190	0.202	0.241
Year Fixed Effects	Y	Y	Y	Y
Region Fixed Effects	Y	Y	Y	Y

Notes: This table relates ESG portfolio performance measures to dummy variables indicating the region in which the investor is located (Panel A), the legal origin of the country in which the investor is located (Panel B), and the type of investor. All regressions control for Equity portfolio AUM, Industry concentration, and Portfolio turnover (as in Table 1.2). t-statistics (in parentheses) are calculated using standard errors clustered at the investor and year levels. * p<0.1, ** p<0.05, *** p<0.01.

We first evaluate differences by legal origin of the investor's country of location using overall ESG portfolio performance. As in prior analysis, we present graphical evidence first and in Figure 1.4 plot average portfolio ESG performance by legal origin. The graphical analysis shows that investors from countries with civil law legal traditions (e.g., French, German, or Scandinavian) tend to have the best overall ESG performance. In contrast, investors located in countries with socialist legal origins tend to have the worst ESG portfolio performance. The figure also shows that, as expected, the overall ESG portfolio performance of investors located in common law countries is worse than that of investors located in civil law countries.

FIGURE 1.4 **ESG PORTFOLIO PERFORMANCE BY LEGAL ORIGIN OF THE INSTITUTIONAL INVESTOR'S COUNTRY OF LOCATION**



Note: This figure displays average ESG portfolio performance by legal origin of the country in which the institutional investor is located.

In Panel B of Table 1.3, we regress the portfolio performance measures on dummies indicating the legal origin of the country in which the investor is located. The base category is common law (or English legal origin), so all coefficients should be interpreted relative to investors from countries with a common law tradition. The panel shows that the overall ESG performance (column (1)) as well as the E and S portfolio performance (columns (2) and (3)) is better for investors from countries with French, German, or Scandinavian legal origins. This finding is consistent with investors from these countries being more stakeholder oriented. Interestingly, the E performance appears quite similar across investors from different civil law traditions. However, when it comes to the social performance (column (3)), investors from countries with French legal origin appear to have even better performance than their peers from other civil law countries. In contrast, investors from countries with an English or civil law tradition tend to have better governance performance (see column (4), Table 1.3, Panel B), a finding consistent with

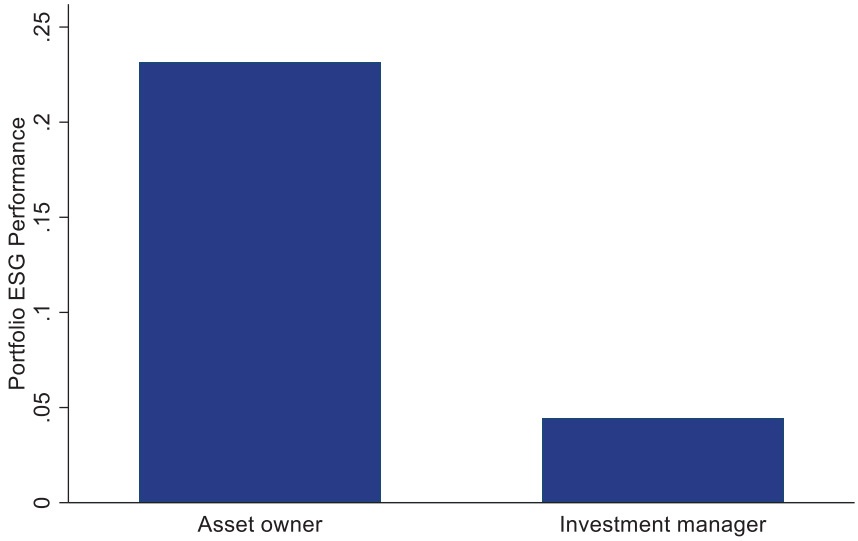
the argument we made above that investors from civil law countries should care more about shareholder-friendly corporate governance. Interestingly, and in line with the graphical evidence, investors from countries with a socialist legal origin (both current and former socialist countries) tend to have the lowest portfolio ESG performance – even lower than that of investors from common law countries.

1.1.3 Institution type and ESG performance

The last dimension we explore in Table 1.3 is the type of investor. We distinguish between asset owners (e.g., insurance companies and pension funds) and investment managers (e.g., banks, asset management companies). Arguably, asset owners have a longer-term orientation, have more of a stakeholder perspective (as is typically the case for pension funds), and are less – if at all – reliant on fee-based income. Hence, we expect asset owners to have generally better ESG performance than that of investment managers.

Figure 1.5 shows that asset owner-type institutions tend to have better ESG portfolio performance relative to investment managers. Panel C of Table 1.3 confirms this in a regression framework controlling for other investor characteristics: the coefficient estimate on the *Asset owner* dummy is generally positive and significant. Hence, relative to investment managers (the omitted category), asset owners tend to have better ESG performance.

FIGURE 1.5 **ESG PORTFOLIO PERFORMANCE BY TYPE OF INSTITUTION**



Note: This figure displays average ESG portfolio performance by type of institution. We distinguish between asset owners (e.g., pension funds or insurance companies) and investment managers (e.g., banks, asset management companies, hedge funds).

Indeed, one could conjecture that asset owners – and in particular, pension funds – primarily reflect and invest based on the preferences of their beneficiaries and possibly other stakeholders. In the case of investment managers, financial considerations play a more important role; thus, there may still be a concern to favour financial performance and fees derived from asset inflows over sustainability concerns. Finally, agency considerations also play a more prominent role in investment management firms, which may therefore be even more inclined to tilt their investment decisions towards financial considerations.

While all the tests in Section 1.1 are mainly descriptive, they demonstrate that a large heterogeneity exists in terms of institutions' ESG portfolio profiles not only around the world but also in terms of investor characteristics and their various investor types.

1.2 HOW DO INSTITUTIONAL INVESTORS IMPLEMENT RESPONSIBLE INVESTING?

We now engage in an in-depth analysis of the different types of ESG or responsible investment strategies that institutional investors use in their equity investments. The Global Sustainable Investment Alliance (GSIA, 2020) and CFA Institute (CFA, 2015) typically distinguish between the following strategies:

1. **Negative/exclusionary screening:** A technique that consists of avoiding securities of companies or countries based on predefined ESG screens.
2. **Positive/best-in-class screening:** An investment approach preferentially selecting securities of companies or countries with better or improving ESG performance.
3. **Norms-based screening:** A strategy consisting of excluding securities of companies based on a company's respect of internationally accepted norms in areas such as human rights and labour standards.
4. **Integration of ESG factors:** The systematic consideration of ESG risks and opportunities in investment analysis.
5. **Sustainability-themed investing:** Investing in securities based on sustainability themes (e.g., water, food).
6. **Corporate engagement and shareholder action:** The practice of entering into a dialogue with companies on ESG issues and exercising both ownership rights and voice to effect change.

Even though the primary focus of this report is on responsible investments in public equities and sustainability-oriented fixed-income instruments, toward the end of this chapter we also briefly discuss impact investing. Impact investing is a rising trend among institutional investors, and we discuss it to understand its ambitions and hurdles.

For a subsample of institutional investors, we dispose of detailed data on the usage of the abovementioned responsible investment strategies. The data on usage of responsible investment strategies comes from the Principles for Responsible Investing (PRI) reporting framework. Principle 6 of the PRI states that signatories should "report on their activities and progress towards implementing the Principles". In this section of the report, we use the data that signatories make available within this reporting PRI framework. Specifically, we obtain detailed data on the use of specific responsible investment approaches. For more information on the data, see Gibson Brandon et al. (2022).

The descriptive statistics in Table 1.4 and Figure 1.6 tabulate institutional investors' use of the abovementioned responsible investment strategies. Note that the strategies are not mutually exclusive, and institutions are likely to use different strategies simultaneously. The analysis shows that corporate engagement is the most used ESG investment strategy by institutional investors. Approximately 82% of the investors apply this approach. The second most frequently used approach is ESG integration, which 77% of the investors report that they apply. Screening is used by 72% of the investors. Despite engagement being the most used strategy, the fact that many investors still rely extensively on screening-based approaches is paradoxical, as a recent theoretical paper by Broccardo et al. (2022) shows that 'voice' strategies (e.g., engagement) are more effective than 'exit' strategies (e.g., negative screening). Furthermore, most of the institutions in the survey by Amel-Zadeh and Serafeim (2018) deem that negative screening is the least effective strategy in terms of sustainability. Interestingly, thematic investment still seems to be a niche approach, with only 33% of the investors reporting its usage. However, this approach has become more prominent over time. Regarding the different types of screening, we find that negative screening is the most prevalent screening approach (68%), while norms-based screening appears to be the least applied approach (only 33% of investors report using this form of screening). Thirty-eight percent of investors report using positive screening.

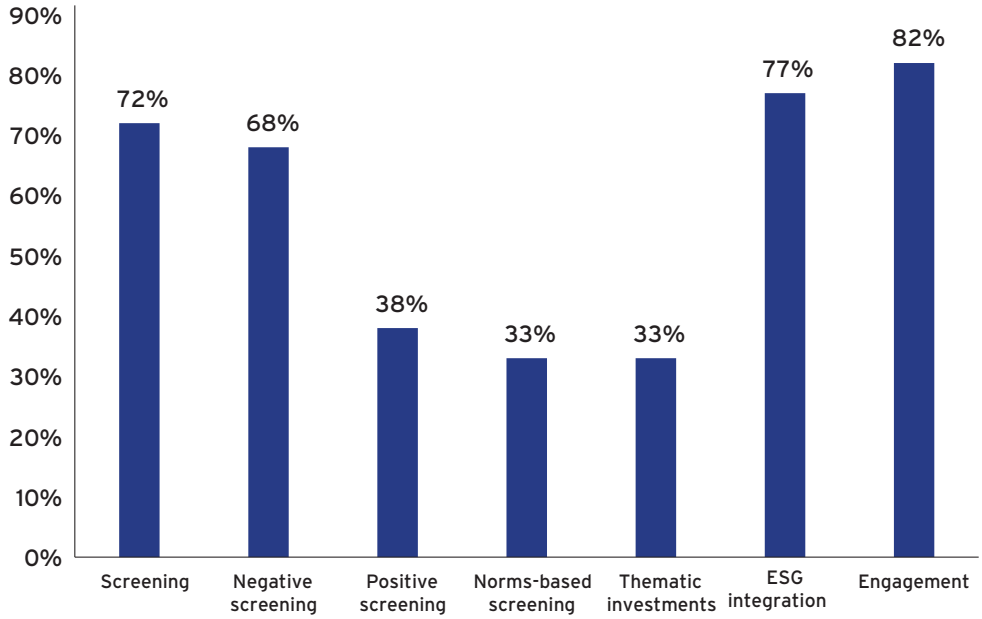
In Appendix Table A.3, we provide more refined descriptive statistics on the responsible investment strategies employed by institutional investors. For example, we find that on average, investors in our sample apply ESG strategies to approximately 78% of their equity AUM. In regard to negative screening, product-, sector- and activity-related screens are most prevalent, with 64% of investors reporting that they implement negative screens based on the products, sectors, or business activity of the firms they invest in. In addition, environmental and social dimensions are more prevalent (46%) than corporate governance (31%) in regard to negative screening. For positive screening, the most common screens on which investors select stocks are the environmental and social performance of investee firms (34%). Interestingly, the most applied screening criteria in regard to norm-based screening are related to the UN Global Compact Principles (28%), followed by the International Labor Organization Conventions (21%).

TABLE 1.4 **SURVEY DATA ON RESPONSIBLE INVESTMENT STRATEGIES**

	No.	Mean	SD	Min.	p1	p50	p99	Max.
Screening	2,796	0.72	0.45	0.00	0.00	1.00	1.00	1.00
Thematic	2,796	0.33	0.47	0.00	0.00	0.00	1.00	1.00
Integration	2,796	0.77	0.42	0.00	0.00	1.00	1.00	1.00
Engagement	2,796	0.82	0.38	0.00	0.00	1.00	1.00	1.00
Negative screening	2,796	0.68	0.47	0.00	0.00	1.00	1.00	1.00
Positive screening	2,796	0.38	0.49	0.00	0.00	0.00	1.00	1.00
Norms-based screening	2,796	0.33	0.47	0.00	0.00	0.00	1.00	1.00

Notes: This table shows descriptive statistics for the strategies used by the subsample of institutional investors for which we have detailed data on the types of responsible investment strategies they use. The data come from the Principles for Responsible Investment Reporting framework. The strategies are not mutually exclusive, and it is possible that institutions use several strategies at the same time. For more information on the PRI reporting framework, see Gibson Brandon et al. (2022).

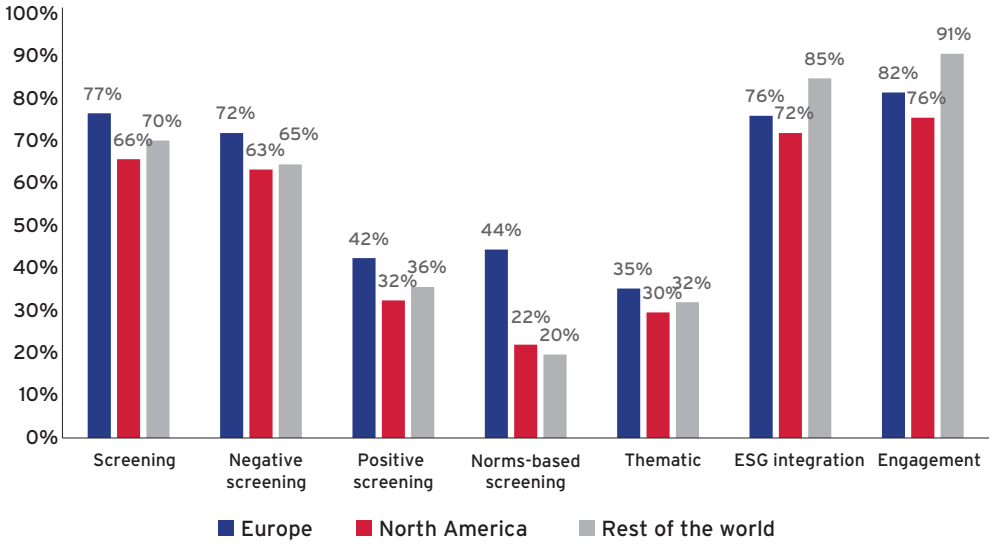
FIGURE 1.6 **USAGE OF DIFFERENT RESPONSIBLE INVESTMENT STRATEGIES**



Note: This figure plots the fraction of institutions that use a given responsible investment approach. The responsible investment approaches are non-mutually exclusive, and it is likely that the institutions use a combination of different approaches at the same time. The approaches are defined in Section 1.2 of the report.

In Figure 1.7 we stratify the use of different responsible investment strategies by the location of the investor to see if investors from certain areas might prefer some approaches over others. The graph shows that screening-based approaches, in particular norms-based screening, are used more extensively by European institutions. In contrast, engagement and ESG integration seem more prominent among investors from the rest of the world relative to European and North American institutions.

FIGURE 1.7 **USAGE OF DIFFERENT RESPONSIBLE INVESTMENT STRATEGIES BY GEOGRAPHIC AREA**



Note: This figure plots the percentage of institutions that use a given responsible investment approach by the geographic location of the investor. The approaches are defined in Section 1.2 of the report.

We now estimate linear probability models to better understand whether certain types of institutions are more likely to rely on specific responsible investment approaches, and also examine whether the apparent geographical difference in Figure 1.7 are statistically significant. To do so, we estimate specifications of the following type:

$$1(\text{investor } j \text{ uses strategy } g \text{ in year } t)_{jt} = a + b\,X_{jt} + \textit{fixed effects} + e_{jt}, \quad (1.3)$$

where 1(investor j uses strategy g in year t) is a dummy variable indicating whether a specific investor uses a specific responsible investment strategy g in year t and X the set of control variables we used before.

In Panel A of Table 1.5, we examine how general investor characteristics correlate with the incidence of specific responsible investment strategies. We find that larger investors are more likely to use any of the abovementioned approaches. A potential explanation is that larger investors dispose of more resources to implement any type of responsible investment approach. At the same time, larger investors are also more prone to the negative externalities from ESG-related issues (as discussed in Section 1.1), which might explain why they are more likely to apply any given responsible investment strategy. The analysis in Panel A, Table 1.5 also shows that investors who trade less and are thus more likely to be long-term oriented, as proxied through portfolio turnover, are more likely to use an engagement approach (see column (4)). Being an active ESG owner seems consistent with being a more long-term-oriented shareholder, given that these investors hold stocks for the long term and have only limited scope to divest. In this sense, the behaviour of low-turnover investors is consistent with the superiority of 'voice' strategies demonstrated by Broccardo et al. (2022). There is also some evidence that more long-

term-oriented investors tend to use more screening-based approaches, though these results are weaker from a statistical point of view (columns (1), (5), and (7)). Finally, more concentrated investors in terms of industry exposure are generally less likely to apply any given responsible investment approach.

In Panel B of Table 1.5, we explore whether the usage of different responsible investment strategies varies around the world and test whether the differences of Figure 1.7 are significant. The omitted base category in these regressions are institutions located in Europe. Consistent with the analysis in Section 1.1, we find that institutions located in North America are less likely to use any given approach (when contrasted with investors located in Europe, the base comparison group). Interestingly, investors located in the rest of the world (i.e., outside of Europe and North America) are more likely to implement responsible investing through engagement and integration (columns (3) and (4), Panel B), a pattern that we already highlighted in Figure 1.7. However, somewhat similarly to investors based in North America, investors located outside Europe and North America are less likely than their European peers to use norms-based screening approaches.

In Panel C, we explore whether the usage of specific strategies is related to the legal origin of investors. The base category are investors located in common law jurisdictions. There is evidence that investors from countries with a civil law tradition are more likely to implement responsible investing through screening-based approaches (columns (1), (5), (6), and (7)). These differences appear to be strong both statistically and economically speaking. Otherwise, there is little systematic evidence that engagement or integration approaches correlate with the legal origin of the country in which the investors are located (columns (3) and (4)). The latter finding is perhaps surprising because, given the corporate governance-centric view in common law countries, one could have expected that investors from common law countries tend to be more active owners than investors from other jurisdictions.

Panel D explores variation along the investor type dimension. Perhaps surprisingly, the analysis shows that asset owners are less likely to use screening-based approaches. This finding is intriguing given the analysis in Section 1.1 showing that asset owners tend to have better ESG performance (see Panel C, Table 1.3). First, our sample of asset owners is relatively small, as to be included in the sample, the asset owner needs to directly manage a sufficient amount of equities. However, asset owners often delegate – at least in part – their asset management to investment managers. Thus, it is possible that asset owners who directly manage a sufficient portion of their equities (i.e., the subset of asset owners in our data) implement screening not in their directly managed equities, but rather in the portion of their equity portfolios outsourced to investment managers. Furthermore, many asset owners may – because of legal constraints – be primarily fixed-income investors. This applies, for instance, to pension funds and insurance and reinsurance companies that could thus implement ESG integration and/or screening strategies mostly on the fixed-income part of their portfolios.

TABLE 1.5 **RESPONSIBLE INVESTMENT STRATEGIES AND INVESTOR CHARACTERISTICS**

	(1) Screening	(2) Thematic	(3) Integration	(4) Engagement	(5) Negative screening	(6) Positive screening	(7) Norms-based screening
Panel A: General investor characteristics							
Equity Portfolio AUM	0.030*** (5.23)	0.022*** (3.41)	0.037*** (7.03)	0.033***	0.032*** (5.38)	0.013** (2.15)	0.019*** (3.35)
Industry concentration	-0.368*** (-3.95)	-0.064 (-0.85)	-0.226** (-2.00)	-0.324*** (-2.88)	-0.341*** (-3.69)	-0.162** (-1.97)	-0.136** (-1.97)
Portfolio turnover	-0.147* (-1.94)	-0.052 (-0.75)	-0.055 (-0.76)	-0.173*** (-2.59)	-0.141* (-1.82)	-0.089 (-1.26)	-0.138** (-2.21)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.087	0.037	0.094	0.127	0.088	0.052	0.108
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Investor type fixed effects	Y	Y	Y	Y	Y	Y	Y
Region fixed effects	Y	Y	Y	Y	Y	Y	Y
Panel B: Geography							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
North America	-0.144*** (-4.15)	-0.087** (-2.37)	-0.077** (-2.31)	-0.095*** (-2.95)	-0.127*** (-3.50)	-0.124*** (-3.25)	-0.252*** (-7.22)
Rest of the world	-0.039 (-1.00)	-0.014 (-0.34)	0.132*** (4.10)	0.124*** (4.45)	-0.050 (-1.23)	-0.056 (-1.33)	-0.223*** (-6.31)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.087	0.037	0.094	0.127	0.088	0.052	0.108
Control variables	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Investor type fixed effects	Y	Y	Y	Y	Y	Y	Y
Region fixed effects	N	N	N	N	N	N	N

TABLE 1.5 **CONTD.**

	Panel C: Legal origins						
	(1) Screening	(2) Thematic	(3) Integration	(4) Engagement	(5) Negative screening	(6) Positive screening	(7) Norms-based screening
Legalorigin==French	0.200*** (5.23)	0.067 (1.45)	-0.022 (-0.50)	-0.037 (-0.94)	0.165*** (3.77)	0.226*** (4.70)	0.276*** (6.14)
Legalorigin==German	0.170*** (4.39)	0.215*** (4.62)	0.027 (0.74)	0.025 (0.73)	0.171*** (4.24)	0.257*** (5.58)	0.199*** (4.64)
Legalorigin==Scandinavian	0.218*** (5.24)	0.024 (0.49)	0.005 (0.12)	0.018 (0.44)	0.168*** (3.75)	0.061 (1.13)	0.403*** (7.76)
Legalorigin==Socialist	-0.186 (-1.19)	0.046 (0.34)	-0.317** (-2.04)	-0.147 (-0.96)	-0.151 (-0.97)	0.095 (0.61)	0.201 (1.29)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.117	0.056	0.072	0.093	0.107	0.089	0.138
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Investor type fixed effects	Y	Y	Y	Y	Y	Y	Y
Region fixed effects	Y	Y	Y	Y	Y	Y	Y
	Panel D: Investor type						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Asset owner	-0.184*** (-2.85)	-0.217*** (-4.33)	-0.084 (-1.54)	0.032 (0.70)	-0.252*** (-3.79)	-0.242*** (-4.39)	-0.007 (-0.12)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.087	0.037	0.094	0.127	0.088	0.052	0.108
Control variables	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Investor type fixed effects	N	N	N	N	N	N	N
Region fixed effects	Y	Y	Y	Y	Y	Y	Y

Notes: This table shows the results from estimating linear probability models that relate dummy variables indicating whether an investor uses a specific responsible investment strategy to several investor characteristics. Panel A focuses on general investor characteristics (e.g., size, turnover), Panel B focuses on the geographic location of the investor, Panel C focuses on the legal origins of the country in which the investor is located, and Panel D focuses on the type of investor. All regressions in Panels B–D include the control variables from Panel A. t-statistics (in parentheses) are calculated using standard errors clustered at the investor level. * p<0.1, ** p<0.05, *** p<0.01.

Overall, the analyses in this section, while mostly descriptive, highlight that the usage of different responsible investment strategies varies considerably across many investor characteristics, such as investor size, long-term orientation, geographic area, and legal origin of their country of origin.

Even though the primary focus of this report is on responsible investment in public equities as well as sustainability-oriented fixed-income instruments, we now also briefly discuss impact investing – a responsible investment strategy primarily used in private markets. Impact investing is experiencing a rising trend among institutional investors, and we discuss it here to understand its ambitions and hurdles. Impact investors make investment decisions with the intention of generating positive and measurable social and environmental impacts alongside a financial return (GIIN, 2022). Impact investors include a wide variety of investors, such as development finance institutions (DFIs), fund managers, diversified financial institutions/banks, private foundations, pension funds, insurance companies, family offices, individual investors, NGOs, and religious institutions (GIIN, 2022). The size of the global impact investment market was estimated in 2022 to reach US$1.164 trillion of assets under management (GIIN, 2022).

One of the limitations associated with analysing impact investing and assessing its incidence, as well as financial and nonfinancial performance, is that it is often conducted with nontraded illiquid vehicles, such as private equity, for which data availability is relatively scarce. A second obstacle is that impact measurement remains rather subjective and heterogeneous. Indeed, numerous impact measurement approaches exist in the industry today. While most institutional investors or development finance institutions have created their own approaches, some have adopted those used by other investors, while others have yet to define a clear impact assessment strategy. This has led to a lack of comparability of impact outcomes and an increased burden on investors, who must select from multiple varying impact assessment frameworks. Regarding the way forward, the proliferation of impact measurement approaches and metrics remains unresolved. A uniform set of standards guiding measurement approaches as well as the selection of rigorous impact metrics would create a basis for accountability, comparability of impact assessments, and consistency in reporting, all of which are critical for the operationalisation of the impact principles and scalability of the industry. A uniform set would further facilitate meaningful impact performance comparisons, appropriate benchmarking, and better decision making, which have thus far been limited in the impact investing market.

CHAPTER 2

ESG investment strategies, risk-adjusted performance, and ESG portfolio-level outcomes

KEY FINDINGS

- Most responsible investment strategies enable institutional investors to significantly reduce their total and idiosyncratic risk exposures.
- In contrast, responsible investment strategies do not significantly impact the risk-adjusted returns of institutional investors' equity portfolios.
- ESG strategies operate as a risk management tool allowing institutional investors to reduce portfolio risk.
- Only few responsible investment strategies (e.g., positive or negative screening) are positively related to portfolio ESG performance.

In this chapter, we focus on examining the risk-return implications of investors' ESG choices. We also examine the role of the responsible investment strategies discussed in Chapter 1 for risk-return characteristics as well as portfolio ESG performance. First, we explore whether the risk and return characteristics of the equity portfolios of the studied institutions are related to their portfolio-level ESG performance. Specifically, we examine how ESG portfolio performance relates to several proxies for the risk and return characteristics of an investor's equity portfolio. Second, leveraging the detailed data on responsible investment strategies, we examine whether investors who use specific responsible investment strategies exhibit differential risk and return patterns. Finally, we study whether the use of certain responsible investment strategies is associated with differential ESG portfolio performance.

2.1 RISK-ADJUSTED INVESTMENT PERFORMANCE AND ESG PORTFOLIO PERFORMANCE

While much of the past research focuses on the relationship between ESG and stock returns or, more generally, financial performance at the firm level (for a comprehensive meta-analysis of past research, see Friede et al., 2015), we explicitly explore the link between measures of equity portfolio risk and ESG performance. To measure the investor's risk and return characteristics, we use risk and return metrics based on holdings-based returns. For that purpose, we calculate the monthly returns of an institutional investor as the buy-and-hold returns based on the institution's disclosed equity holdings for which ESG scores are available. The buy-and-hold returns measure the hypothetical gross returns of the long equity portion of the institutional investor's portfolio. Given that many institutional investors cannot short, the holdings-based returns are a reasonable approximation of their long-term investment performance.[2] We calculate holdings-based returns by assuming that investors trade their positions only when new equity holdings are observed (usually at quarter-ends). This implies no interim trading between reported quarter ends. Based on the time series of these holdings-based returns, we construct standard mean–variance investment performance measures (mean return and volatility and risk decomposed into its idiosyncratic and systematic components). We also calculate Carhart's (1997) four-factor alphas, which we calculate over 12 months using AQR's factors as the benchmarks.[3] Worldwide stock returns are obtained from Datastream.

In Table 2.1, we display descriptive statistics of the risk and return metrics at the institutional investor portfolio level. Panel A shows the statistics for the full sample of institutional investors and Panel B for the subsample of institutions for which we have detailed data on the responsible investment strategies that they employ. We estimate pooled panel regressions in which we relate measures of return and risk to investors' ESG performance. As in Chapter 1, all models control for equity portfolio AUM, industry concentration, portfolio turnover, and year, region, as well as institution type fixed effects:

$$Return\ (or\ Risk)_{jt} = a + b\ ESG\ performance_{jt} + c\ X_{it} + fixed\ effects + e_{jt} \quad (2.1)$$

2 Kacperczyk et al. (2008) compare returns calculated from holdings data with reported returns for a sample of mutual funds at the monthly frequency. They find dispersion in the difference between reported and holdings returns, but document that the difference is on average close to zero.

3 https://www.aqr.com/Insights/Datasets

TABLE 2.1 **RISK AND RETURN CHARACTERISTICS OF INSTITUTIONAL INVESTORS**

Panel A: Full sample of investors

	Count	Mean	S.D.	Min.	p1	p50	p99	Max.
Mean return	76,683	0.0095	0.0281	-0.1402	-0.0554	0.0114	0.0562	5.1629
Carhart alpha	76,683	0.0012	0.0171	-1.0233	-0.0429	0.0009	0.0477	1.0296
Volatility	76,683	0.0492	0.0648	0.0000	0.0117	0.0419	0.1400	15.6280
Idio. risk	76,678	0.0257	0.0566	0.0014	0.0054	0.0190	0.1096	13.8021
Beta	76,683	0.0387	0.0354	-0.2710	-0.0017	0.0340	0.1072	7.3305

Panel B: Subsample of PRI investors with detailed data on used responsible investment strategies

	Count	Mean	S.D.	Min.	p1	p50	p99	Max.
Mean return	2,731	0.0090	0.0136	-0.0838	-0.0344	0.0085	0.0417	0.1138
Carhart alpha	2,731	0.0002	0.0190	-0.1201	-0.0468	0.0001	0.0590	0.4763
Volatility	2,731	0.0377	0.0236	0.0053	0.0093	0.0355	0.1265	0.3423
Idio. risk	2,731	0.0216	0.0223	0.0014	0.0035	0.0148	0.1131	0.3201
Beta	2,731	0.0276	0.0160	-0.1213	-0.0016	0.0295	0.0635	0.1654

Notes: In this table, we display descriptive statistics for the risk and return measures used in Chapter 2 of the report. Panel A reports descriptive statistics for the full sample of investors and Panel B for the sample of institutional investors for which we have detailed data on the use of responsible investment strategies. Variable definitions can be found in Appendix Table A.1.

The results from estimating the equation are displayed in Table 2.2. Panels A and B display results when using the portfolio-level *Mean return* and *Carhart alpha* as the dependent variables. We find no relation between *Mean return* or *Carhart alphas* and investors' ESG performance. However, we uncover a strong and significantly negative relationship between all three measures of portfolio risk and ESG performance. Portfolio volatility, idiosyncratic, and systematic risk are generally lower for investors with better ESG performance (see Panels C to E).

In terms of magnitudes, the estimated effects in the table appear quite similar across the E and S dimensions. For instance, a standard deviation increase in the E (S) performance of the investor is associated with an approximate 11% (9%) lower portfolio volatility.[4] Taken together, these findings are important, as they suggest that solid ESG policies can serve as portfolio risk management devices that operate primarily through a risk reduction channel. Implementing responsible investment strategies should thus play an important role in the risk management strategy of investors, possibly strengthening the resilience of institutional investors' portfolios. Similar findings and conclusions are presented in Dunn et al. (2018), Gibson Brandon et al. (2021b), and Hoepner et al. (2022).

4 We calculate the economic effect for the environmental dimension by multiplying the coefficient estimate -0.0114 from Table 2.2 Panel C, column (2) with a one standard deviation increase for the Environmental score (0.499; see Appendix Table A.2) and dividing it by the average volatility (0.0492) of the investors (see Table 2.1, Panel A).

TABLE 2.2 **RISK AND RETURN CHARACTERISTICS AND ESG PERFORMANCE**

Panel A: Mean return				
	(1) **Mean return**	**(2)** **Mean return**	**(3)** **Mean return**	**(4)** **Mean return**
ESG performance	-0.00145 (-1.19)			
E performance		-0.00046 (-0.37)		
S performance			-0.00207 (-1.63)	
G performance				-0.00190 (-1.43)
Observations	76,335	76,335	76,335	76,335
Adjusted R-squared	0.354	0.353	0.354	0.354
Panel B: Carhart (1997) alpha				
	(1) **Carhart alpha**	**(2)** **Carhart alpha**	**(3)** **Carhart alpha**	**(4)** **Carhart alpha**
ESG performance	-0.00099 (-1.04)			
E performance		-0.00086 (-0.89)		
S performance			-0.00087 (-0.92)	
G performance				-0.00122 (-1.27)
Observations	76,335	76,335	76,335	76,335
Adjusted R-squared	0.021	0.021	0.020	0.021
Panel C: Portfolio volatility				
	(1) **Volatility**	**(2)** **Volatility**	**(3)** **Volatility**	**(4)** **Volatility**
ESG performance	-0.01146*** (-7.07)			
E performance		-0.01140*** (-7.57)		
S performance			-0.00994*** (-6.31)	
G performance				-0.00950*** (-5.43)
Observations	76,335	76,335	76,335	76,335
Adjusted R-squared	0.101	0.100	0.098	0.097

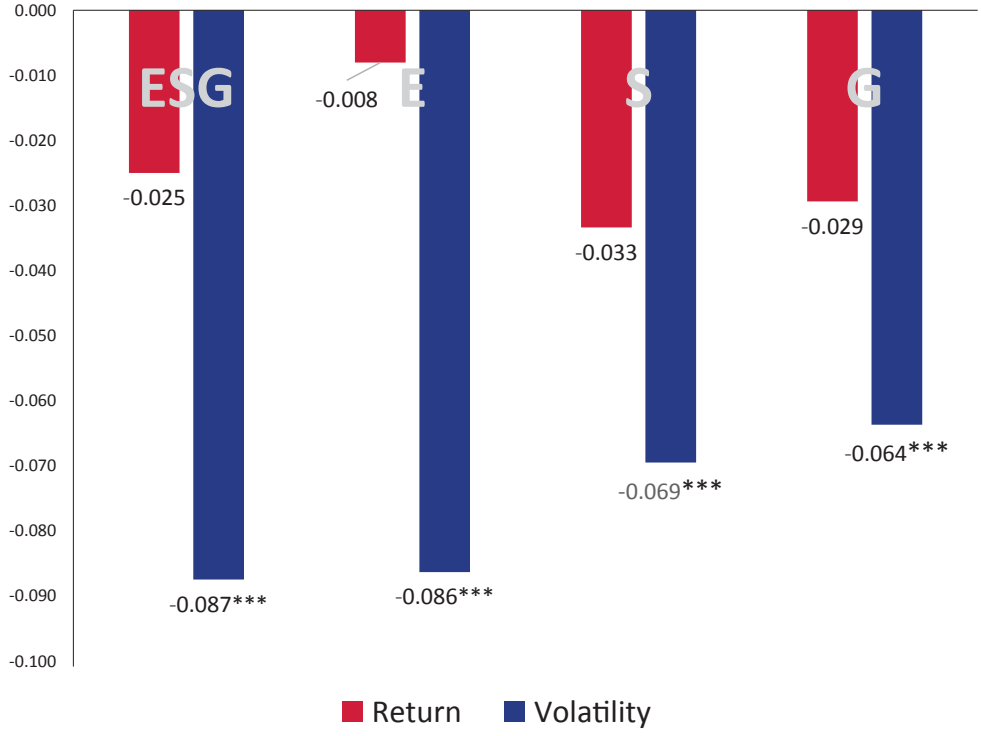
TABLE 2.2 **CONT.**

	Panel D: Idiosyncratic risk			
	(1) Idiosyncratic risk	(2)Idiosyncratic risk	(3)Idiosyncratic risk	(4)Idiosyncratic risk
ESG performance	-0.01278*** (-9.22)			
E performance		-0.01269*** (-8.69)		
S performance			-0.01172*** (-8.30)	
G performance				-0.01017*** (-8.57)
Observations	76,335	76,335	76,335	76,335
Adjusted R-squared	0.057	0.056	0.054	0.051
	Panel E: Beta			
	(1) Beta	(2) Beta	(3) Beta	(4) Beta
ESG performance	-0.00314** (-2.24)			
E performance		-0.00335** (-2.53)		
S performance			-0.00239 (-1.57)	
G performance				-0.00273* (-1.86)
Observations	76,335	76,335	76,335	76,335
Adjusted R-squared	0.278	0.279	0.278	0.278

Notes: This table shows the results from OLS regressions of risk and return measures on the ESG portfolio measures. We use the following dependent variables. Mean return (Panel A), Carhart (1997) alpha (Panel B), Volatility (Panel C), Idiosyncratic risk (Panel D), and Systematic risk as measured by beta (Panel E). All models control for *Equity portfolio AUM, Industry concentration, Portfolio turnover* and year, region, and institution type fixed effects. Variable definitions can be found in Appendix Table A.1. t-statistics (in parentheses) are calculated using standard errors clustered at the investor level. * p<0.1, ** p<0.05, *** p<0.01.

To present our regression key results in a graphical way, Figure 2.1 displays standardised (or beta) regression coefficients for the key independent variables (i.e., *Portfolio ESG Performance* as well as individual E, S, and G performance). We focus on the regressions that use the *Mean return* (Table 2.2, Panel A) and *Volatility* (Panel C) as dependent variables and the figure plots *standardised* (or beta) coefficients from the regressions estimated in these panels. To estimate standardised regression coefficients, the data are standardised so that the means (standard deviations) of the variables are equal to 0 (1). The advantage of this approach is that standardised coefficients are unitless and refer to how many standard deviations the dependent variable changes, per standard deviation change in the independent variable. This standardisation facilitates comparing effect sizes across predictor variables and across dependent variables. The higher the absolute value of the standardized coefficient, the stronger the effect of the independent on the dependent variable.

FIGURE 2.1 **STANDARDISED EFFECTS OF ESG PORTFOLIO PERFORMANCE ON PORTFOLIO RETURN AND RISK**



Notes: This table displays *standardised* (or beta) regression coefficients from regressing mean return and volatility on Portfolio ESG performance (and the individual E, S, and G counterparts). The standardized coefficients are obtained from the regressions in panels A and C of Table 2.2. The sample used to estimate the standardized coefficients consists of N=76,355 investor-year observations. * p<0.1, ** p<0.05, *** p<0.01.

Unsurprisingly, Figure 2.1 is consistent with the estimation results from Table 2.2. First, it shows that the mean portfolio return is unrelated to the ESG portfolio performance measures, whereas volatility is significantly lower for investors with better ESG portfolio performance. The graph also demonstrates that a standard deviation increase in ESG performance is associated with about a 0.09 standard deviation decrease in portfolio volatility. When comparing the effect size of *Portfolio ESG performance* across the two dependent variables, we observe that, in absolute terms, the effect size is about 3.5 (=0.087/0.025) times larger for *Volatility* than for *Mean return*. The latter finding suggests that ESG portfolio performance has a much stronger impact on volatility than on the mean return of the portfolio, and that ESG can serve as a portfolio risk management tool. Another interesting observation can be made from Figure 2.1: it seems as if the effect size is slightly larger in absolute terms for E (-0.086) than for S (-0.069) and G (-0.064) performance. Overall, the evidence from Table 2.2 and Figure 2.1 suggests that ESG strategies operate as a risk management tool allowing institutional investors to reduce their portfolio risk.

In Table 2.3, we explore whether specific responsible investment strategies might exhibit stronger risk-reducing effects. We do so by regressing the previously used risk and return metrics on the indicator variables that identify institutions that apply specific approaches to responsible investing:

$$Return\,(or\,Risk)_{jt} = a + b\,1(\text{investor } j \text{ uses strategy } g \text{ in year } t)_{jt} + cX1_{jt} + fixed\,effects + e_{jt}. \quad (2.2)$$

Consistent with prior analysis on the link between ESG portfolio performance and risk-adjusted returns, the results displayed in Panels A and B of Table 2.3 show no link between mean returns (or Carhart alphas) and the usage of certain responsible investment strategies, suggesting that at least implementing responsible investment strategies does not result in *lower* financial performance (Panels A and B). Further regression analysis reported in Panels C to E shows that there does not seem to be one dominant responsible investment strategy behind the risk-reducing effects of responsible investing documented in Table 2.2 and Figure 2.1. As such, investors who use general screening approaches, thematic investment, ESG integration, and engagement, but also specifically negative and positive screening, all exhibit lower portfolio volatility (see columns (1) to (6) of Panel C).

TABLE 2.3 **RISK AND RETURN CHARACTERISTICS AND RESPONSIBLE INVESTMENT STRATEGIES**

	Panel A: Mean return						
	(1) Mean return	(2) Mean return	(3) Mean return	(4) Mean return	(5) Mean return	(6) Mean return	(7) Mean return
Screening	-0.000 (-0.74)						
Thematic		-0.000 (-0.48)					
Integration			-0.000 (-0.22)				
Engagement				-0.000 (-0.72)			
Negative screening					-0.000 (-1.07)		
Positive screening						0.000 (0.34)	
Norms-based screening							-0.000 (-0.30)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.408	0.408	0.408	0.408	0.408	0.408	0.408

TABLE 2.3 **CONTD.**

	Panel B: Carhart (1997) alpha						
	(1) Carhart alpha	(2) Carhart alpha	(3) Carhart alpha	(4) Carhart alpha	(5) Carhart alpha	(6) Carhart alpha	(7) Carhart alpha
Screening	-0.000 (-0.23)						
Thematic		-0.000 (-0.70)					
Integration			0.001 (0.95)				
Engagement				0.001 (1.33)			
Negative screening					0.001 (-0.64)		
Positive screening						0.001 (-1.06)	
Norms-based screening							0.001 (1.18)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.035	0.035	0.036	0.036	0.035	0.035	0.035
	Panel C: Volatility						
	(1) Volatility	(2) Volatility	(3) Volatility	(4) Volatility	(5) Volatility	(6) Volatility	(7) Volatility
Screening	-0.002* (-1.73)						
Thematic		-0.001* (-1.69)					
Integration			-0.003** (-2.36)				
Engagement				-0.004** (-2.47)			
Negative screening					-0.003** (-2.13)		
Positive screening						-0.002* (-1.74)	
Norms-based screening							0.000 (0.19)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.433	0.432	0.434	0.436	0.434	0.432	0.431

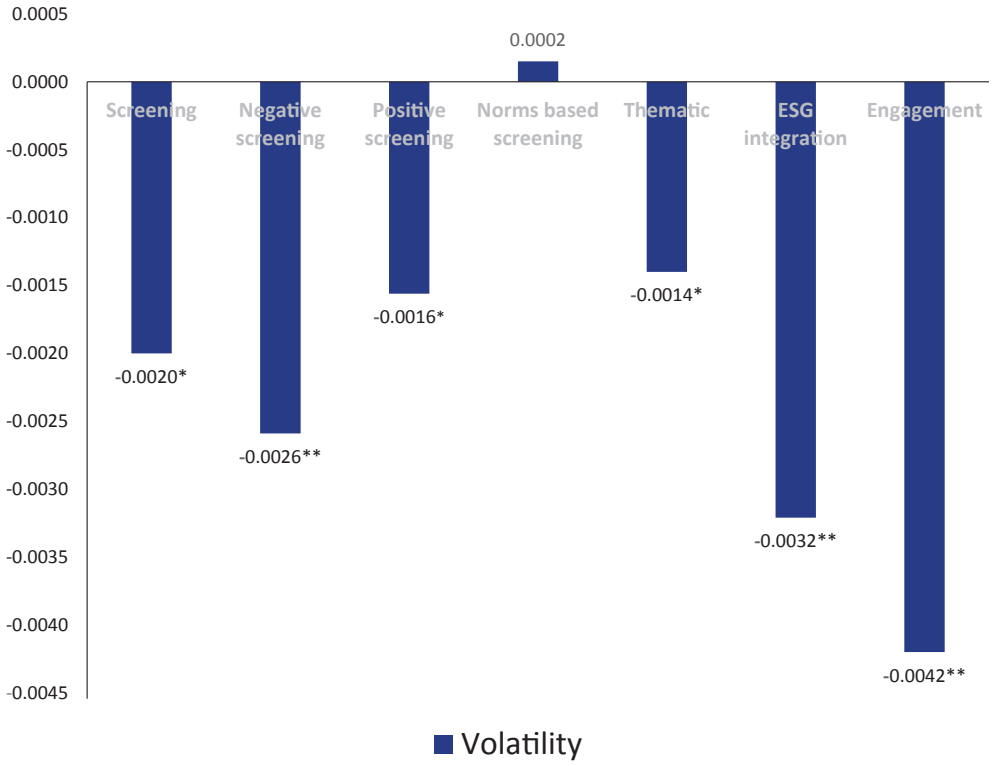
TABLE 2.3 **CONTD.**

Panel D: Idiosyncratic risk							
	(1) Idiosync. risk	(2) Idiosync. risk	(3) Idiosync. risk	(4) Idiosync. risk	(5) Idiosync. risk	(6) Idiosync. risk	(7) Idiosync. risk
Screening	-0.003** (-2.33)						
Thematic		-0.002** (-1.97)					
Integration			-0.003** (-2.49)				
Engagement				-0.005*** (-2.81)			
Negative screening					-0.003*** (-2.60)		
Positive screening						-0.002** (-2.52)	
Norms-based screening							-0.000 (-0.38)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.392	0.390	0.393	0.395	0.393	0.391	0.389
Panel E: Beta							
	(1) Beta	(2) Beta	(3) Beta	(4) Beta	(5) Beta	(6) Beta	(7) Beta
Screening	-0.000 (-0.16)						
Thematic		-0.000 (-0.59)					
Integration			-0.001 (-1.54)				
Engagement				-0.001 (-1.46)			
Negative screening					-0.001 (-1.01)		
Positive screening						0.000 (0.51)	
Norms-based screening							0.000 (0.37)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.602	0.602	0.602	0.602	0.602	0.602	0.602

Notes: This table shows the results from OLS regressions of risk and return measures on the dummy variables indicating if the investor uses a specific responsible investment strategy. The strategies are non-mutually exclusive. We use the following dependent variables: Mean return (Panel A), Carhart (1997) alpha (Panel B), Volatility (Panel C), Idiosyncratic risk (Panel D), and Systematic risk as measured by beta (Panel E). All models control for *Equity portfolio AUM, Industry concentration, Portfolio turnover* and year, region, and institution type fixed effects. Variable definitions can be found in Appendix Table A.1. t-statistics (in parentheses) are calculated using standard errors clustered at the investor level.* p<0.1, ** p<0.05, *** p<0.01.

In Figure 2.2 we plot the coefficient estimates for the different approaches, to get a better sense of the effect sizes. We observe the that the risk-reduction effect is perhaps slightly larger for engagement and ESG integration. Relative to the volatility of the average investor, institutions that apply engagement approaches have about an 11% (=-0.0042/0.0377*100) lower portfolio volatility. With an 8.5% (=0.0032/0.0377*100) lower portfolio volatility relative to the mean investor, the effect is a bit smaller for investors that apply ESG integration approaches, when compared to the risk-reducing impact resulting from engagement.

FIGURE 2.2 **RELATION BETWEEN THE PORTFOLIO VOLATILITY AND INSTITUTIONAL INVESTORS' USE OF DIFFERENT RESPONSIBLE INVESTMENT STRATEGIES**



Notes: This figure displays the effects of institutional investors' use of different responsible investment strategies on their portfolio volatility. The figure plots the coefficients from Panel C of Table 2.3. The sample used to estimate the coefficients consists of N=2,718 investor-year observations. * p<0.1, ** p<0.05, *** p<0.01.

Regarding idiosyncratic risk, which we evaluate in Table 2.3 Panel D, we again find that all strategies except for norms-based screening are associated with lower idiosyncratic risk. Overall, the effects appear stronger for idiosyncratic risk than for volatility, both in statistical and economic terms. For instance, relative to the idiosyncratic volatility of the mean institution, which stands at about 2.16% (see Table 2.1), institutions that apply ESG engagement exhibit about a 25% lower idiosyncratic risk (=-0.005/0.0216*100). Finally, we find no evidence that systematic risk as measured by Beta is related to the use of specific ESG strategies (Panel E).

Overall, the analysis in this section suggests that most ESG and responsible equity investment strategies operate as a risk management device allowing institutional investors to effectively reduce their portfolio risk. Another interesting and important question is whether responsible investment strategies differ in their effectiveness in delivering portfolio-level ESG performance, a theme that we explore in the next section.

2.2 DIFFERENT RESPONSIBLE INVESTMENT STRATEGIES AND ESG PORTFOLIO-LEVEL OUTCOMES

To examine the question of whether some strategies are more effective than others in delivering ESG portfolio performance, we now study whether different responsible investment approaches result in different ESG portfolio outcomes. To do so, we estimate the following specification:

$$ESG\ Performance_{jt} = a + b\,1(\text{investor } j \text{ uses style } g \text{ in year } t)_{jt} + c\,X1_{jt} + fixed\ effects + e_{jt}, \quad (2.3)$$

We report the results in Table 2.4 and graphically for total portfolio ESG performance in Figure 2.3. The results are presented graphically for the separate E, S, and G portfolio scores in Figure 2.4. The analysis shows that investors achieve better total ESG performance primarily through screening – especially positive screening – strategies.

For instance, investors who apply positive screening strategies have significantly better ESG, E, and S performance (see column (6) of Panels A, B, and C of Table 2.4). Relative to the average investor, institutions that apply positive screening have about a 33% (=0.07/0.21*100) better total ESG portfolio performance.[5] The fact that ESG performance does not seem related to engagement strategies may sound surprising, given the popularity of this strategy among institutional investors. The absence of a relation could be because we measure the relationship between portfolio ESG performance and contemporaneous strategy variables. However, engagement strategies may take time (several years) to materialise in firms' improved ESG policies.

5 To calculate this effect size, we relate the coefficient estimate for the Positive Screening dummy to the average ESG portfolio performance, which is given in Panel B Table A.2.

TABLE 2.4 **ESG PERFORMANCE AND RESPONSIBLE INVESTMENT STRATEGIES**

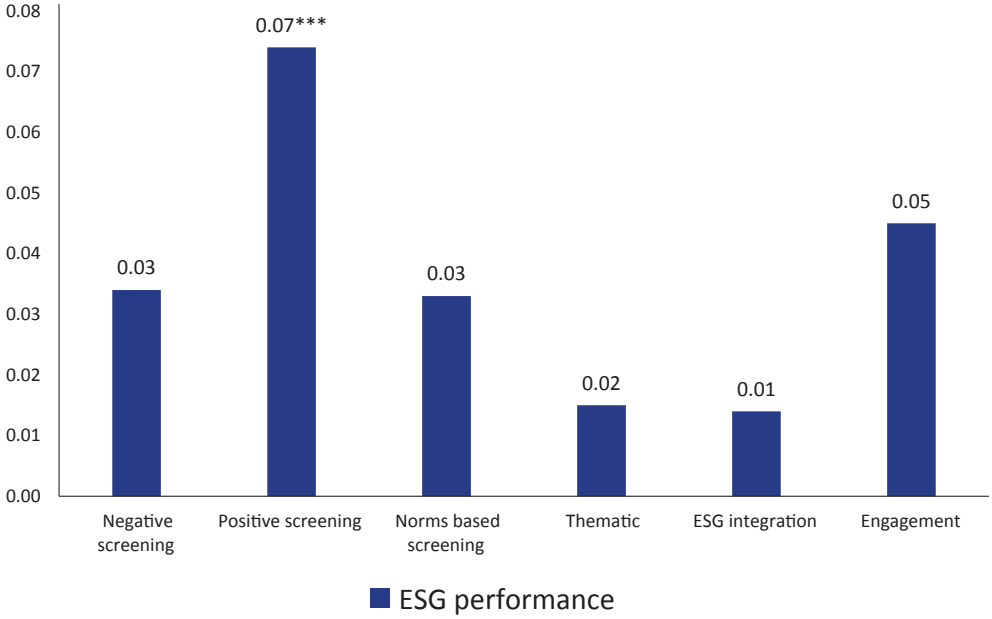
	Panel A: ESG score						
	(1) ESG perf.	**(2) ESG perf.**	**(3) ESG perf.**	**(4) ESG perf.**	**(5) ESG perf.**	**(6) ESG perf.**	**(7) ESG perf.**
Screening	0.043 (1.41)						
Thematic		0.015 (0.66)					
Integration			0.014 (0.41)				
Engagement				0.045 (1.14)			
Negative screening					0.034 (1.19)		
Positive screening						0.074*** (3.18)	
Norms-based screening							0.033 (1.45)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.249	0.248	0.248	0.249	0.249	0.254	0.249
	Panel B: Environmental score						
	(1) E perf.	**(2) E perf.**	**(3) E perf.**	**(4) E perf.**	**(5) E perf.**	**(6) E perf.**	**(7) E perf.**
Screening	0.052* (1.91)						
Thematic		0.025 (1.23)					
Integration			0.019 (0.62)				
Engagement				0.042 (1.10)			
Negative screening					0.047* (1.81)		
Positive screening						0.087*** (4.07)	
Norms-based screening							0.032 (1.52)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.249	0.246	0.246	0.247	0.248	0.256	0.247

TABLE 2.4 **CONTD.**

Panel C: Social score							
	(1) S perf.	**(2) S perf.**	**(3) S perf.**	**(4) S perf.**	**(5) S perf.**	**(6) S perf.**	**(7) S perf.**
Screening	0.042 (1.63)						
Thematic		0.009 (0.46)					
Integration			0.006 (0.21)				
Engagement				0.032 (0.94)			
Negative screening					0.041* (1.69)		
Positive screening						0.057*** (2.89)	
Norms-based screening							0.036* (1.90)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.251	0.249	0.249	0.250	0.251	0.254	0.251
Panel D: Governance score							
	(1) G perf.	**(2) G perf.**	**(3) G perf.**	**(4) G perf.**	**(5) G perf.**	**(6) G perf.**	**(7) G perf.**
Screening	-0.041 (-1.37)						
Thematic		-0.018 (-0.72)					
Integration			-0.014 (-0.48)				
Engagement				0.012 (0.39)			
Negative screening					-0.041 (-1.41)		
Positive screening						0.013 (0.49)	
Norms-based screening							-0.030 (-1.32)
Observations	2,718	2,718	2,718	2,718	2,718	2,718	2,718
Adjusted R-squared	0.146	0.145	0.145	0.145	0.147	0.145	0.146

Notes: This table shows the results from OLS regressions of institutional investors' ESG performance on the dummy variables indicating if the investor uses a specific responsible investment strategy. We use the following dependent variables: Overall ESG performance (Panel A), E performance (Panel B), S performance (Panel C), and G performance (Panel D). All models control for Equity portfolio AUM, Industry concentration, Portfolio turnover and year, region, and institution type fixed effects. Variable definitions can be found in Appendix Table A.1. t-statistics (in parentheses) are calculated using standard errors clustered at the investor level. * p<0.1, ** p<0.05, *** p<0.01.

FIGURE 2.3 **RELATION BETWEEN PORTFOLIO ESG PERFORMANCE AND USE OF DIFFERENT RESPONSIBLE INVESTMENT STRATEGIES**

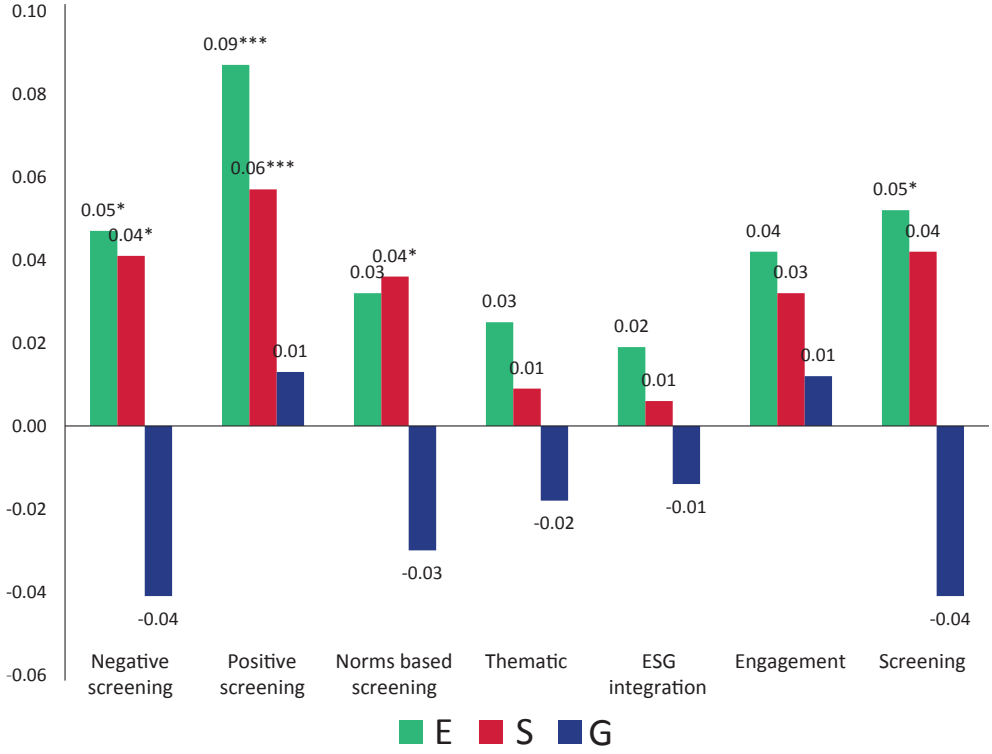


Notes: This figure displays the effects of institutional investors' use of different responsible investment strategies on their Portfolio ESG performance. The figure plots the coefficient estimates from Table 2.4 Panel A. * p<0.1, ** p<0.05, *** p<0.01.

In Figure 2.4, we represent graphically the relation between individual E, S, and G portfolio performance and the use of the different strategies. Several observations can be made from this figure. First, we find no evidence that portfolio governance performance is significantly related to the use of positive screening, or any other responsible investing approach. All of the estimated effects for the governance performance are insignificant. The graph shows that most of the coefficient estimates are negative for the G portfolio performance, but given that these coefficients are noisily estimated, this pattern should not be over-interpreted. The second observation from Figure 2.4 is that the positive effect of the use of positive screening on the total ESG portfolio performance seems to be concentrated primarily in its effect on the E and S portfolio performance.

Thus, to conclude, our evidence suggests that it is mostly positive screening that positively affects the ESG, and especially the E and the S, performance of equity portfolios held by institutional investors.

FIGURE 2.4 **RELATION BETWEEN PORTFOLIO E, S, AND G PERFORMANCE AND USE OF DIFFERENT RESPONSIBLE INVESTMENT STRATEGIES**



Notes: This figure displays the effects of institutional investors' use of different responsible investment strategies on their individual Portfolio E, S, and G performance. The figure plots the coefficient estimates from Table 2.4 Panels B–D. * p<0.1, ** p<0.05, *** p<0.01.

CHAPTER 3

Do institutional investors walk the ESG talk?

KEY FINDINGS

- There is evidence that institutional investors that publicly commit to ESG show behaviour consistent with their ESG promises.
- However, important heterogeneity exists among institutional investors, and greenwashing concerns are more pronounced in the United States and among funds and institutions that have jumped on the ESG bandwagon recently.
- More research is needed to determine if responsible investors can truly have an impact and change firm behaviour in ways consistent with sustainable development.

Investors have different ways to signal their commitment to responsible investing. For instance, they can launch specialised ESG funds or sign up to responsible investment related investor initiatives. It is still a somewhat open question to what extent institutional investors who join responsible investment initiatives or launch ESG-related investment funds live up to their stated sustainability commitments. Building on our own prior research and several recent studies, we discuss in this chapter whether investors who publicly signal ESG commitment actually 'walk the ESG talk' and whether their words translate into more responsible equity portfolio outcomes. We also discuss the issue of greenwashing. It is important to evaluate whether institutions that commit to investing responsibly do so in practice, since after all, responsible investment can have a meaningful, positive impact on the world only if investors walk the talk and live up to their ESG promises.

There are many voluntary ESG-related investor initiatives that currently coexist and to which investors can adhere. One prominent – if not *the* most prominent – initiative is the UN-sponsored Principles for Responsible Investment (PRI), whose signatory members publicly commit to incorporating ESG principles in their decision making. The initiative counted over 4,000 signatories representing collective AUM of close to $121 trillion at the end of 2021. In a recent paper with Simon Glosser, Pedro Matos and Tom Steffen, we evaluate whether investors who sign up for the PRI walk the ESG talk and invest responsibly (Gibson Brandon et al., 2022). Analysing a large and heterogeneous

global sample of institutional investors who signed up for the PRI, we find that institutional investors who sign up tend on average to have better equity portfolio ESG scores and improve these scores after joining the initiative. However, when examining PRI signatories from different parts of the world, the picture is much more nuanced. The cross-country analysis shows that relative to non-signatory institutional investors, only PRI signatories outside the United States have better portfolio ESG scores. In contrast, US PRI signatories do not exhibit better portfolio ESG scores than their uncommitted peers. Institutional investors in the United States do not seem to improve their ESG performance after signing the principles either. Using detailed data on the extent to which PRI signatories use specific responsible investment strategies, we also uncover that some US-domiciled PRI signatories have significantly worse ESG portfolio performance than non-PRI institutions, raising serious concerns about greenwashing among US-based PRI signatories.

Further characterising the greenwashing by US investors who are fundamentally uncompliant with Principle 1 of the PRI ("We will incorporate ESG issues into investment analysis and decision-making processes"), we show in the paper that these greenwashing institutions (1) have recently underperformed; (2) cater to retail, and thus less sophisticated, clients; (3) have operations that have been involved in negative ESG incidents; and (4) are more likely to have joined the PRI late. These cross-sectional results indicate that the US PRI signatories that fail to implement ESG investment practices might be greenwashing because of a misalignment of interests between fund managers and their end investors or other stakeholders. We also highlight three main reasons – commercial motives, uncertainty about fiduciary duties, and lower ESG market maturity – why US-domiciled PRI signatories do not follow through on their responsible investment commitments. This explanation is important for policy reasons, given that greenwashing generates negative externalities for various categories of stakeholders. In Chapter 6 of this report, we examine whether market discipline suffices or whether alternative regulatory measures may be needed to curb greenwashing behaviour and mitigate its economic and social cost.

Besides the PRI, which is an initiative generally oriented towards ESG, there are also more climate-oriented investor initiatives. Institutional investors have also committed to other alliances with pledges to foster transparency with respect to carbon emissions, net zero alignment, or, more generally, greener economies. For example, major investors created the Carbon Disclosure Project (CDP) in 2000 to encourage companies worldwide to disclose their greenhouse gas (GHG) emissions and corporate efforts to mitigate, and adapt to, the effects of climate change. More recently, Climate Action 100+, a climate-centric initiative that focuses primarily on investor engagement related to climate change, was created. Launched in 2017, the initiative targets the global top publicly listed companies that have the largest GHG emissions to accelerate their transition to net-zero emissions and meet the objectives of the Paris Agreement. Other initiatives include the Net Zero Asset Managers initiative (NZAM), the Net-Zero Asset Owner Alliance

(NZAOA), the Net-Zero Insurance Alliance (NZIA), and the Net-Zero Banking Alliance (NZBA). It remains to be seen if these various pledges will generate meaningful CO_2 emissions reductions by these various institutions in the long run or whether they are simply 'cheap talk'.

Regarding the question of whether investors involved with other more climate-centric initiatives mentioned above (i.e., CDP and Climate Action 100+) walk the ESG talk, a recent paper by Atta-Darkua et al. (2023) provides some insights. Combining global data on institutional investors' equity holdings and firm-level carbon emissions, the authors explore to what extent climate-conscious institutional investors decarbonise their equity portfolios. They measure investor climate consciousness using an institution's participation in CDP or the Climate Action 100+, two prominent climate-oriented investor initiatives. Specifically, they evaluate whether and how climate-conscious institutions reduced the carbon emissions of their equity portfolios between 2005 and 2019. The authors also explore if geographical differences in institutions' decarbonisation efforts exist. The paper provides evidence that, on average, climate-oriented institutions reduced their equity portfolio-level carbon footprints over the studied time period. In particular, this statement applies to institutions based in countries that have carbon emissions pricing schemes, such as France, Germany, and Japan.

The authors then look at how investors achieved the decarbonisation of their portfolios. In principle, portfolio decarbonisation could be achieved either via re-weighting – that is, tilting portfolio holdings towards lower carbon emitting firms – or by pushing portfolio firms towards emissions reductions using corporate engagement. The analysis in Atta-Darkua et al. (2023) suggests that portfolio re-weighting or tilting (i.e., overweighting low emitters and underweighting high emitters) is the predominant strategy that climate-conscious institutions use to green their portfolios. Again, this re-weighting or tilting strategy is used in particular investors based in countries with emissions trading schemes. However, the authors find only limited evidence of widespread and systematic investor climate engagement with firms that would also result in lower portfolio-level emissions. The fact that institutions rely predominantly on tilting or re-weighting is reminiscent of some of the findings we presented in Chapter 2, namely, that screening approaches are used by a large fraction of institutions. Atta-Darkua et al. (2023) also find no evidence that climate-conscious investors allocate capital towards firms that generate novel patents with environmental and climate benefits. However, these investors do re-weight their holdings towards firms generating more revenues from green products and services, such as renewable energy. While the analysis in Atta-Darkua et al. (2023) does show that climate-conscious investors align their portfolios with their ESG preferences, the paper also raises some doubts about the effectiveness of investor-led initiatives in reducing corporate carbon emissions and helping take necessary action to mitigate climate change. The problem arises mainly because portfolio re-weighting does not reduce the negative externality of the carbon emissions of companies at the aggregate level, but merely makes investors' portfolios appear more climate friendly.

Gibson Brandon et al. (2022) and Atta-Darkua et al. (2023) focus on studying institutional investors, irrespective of their type. Other papers have focused on specific types of institutional investors (e.g., mutual funds or hedge funds). For instance, Andrikogiannopoulou et al. (2022) explore how textual analysis of mutual funds' regulatory filings can be used to identify greenwashing funds. They also examine whether there are real effects associated with mutual funds' greenwashing behaviour. Focusing on US-based active mutual funds, they construct novel measures of funds' ESG commitments by applying textual analysis to the discretionary investment-strategy descriptions of mutual funds' prospectuses. This approach is promising since it exploits disclosures that mutual funds are required to make to the Securities Exchange Commission.

The analysis in Andrikogiannopoulou et al. (2022) documents that mutual fund investors respond strongly to text-based ESG measures extracted from the mutual funds prospectuses. Using discrepancies between text-based ESG measures and measures based on ESG holdings – i.e., holdings-based measures similar to those used in Chapters 1 and 2 of this report and in Gibson Brandon et al. (2022) – the authors identify greenwashing funds. Several novel facts are highlighted in the paper: greenwashing is more prevalent after 2016, more prominent in funds with lower past flows and weaker oversight, and also occurs more frequently in funds with higher expense ratios. Interestingly, Andrikogiannopoulou et al. also uncover that greenwashing mutual funds attract similar flows as funds that truthfully reveal their ESG commitment, suggesting that mutual investors cannot distinguish between greenwashing and non-greenwashing mutual funds. On the other hand, greenwashing funds have inferior performance than genuinely green funds, i.e., those that truthfully reveal their ESG type. Overall, their analysis suggests that there is greenwashing in the population of US active mutual funds and that this greenwashing behaviour has real effects as it results in misallocation of capital (towards lower performing funds and towards funds that do not live up to their ESG promises).

Another way of examining if responsible investors walk the ESG talk is to look at whether specifically labelled ESG funds display investment and/or voting behaviour compliant with ESG considerations. This approach is taken by Dumitrescu et al. (2022), who also study greenwashing at the fund level. They propose a new definition of greenwashing based on ESG labels, sustainability scores of portfolio holdings, and fund voting behaviour. Their analysis suggests that self-labelled ESG funds have a better portfolio-level ESG performance and also show more voting support for ESG proposals. They estimate that about 24% of self-labelled ESG funds are greenwashing, according to their definition. They show interesting cross-sectional variation as well. For instance, greenwashing funds are more likely to belong to larger and older fund families, and less likely to be offered by PRI signatories. The authors also find that retail investors do not distinguish between greenwashing and true ESG funds. In contrast, institutional investors appear to fall less for greenwashing. The paper strikes a somewhat positive

conclusion, arguing that the analysis suggests that claims of generalised greenwashing in the asset management industry are probably exaggerated. Nonetheless, the authors conclude that there is room for regulation aimed at enhanced ESG disclosure, at least for those funds that target retail investors.

Another paper looking at the question of whether labelled ESG funds deliver on their ESG promises is Heath et al. (2022). The authors examine the investment behaviour of socially responsible investment (SRI) funds and find that such funds generally invest consistent with ESG tenets. For example, SRI funds allocate more capital to firms with lower pollution, more board diversity, higher employee satisfaction, and better workplace safety. However, the authors fail to find evidence that these funds change firm behaviour in ways consistent with better sustainability. This finding is reminiscent of the finding presented in Atta Darkua et al. (2023), who show that institutional investors primarily tilt to low-emissions firms as opposed to systematically pushing firms to reduce emissions via engagement. Heath et al. (2022) argue that SRI funds are not greenwashing (i.e., overstating their commitment to responsible investing), but rather 'impact washing', that I,s failing on their promise of delivering sustainability impact by changing company behaviour. The issue of whether responsible investors can really move the needle in terms of promoting impact is addressed in Chapter 5 of this report.

Dikolli et al. (2022) also look at whether labelled ESG funds show behaviour consistent with the ESG proposition. They focus on ESG funds' voting behaviour, an important component of a fund's shareholder engagement strategy and one of the main implementation strategies discussed in Chapter 2 of this report. Specifically, the authors analyse voting behaviour of funds that are classified by Morningstar as sustainable investment funds. They find that these Morningstar ESG funds are more likely than other mutual funds to vote in favour of ESG shareholder proposals, which is consistent with the findings of some of the other papers discussed above. While the analysis suggests that ESG funds at least partially walk the ESG talk, Dikolli et al. (2022) highlight an interesting twist. They find that fund families seem to play an important role in ESG voting behaviour. Focusing again on PRI membership (in the spirit of Gibson Brandon et al., 2022) and when analysing funds from the same fund family, they find that ESG funds of PRI families are significantly more likely to support ESG proposals than non-ESG funds of the same PRI families. They determine that the significant difference stems from non-ESG funds of PRI families providing less support than non-ESG funds from non-PRI families. This is also consistent with some of the findings in Gibson Brandon et al. (2022), who document that a subset of US PRI signatories have worse portfolio-level ESG scores than US non-signatories. Dikolli et al. (2022) conclude that ESG funds available to US investors at least partially walk the ESG talk in that these funds provide more support for shareholder proposals aligned with their designated sustainable investment objective. However, they also caution that the type and family of the fund determine the extent to which they support ESG proposals.

Several other studies have also looked at the role of PRI membership for specific types of institutional investors. Kim and Yoon (2022) focus on US mutual funds managed by PRI signatories. Consistent with Gibson Brandon et al. (2022), they find that US mutual funds who sign up to the PRI do not improve their fund-level ESG scores after signing. The paper is narrower in scope than Gibson Brandon et al. (2022) as it focuses only on a subset of institutional investors and one single geographic area – the United States. As such, it cannot isolate the subtle geographical differences that exist among PRI signatories and which are highlighted in Gibson Brandon et al. (2022) and Chapter 1 of this report. In addition, Gibson Brandon et al. (2022) do not only focus on PRI membership but use detailed data on the strategies of US PRI signatories in order to demonstrate additional and important heterogeneity among US-based signatories. Another study focusing on a subset of institutional investors is Liang et al. (2022). The authors examine hedge funds that have signed up to the PRI and find that hedge funds that endorse the PRI underperform other hedge funds after adjusting for risk, but attract greater investor flows, accumulate more assets, and harvest greater fee revenues. Consistent with an agency explanation, the underperformance is driven by PRI signatories with low ESG scores and is greater for hedge funds with poor incentive alignment. Both Kim and Yoon (2022) and Liang et al. (2022) argue that some PRI signatories' behaviour is consistent with greenwashing.

Another interesting paper is Ceccarelli et al. (2022). The authors start by observing that many institutional investors commit to responsible investment. However, there might be considerable heterogeneity among these investors. For instance, the analysis in Chapter 1 of this report highlights heterogeneity in terms of geography. Gibson Brandon et al. (2022) also show that among PRI signatories, some investors are more committed than others by exploiting detailed data on the strategies that these investors use. These authors also provide evidence that among PRI signatories, heterogeneity is meaningfully related to portfolio ESG outcomes, with more committed investors typically displaying better ESG performance at the portfolio level. Ceccarelli et al. (2022) question the credibility of public commitments to PRI. They highlight a new group of 'ESG leaders', i.e., institutional investors that are truly committed to improving firms' sustainability outcomes. They show that the positive relationship between E and S performance of firms and institutional investor ownership first documented by Dyck et al. (2019) is entirely driven by such 'ESG leaders'. Finally, Ceccarelli et al. (2022) argue that these ESG leaders are truly committed owners facilitating corporate change, and also show that ESG-related engagement campaigns are successful only when firms are substantially owned by these ESG Leaders.

Overall, the nascent literature on greenwashing and the question of whether institutional investors who claim to invest responsibly do so in practice paints a mixed picture. While there are certainly some pockets of evidence in favour of the view that responsible investors walk the talk – responsible investors in Europe for instance, ESG leaders, or PRI signatories that implement ESG investing more seriously – greenwashing does

appear to be a concern in some geographic areas, and among funds and investors who have jumped on the ESG bandwagon recently. In addition, greenwashing has become more prevalent in recent years (Andrikogiannopoulou et al., 2022), although it is perhaps not as generalised as one might think (Dumitrescu et al., 2022). Andrikogiannopoulou et al. (2022) highlight an important point that greenwashing appears to generate real effects as it affects allocational efficiency because fund flows are sent to lower performing and costlier mutual funds. An important challenge therefore is determining the costs of greenwashing. While a lot of research focuses on identifying greenwashing, an important question that still remains to be answered is the extent to which responsible institutional investors can have a meaningful impact in changing company behaviour. We address this question partially in Chapter 6. Whether market forces will eventually weed out greenwashing behaviour or whether further regulatory development is required remains to be seen. Overall, this is an important area that calls for further research.

CHAPTER 4

Institutional investors as bond investors and the role of security design in ESG investments

KEY FINDINGS

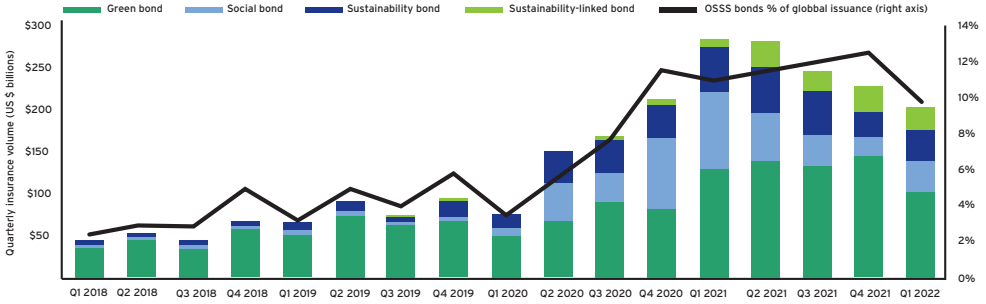
- The sustainable fixed-income market is the place where strong ESG product innovation and growth is occurring.
- Sustainability-linked bonds (SLBs) are an innovative debt instrument that can be incentive-compatible for the issuing firms provided that the coupon penalty is sufficiently high.
- SLBs are issued predominantly by European firms and the issuers typically are large, profitable, highly levered value firms that have high ESG scores.
- About 20% of newly issued SLBs are overpriced and thus imply a transfer of wealth from bondholders to the shareholders of the issuing firm.

The first three chapters of this report focused exclusively on institutional investors' equity investments. However, fixed-income securities represent by choice or necessity – for instance, through regulatory constraints imposed on most asset owners' asset allocations – an important pillar of many institutional investors' responsible investment strategies. The fixed-income market is also the place where we have seen both ESG product innovation and growth over the recent past.

Over the last decade, we have seen a proliferation of sustainable bond instruments issued by both financial and nonfinancial firms to cater to the growing appetite of institutional investors for sustainable assets. According to a May 2022 Moody's ESG Solutions Report, the combined issuance of green, social, sustainability, and sustainability-linked (GSSS) bonds should reach $1 trillion at the end of 2022, and despite a slowdown in issuance growth due to the currently disruptive economic and geopolitical conditions, Moody's expects volumes issued in the sustainable bond market to strengthen in the future due to rising climate and resource scarcity considerations. As Figure 4.1 shows, green bonds

have dominated thus far, and Moody's expect them to represent more than half of the volume issued in 2022 ($550 million). However, we see other instruments, in particular, sustainability-linked bonds with an expected issuance amount of $150 million in 2022, gradually attracting increasing firm and investor interest.

FIGURE 4.1 **TOTAL GREEN, SOCIAL, SUSTAINABILITY, AND SUSTAINABILITY-LINKED (GSSS) BOND ISSUANCE FROM Q1 2018 TO Q1 2022**

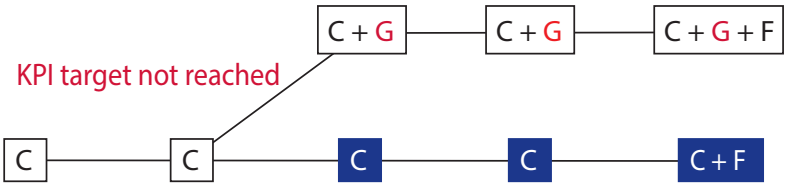


Note: The bar chart shows the quarterly issuance volume in billion US$ of each type of GSSS bonds from 2018 to the beginning of 2022. The black line represents the percentage of GSSS bonds of global issuance.

Source: Moody`s ESG Solutions, Environmental Finance Data, Dealogic.

The main particularity of sustainability-linked bonds is that, unlike green bonds, they are not bound to finance green or environmentally related projects but can be used by the issuer to pay for all types of expenses. However, the coupon payment structure of these bonds depends on the achievement of a predefined sustainability target at a pre-specified date, and a penalty is typically added to the coupon if a target based on a measurable sustainability key performance indicator (KPI) is not met. Also, the sustainability target is not limited to environmental issues but can also cover social and governance aspects, such as gender diversity, workplace safety, or human rights issues, among others. Figure 4.2, adapted from Berrada et al. (2022), shows the typical payment structure of an SLB in which upon non-achievement of the KPI target a penalty G is added to the coupon C of the bond.

FIGURE 4.2: **PAYMENT STRUCTURE OF A TYPICAL SUSTAINABILITY-LINKED BOND**



Notes: The figure shows the stylized payment structure of a Sustainability-linked bond where C is the coupon, F is the face value and G is the potential coupon step-up (penalty) which is connected to the sustainability target.

Source: Berrada et al. (2022)

In this chapter, we focus on an analysis of sustainability-linked bonds due to their novelty and, even more so, to highlight their original incentive-compatible structure for firms and shed light on the complexity raised by their pricing mechanism.

4.1 THE CHARACTERISTICS OF FIRMS ISSUING SLBS

In this first section, we conduct an empirical study aimed at answering the following question: What are the main characteristics of firms that issue SLBs? For that purpose, we collect bond and firm-level data on 434 SLBs issued from 2018 to August 2022. We also collect corresponding data for non-SLB issuing firms over the same time period. The data are described in detail in Appendix B.

We next construct a dummy variable, *SLB Issuer*, for companies that have issued an SLB. The dummy equals one if firm i has issued an SLB in the year of observation t and afterwards. Most of our analysis relies on logit and OLS regressions of the form:

$$SLB\ issuer_{it} = a + b\,X_{it} + fixed\ effects + e_{it} \tag{4.1}$$

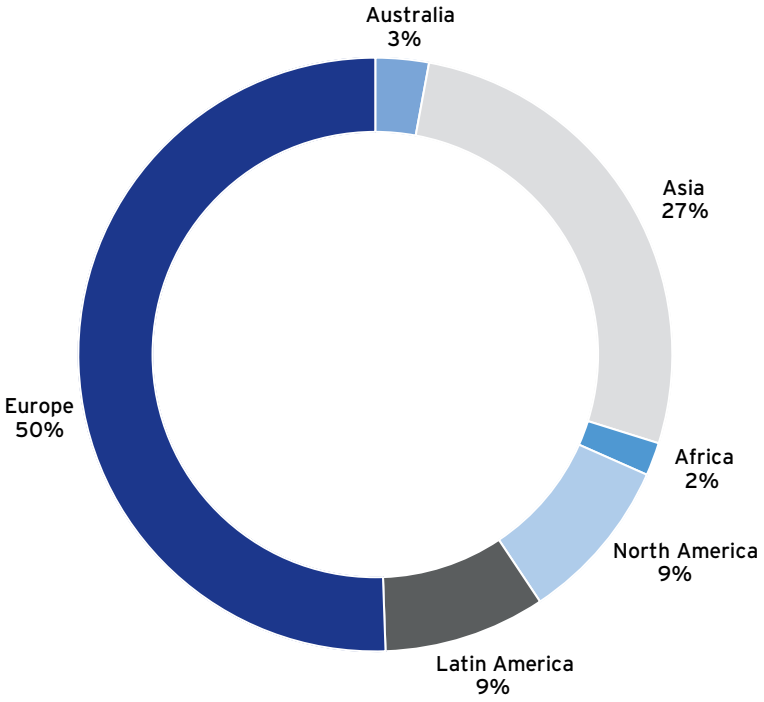
where the SLB issuer dummy is associated with a vector of firm characteristics X and relevant fixed effects (FE), capturing aspects such as location or the industry in which the firm operates.

We first examine the regional and industry characteristics of firms that issue an SLB. Figure 4.3 shows that SLBs are predominantly issued by European firms (50.5% of the issues), followed by Asia (26.9%) and North America (9.0%).

Table 4.1, which shows the results from linear probability models estimated using OLS with standard errors clustered at the firm level and following Equation 4.1, corroborates this European predominance. In the regression, we include a dummy variable that indicates whether the firm is located in Europe. The results, reported in column (3) of the table, show that relative to firms in other parts of the world, European firms have a 0.3 percentage point higher probability of issuing an SLB. Note that the base probability of issuance for all firms outside of Europe is relatively low, highlighting that SLB issuance is a recent phenomenon and that only a few firms have issued SLBs so far. At the same time, this finding illustrates the massive potential of this market segment. In Table 4.1, we explore further geographic variations in SLB issuance. Firms in the United States have a 0.15 percentage point lower probability of issuing an SLB (column (5)). Thus, Europe seems to be the driving force for SLB issuances since the inception of this bond market segment.[6]

6 Note that the coefficient for the dummy marking Latin American firms is also positive but only marginally significant.

FIGURE 4.3 **SLB ISSUANCE BY COUNTRY**



Note: The pie chart shows the percentage of total SLBs issues originating from firms located in a specific geographical region. Region is defined based on the companies' country of domicile.

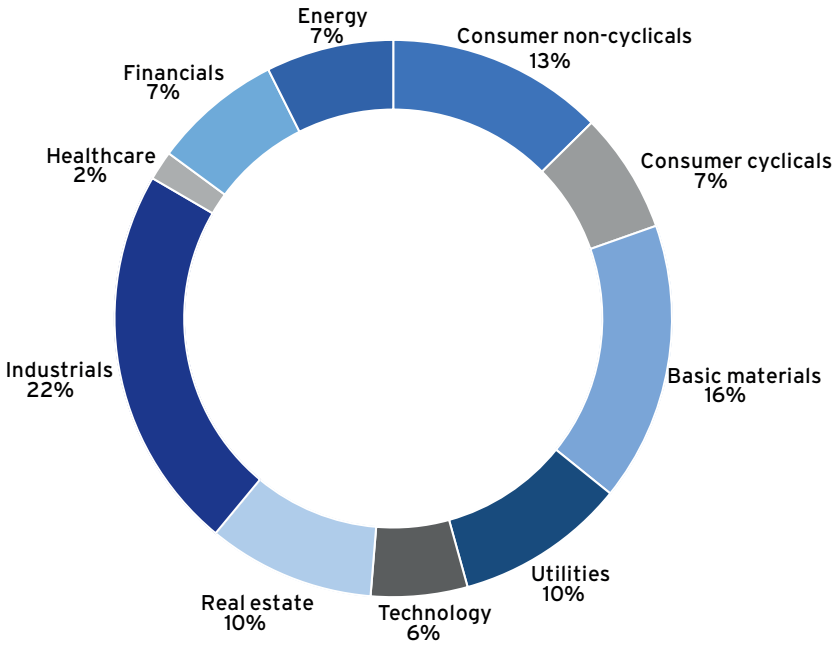
TABLE 4.1 **SLB ISSUANCE BY REGION**

	(1) SLB issuer	(2) SLB issuer	(3) SLB issuer	(4) SLB issuer	(5) SLB issuer
Africa	0.00137				
	(0.73)				
Australia		-0.000744**			
		(-2.02)			
Europe			0.00269***		
			(5.65)		
Latin America				0.00183*	
				(1.80)	
North America					-0.00146***
					(-6.98)
Constant	0.00127***	0.00132***	0.000776***	0.00123***	0.00180***
	(10.48)	(10.44)	(7.52)	(10.14)	(10.08)
N	169,931	169,931	169,931	169,,Ω931	169,931

This table shows linear probability models in which an SLB issuer dummy is related to region dummies. Region dummies are constructed based on a company's country of domicile. Standard errors are clustered at the company level. t-statistics are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

In Figure 4.4, we now look at the industry distribution of SLB issuers and see that industrials (22.4% of the total issuances) have the lead, followed by basic materials (16.2%) and utilities (9.9%). The graph suggests that, above all, firms belonging to environmentally sensitive industrial sectors are issuing SLBs. Using a similar OLS framework as above for the regional analysis, Table 4.2 shows that relative to the average probability of issuance for all other industries, firms from the utilities sector have a 0.48 percentage points higher probability of issuing an SLB, while firms from industrials and consumer non-cyclicals have a weakly higher probability of issuing an SLB. These differences are statistically significant. In contrast, firms that are active in the healthcare, technology, consumer cyclicals, or financial sectors are significantly less likely to issue SLBs.

FIGURE 4.4 **SLB ISSUANCE BY SECTOR**



Note: The pie chart shows the percentage of total SLBs issues originating from firms from a specific industry. We define industry based on the TRBC Economic Sector code.

TABLE 4.2 **SLB ISSUANCE BY INDUSTRY**

	(1) SLB issuer	(2) SLB issuer	(3) SLB issuer	(4) SLB issuer	(5) SLB issuer	(6) SLB issuer	(7) SLB issuer	(8) SLB issuer	(9) SLB issuer	(10) SLB issuer
Energy	0.000626									
	(0.92)									
Basic materials		0.000436								
		(1.08)								
Industrials			0.000688*							
			(1.76)							
Consumer cyclicals				-0.000683**						
				(-2.44)						
Consumer noncyclicals					0.00142*					
					(1.95)					
Financials						-0.000890***				
						(-3.74)				
Healthcare							-0.00121***			
							(-6.37)			
Technology								-0.000904***		
								(-3.77)		
Utilities									0.00482***	
									(2.72)	
Real estate										0.000946
										(1.41)
Constant	0.00125***	0.00122***	0.00118***	0.00137***	0.00119***	0.00143***	0.00140***	0.00141***	0.00115***	0.00122***
	(10.15)	(9.59)	(9.24)	(10.15)	(9.88)	(10.15)	(10.45)	(10.21)	(10.00)	(10.00)
N	168,947	168,947	168,947	168,947	168,947	168,947	168,947	168,947	168,947	168,947

Notes: This table shows linear probability models in which the SLB issuer dummy is related to industry dummies. Industry dummies are constructed based on the economic sectors of the Refinitiv Business Classification (TRBC). Standard errors are clustered at the company level. t-statistics are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

TABLE 4.3 **SLB ISSUANCE AND FINANCIAL AND NONFINANCIAL CHARACTERISTICS**

	(1) SLB issuer	(2) SLB issuer	(3) SLB issuer	(4) SLB issuer	(5) SLB issuer	(6) SLB issuer	(7) SLB issuer	(8) SLB issuer	(9) SLB issuer	(10) SLB issuer
log(Assets)	0.608***								0.583***	0.264***
	(14.41)								(12.68)	(2.85)
ROA		2.879***							2.024*	1.792
		(4.89)							(1.93)	(1.06)
Tobin's Q			-0.218**						-0.0126	-0.0309
			(-2.10)						(-0.13)	(-0.24)
Leverage				1.458***					2.233***	2.141***
				(10.46)					(6.61)	(4.42)
E Pillar					0.0267***					0.00466
					(4.39)					(0.47)
S Pillar						0.0349***				0.0208*
						(4.25)				(1.72)
G Pillar							0.0173***			-0.00369
							(3.06)			(-0.48)
Board diversity								0.0370***		0.0319**
								(3.98)		(2.49)
Observations	100,307	88,043	89,627	98,807	34,201	34,172	34,205	34,156	80,248	24,026

Notes: This table reports logit regressions in which a dummy variable marking firms that have issued an SLB is related to financial and nonfinancial characteristics. All regressions include year, industry, and region fixed effects. Standard errors are clustered at the company level. t-statistics are in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

4.1.1 Financial characteristics of SLB issuers

In this section, we explore how the probability of issuing an SLB correlates with firms' financial characteristics, such as amount of assets, profitability, leverage, or valuation (as proxied by Tobin's Q). The descriptive statistics for these and other explanatory variables used in this chapter are shown in Appendix Table B.2 (see Appendix B).

Relying on logit regressions with year, industry, and region fixed affects and standard errors clustered at the company level, we can observe by looking at columns (1) to (4) in Table 4.3 that a firm is significantly more likely to issue an SLB if it is large (as proxied by *log(Assets)*), more levered, and more profitable (as measured by higher return on assets (ROA)). Tobin's Q is negatively related to the SLB issuance dummy, which suggests a somewhat higher tendency for value firms to issue SLBs. These results are further confirmed in the multivariate specification displayed in column (9), where *log(Assets)*, *Leverage* and *ROA* all remain positive and significant. Thus, to summarise, our analysis suggests that the market for SLBs, which is still in its infancy, is strongly titled toward larger, more levered, more profitable, and value firms and may offer those firms a diversification instrument in the fixed-income financing space. We examine at later stage of this report whether SLB issuance enables these firms – or a subsegment of them – to obtain a more attractive cost of capital due to the rising appetite of institutional investors for sustainable debt.

4.1.2 Sustainability characteristics of SLB issuers

In this section, we further explore how the probability of a firm issuing an SLB correlates with firms' sustainability characteristics. As explanatory variables, we use environmental, social, and governance ratings from Refinitiv as well as board diversity. The descriptive statistics for these variables are in Appendix Table B.2. Looking at columns (5) to (8) in Table 4.3, we see that firms that have higher environmental or social scores have a significantly higher probability of issuing an SLB. The governance rating of these firms seems to matter, as does board diversity – a proxy for sound corporate governance that is also associated with a significantly higher probability of SLB issuance. Column (10) shows that when we combine all financial and sustainability variables, we find that only size, leverage, social rating, and board diversity remain positively and significantly related to the likelihood of SLB issuance. Thus, sustainability indicators, such as ESG ratings and board diversity, are also positively related to firms' decisions to issue an SLB, and this may reflect the fact that a higher E, S, or G rating as well as greater board diversity represent some of the nonfinancial factors considered by responsible investors when buying these securities at issuance, for instance, when using ESG integration and/or positive screening as their responsible investment strategies.

4.2 WHAT IS SPECIAL ABOUT SLBS AS FIXED-INCOME INSTRUMENTS?

Berrada et al. (2022) answer the question of when SLB issuance can induce managers to exercise costly effort to achieve the predefined sustainability target at a predefined horizon. In a one-period stylised model with a single firm, the authors show that the manager makes an effort only if the discounted 'expected penalty saving' (i.e., avoiding the coupon penalty) is higher than the cost of exercising the environmental investment (i.e., paying the cost of investment by providing the effort to attain the target). This result is very general and holds for risk-neutral investors as well as for the case where investors internalise environmental performance (i.e., when investors care about the sustainability characteristics of the firm, as responsible investors would typically do). Even though the model focuses on SLBs with environmental KPIs, their result for incentive compatibility (i.e., the conditions under which SLBs provide managers with incentives to work hard to achieve the target) also extends to other sustainability (social or governance) KPIs and investments undertaken by the firm.

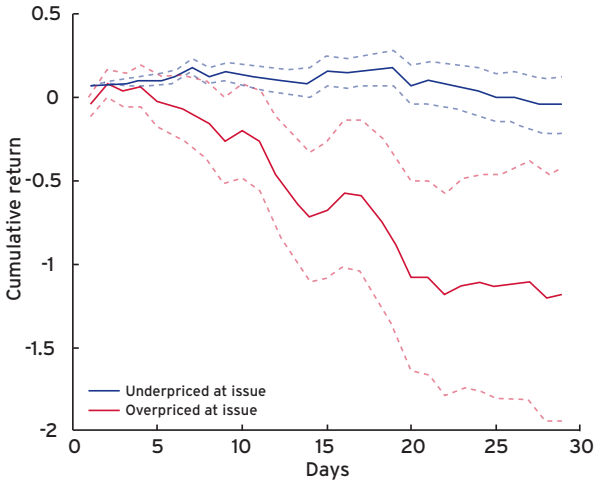
Empirically, the authors find that during their sample period starting in November 2018 and ending in February 2022, the average (median) coupon penalty observed on SLBs was approximately 28 (25) basis points. From a security design perspective, this begs the question as to whether the size of the penalty of the SLBs issued so far is sufficiently high to incentivise firms and their managers to reach the stipulated KPIs. This question is further examined in Chapter 5.

4.3 ARE SLBS FAIRLY PRICED AT ISSUANCE?

In their study, Berrada et al. (2022) also examine whether SLBs are fairly priced at issuance. To address this issue, they develop a mispricing measure that relies on an SLB's actual issue price and an upper and lower bound defined, respectively, as the theoretical SLB prices if the sustainability target is reached with certainty and if it is never reached. This procedure allows them to circumvent the fact that one can observe neither the probability of a firm reaching the target nor the sustainability appetite and thus the demand of investors for a specific SLB issue. Moreover, with the mispricing measure, the authors can identify the extent of mispricing for each individual bond as well as potential wealth transfers between bondholders and shareholders at issuance.

Three main findings can be derived from their subsequent empirical analysis. First, when the mispricing measure is strictly larger than one, SLB issues are overpriced. The overpriced bonds represent approximately 20% of the sample. Empirically, such overpricing leads to a post-issuance decrease in prices in the secondary bond market (see Figure 4.5). In Figure 4.5, the solid red (blue) line shows the 30-day post-issuance cumulative returns of overpriced (underpriced) SLBs. The secondary market performance difference between overpriced and underpriced bonds is approximately 1.2 percentage points during a 30-day horizon after issuance.

FIGURE 4.5 **SLBS POST ISSUANCE PERFORMANCE**



Note: The graph shows the cumulative SLB returns 30 days after the issuance date for underpriced SLBs (blue) and overpriced SLBs (red). The shaded areas represent the 95% confidence interval. Units are in percentage.

Source: Berrada et al. (2022).

The second finding is that when firms issue overpriced SLBs, a significant wealth transfer occurs from the bondholders to the shareholders of the issuing firms, with stock prices reacting more positively when firms issue more overpriced SLBs. Indeed, the authors estimate a 1.8 percentage point higher abnormal stock market reaction for an interquartile range increase in the mispricing measure. Third, they document a large heterogeneity in the pricing (and resulting yield discounts or premiums) of these bonds.

A final and important practical implication of their analysis is that it allows for a comparison of the original market yield of each SLB at issuance with the standard industry-computed yield at issuance. This yield comparison suggests that the industry generally 'overstates' the yield discount on an SLB for the issuing firm because the industry-computed yield typically ignores the expected coupon penalty faced by these firms.

As SLBs and other sustainability-related fixed instruments proliferate, understanding their incentive-compatibility structure and pricing will become even more important for responsible investors who embed such instruments in their asset allocation strategies.

CHAPTER 5

Can institutional investors truly move the needle? Financial and sustainable impacts of their responsible investment strategies

KEY FINDINGS

- A large body of literature on ESG shareholder activism demonstrates that such activism (or 'voice') can lead to desirable sustainability improvements at the firm level.
- In particular, responsible shareholders who engage with firms can be successful in improving their operating performance, profitability, efficiency, and corporate governance.
- Finally, there is evidence – though limited so far, due to data availability – that green bonds and sustainability-linked bonds can lead their issuing firms to reduce their CO_2 emissions.

In this chapter, we examine whether responsible institutional investors can truly move the needle, that is, whether they can be effective in pushing firms to adopt sounder and more efficient environmental, social, and governance policies through their responsible equity and fixed-income investment strategies. In a way, this chapter addresses the question highlighted in Chapter 3, namely, that there is evidence that responsible investors invest consistent with their ESG promises. However, it is less clear that they have real world impact.

5.1 RESPONSIBLE INVESTORS AS ACTIVE ESG INVESTORS

It is well known from the study by Amel-Zadeh and Serafeim (2018), as well as from our own analysis in Chapter 1, that negative screening or so-called 'exit' strategies play a significant role in investors' responsible investment strategies. This is paradoxical, as a recent theory paper by Broccardo et al. (2022) demonstrates that 'voice' strategies are

more aligned with social incentives than are 'exit' strategies. Thus, in this section we review the recent evidence on firm-level financial and sustainable outcomes associated with voice and, more precisely, ESG engagement strategies.

Dimson et al. (2015) conduct an in-depth analysis of the ESG engagement strategy of a large institutional investor by studying proprietary data on the investor's ESG engagements from 1999 to 2009. They find that, on average, these ESG engagements led to a positive, size-adjusted abnormal return of +2.3% during the year after initial engagement. The average one-year, size-adjusted abnormal return after initial engagement was +7.1% for successful engagements, but neither a significant nor negative reaction was observed for unsuccessful ones. Furthermore, they find that engaged companies improved their operating performance, profitability, efficiency, and corporate governance. In their paper, Barko et al. (2022) examine 847 separate engagements by a large European ESG activist fund and find that, although the impact of these engagements is almost neutral on engaged firms' accounting performance, they increase the ESG scores of ex-ante poorly rated firms and decrease those of firms with ex-ante high ESG scores. In a similar spirit, Hoepner et al. (2022) find that engagement has beneficial effects by reducing firms' downside risk. More recently, the study by Naaraayanan et al. (2021) examines the Boardroom Accountability Project (BAP), using a difference-in-differences approach to assess the effectiveness of environmental engagements. The authors find that, following these engagements, targeted firms significantly reduce their toxic releases, production-related emissions, and greenhouse emissions. The authors further document that the BAP engagement initiative had positive externalities on the local economies around the plants of the targeted firms (by improving, for instance, public health). Finally, Akey and Appel (2020) note beneficial environmental effects resulting from hedge fund activism. Dimson et al. (2021) focus on the effects of coordinated ESG engagements, where instead of a single investor engaging with firms, a coalition of investors targets firms and engages with them on ESG issues. This latter paper also finds evidence of beneficial effects from coordinated engagement.

The studies cited above, together with a large body of literature on ESG activism, demonstrate that ESG activism (or 'voice') can lead to desirable sustainability improvements at the firm level. But can institutional investors also be effective as debtholders, which tends to be the case for most asset owners?

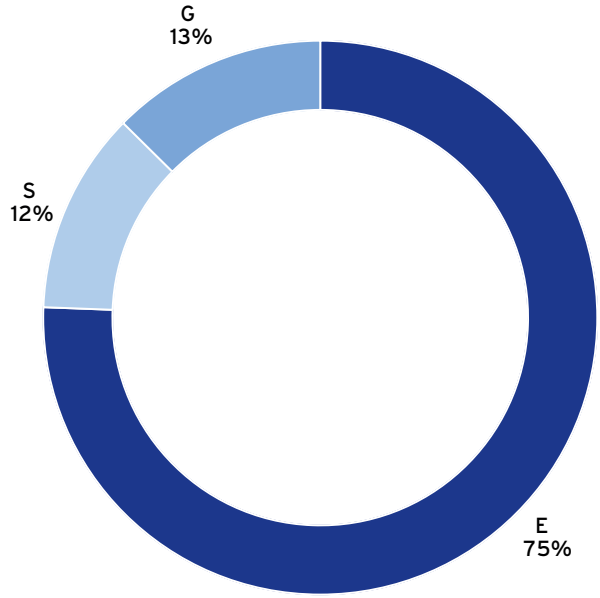
5.2 EVIDENCE FROM INSTITUTIONAL INVESTORS AS FIXED-INCOME INVESTORS

The literature on sustainability effects at the firm level associated with the issuance of sustainability-related fixed-income investments is still sparse. We can draw some conclusions based on the study on green bonds by Flammer (2021). The author finds that after issuance, the environmental rating of the issuing firms increases and firm-

level CO_2 emissions significantly decrease relative to characteristics-matched firms. Based on her findings, she argues that firms issue green bonds to send a credible signal of their environmental commitment, but her study does not support the competing greenwashing or access to more inexpensive cost of capital hypotheses.

We expand on her findings by addressing a similar empirical question for SLBs. As we showed in the previous chapter, since these bonds embed an incentive compatible feature, it is worthwhile examining whether the mechanism of SLBs is indeed effective and leads firms that have issued SLBs to significantly reduce their CO_2 emissions (or CO_2 emission intensities) in the years following their issuance.

FIGURE 5.1 **KPI TARGETS USED WHEN ISSUING SLBS**



Notes: The pie chart shows the KPI mentioned in the SLB prospectus that can be allocated to an environmental, governance or social target. The percentage shows the fraction of E, G and S KPIs among all KPIs identified in the sample.

Before we present our empirical analysis, it is important to mention that most SLBs have KPIs related to the environment, as illustrated in Figure 5.1. The figure shows that 75.6% of the SLB issues have KPIs that are environmentally related, and in most cases, the KPI focuses on CO_2 emissions reductions at a prespecified horizon (i.e., the step-up date, which is the date at which the coupon penalty can be triggered if the KPI target is not reached). Thus, we limit the analysis of SLBs' real effects to the impact of SLB issuance on potential reductions in subsequent CO_2 emissions (or intensities) by the issuing firms.

In the empirical analysis of the real effects of SLB issuance, we build on the dataset for SLB issuing and control firms as described in Chapter 4 (and Appendix B). We focus on SLBs issued in 2021 because only a few issues occurred before 2021. For each firm that issued an SLB in 2021 and for which we observe CO_2 emissions data, we use nearest-

neighbour matching on industry, *log(Assets)*, and *Leverage* without replacement (i.e., we match the SLB issuer to the most similar firm in the issuer's industry based on size and leverage). We choose to match on industry, *log(Assets)*, and *Leverage* mainly because our analysis in Table 4.1 shows that there are differences across industries in terms of the propensity to issue SLBs, and Table 4.3 shows that firm size and leverage are positively correlated with SLB issuance. In total, we are able to identify 42 SLB issuers in 2021 for which we observe sufficient CO_2 emissions data. The reduction in the number of SLBs studied results from the fact that we require CO_2 emissions data to be available, and these data are not available for all firms and typically become available only with a certain lag (Zhang, 2022). In other words, as of the autumn of 2022, many firms have still not disclosed all CO_2 emissions data for 2021.

Using the matched sample, we now examine the real effects of SLB issuance on CO_2 emissions. We estimate a difference-in-difference regression where we regress several CO_2 emissions measures on a 'treatment dummy' *1(firm-issued SLBs in 2021)*. The dummy identifies firms that issued an SLB in 2021:

$$y_{it} = a + b\ 1(\textit{firm-issued SLB in 2021})_{it} + \textit{fixed effects} + e_{it}, \tag{5.1}$$

The coefficient of interest *b* measures whether SLB-issuing firms reduce emissions more after issuance relative to similar matched firms. We estimate the coefficient using OLS regressions with standard errors clustered at the firm level. Y_{it} are the different CO_2-related variables, that is, *the percentage change in CO_2 emissions and percentage change in CO_2 intensity*. We also estimate a variant of the above specification in which we use a dummy if, in 2021, the firm issued an SLB with an environmental KPI. We report the results in Table 5.1. In this table, Panel A reports the results for the *percentage change in CO_2 emissions* using the dummy that marks firms that issued an SLB (columns (1) to (3)) and the dummy that marks firms that issued an SLB with an environmental KPI (columns (4) to (6)). Panel B reports the results using *percentage change in CO_2 intensity* as the dependent variable.

Table 5.1 shows that most estimated coefficients are not significant, likely for several reasons. First, the sample of SLBs we study is relatively small. Second, we have only a limited number of observations we can use to calculate the before/after difference in emissions, since the SLBs we study have been issued only recently. In fact, our analysis consists of comparing only two years – the year of issuance (2021) with the year preceding issuance (2020). A third reason for not finding strong effects is that firm-level CO_2 emissions data become available only with a lag. Fourth, firms' average target date to meet their KPI for CO_2 emissions reductions typically extends over a five-year horizon, and emissions may not be linearly declining over that time horizon.

TABLE 5.1 **REAL EFFECTS OF SLB ISSUANCE**

Panel A: Absolute CO_2 emissions

	Dependent variable: % change in CO_2 emissions					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm issued SLB in 2021	0.042 (0.78)	-0.095 (-0.88)	-0.093 (-0.85)			
SLB with environmental KPI in 2021				0.039 (0.80)	-0.069 (-0.79)	-0.053 (-0.52)
Observations	165	165	165	165	165	165
Year Fixed Effects	N	Y	Y	N	Y	Y
Region fixed effects	N	N	Y	N	N	Y
Industry fixed effects	N	N	Y	N	N	Y

Panel B: CO_2 emission intensities

	Dependent variable: % change in CO_2 intensity					
	(1)	(2)	(3)	(4)	(5)	(6)
Firm issued SLB in 2021	-0.05 (-1.01)	-0.08 (-0.77)	-0.073 (-0.71)			
SLB with environmental KPI in 2021				-0.112** (-2.46)	-0.144* (-1.75)	-0.132 (-1.37)
Observations	164	164	164	164	164	164
Year fixed effects	N	Y	Y	N	Y	Y
Region fixed effects	N	N	Y	N	N	Y
Industry fixed effects	N	N	Y	N	N	Y

Notes: This table shows difference-in-difference regressions in a matched sample of SLB and non-SLB issuers. For each SLB issuer, we use nearest-neighbor matching to identify the firm in the same industry that is closest in terms of log(Assets) and Leverage. The dependent variable is % change in CO2 emissions (Panel A) and % change in CO2 emissions intensity. The main independent variables are a dummy indicating if the firm issued an SLB in 2021 (columns (1)-(3)) and a dummy indicating if the firm issued an SLB in 2021 with an environmental target (columns (4)-(6)). The sample is restricted to the years 2020 and 2021. Standard errors are clustered at the firm level. t-statistics are presented in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Despite these limitations, we do uncover some significant effects. These are found in Panel B, which focuses on percentage change in CO_2 intensity, perhaps because many firms state CO_2 reduction targets in relative terms (i.e., in terms of intensities). Notably, column (4) in Panel B of Table 5.1, which shows changes in the percentage change CO_2 intensity variable following the issuance of an SLB with an environmental target, indicates that firms that have issued an SLB with an environmental target reduce their emissions intensity more relative to control firms (and firms that have issued SLBs with nonenvironmental targets). Perhaps not surprisingly, the results are weaker when fixed effects are accounted for (columns (5) and (6)). Relative to control firms, 'treated firms' reduce CO_2 emissions intensities by approximately 11 to 14 percentage points more. These effects seem sizeable, but we should bear in mind that they are estimated using only a small sample. Overall, our results should be taken with a grain of salt and seen as providing only preliminary evidence of the real effects of SLB issuance, which need to be confirmed after more SLB issuance data – and above all, the most recent CO_2 emissions data – become available.

To summarise, the literature that documents and quantifies the real effects of institutional investors' responsible investment strategies on firms' sustainability efforts and policies is still nascent and is insufficient for making firm conclusions on whether their combined effects on the real economy are significant. Some research shows that institutions can have an impact, primarily through engagement strategies. However, as Gibson Brandon et al. (2022) show, some institutional investors, predominantly in the United States, choose to adhere to sustainable investment principles such as the PRI simply for commercial reasons and to attract higher inflows – not necessarily to live up to responsible investment principles and push firms to act more sustainably. Thus, greenwashing among institutional investors is a genuine concern. It is important in light of these facts to examine whether institutional investors can collectively offer sufficiently strong market discipline to push firms in the right 'sustainability direction' and/or whether we need market regulations to move firms to adopt more sustainable policies and actions. This question will be examined in the next chapter.

CHAPTER 6

Challenges for institutional investors to act as responsible investors

KEY FINDINGS:

- Financial and commercial motives that favour firms' ESG adoption, lack of harmonisation and standardisation in ESG measurement and reporting standards, as well as methodological and data-driven issues that lead to ESG rating disagreement represent some of the main challenges for institutional investors who want to invest responsibly.
- ESG rating disagreement among data vendors can be quite large, especially for the S and the G pillars. ESG rating disagreement increases firms' cost of capital as investors require a higher risk premium for stocks that are prone to high ESG rating disagreement.
- There is empirical evidence that among PRI signing institutions, greenwashing is more prevalent in the United States than in Europe and it remains to be seen whether this gap will widen with the ongoing adoption of more stringent sustainable finance regulation in Europe.
- What is the future outlook for ESG and for responsible investors? This perspective raises many subtle questions which we address while keeping in mind that as ESG investing is about to become mature, one should not lose track of its long-term orientation for value creation.

In this chapter, we first provide a typology and shed light on the main challenges that prevent institutional investors from contributing effectively to a more sustainable economy with their investment policies. Second, we examine whether market discipline is a sufficient mechanism to make institutional investors act responsibly or whether regulation is needed to promote that objective.

6.1 MAIN CHALLENGES

We distinguish between (a) financial and commercial motives that favour ESG adoption, (b) lack of harmonisation and standardisation in ESG measurement and reporting standards, (c) methodological and data-driven issues that lead to ESG rating disagreement among the various ESG data vendors, and finally (d) other issues.

6.1.1 Financial and commercial motives as drivers of responsible investment adoption

In their survey of a sample of mainstream institutional investors, Amel-Zadeh and Serafeim (2018) find that ESG considerations matter to a large majority of the respondents (63%) because they are perceived as financially material to their portfolios' investment performance. The research also finds that ethical motives are more important for European than US institutional investors regarding adoption of ESG investment. On a related note, Gibson Brandon et al. (2022) find that among US investors, commercial motives may be one of the main drivers for signing up to the PRI principles. However, as pointed out in Chapter 3, some US PRI investors do not follow through on their responsible investment commitments and do not incorporate ESG issues into their equity investment decisions. Indeed, these investors seem to adhere to responsible investing by signing the PRI for purely opportunistic reasons, as they can attract significantly higher investor flows after joining the PRI. Gibson Brandon et al. (2022) do not find similar inflow benefits for non-US PRI signatories, suggesting that outside of the United States, investors join the PRI for more genuine reasons (possibly because they are more intrinsically motivated to pursue responsible investments). To summarise, these results suggest that the PRI label may, at least in the United States, be used opportunistically by some investors who tend to greenwash. These investors are also more likely to sign the PRI after they have recently underperformed, perhaps to make up for lost business. Moreover, the fact that clients still channel significantly higher inflows into such institutions begs the question as to whether market discipline suffices to protect clients from greenwashing, a topic we will address further in the next section.

6.1.2 Lack of harmonisation and enforcement of ESG measurement and reporting standards

There are several impediments to adequately measuring sustainability and reporting on firms' sustainability performance. First, sustainability encompasses environmental, social, and governance dimensions, which are all multidimensional and often lack quantitative measurements (except for some environmental KPIs), meaning that all of the reported ESG information remains rather descriptive and subjective by nature. Second, one needs to decide whether the ESG information reported should focus on single materiality (i.e., financially relevant information) or double-materiality standards, which would also consider information regarding firms' impacts on the wellbeing of other stakeholders, even if this ESG information is not financially relevant (Krueger and Pasche, 2021). Furthermore, most of the reporting done by firms on sustainability matters remains to a large extent voluntary and thus subject to selection bias. Finally, in their global survey, Amel-Zadeh and Serafeim (2018) emphasise that the lack of ESG data comparability across firms and the lack of ESG reporting standards are seen by

more than 40% of the respondents as the two largest impediments when implementing ESG investment strategies. Over the last 20 years, we have seen a proliferation of ESG reporting and disclosure standards aimed at nonfinancial firms. Below, we describe some prominent ESG reporting standards and frameworks:

The **Global Reporting Initiative** (**GRI**) **Standards** are led by an international independent organisation founded in Boston in 1997 and represent the first set of global standards for sustainability reporting. The GRI's objective is to assist organisations in reporting their impact on the economy, the environment, and people in a trustworthy and comparable manner. As such it is a double-materiality standard. The standards include the GRI Universal Standards, which apply to all organisations; the GRI Sector Standards, applicable to specific sectors; and the GRI Topic Standards, each listing disclosures relevant to a particular topic. According to the UN Sustainable Stock Exchanges (SSE) Initiative, as of December 2021, the GRI standards are the most commonly cited standards in the ESG disclosure guidelines for global stock exchanges.

The **Sustainability Accounting Standards Board** (**SASB**) was formed in 2011 "to establish disclosure standards on sustainability matters that facilitate communication by companies to investors of decision-useful information" (Cort and Esty, 2020). Its focus was primarily on financially material sustainability information, thus adopting a single-materiality approach. In 2018, the SASB issued different industry- and sector-specific standards covering the minimum sustainability reporting requirements for a wide variety of firms. In June 2021, the SASB and the International Integrated Reporting Council (IIRC) announced their merger to form the Value Reporting Foundation (VRF). In November 2021, the IFRS Foundation announced its commitment to consolidate the Climate Disclosure Standards Board (CDSB), which was an initiative of the CDB, and the VRF. As of August 2022, the IFRS Foundation has also completed the consolidation of the VRF into its organisation. It is likely that the SASB standards will play an important role in the General Sustainability-related Disclosures that the International Sustainability Standards Board (ISSB), which is part of the IFRS Foundation, is currently developing.

In terms of prominent reporting standards and frameworks regarding climate change-related disclosures, we can cite the following.

The **Task Force for Climate-related Financial Disclosures** (**TCFD**) was created by the Financial Stability Board (FSB) in 2015 and mainly targets firms', banks', and investors' climate risk disclosures. It has issued 11 climate-related financial disclosure recommendations spanning governance, strategy, risk management, as well as metrics and targets. The TCFD identified seven categories of climate-related metrics and seeks the disclosure of metrics aligned with these to support convergence in the disclosure of key metrics. Although the TCFD recommendations remain a voluntary framework,

their association with the FSB gives them significant legitimacy within the financial sector. Governments around the world have begun to codify aspects of the TCFD recommendations into their climate policies and regulations, and are even considering their mandatory adoption (Ilhan et al., 2023).

The **EU Taxonomy** is a comprehensive classification system for sustainable economic activities developed by the European Commission. Its main purpose is to provide a common benchmark for investors and banks and to scale up investments in the sustainable sector to meet the 2015 Paris climate goals. The EU Taxonomy specifies climate-related KPIs for large nonfinancial companies. It establishes a catalogue that firms can use to check whether an investment can be labelled as green. It also links the taxonomy to disclosure at the firm level. Disclosure is binding for all large companies, SMEs with securities listed on regulated markets (other than listed microenterprises), and financial market participants, including occupational pension providers that offer and distribute financial products in the European Union (including those from outside the Union).

We argue that the main problem today is not a lack of ESG reporting standards, but their worldwide proliferation and heterogeneity in terms of ESG scope, requirements, and measurement techniques. This, coupled with the fact that firms often comply with these standards on a voluntary and non-audited basis, generates self-reporting biases and validation concerns for investors and rating agencies that rely on these firms' ESG reports for decision making.

Regarding the harmonisation of these standards, we should mention that the main harmonisation effort to unify ESG reporting standards is the International Sustainability Standards Board. The ISSB was established in November 2021 under the IFRS Foundation. Its goal is "to respond to the need for high-quality, transparent, reliable, and comparable reporting on climate and other ESG matters" (as stated by Robert G. Eccles, SASB Founding Chair). In March 2022, the ISSB released two exposure drafts (Eds) on IFRS Sustainability Disclosure Standards. The objective of the General Requirement ED (IFRS S1) and the Climate ED (IFRS S2) is to provide a core framework for the disclosure of financially material information on all significant sustainability- and climate-related risks and opportunities across an entity's value chain that is useful to primary users of general-purpose financial reporting when assessing enterprise value – the 'single materiality' concept. The body committed to consolidating the CDSB and the VRF by June 2022. It also signed a collaboration agreement with the GRI to coordinate its standard-setting activities.

To conclude, academic research has often evidenced the benefits to firms and investors of greater disclosure regarding financial reporting; however, further studies are clearly needed to justify whether the same statement applies to sustainability disclosure. Important evidence in this respect is emerging. For instance, Krueger et al. (2023)

document liquidity benefits from mandatory ESG disclosure. Moreover, it is still an open issue as to whether the costs and benefits associated with enhanced and harmonised ESG disclosure can be optimised through market discipline or whether we need regulation and thus make them binding.

6.1.3 Data, measurement issues, and ESG ratings disagreement

Unlike credit ratings, ESG ratings are most often created while relying mainly on non-standardised and soft information, which is often voluntarily disclosed by firms. There is also no regulation specifying how these ratings should be constructed. In addition, as mentioned in Chapter 1, methodologies are often opaque and proprietary. As a result, ESG ratings can diverge substantially (Mackintosh, 2018). Despite the increasing relevance of ESG ratings, there are relatively few large-scale studies examining the nature and consequences of ESG ratings disagreements. While some research on why ESG ratings diverge is now beginning to emerge (e.g., Berg et al., 2022; Christensen et al., 2021), it is still not well understood whether there are financial or other real consequences stemming from ESG ratings disagreements.

Gibson Brandon et al. (2021a) attempt to bridge this gap and first document, using seven different ESG ratings, that the level of disagreement across ratings vendors (as evidenced by low pairwise correlations between the ratings issued by different vendors) can be quite large, especially for the governance pillar, as illustrated in Table 6.1. For instance, the average correlation across seven ratings is about 0.45 for the total rating and 0.46, 0.33, and 0.16 for the individual E, S, and G pillars, respectively.

In their main empirical analysis, the authors examine whether there is a significant impact of ESG ratings disagreements on stock returns. For that purpose, they measure ESG ratings disagreements using the standard deviation of the available ESG ratings from the seven different data providers for a given firm at a given point in time. They calculate the disagreement measures for the total ESG rating and separately for the E, S, and G dimensions (or 'pillars'). They then relate monthly stock returns to this proxy for ESG ratings disagreements, controlling for the standard stock characteristics that are known to have predictive power in the cross-section of stock returns (e.g., size, momentum, quality).

The results suggest that stock returns are positively related to ESG ratings disagreements. Further tests show that the relationship is driven mainly by disagreement over the environmental rating pillar. In terms of economic magnitude, an interquartile range increase in ESG ratings disagreements is associated with an increase of 92 basis points in the annual cost of firms' equity capital. Hence, ignoring differences in ESG ratings disagreements in corporate valuations could lead to sizeable mistakes when estimating the value of a firm's equity.

TABLE 6.1 **CROSS-CORRELATIONS BETWEEN RATINGS ISSUED BY DIFFERENT ESG RATING PROVIDERS**

	N	Mean	StdDev	Pearson correlations					
	(1)	(2)	(3)	(4) Asset4	(5) Sust.	(6) Inrate	(7) Bloom.	(8) FTSE	(9) KLD
Panel A: Total pillar									
Asset4	42,087	0.501	0.289						
Sustainalytics	44,078	0.501	0.289	0.752					
Inrate	26,037	0.501	0.284	0.233	0.303				
Bloomberg	44,464	0.501	0.289	0.750	0.693	0.124			
FTSE	17,220	0.501	0.288	0.568	0.614	0.267	0.586		
KLD	44,951	0.501	0.288	0.524	0.559	0.292	0.477	0.488	
MSCI IVA	43,775	0.501	0.289	0.396	0.434	0.318	0.303	0.266	0.439
Avg. correlation					0.447				
Panel B: Environmental pillar									
Asset4	42,019	0.501	0.289						
Sustainalytics	44,020	0.501	0.289	0.706					
Inrate	26,036	0.501	0.286	0.305	0.487				
Bloomberg	37,624	0.501	0.289	0.647	0.557	0.206			
FTSE	17,220	0.501	0.288	0.654	0.678	0.368	0.607		
KLD	44,669	0.501	0.280	0.575	0.609	0.422	0.431	0.581	
MSCI IVA	43,580	0.501	0.289	0.233	0.352	0.404	0.187	0.239	0.312
Avg. correlation					0.455				
Panel C: Social pillar									
Asset4	42,087	0.501	0.289						
Sustainalytics	44,078	0.501	0.289	0.617					
Inrate	26,037	0.501	0.288	0.133	0.143				
Bloomberg	44,364	0.501	0.288	0.685	0.527	0.062			
FTSE	17,220	0.501	0.288	0.637	0.501	0.106	0.560		
KLD	44,951	0.501	0.288	0.367	0.391	0.129	0.276	0.271	
MSCI IVA	43,775	0.501	0.289	0.266	0.303	0.236	0.202	0.191	0.337
Avg. correlation					0.33				
Panel D: Governance pillar									
Asset4	42,087	0.501	0.289						
Sustainalytics	44,078	0.501	0.289	0.331					
Inrate	26,037	0.501	0.283	0.297	0.401				
Bloomberg	44,464	0.501	0.282	0.432	0.327	0.344			
FTSE	17,220	0.501	0.288	0.027	0.160	-0.029	-0.027		
KLD	44,951	0.501	0.248	0.104	0.089	0.081	0.153	-0.065	
MSCI IVA	43,775	0.501	0.288	0.132	0.135	0.145	0.060	0.023	0.133
Avg. correlation		0.155							

Notes: This table shows summary statistics and Pearson correlations between the ratings of the seven different data providers. The results are displayed in separate panels for the Total rating and the separate E, S, and G pillar ratings. The first three columns show the descriptive statistics of the different ESG providers' ranked scores (number of firm-month observations (N), mean (Mean), and standard deviation (StdDev)). The following columns display the pairwise cross-correlations. We also display the average pairwise correlation between providers in the last row of each panel.
Source: Gibson Brandon et al. (2021a)

Why should ESG ratings disagreements matter to institutional investors who invest responsibly? As illustrated in Chapter 1 of this report, two strategies are currently very popular in the responsible investment landscape: screening and ESG integration. If asset managers and investment managers wish to optimise financial performance while investing responsibly, they should care about ESG ratings disagreement and its impact on stock returns. Indeed, the analysis in Gibson Brandon et al. (2021a) suggests that with positive (negative) screening, they should buy (sell) primarily those stocks that, for a given high (low) ESG rating, command the lowest (highest) level of ESG disagreement. This should allow positive (negative) screeners to mitigate the adverse impact of ESG ratings disagreements on their buy (sell) trades' expected future returns. Similarly, an ESG integration strategy may fail to deliver its financial promises if it does not search simultaneously for stocks that have superior ESG ratings and embed the lowest level of ESG ratings disagreements within an industry. Indeed, controlling for a low level of ESG ratings disagreements allows investors who integrate ESG criteria into their stock selection process to avoid a subsequent unintended stock price decline. Finally, from an ESG perspective, to be sure that as an investor you are mostly allocating your portfolio to high ESG stocks, you should select those with low ESG ratings disagreements; otherwise, you cannot totally exclude being exposed to less-sustainable stocks. Similarly, if you want to favour ESG engagement strategies and improve firms' ESG policies, you should pick stocks that have both low ESG ratings disagreements and low ESG ratings. Perhaps the latter is also a reason we do not find strong effects of engagement strategies on ESG portfolio performance in Chapter 2.

6.1.4 Other issues

In addition to data reliability and lack of standardisation in firms' ESG reporting, Amel-Zadeh and Serafeim (2018) report in their survey of institutional investors that the third major obstacle (according to 40.5% of respondents) to implementing ESG strategies is the cost of gathering and analysing ESG data. It would be desirable to foster more transparency of and disclosure on the effective costs associated with ESG data analysis and more information on the resources (e.g., personnel costs) that investors dedicate to ESG matters.

Another problem documented in Chapter 4 is that some ESG products – especially new fixed-income instruments with ESG attributes, such as SLBs or social bonds – are complex to understand, value, and embed efficiently in an asset allocation strategy. Some of these instruments can also have low liquidity, making them unattractive to some institutional investors. This begs the question as to whether the sustainable finance literacy of asset managers and investment managers who use such instruments is sufficient, especially when it comes to small organisations with limited budgets dedicated to their employees' education.

Finally, one should not underestimate the role of managerial incentives and suitable KPIs in promoting sustainability as an investment goal. Indeed, as long as the debate on whether financial and sustainable performance are complements or substitutes is not settled, and as long as CIOs are evaluated and remunerated based exclusively on their financial performance, there seem to be few incentives for managers to truly push for responsible investment strategies. Recently, there has been an emerging trend in some countries – such as France, Germany, Denmark, and the United States – to base part of the variable compensation of CEOs and other high-level executives of nonfinancial firms on their sustainable performance and to use sustainability KPIs. Flammer et al. (2019) document in their empirical study on S&P 500 firms that have adopted such policies that CSR contracting helps to direct managers' attention to stakeholders that are less salient but financially material to the firm in the long run, thereby enhancing firms' corporate governance. In fact, the PRI has recently (in 2021) issued recommendations that invite investors to support the ESG performance–remuneration link in nonfinancial firms' remuneration policies.[7] However, it would be desirable to expand on that trend in the asset management industry itself and not only among nonfinancial firms.

6.2 GREENWASHING, MARKET DISCIPLINE, AND ESG REGULATION

The abovementioned challenges and a propensity to greenwash by some institutional investors (as documented in Chapter 3) naturally beg the question as to whether market discipline alone suffices in promoting genuinely responsible actions among institutional investors or whether we need regulations to foster their sustainable behaviours and tangible sustainable outcomes. To draw inferences from that question, we now rely on a comparison between the United States and Europe, recognising that institutional investors' sustainable strategies, products, services, and disclosure policies are much more regulated in Europe. Perhaps because of more developed regulations in some parts of the world, we also observe strong geographical differences in investor ESG performance across regions (as documented in Chapter 1 of this report).

We draw on the recent study by Gibson Brandon et al. (2022) and focus on PRI signatories around the world. The study provides evidence that greenwashing among PRI signatories is far more pronounced in the United States than in Europe. The authors suggest that this difference could be explained by several nonexclusive factors. First, as already stated in Section 6.1, commercial motives play a more prominent role in the United States for adopting responsible investing and could thus exacerbate US institutional investors' propensity to greenwash to either mask poor past performance

7 See www.unpri.org/executive-pay/esg-linked-pay-recommendations-for-investors/7864.article

and/or attract significantly higher investor flows. Second, the European ESG market faces less regulatory uncertainty, given that since the launch in 2018 of the European Commission's Action Plan on Financing Sustainable Growth[8] in particular, Europe has been pushing forward a host of sustainable finance-related regulations.

Indeed, a possible explanation for why US PRI signatories do not fully implement ESG investing could be the concern that considering ESG factors may still not be perceived as compliant with their fiduciary duties. On the contrary, non-US PRI signatories may implement ESG because there is more regulatory clarity over whether incorporating ESG issues is consistent with institutions' fiduciary duties.

To examine the role of increased legal clarity regarding the compatibility of ESG with fiduciary duties, Gibson Brandon et al. (2022) analyse the effects of the UK Law Commission and clarify that considering ESG factors was consistent with investors' fiduciary duties. In response to the 2012 Key Review of UK Equity Markets and Long-Term Decision Making, the UK government asked the Law Commission in 2013 to examine the fiduciary duties of investment intermediaries. As a result of this project, the Law Commission put forward that trustees may consider ESG issues when making investment decisions, clarifying that considering ESG issues is compatible with investors' fiduciary duties, particularly when these ESG factors are financially material.

Relying on a difference-in-difference research design, Gibson Brandon et al. (2022) also test whether the UK Law Commission's clarifications reduced greenwashing by PRI signatories in the UK. The analysis shows that it did: following the clarification, PRI signatories in the UK were found to improve their equity portfolio ESG performance relative to non-signatories in the UK. These results suggest that after regulations reduced the uncertainty over the fiduciary compatibility of sustainable investments, UK PRI signatories seemed to 'walk the ESG talk' more seriously.

Despite the limitations of using a single legal shock in a different country, this evidence – based on another common law country – supports the conjecture that the legal uncertainty in the United States over the fiduciary compatibility of ESG integration may preclude US PRI signatories from implementing ESG more thoroughly.

8 https://ec.europa.eu/commission/presscorner/detail/en/IP_18_3729

6.3 OUTLOOK: THE FUTURE OF ESG

As we come to the end of this report, there are many issues and open questions with regard to the future outlook and role of ESG for responsible institutional investors.

First, will enhanced regulation in the EU further widen the gap between the United States and the European ESG markets? The gap between the United States and Europe regarding the enforcement of sustainable policies that mitigate greenwashing is most likely to widen as new ESG regulations, such as the EU Sustainable Finance Disclosures Regulation (SFDR) and alignment with the EU Taxonomy, come into effect in Europe. However, the SEC has also recently proposed taking action to fight greenwashing[9] and fined a prominent investment manager over misstatements and omissions concerning ESG,[10] suggesting more future regulatory action in the United States. In addition, the SEC is considering the introduction of mandatory climate related disclosures (see also Ilhan et al., 2023).

Second, can market discipline also be a mitigating factor when it comes to greenwashing? Indirectly, this may be possible with the help of financial innovation and security design. We have seen in Chapter 5, for instance, that after the issuance of SLBs, firms tend to reduce their CO_2 emissions (even if our conclusion should be interpreted with caution, given the small sample of SLBs that have been issued until now and given that we do not yet have a sufficiently long time series to measure sustainability outcomes after SLB issuance). Thus, the debate between the effectiveness of market discipline versus regulation in promoting more sustainable economies is still wide open and necessitates further theoretical and empirical research to determine which policies can more effectively curb greenwashing.

Third, one may wonder whether enhanced regulation will exercise the necessary push to improve ESG data quality, measurement, and reporting. This is especially true for the S and the G pillars, which are subject to the highest level of disagreement among ESG rating providers (Gibson et al., 2021a). Europe can provide a welcome natural experiment in light of the upcoming enforcement of the EU Taxonomy, the SFDR, and the firm-level disclosure requirements resulting from the Corporate Sustainability Reporting Directive (CSRD) in comparing ESG data quality and transparency before and after these regulations take effect.

Fourth, at the macroeconomic level, one important issue deserves more focus by academics and policymakers. How can we make sure that 'alleged' sustainable investment products and strategies do exercise significant sustainable impacts at the aggregate economic level? Let's consider negative screening strategies, for instance. These can certainly improve the sustainability profile of the portfolios held by responsible

9 www.sec.gov/news/statement/peirce-statement-esg-052522
10 www.sec.gov/news/press-release/2022-86

investors. However, it is less clear how they can push the underlying firms towards more sustainable policies (such as branching their investments towards energy transition) unless the cost of capital of the firms becomes incredibly high. The same critique applies to positive screening strategies. Is there empirical evidence that those highly rated firms will continue to invest more into greener or more inclusive processes once their stocks are held by institutional investors, or will they simply further capitalise on their good ESG ratings? As Edmans (2023) states, "classifications into ESG and non-ESG buckets are typically based on current status rather than future potential. This highlights another problem with the metric-driven approach: metrics only capture what's happened in the past. Any analysis of long-term value would focus on a company's future potential; certainly, historic data is useful, but only to the extent it helps you forecast future cash flows".

Fifth, as we witness a rising trend in impact investing among institutional investors, a natural question that arises is what is (are) the link(s) between the concepts of sustainability and impact? This has implications when it comes to ESG or impact data gathering, to defining the relevant KPIs, and to setting impact investing and sustainability reporting standards. Do these two approaches converge or diverge, and how? Can, and should, impact metrics also be used by firms to match impact investors' expectations? And finally, can we build on some of the academic evidence developed in the sustainable finance literature to optimally allocate impact earmarked capital into the 17 Sustainable Developments Goals (SDGs)?

Finally, as claimed by Edmans (2023), ESG is about to migrate from a niche to a mainstream subject: "The biggest driver of this ascent is the recognition that ESG factors are critical to a company's long-term (financial) value." It is important to keep this long-term perspective associated with ESG investing, in particular as many investors have recently raised doubts regarding ESG investing based on the geo-political and macroeconomic turbulences of the year 2022, which led to broad-based underperformance of their ESG managed portfolios. But 'doing well by doing good' must be understood with that long-term perspective in mind, otherwise we may once more succumb to short-term incentives and decisions that come with their own externalities for our future generations.

Discussions

Giovanni Dell'Ariccia, *IMF*[11]

This is an incredibly informative report. I am not an expert in this field and learned a lot. I recommend this report to anybody who is looking for a one-stop window to learn about the academic literature on responsible investing.

What does the report do? The authors provide a good summary of their work in their report. In a nutshell, they explore the characteristics of investors that favour ESG equity investment; they examine the performance of these portfolios; they look into sustainability-linked bonds, which is a new avenue for this literature; and then they discuss what are the challenges going forward, and particularly the 'greenwashing' issue.

To begin, I wish to emphasise why ESG investing is an important topic. There is clearly significant heterogeneity in 'greenness', not only across industries but also across firms within the same industry. Across industries, the point is obvious and largely driven by technology: if, for instance, you work in the oil industry – relative to banking – of course your emissions are much worse, your carbon footprint is much worse. But even when you're looking within three- or four-digit industries, there is substantial heterogeneity across firms, so there is the hope that – at least in theory – by investing in more socially responsible firms, within each industry, we can influence corporates at some level, through the financing channel rather than the regulation. This phenomenon can be seen in one of the papers that one of our teams is putting together (Capelle et al., 2022).

As a general reaction to the report, I wish to emphasise that it is very comprehensive and well-written. That said, I have some constructive criticism on some of the empirical strategies. Further, some of the evidence presented – in my view – is hard to interpret (this is not just the report's evidence, but an issue with this literature more generally). Further, I believe that that the issues left open are incredibly interesting and probably the most relevant for policymaking.

First, the report is very dense, and I would encourage the authors to produce a draft along the lines of their excellent presentation. Beyond adding the interesting figures from the presentation, I would encourage them to provide a clearer explanation/description of the methodology they use in the various regressions and of their dataset. All of this would help readers and would increase the impact of the paper dramatically.

In terms of the results, it is not entirely clear how the authors compute the variables at the portfolio level. Looking at the appendix, it seems that the authors only include holdings in the portfolio of these investors for which there an ESG score is available. The authors should provide information on how large this portion of the portfolio is relative to the total portfolio.

11 The views expressed do not represent in any manner those of the International Monetary Fund.

Let's take the case of Fidelity: I don't know how many of the firms that are part of Fidelity Holdings have ESG scores. Maybe it is 99%, but maybe it is 5%. Since the regressions only focus on these firms, I find it hard to interpret what the coefficients mean for Fidelity as a whole. When I look at the risk-return frontier, for example, I would like to see what investing in ESG does for the risk-return frontier on an investor's entire portfolio, not just the portion for which an ESG score is available.

On a more technical level, what is the beta between the part of the portfolio for which an ESG score is available and the part of the portfolio for which it is not? This issue reminded me of a paper that Patrick Bolton and co-authors wrote a few years ago (Andersson et al., 2016). The authors argue that in order to have green investing, rather than targeting solar companies for instance, one would want to do what we are doing a little bit more now: targeting, within industries, the companies with the best ESG scores and then – as a constraint on your portfolio – to generate a beta of one with the market. Then, in case environmental regulation doesn't progress, such a portfolio will perform exactly like the market – as its beta is one. Conversely, if, over time, tighter environmental regulation is imposed, the portfolio will outperform the market, since companies with better ESG scores will perform better than their competitors in each industry.

It would also be interesting to look in more detail at the relationships between companies for which ESG scores are available and those for which they are not. The latter are unlikely to form a random sample. Most likely there is some correlation between the fact that a company is scored and the characteristics of that particular company, as opposed to a company that is not scored at all.

All this makes it a little hard to interpret some of the coefficients. For example, in the authors' sample, investors having a larger amount of assets under management that have an ESG score tend to do better, but we do not know whether it is because they have greater expertise in environmentally friendly companies, or because that is representative of the overall portfolio. A related point concerns the coefficient about concentration: I understand the interpretation that a company that is invested in very few sectors is – everything else equal – less exposed to environmental externalities than the ones that invest in the overall economy. However, I would like to know if this applies just to the ESG-scored companies or to the entire portfolio. Further, one could argue that by investing solely in sectors that are particularly exposed to environmental externalities, one would be more rather than less exposed. It follows that it is important to understand what kind of investors concentrate their holdings in one or two industries.

A related concern is that the result on concentration may be driven by specialization rather than concentration itself. For instance, suppose most 'concentrated' investors specialised in the oil industry. Then, if that were the case, their performance would be relatively lower from an ESG point of view, but it would be driven by specialisation rather than the fact that their portfolios are more concentrated. Thus, I encourage the authors to provide some information about these investors.

An additional point is that that it would be interesting to get a sense of the time series versus cross-section heterogeneity. I admit this point is a bit unfair to the literature on ESG investing, since we only have a few years of data available. Yet, one may suspect that that that much of the evidence in the report is driven by investors' structural characteristics and it is incumbent on the authors to provide a bit more clarity on what is driving the results – within or between heterogeneity? If the propensity to invest in ESG is structural, one should not see much time-series evolution, and the effects should be mainly cross-sectional. Yet, maybe these phenomena are trended, and entire industries improve over time. A few charts describing the dataset and what one should expect would help.

Finally, focusing on something Rajna said at the very end of her presentation, what is the interaction between ESG investing and monetary policy? Is ESG investing cyclical? Put differently, is ESG investing more similar to the real estate sector or to the energy industry? Is there more propensity to invest in environmentally friendly, governance-friendly industries when interest rates are low or when they are high, or essentially is it an acyclical sector? If there are enough data, it would be interesting to look at that. A similar story relates to the risk attitudes: does ESG investing benefit from flight to safety, or is it perceived as risky and suffers when monetary policy is tightened?

Finally, as I said at the beginning, the results on portfolio performance are very intriguing. If we take them at face value (meaning all the issues I raised about not considering the entire portfolio are non-important) and investors with better ESG performance manage to lower the volatility of returns without hurting average performance, this would be fantastic news. It would mean we don't need any political pressure or regulation to improve ESG performance; all we need to do is to show people that being good on the ESG front is also good for making money. Now, this in my view is hard to square with the results the authors present about the United States. If investors in the United States are 'cheating' (they are signing grandiose statements, but they don't 'walk the talk'), then why don't they 'walk' instead of 'talking', since by doing so they could reduce volatility without scarifying average returns? I think this is something that would be interesting to investigate.

Serena Fatica, *European Commission – Joint Research Center*[12]
Thanks a lot to the organisers for inviting me to discuss this very interesting report. This is an important and insightful report that manages to collect very new and interesting evidence on what is a very relevant topic, not only for the financial sector but also for policymakers and for the real economy itself.

12 The views expressed are not the views of the European Commission.

I will focus my comments on four main points made by the report. Some of them were already put on the table by Rajna in the last slides, while some others were already mentioned by Giovanni. So, I hope I can provide answers to some of them, hopefully without adding more question marks.

First, I will discuss the issues and challenges with ESG; secondly, still focusing on ESG, I would point out some literature that is investigating ESG from a cyclical perspective, so whether ESG is robust or whether sustainability preferences are robust to downturns and turmoil in financial markets; then, I was intrigued by the results on the difference between European and US (or rest of the world) investors in terms of the potential risk of greenwashing and here, of course – given my affiliation – I would like to bring to the table the role of regulation, which in my view is not to be overlooked in this case. Finally, I would focus on fixed income by looking in more details at the report's work on sustainability-linked bonds (SLBs) and contrasting it to what we know about sustainable fixed income securities that are based on the use-of proceeds approach.

Let me start with the issues and challenges from ESG. I think this is a discussion the authors could bring upfront in the report, where it is currently taken at the very end, to help the reader understand better some of the results that the report presents through its regressions.

It would be useful to inform the reader that there are measurement issues and noise in ESG ratings and ESG scores. There is some literature out there warning about the reliability and the comparability of the ESG ratings and scores across the many providers of such data. A recent report by KPMG counts around 160 market players that are providing ESG ratings currently; it's not only the four or five usual suspects that we know and that we use in our research. There is an issue of comparability not only in the cross-section but also in the time-series, as the different vintages of scores and ratings by the same providers might not be comparable as methodologies improve. The complexity and measurement issues in the ESG world could be driving some of the report's econometric results.

The authors, for instance, find that institutional investors use predominantly negative screening in their investment strategies. This result could be a sign that it is easier to divest from industries that are generally perceived as riskier in terms of climate change, such as fossil fuels, rather than 'cherry-picking' firms with the best ESG performance. The ability of ESG to reflect firm-level information is crucial when it comes to highly innovative companies in green technologies, such as 'cleantech', which are the backbone of the low-carbon transition.

The report's result that size and complexity/diversification of the funds by the investors correlate positively with ESG investing could indeed be a sign that only bigger and more sophisticated market players orientate themselves in the complex world of ESG.

Then, pointing out something that was already brought up by Pietro Garibaldi in his introduction, I think the underlying theme when you read the report – which is common to all of this literature, talking about ESG – is really whether this is all about the environmental component.

First of all, climate change mitigation is probably the most sustainable target we have, at least the one that was spelled out more clearly in international agreements; secondly, with all necessary caveats, CO_2 emissions are a hard measure of performance.

The flip side of this is that probably most of the noise in ESG might actually come from the social and the governance components. This is something that the authors could spell out clearly in their narrative.

The report partly takes this into account by separating in the regressions the E, the S, and the G components, and one can see that basically the overall coefficient in the regression in the first chapter is driven by the E. Again, discussing this explicitly would be useful.

Next, I would like to give a bit of the flavour of what the ESG ecosystem is, and where bottlenecks might arise. First, there are issues of data availability and accuracy for the issuers of financial products and companies. Second, a few elements are crucial for market data providers: their business model and governance, the reliability and transparency of their products, and the engagement with companies and issuers. Finally, on the investor side, greenwashing or the use of ESG as a pure marketing tool are the points to watch. Eventually, everything boils down to sustainability preferences by end investors that, in a way, complement the traditional risk and return trade-off in finance.

The European Commission is working on these dimensions on the regulatory side. It launched a public consultation from April 2020 to June 2022 on ESG ratings and sustainability factors in credit rating. The goal is also to try to understand whether market discipline is enough in this area, or whether some kind of regulation – which was the case for the European Green Bond Standard – is needed to protect investors and make sure that financial flows go to sustainable activities.

My second point on ESG echoes again something that has been already pointed out: is ESG investing something that has a long-term perspective?

Ultimately, what we want is for financial flows to go to the real economy into sustainable activities in the longer term. The question arises whether ESG investing is dependent on economic conditions and, if it is, how.

There is some literature that started along with the Covid outbreak looking into the performance and the resilience of ESG investing in times of crisis. Results are mixed.

On one hand, some papers suggest that sustainability preferences are sort of a necessity (e.g., Pastor and Vorsatz, 2020; Broadstock et al., 2021) and therefore robust to the cycle and turmoil in financial markets: end investors really want to invest in green or sustainable assets, irrespective of what happens to their income and to returns on financial markets. On the other hand, some papers reach the opposite conclusion that sustainability is a luxury good (Demers et al., 2020; Bansal et al. 2021; Döttling and Kim, 2022). When things go well, people invest in sustainable assets; when things start to go bad, or whenever the incentives are not that favourable towards sustainable investing, there is a flight to pure risk-return considerations, as in the standard, traditional finance theory.

What would be interesting to see here – having, for instance, the energy crisis in mind – is whether ESG investing is responding to changes in incentives. So, again, oil and gas companies have been very profitable lately. What has happened to investment by ESG funds? Did they continue to stay away from that or did they change their investment orientation following higher returns?

My next point concerns the role of regulation. The authors find that European investors are more likely to walk the sustainability talk. Most likely, regulation plays a role here.

In Europe, after the 2015 Paris Agreement the regulatory stance – at least on the environmental side – has been more certain and predictable, compared to the US withdrawal from the Paris Agreement under Trump's administration. This immediately translates into lower perceivable transition risk stemming from policy action in Europe versus the United States.

The report mentions the EU Taxonomy. Other initiatives taken in the past testify to the long-standing efforts of the European Commission to green the economy and finance as well. The Commission work started in 2018 with the Action Plan on Financing and Sustainable Growth, followed by the European Green Deal Investment Plan of January 2020, and the so-called Renewed Strategy for Financing the Transition to a Sustainable Economy in July 2021, with the proposal of regulation for European Green Bond Standard.

A first report published in February 2022 on Social Taxonomy is worth mentioning – a clear indication that sustainability does not only involve the E dimension.

What matters most for ESG ratings and scores is availability of information – transparency, disclosure and reporting then become of primary importance here. In this respect, a couple of relevant pieces of legislation are the Corporate Sustainability Reporting Directive, which acts on the first step of the ESG producing/supply chain, and the Sustainable Finance Disclosure Regulation, that applies already as of March 2021 and has an immediate bearing on financial market participants.

In Europe one can already identify investments on funds or investors that are 'green', along with the differentiation between 'very green' (Article 9) funds, and 'light-green' (Article 8) funds. This could be one of the reasons behind the finding in the report that subscription to the PRI in Europe corresponds to sustainable investment strategies: regulation constrains what some type of investors can do if they present themselves as green or sustainable to the public.

The last point of my discussion concerns fixed income. I liked very much the report's focus on sustainability-linked bonds – a new product that is more flexible than use-of-proceeds fixed-income instruments that are so far the stars of climate-finance.

If one has in in mind the supply side, one could ask whether SLB issuers are also issuing other types of sustainable instruments – green bonds, for instance – or if those instruments are used for financial diversification or other types of diversification.

This doesn't seem to be the case when you look at the report's charts: a lot of it (80–85%) finances projects with environmental targets, mostly climate change mitigation. Not surprisingly, this is the same that Fatica and Panzica (2021) found for green bonds. So, from an end-point perspective, the idea seems to be the same; the way you get there as a company – which motivates whether SLBs versus other types of instruments are used – is probably different on the financial side.

On the demand side, what I feel is missing – given the focus of the report on institutional investors – is a discussion of who owns sustainability-linked bonds. I know that this is challenging issue, given the limited data points available. In Fatica and Panzica (2022), we did a similar exercise with green bonds, looking at portfolio holdings of institutional investors, and what happened during the Covid crisis. We found that green holdings, unlike conventional holdings on conventional bonds, were indeed shielded by institutional investors during the crisis.

This is particularly true for investors with an ESG mandate – as classified by Bloomberg, or the investors with top E-scores. So, sustainability considerations are at play, on the demand side, and seem to be robust to the economic and financial cycle.

My very last point is that green holdings are more concentrated than holdings of comparable conventional bonds, which might be a sign of scarcity or the result of basic portfolio diversification, but still, you cannot rule out that green preferences are at play.

QUESTIONS TO THE AUTHORS OF THE REPORT

Question 1 by Giovanna Nicodano, *Chair of Collegio Finance*
Thank you very much for your presentation and insights. I think that in the discussion on sustainable investment, taxation is hardly discussed and represents a sort of elephant in the room. The state – at least in continental European countries – is an important and relevant player in social sustainability, as it is paying pensions and implement insurance schemes, just to name two key activities. In my view, to date the sustainability ratings ignore tax compliance.

As a consequence, if I follow an ESG rating that ignores this dimension, I'm going to distract investments from tax-compliant companies. At the same time, if there are two companies that are equal – one is incorporated in France, the other in Luxembourg – the French one, which also pays taxes, is going to be discriminated against by ESG criteria.

Recently, PRI seems to be moving towards incorporation of tax compliance in its domain, but so far it is still an issue that is not dealt with.

Question 2 by Stefano Serra, *Chairman of Torino's metal industry companies*
I have some comments about the role of institutional investors as responsible investors. I think the focus was more on the instruments that have been issued. I certainly think that there are greenwashing risks not only from the company side, but also from the investors' side.

I was very surprised to learn that in sustainability bonds, Europe accounts for half of the market, and its size is larger than that of the United States.

I think it was 2018 when Larry Fink, CEO of BlackRock, wrote to the CEOs of large companies that it would have been rather interesting to extend the monitoring of responsible investors and control the risk of greenwashing. In addition, I believe that in the environmental component of ESG, the roadmap is a one-way ticket.

The question concerns the speed of the road map. Europe has a huge responsibility in deciding to accelerate the speed, thus changing the cost structure for companies and their competitiveness.

Online questions

- Given how much of a black box the ESG rating providers' methodologies are, how were the authors of the 2021 paper able to create their Pearson correlation table? Is this the result of a sample of rated companies? If so, isn't there an inherent Granger causality issue, i.e., that a company being rated by so many agencies seems linked to their willingness to publish sources that the rating agencies are going to seek.

- I wondered how the deployment of direct air capture facilities might impact the meeting of ESG key performance indicators, given that even companies that do not respect the CO_2 reduction levels associated with the return rate of their bonds might offset the excess emissions by buying carbon capture certificates, and thus appear compliant even without actually reducing their emissions in the first place.
- Isn't it advisable to start to devise and distinguish KPIs for strictly speaking emissions reduction so that these activities get separated from the absorption of legal CO_2 from the atmosphere?

ANSWERS BY THE AUTHORS OF THE REPORT

Rajna Gibson-Brandon
Thanks a lot for the insightful questions. Some of the comments of the discussant will be dealt with in the revision. With respect to tax compliance, I have not had the chance to talk about the S and the G [and their] poor appearance in the ESG vocabulary, but I think the European Corporate Governance Institute is now moving towards the concept of responsible capitalism which, in my view, implies also responsible governance.

I think the metrics that ESG raters are using these days on governance look at the perspective of maximising the firm for the shareholders, so we haven't moved [yet] to responsible governance that takes all the stakeholders into account – and when you take all the stakeholders it means you take the government – and you have to consider those indicators such as tax compliance. I think we're not there in terms of all these reports that I've read by companies when I was doing this study on the quality of the ESG reporting.

The comment is well taken: government, and more specifically the tax compliance issue, are still missing in the current ESG rating frameworks.

Philipp Krueger
I would like to pick up this issue of ESG rating disagreement, because there was a question that was being asked online, and it was also an issue raised in Serena Fatica's presentation.

Rajna and I have published a paper on this topic in the Financial Analysts Journal, which is one of the first papers published on ESG rating disagreement.

I think that one must be much more nuanced when talking about ESG rating disagreement, because what we show, and what is also clear from the table in the report itself, is that the statement that ESG ratings are uncorrelated is not supported by the data. If you look at some of these ratings, they have correlations that go as high as 0.75; this is not as high as the correlation in credit ratings, but I think that's not the

correct comparison to make because ESG ratings are more of an opinion – it is an ESG sustainability opinion – and if we think about opinions and diversity of opinions, we find similar issues in many different areas in finance. If you think about analysts' forecasts, for instance, there's a lot of dispersion, and nobody complains about it.

There is also a lot of dispersion in voting recommendations, for example. If you look at the voting of corporate governance and at the voting recommendations being made by the large proxy advisors, one finds that there is a lot of disagreement there. Similar disagreement is found in portfolio management and holdings of mutual funds.

So, my first, broader comment is that disagreement in opinions in itself is not especially intrinsic to ESG or sustainable finance; it is many areas of finance. Secondly, diversity in opinions is not necessarily bad. What is bad is diversity in measurements and divergence that comes from measurement. Here, there is obviously a lot that can be done, and is being done – in particular at the EU level, where regulations are coming that will lead to more convergence in ESG measures, which ultimately are going to lead to more convergence in these ESG scores and ratings themselves. I think one has to be more concise and precise when discussing this issue of disagreement in itself.

THE PERSPECTIVE OF MARKET PARTICIPANTS

Federico Ravenna, Sveriges Riksbank
Welcome to the last session of the LTI meeting on the presentation of the report on ESG markets and investors. We will have a discussion with two esteemed colleague economists.

To my right, I have Carla Ferrari, who is no stranger to economic analysis: she has been the Head of Research at Intesa San Paolo IMI Group for several years, and now she is Chief Financial Officer of Compagnia di San Paolo, a foundation with over €8 billion of assets under management. I would say that Compagnia di San Paolo is a quintessential long-term investor – so it would be interesting hearing the view from the demand side of the market.

On my left, I have Valentina Bosetti, who is a Professor at Bocconi University, with a long career of academic publications in the field of climate change. Yet, she is here today in her capacity as Chairperson of Terna SpA – the Italian transmission system operator and one of the main electricity grid operators in Europe. She will represent the supply side of the market – companies acting as issuers of ESG assets, considering that Terna has a plan to invest around €10 billion in electricity infrastructure over the 2021-2025 period, which means that they are not only engaged in green investments, but they need to issue a considerable amount of financial instruments to fund this investment.

As for myself, I am Federico Ravenna. I have an academic career in monetary economics and have worked as a central banker for the last seven years. I have been Head of Research at the Central Bank of Denmark and now I am a Senior Adviser at the Riksbank, which is the central bank of Sweden. I will bring the perspective of policy institutions that participate directly in the financial market. In fact, in Denmark, the central bank acts also on behalf of the government as an issuer of sovereign bonds and has been issuing in the past years a very significant amount of green bonds.

I would say just a few words to explain how we ended up with a rapidly growing ESG market. Governments have agreed on setting goals for a transition towards a net-zero emissions global economy by 2050, and as economists we figured out a long time ago how to set incentives to achieve these goals. There is an externality from polluters, and we can address it by imposing a tax to change the behaviour. So, the easy right way we have known for more than 100 years is to impose a carbon tax. That is a difficult thing to do on a global scale, and there are a lot of political economy issues associated with this avenue.

Another possibility is that financial markets provide incentives that play a similar role by channelling financial resources away from brown industries and towards green sustainable industries. It has been estimated that we need around $7 trillion of investment per year to switch from brown to green industries by 2030 to achieve our set climate goals.

What is the role of public institutions like central banks in all of this? The ECB has been very engaged in the climate debate and has planned to ask for environmental impact disclosures of the assets that are pledged as collateral in its monetary policy operations; in addition, asset purchases have to be in line with disclosures set by the EU Taxonomy.

The first report documenting the disclosures will be released in 2023. Also, in agreement with its Corporate Sector Purchase Programme, the ECB intends to tilt its portfolio according to climate change considerations. That summarises the current situation for central banks in their capacity as holders of assets.

Keep in mind, though, that central banks are not as large market players as they might seem. Think of Denmark: the total assets held by the Danish central bank are about one-third of GDP. This may seem a large amount. However, if you just think of demand deposits – straightforward bank liabilities – with respect to the banking system in the same country, they are four times as large. And if you think about the total stock of financial assets – even in a country as small as Denmark – it is several times over the value of annual GDP. Therefore, with their balance sheets, central banks are relatively minor players. Three-quarters of all the green bonds issued are issued by the private sector, not by sovereigns.

The reality is that whatever we ask institutions like central banks to do, or whether we ask the European Union to issue green bonds to finance its NextGenerationEU efforts (that is about €350 billion over the next years), we will still need the corporate sector to move by issuing large volumes, if we want to really think that the financial sector could provide incentives to firms to help in the climate transition.

In that respect, it would be very useful to hear the opinions of Valentina Bosetti, since we need companies as issuers to help participate in this market. I thus start by asking whether an issuer like Terna feels that the market provides the correct incentives to hold companies who issue ESG bonds – or who have an ESG rating – accountable for their efforts. Is the ESG rating of a company like Terna acknowledged by the markets? Is it something that you feel that markets actually look at, or is it just a label?

Valentina Bosetti, *Bocconi University, Terna SpA, President*
Thanks a lot for having me participate in the workshop and this panel. The simple answer to the question posed by Federico is yes, if you belong to the first in class as Terna does. It is effortless to be the first in class if you are building something that is a crucial infrastructure, that provides electricity in an affordable way to the full population in a country, and represents the enabling player for the energy transition. The answer is certainly yes if you are a company such as Terna, which gets very high rankings in all ESG indicators and your investments are 97% Taxonomy-compliant.

When your achievements are so high, you easily give a signal. My comment is that it is like preaching to the converted. We do not need to move Terna. We need to move the rest of the population of firms, and I do not think ESG at the moment is doing the full job.

The problem of poor correlation across ESG indicators may not even be the most important one. To me, the main problem is the lack of transparency in how these indicators are built. Environmental, social and governance accounting requires working with multiple dimensions, comparing qualitative to quantitative scores and aggregating across these dimensions in ways that may not be transparent.

Sometimes the score is expressed as a ranking; sometimes it is about being part or not of the indicator. The point is that these aggregating weights are not necessarily disclosed. But these weights are crucial as they represent the relative importance of these dimensions to the joint sustainability performance.

If the lack of transparency is the biggest problem, the second problem is that they are costly to firms. This implies that if you are a small player, you are less likely to be ranked within multiple ESG indicators.

These challenges limit the potential of these tools. I think the keyword to increase transparency and reduce the costs is ‘standardisation’, and the taxonomy is heading there. It is a good step in the right direction. We also need some basic indicators that are calculated in an open fashion way by impartial players who do not have a stake, such as regulators, academics or a governmental agency.

Further, among the components of the indicators, 'E' is the key. 'G' is not a big issue because if you are transparent in providing the information, then your data are out there. The fact that information is transparently provided to the market means that you typically have good governance.

A final big question is whether we are talking about the stock or are we talking about the flow? Do we want to know whether the company itself is environmentally sustainable or if the investment it is searching funds for is? This makes a big difference. We have to be clear in defining which purpose these instruments should serve.

Federico Ravenna
Thank you. Now it is time to hear from the investors. Is it easy for a long-term investor like Compagnia di San Paolo to build an ESG portfolio the way you would like to? Do you get the right signals?

Carla Ferrari, *Compagnia di San Paolo, Equiter SpA*
Thank you for inviting me to be part of the panel. As a practitioner, I bring to the table the point of view of an institutional investor such as Compagnia di San Paolo, and I would like to remind you very briefly that Compagnia di San Paolo decided to carry out a sustainability assessment in 2020. Subsequently, in 2021 we decided to adopt a responsible investment policy that is applied initially only to the listed portfolio and is based on two pillars. The first pillar is the ESG exclusion. We have a sort of negative screening, and any controversial firm behaviour and activities are excluded from our investment list. Secondly, we have an ESG integration approach based on the best in class.

Starting in January 2022, we decided to work on our existing portfolio. We are not starting from scratch. Indeed, we have an existing portfolio and we have – first of all – to check what we have in our portfolio and this is a very long, ongoing process.

It is a sort of triangle between an advisor, the fund managers and the Compagnia as investor. We have to start a discussion with the fund managers, and try to understand what they do, and then take a very difficult decision: give up and exit from that particular investment, or try to convince them to adopt other policies.

In this respect, we have a very big difference between investments in Europe – as this report has clearly set up – and in the United States. Across the two continents there are two different approaches and different attention to these kinds of issues. The market is evolving in this direction. It is not only a trend but something more important than just "we have to do it because it is very nice to have this kind of investment".

At the moment, though, if you look at the ESG ratings – as has already been said – they are based on soft information, they are voluntary-based and they are so far based on a methodology which is neither well-known nor transparent.

It is not easy at the moment to adopt this approach and, for this reason, we prefer to have an approach based on the best in class and not on an ESG rating minimum, because this is quite a divergent way of selecting.

As an institutional investor, Compagnia di San Paolo has an important role, since we can push the market, and we can act as a sort of stimulus for the issuers and the market players. I clearly realise this during our assessment activity, in particular when we try to convince issuers to adopt ESG policies and to obtain good results. Our analysis takes time, and we need to be very patient, but we are long-term investors and we can invest also our time in obtaining something that we consider very important.

The reason being that we have to align our investment policy with our grant-making activities. Compagnia di San Paolo has adopted strategic plan based on the SDG principles; for these reasons, we want to be coherent also through the investment tools with this policy. It is something that many institutional investors apply, and I think that it is a very important stimulus for the market.

Federico Ravenna
Thank you to both speakers. I will ask another couple of brief questions.

The first question is based on what Valentina Bosetti was saying about the stock versus flow assessment. From the point of view of an issuer, would it be easier to just issue green bonds, that is, assets for which it is clear that the proceeds of the issuance are tied to the specific green investment?

Maybe we are underachieving with the ESG labels, whose actual weight in support of the green transition is more difficult to pin down exactly. How do ESG commitments map into outcomes for a firm?

Valentina Bosetti
From the point of view of the issuer, certainly yes.

From a social point of view, if you want to distinguish between a green bond that a company like Terna is issuing and a green bond that, for instance, a fossil company is issuing – in case you represent an investor who does not want to invest in fossil companies anymore – then you need additional information. For instance, you may want to label green bonds depending on the level of emissions of the issuer, or on its rate of emission change with respect to last year. You can also compare the firm's emissions per output to the average level in the same sector.

All this required information calls for companies' emissions information to become freely available. As of now, information concerning electricity consumption and emissions is very rarely available and only for a subset of companies (for example, those firms regulated by the Emission Trading Scheme). In this quest for open information, central banks may have an important role. In this respect, the Bank of Italy is pushing forward an effort to make more information about firms' exposure to climate physical and transition risks available.

Information is indeed key. If data are not available, all this discussion is nice, we are still moving in the right direction, but I do not think we will reach a huge improvement in the long run.

Federico Ravenna
I agree with Valentina Bosetti. It is hard to build the right information datasets and be able to set benchmarks. There is something else that Carla Ferrari was mentioning about the difference between the US and the European markets. I think more than half of the issuers are in Europe as a matter of fact, but we need to get the US corporates on board if we hope for this to work out.

Carla Ferrari
My feeling is that Europe is more active in responsible investing because there has been a very important push at the European level, and the European Commission has issued an important piece of regulation. For this reason, the European market has reacted in a completely different way compared to the US market.

The point is that the size of the two markets is totally different and, if we don't take this into consideration, it will be very difficult for institutional investors to find the investment opportunities to set up a diversified ESG-compliant portfolio extended also to the US market.

So, we need to have a more balanced development of these investment opportunities. However, it will be difficult to push the American market in this direction and the European regulation will not be sufficient.

I think that it has been very important for the European market, but this is also linked to the fact – as has been correctly mentioned in the report – that there are also cultural differences beyond differences in regulation. In Europe is more important and more relevant to invest responsibly, and it is very difficult to have the same impact in other markets.

This is a very subtle point. From the standpoint of an institutional investor, it is necessary to be balanced and have a diversified portfolio. We simply cannot invest everything in the European market, and we need to find a solution.

I do not think that the solution can only be represented by regulation. The European regulation did a lot for European markets in terms of investment opportunities in Europe. However, as a single institutional investor, we can contribute to the creation of an ongoing dialogue with the companies in which we invest.

We push in this direction, but I do not know if other social investors are acting the same way. We can play this role, which is a very active one, but we probably need other transformation policies.

This afternoon somebody mentioned also the fiscal dimension. I think that different incentives and the role of the central banks – not only the European Central Bank, but also the Federal Reserve – could be important to give some guidelines, because it is difficult to regulate markets and guidelines are therefore quite important.

This is a long-term process and it is impossible to realise it in the short run. What has been presented today is a very nice picture of the situation and I think that a lot of questions and policy proposals have been made because this is something we have to deal with; we have to contribute to this evolution and to these market changes. Even though it will take a long time, it is a key process for society.

Federico Ravenna
Let us hope that Europe is not permanently different from the United States in terms of ESG markets, but just a couple of years ahead. At this point we should take a couple of questions from the floor.

Rajna Gibson Brandon
Valentina Bosetti mentioned the importance of the E dimension and I fully agree with the remarks she made on the importance of data availability and transparency distinguishing between sustainability as measured at the firm versus at the investment project level.

Since we had no time to enter into this discussion, I would like to raise the importance of the social pillar, especially post-Covid, as well as the fact that environmental issues also have social consequences especially for less developed countries. These are all aspects that need to be tackled and are so far rather neglected by the ESG rating providers. They have been put marginally on the side, maybe because the S pillar is more qualitative, more subjective and more difficult to quantify using robust metrics.

I wanted to hear your opinion on this.

Valentina Bosetti
I have studied climate change all my life, so I am biased. However, what I dislike is the fact that people consider themselves experts in sustainability, which does not mean much to me.

I think there are plenty of experts in, for example, unionisation or the role of education of a company's employees. There are good indicators, there are experts at work in that domain and there are some quantitative indicators as well, like hours of training or the level of welfare of the workforce. The point is that there are few elements – typically very well regulated in Europe – that could be part of a different indicator. I do not think that the S is not important. It actually would deserve a full separate conference.

I do not think that weighting how much you are training your employees versus how many emissions you make makes sense. I do not think they should be weighted and aggregated, I think they should be kept separate.

Like most environmental economists have realised, one cannot aggregate, for instance, the number of lives saved versus its money dimension. You keep them disaggregated and then you let people see how much training is done and how much emissions are made. And if as an investor I like that, then I will invest, but do not give me a number that is some aggregation of different factors, because that is quite dimensionless.

Federico Ravenna
Let us ask Carla Ferrari if she looks at the ESG total score or cares about each score more.

Carla Ferrari
Looking at the ESG score, the environmental factor is indeed the easiest to measure and to transform into quantitative KPIs, while the social factors are more difficult to be applied by companies, as Valentina Bosetti correctly said. I thus totally agree that something has to be done to create more of a relationship between the three components of ESG. Environment now plays the key role, and it is easier to consider and interpret, from a certain point of view, but social and governance factors should not be neglected in the future.

Philipp Krueger
I really like what Valentina Bosetti said about methodology. I guess there should be more transparency concerning the methodologies and the data companies use to construct these scores, as well as the weights they use. However, I think this is already happening right now. Regulation is already being enacted, and index providers – not ESG index providers but Morgan Stanley Capital International, for instance – have to disclose the methodologies they use.

Valentina Bosetti mentioned that companies should provide data about greenhouse gas emissions, for instance. I completely agree with her, but this phenomenon is already happening. In the UK there is a mandatory requirement since 2013 with largely beneficial effects, so I think it is not a problem with ESG or investors, really, but it is much more of a policy problem. In the European Union we do not have that level of transparency yet,

as a matter of fact. Of course, a lot is under way. The Corporate Sustainability Reporting Directive is coming; the EU is talking about the data repository where all this non-financial data will become available. I think these things should be acknowledged. In some years' time, there will be much more precise and higher-quality data on ESG issues.

So, my question is actually for Carla Ferrari. If we think that these data have to be required, do you, as a large long-term investor, engage with policymakers on regulation? This is not, in fact, something that investors can fix. In public markets we have requirements. Firms have to disclose standardised financial information and we do not regulate financial analysts on how they use that data – they can do whatever they want with that data and come up with whatever opinions they like. I think, though, that the really important question is not related to investors but is much more related to transparency and regulatory action to make high-quality ESG information available. I would be quite intrigued to know whether you, as a large investor, lobby in Washington, the Securities and Exchange Commission or some other institutions at the European level to make this data available.

Carla Ferrari

I agree with Philippe that the lack of transparency is to be faced. It is not easy for us now – there is no source of data that can be reliable enough because of the lack of regulatory frameworks and common standards. From this point of view, the first priority is to create the right framework to obtain more transparency.

From another point of view, I should remind that markets do not like too much regulation and that is probably the reason why this was not the path chosen in the United States. You have to find a very good balance between guidelines in order to establish the rules for data transparency and methodologies and have, as a consequence, a more reliable ESG rating – not solely based on voluntarily provided information, which you do not know exactly what kind of information it is.

At the same time, once you have guidelines, you have to push the market through incentives rather than compulsory regulation. My experience is that too strong a regulation is not appreciated by the markets and, if we want to obtain more investment opportunities, we have to play this role of finding the good balance between regulation, good KPIs and results.

We are experiencing this new way of investing, which implies also discussion with the companies. It is a very important dialogue, very time-consuming as well, and it is not easy to find a solution. It could be a matter of cost, and we should not underestimate this dimension and that there is a difference between big and well-established companies and small companies. It is easy for large and rich companies to be high-ranking because they can invest significant resources in it; yet there are also small companies that cannot invest so much in reporting and communication and, for these reasons, they do not benefit from the same level of external transparency.

While I do not have a solution, I acknowledge that this is the situation we face when we engage in discussion with the companies.

Federico Ravenna

I do not expect the oil refining companies to lobby Washington to have more CO_2 emissions disclosures, but I was wondering whether industries, especially the electricity grid and power operators, are more at the forefront. Do these industries want disclosures because, if they are green enough, they will be rewarded by the markets?

Valentina Bosetti

Certainly, the idea of moving towards a system where the regulator remunerates the socially beneficial investments in the way the tariff is built goes clearly in that direction. I just wanted to add that data are important, but you need board members that understand what the data represent. On banks' boards, for instance, you have a lot of experts in reading balance sheets and interpreting what is going on with the risks and numbers, but you do not have people who know what a tonne of emissions is.

I am part of a board, and I can assure there is a process of trying to educate board members, but most people who are older than 58 – which is the average age of board members in Italy – did not study climate change, at any level of education. They do not know what it is; they may learn a little bit about it from the newspapers, but they have no idea, so there is a big important training process that we should undertake.

Federico Ravenna

Talking about costs, the last thing I would like to say is that we have calculated in Sweden what would be the cost of 'getting it wrong'. So, if you imposed the carbon tax at the current Swedish level on a global scale, and then it turns out that climate change or warming were not as bad as we thought, the loss would be quite minimal. And the other way around, if we did not impose the tax and global heating went as expected, there would be huge costs. Therefore, it is much safer to err on the side of having a higher tax, either through carbon taxes or by imposing penalties, borrowing rates or cost of capital to companies that are CO_2 emitters.

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Appendix A: Sample construction and data issues for Chapters 1 and 2

The datasets used in Chapters 1 and 2 of this study combine data from several sources. Global institutional equity data are obtained FactSet Ownership (see Ferreira and Matos (2008) for details on these data). We match the institutional investor equity holdings data with ESG scores from MSCI, Refinitiv, and Sustainalytics to calculate ESG portfolio performance. We also match other firm-level data, such as a firm's market capitalization or their monthly stock returns, which are obtained from Datastream.

The data on responsible investment strategies that we match to the institutional investor holdings data come from the Principles for Responsible Investment (or PRI) reporting framework. The PRI is a United Nations-supported international network of investors working together to implement its six aspirational principles, often referenced as "the Principles". Principle 6 states that signatories should "report on their activities and progress towards implementing the Principles". This study uses the data that signatories make available within the reporting PRI framework. Specifically, from the PRI reporting framework, we obtain detailed data on the use of specific responsible investment approaches. Signatory reporting data only start in 2014 and extend to 2018. For more information on these data, see Gibson Brandon et al. (2022).

Table A.1 provides variable definitions for the variables used in Chapters 1 and 2. Table A.2 provides summary statistics for the two main samples used in Chapters 1 and 2. Panel A has descriptive statistics for the sample used in Tables 1.1, 1.2, and 2.2, which we refer to as the whole sample, because these variables can be calculated between 2003 and 2017. Panel B of Table A.2 summarizes the main variables used in the analysis of the subsample of institutional investors for which we dispose of detailed data on the use of different investment strategies. This dataset is used in Tables 1.4, 1.5, 2.3, and 2.4. These data are available only between 2013 and 2017.

TABLE A.1 **VARIABLE DEFINITIONS FOR CHAPTERS 1 AND 2**

ESG variables and institutional investor level variables	
ESG Performance	The value-weighted equity portfolio-level total ESG scores of an institutional investor (as defined in Equation 1.1). We use an equal-weighted, firm-level ESG score for each stock in an investor's portfolio, which is calculated by taking an equal-weighted average of the normalized ESG scores from three ESG data providers (MSCI IVA, Refinitiv, and Sustainalytics) (whenever available). To calculate the portfolio measure, we calculate the value-weighted, average firm-level ESG score using the market value of each stock position as the weight.
E Performance	Like ESG performance above but using only stock-level Environmental score.
S Performance	Like ESG performance above but using only stock-level Social score.
G Performance	Like ESG performance above but using only stock-level Environmental score.
Equity portfolio AUM	The logarithm of the total market value of an investors' equity holdings for which ESG scores are available.
Industry concentration	Dummy that takes the value of one if an investor holds stocks from two or fewer different industries.
Portfolio turnover	The average portfolio churn rate of the last 4 quarters for a given investor. See Gaspar, Massa, and Matos (2005) for more details.
Europe	Dummy indicating if investor in Europe.
North America	Dummy indicating if investor in North America.
Rest of the world	Dummy indicating if investor not in North America or Europe.
Asset owner	Dummy indicating if investor classified as an asset owner (e.g., pension fund or insurance company).
Investment manager	Dummy indicating if investor classified as an investment manager (e.g., asset management company).
Legal origin==English	Dummy indicating if investor in a country of English Common Law tradition (defined Following La Porta et al. (1998), La Porta, Lopez-de-Silanes, and Shleifer (2008), Djankov et al. (2008), and Spamann (2010) and Liang and Renneboog (2016)).
Legal origin==French	Dummy indicating if investor in a country of French Civil Law tradition.
Legal origin==German	Dummy indicating if investor in a country of German Civil Law tradition.
Legal origin==Scandinavian	Dummy indicating if investor in a country of Scandinavian Civil Law tradition.
Legal origin==Socialist	Dummy indicating if investor in a country of Socialist Legal tradition.

TABLE A.1 **CONTD.**

	Risk and return variables
Mean return	Mean of the portfolio holdings-based returns over 12 months, which is calculated using the monthly buy-and-hold returns based on an institutions' disclosed equity holdings (for which ESG scores are available). We assume no interim trading between reported quarter-ends.
Carhart alpha	Carhart (1997) 4-factor alpha of the holdings-based returns over 12 months. We use AQR's global equity factors to calculate the alpha.
Volatility	Standard deviation of the holdings-based returns over 12 months.
Idio. Risk	Idiosyncratic risk of the holdings-based returns over 12 months.
Beta	Systematic risk of the holdings-based returns over 12 months. We use AQR's global equity market factor to calculate the systematic risk.
	Responsible Investment Strategy Variables
Screening	Dummy indicating if the investor uses any type of screening strategy (obtained from the PRI reporting framework, see Gibson Brandon et al. (2022) for more details).
Thematic	Dummy indicating if the investor uses thematic investment (obtained from the PRI reporting framework, see Gibson Brandon et al. (2022) for more details).
Integration	Dummy indicating if the investor uses ESG integration (obtained from the PRI reporting framework, see Gibson Brandon et al. (2022) for more details).
Engagement	Dummy indicating if the investor uses Corporate Engagement (obtained from the PRI reporting framework, see Gibson Brandon et al. (2022) for more details).
Negative Screening	Dummy indicating if the investor uses Negative Screening (obtained from the PRI reporting framework, see Gibson Brandon et al. (2022) for more details).
Positive Screening	Dummy indicating if the investor uses Positive Screening (obtained from the PRI reporting framework, see Gibson Brandon et al. (2022) for more details).
Norms-Based Screening	Dummy indicating if the investor uses Norms-Based Screening (obtained from the PRI reporting framework, see Gibson Brandon et al. (2022) for more details).

TABLE A.2 **DESCRIPTIVE STATISTICS FOR THE MAIN VARIABLES USED IN CHAPTERS 1 AND 2**

Panel A: ESG variables and institutional investor level variables (Whole sample, 2003-2017)

	count	mean	sd	min	p1	p50	p99	max
ESG Performance	83768	0.0520	0.5069	-3.6089	-1.4643	0.1489	0.9658	3.9330
E Performance	83768	0.0628	0.4991	-2.7439	-1.3368	0.1523	0.9424	2.9050
S Performance	83768	0.0344	0.4652	-3.5266	-1.3801	0.0945	0.9245	3.4859
G Performance	83768	0.0554	0.4475	-3.5266	-1.4516	0.1561	0.7906	3.3586
Equity Portfolio AUM	83768	5.0738	2.5076	-10.9196	-1.2697	5.0766	10.8944	14.7774
Industry concentration	76656	0.0190	0.1366	0.0000	0.0000	0.0000	1.0000	1.0000
Portfolio turnover	76452	0.3652	0.3113	0.0000	0.0215	0.2712	1.4703	10.9858
Europe	83768	0.2723	0.4451	0.0000	0.0000	0.0000	1.0000	1.0000
North America	83768	0.6119	0.4873	0.0000	0.0000	1.0000	1.0000	1.0000
Rest of the World	83768	0.1158	0.3200	0.0000	0.0000	0.0000	1.0000	1.0000
Asset Owner	83768	0.0401	0.1963	0.0000	0.0000	0.0000	1.0000	1.0000
Investment Manager	83768	0.9599	0.1963	0.0000	0.0000	1.0000	1.0000	1.0000
Legalorigin==English	83768	0.7456	0.4355	0.0000	0.0000	1.0000	1.0000	1.0000
Legalorigin==French	83768	0.1006	0.3008	0.0000	0.0000	0.0000	1.0000	1.0000
Legalorigin==German	83768	0.1079	0.3103	0.0000	0.0000	0.0000	1.0000	1.0000
Legalorigin==Scandinavian	83768	0.0281	0.1654	0.0000	0.0000	0.0000	1.0000	1.0000
Legalorigin==Socialist	83768	0.0177	0.1318	0.0000	0.0000	0.0000	1.0000	1.0000

TABLE A.2 **CONTD.**

Panel B: ESG variables and institutional investor level variables (PRI survey sample, 2013-2017)

	count	mean	sd	min	p1	p50	p99	max
ESG Performance	2796	0.2127	0.4360	-2.1292	-1.2492	0.2475	1.0271	1.9398
E Performance	2796	0.2357	0.4012	-2.0837	-1.2947	0.3089	0.9125	1.5475
S Performance	2796	0.1759	0.3803	-1.8347	-1.2656	0.1999	0.8761	1.5752
G Performance	2796	0.0346	0.4217	-2.2566	-1.1488	0.1208	0.8308	1.4319
Equity Portfolio AUM	2796	7.1539	2.8402	-8.3809	0.2577	7.4498	13.0372	14.7774
Industry concentration	2731	0.0168	0.1287	0.0000	0.0000	0.0000	1.0000	1.0000
Portfolio turnover	2719	0.2778	0.2010	0.0000	0.0357	0.2284	1.0475	1.9998
Europe	2796	0.4932	0.5000	0.0000	0.0000	0.0000	1.0000	1.0000
North America	2796	0.2779	0.4480	0.0000	0.0000	0.0000	1.0000	1.0000
Rest of the World	2796	0.2289	0.4202	0.0000	0.0000	0.0000	1.0000	1.0000
Asset Owner	2796	0.0658	0.2480	0.0000	0.0000	0.0000	1.0000	1.0000
Investment Manager	2796	0.9342	0.2480	0.0000	0.0000	1.0000	1.0000	1.0000
Legalorigin==English	2796	0.5672	0.4955	0.0000	0.0000	1.0000	1.0000	1.0000
Legalorigin==French	2796	0.1477	0.3549	0.0000	0.0000	0.0000	1.0000	1.0000
Legalorigin==German	2796	0.1609	0.3675	0.0000	0.0000	0.0000	1.0000	1.0000
Legalorigin==Scandinavian	2796	0.1127	0.3162	0.0000	0.0000	0.0000	1.0000	1.0000
Legalorigin==Socialist	2796	0.0114	0.1064	0.0000	0.0000	0.0000	1.0000	1.0000

TABLE A.3 **PRI REPORTING DATA ON MORE REFINED RESPONSIBLE INVESTMENT STRATEGIES**

	count	mean	sd	min	p1	p50	p99	max
% ESG	2796	0.78	0.39	0.00	0.00	1.00	1.00	1.00
% Screening	2796	0.50	0.47	0.00	0.00	0.35	1.00	1.00
% Thematic	2796	0.11	0.29	0.00	0.00	0.00	1.00	1.00
% Integration	2796	0.66	0.45	0.00	0.00	1.00	1.00	1.00
N_Pro	2796	0.55	0.50	0.00	0.00	1.00	1.00	1.00
N_Act	2796	0.48	0.50	0.00	0.00	0.00	1.00	1.00
N_Sec	2796	0.36	0.48	0.00	0.00	0.00	1.00	1.00
N_Geo	2796	0.28	0.45	0.00	0.00	0.00	1.00	1.00
N_ProSecAct	2796	0.64	0.48	0.00	0.00	1.00	1.00	1.00
N_ES	2796	0.46	0.50	0.00	0.00	0.00	1.00	1.00
N_CG	2796	0.31	0.46	0.00	0.00	0.00	1.00	1.00
P_Pro	2796	0.22	0.41	0.00	0.00	0.00	1.00	1.00
P_Act	2796	0.19	0.40	0.00	0.00	0.00	1.00	1.00
P_Sec	2796	0.18	0.38	0.00	0.00	0.00	1.00	1.00
P_Geo	2796	0.08	0.27	0.00	0.00	0.00	1.00	1.00
P_ProSecAct	2796	0.28	0.45	0.00	0.00	0.00	1.00	1.00
P_ES	2796	0.34	0.47	0.00	0.00	0.00	1.00	1.00
P_CG	2796	0.30	0.46	0.00	0.00	0.00	1.00	1.00
NORM_UNGCP	2796	0.28	0.45	0.00	0.00	0.00	1.00	1.00
NORM_UNGPoBH	2796	0.15	0.36	0.00	0.00	0.00	1.00	1.00
NORM_ILOC	2796	0.21	0.41	0.00	0.00	0.00	1.00	1.00
NORM_UNCAC	2796	0.16	0.37	0.00	0.00	0.00	1.00	1.00
NORM_OECD	2796	0.17	0.37	0.00	0.00	0.00	1.00	1.00

Note: This table shows descriptive statistics for more detailed information on the responsible strategies used by PRI signatories.

Appendix B: Sample construction and data issues for Chapters 4 and 5

SLB ISSUER

For the data used in Chapters 4 and 5, we start by gathering all bonds in Bloomberg as of 29 August 2022 that are labelled "Sustainability-Linked". This yields a list of 434 bonds from 2018 to 2022. We consider only bonds issued by publicly listed companies. Therefore, we lose a significant number of SLBs that we could use in the analysis. The remaining sample of listed SLB issuer companies consists of 196 bonds issued by 127 listed companies between 2020 and 2022.

CONTROL GROUP OF FIRMS

In the analysis of Chapter 4, we compare SLB issuers to non-issuers. We refer to non-issuers as the 'control group'. For each country in which at least one form issues an SLB, we use the associated list of all active equities ISINs provided by DataStream. These country-specific equity ISIN lists form the universe for our control group. In the final dataset, we have 43327 companies from 121 countries.

Finally, we use the equity ISINs from the SLB issuer companies and the control group companies to retrieve their times series characteristics (e.g., Assets, ROA, CO_2 emissions) and static characteristics (e.g., industry classification) from Datastream.

TIME SERIES DATA

We retrieve company time-series data from 2019 to 2022 from Refinitiv. The time-series data consists of the market value of equity, basic balance sheet data from Datastream and ESG-related data from Eikon. The basic balance sheet data used are total debt, total assets and EBITDA. All balance sheet variables are retrieved in USD. Next, we use the balance sheet data obtained from Datastream to construct further company variables. We calculate log assets as a measure of size, leverage as a ratio of total debt to total assets, Tobin's Q as the sum of the market value of equity and the book value of debt to total assets and ROA as the ratio of EBITDA to total assets. ESG-related data are the E, S, and G pillar scores, ESG score, total CO_2 emissions, direct CO_2 emissions,[13] indirect CO_2 emissions,[14] CO_2 intensity measured in total CO_2-equivalent emissions to firms' revenues in US dollars and board diversity as a percentage.

13 Direct CO_2 and CO_2-equivalent emissions in tonnes-direct emissions from sources that are owned or controlled by the company (scope 1 emissions).

14 Indirect CO_2 and CO_2-equivalent emission in tonnes-indirect emissions from the consumption of purchased electricity, heat or steam that occur at the facility where electricity, steam or heat is generated (scope 2 emissions).

STATIC DATA

Furthermore, to describe the companies' industry, we retrieve the TRBC Economic Sector code and the Country of Domicile Name.

Finally, we eliminated duplicates and missing values.

SAMPLE CONSTRUCTION

First, we eliminate all companies with market values of equity and book values of total assets smaller than $10,000. To mitigate distortion from outliers, we trim all ratios at the 1st and 99th percentiles of their empirical distributions. Descriptive variables are presented in Table B.1. Table B.2 shows variable definitions for the variables used.

TABLE B.1 **VARIABLE DEFINITIONS**

	Firm characteristics
SLB dummy	SLB dummy is a variable that equals one if a company has issued an SLB in the year of observation and afterward.
log(Assets)	Total assets represents the sum of total current assets, long-term receivables, investments in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
ROA	ROA is the ratio of EBITDA over total assets. EBITDA represents the earnings of a company before interest expense, income taxes and depreciation. It is calculated by taking the pre-tax income and adding back interest expense on debt and depreciation, depletion and amortization and subtracting interest capitalised.
Tobin Q	Tobin's Q is the sum of market value of equity and book value of debt over total assets. Market value of equity is the share price multiplied by the number of ordinary shares issued. The amount issued is updated whenever new tranches of stock are issued or after a capital change. For companies with more than one class of equity capital, the market value is expressed according to the individual issue.
Leverage	Leverage is the ratio of total debt over total assets. Total assets represent the sum of total current assets, long-term receivables, investments in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets. Total debt represents all interest bearing and capitalized lease obligations and is the sum of long- and short-term debt.
Environmental scores	Refinitiv's Environment Pillar Score is the weighted average relative rating of a company based on the reported environmental information and the resulting three environmental category scores.
Social scores	Refinitiv's Social Pillar Score is the weighted average relative rating of a company based on the reported social information and the resulting four social category scores.
Governance scores	Refinitiv's Governance Pillar Score is the weighted average relative rating of a company based on the reported governance information and the resulting three governance category scores.
Board diversity	Percentage of females on the board

TABLE B.1 **CONTD.**

Real effects analysis	
CO_2 emissions	Total carbon dioxide (CO_2) and CO_2-equivalent emission in tonnes. Relevant gases are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCS), perfluorinated compound (PFCS), sulphur hexafluoride (SF_6), nitrogen trifluoride (NF_3)
% change in CO_2 emissions	Percentage change in total CO_2 emissions is the one-year delta in CO_2 emissions over base year CO_2 emissions. [emissions(t)-emissions(t-1)]/ emissions(t-1)
CO_2 intensity	CO_2 intensity is measured in total CO_2 and CO_2-equivalent emissions in tonnes divided by net sales or revenue in millions of US dollars.
% change in CO_2 intensity	Percentage change in total CO_2 intensity is the one-year delta in CO_2 intensity over base year CO_2 intensity. [intensity(t)-intensity(t-1)]/intensity(t-1)

Sources: Eikon, Datastream.

TABLE B.2 **DESCRIPTIVE STATISTICS FOR DATA USED IN TABLES 4.1, 4.2, AND 4.3**

	count	mean	sd	p1	p5	p50	p75	p99	min	max
					Control					
Marketvalue	153990	2049974	6276549	0	310	154895	938730	3.56E+07	0	6.36E+07
Leverage	98892	0.237827	0.305148	0	0	0.167325	0.351052	1.389665	0	3.915254
Tobin's Q	89632	2.356211	5.064767	0.144832	0.286407	1.066093	2.125325	25.44955	0.101713	76.5
ROA	87830	-0.01847	0.347728	-1.73051	-0.57064	0.06464	0.118324	0.330404	-3.44586	0.425405
log(Assets)	100417	12.31616	2.938618	3.970292	7.257708	12.47547	14.15438	18.951	0	22.46425
Total Assets	98749	3660351	1.32E+07	142	1782	259188	1334063	7.36E+07	25	1.70E+08
Total Debt	99265	940057.8	3361552	0	0	26613	283493	1.87E+07	0	3.98E+07
ESG Score	33930	48.04013	21.32062	7.82	14.68	47.71	65.39	89.13	0.72	95.6
E Pillar	33926	38.88167	30.10039	0	0	37.32	65.12	94.83	0	99.2
S Pillar	33897	49.81075	23.94253	3.81	11.75	49.29	69.77	94.21	0.26	98.23
G Pillar	33930	52.06735	22.49463	6.6	14.7	53	70.24	93.19	0.16	99.48
Board Diversity	33886	22.32688	14.1219	0	0	22.22	33.33	55.56	0	100
CO_2 intensity	19116	1205.613	47272.58	0.09	0.9	30.535	170.575	7010.12	0	5591078
% change in CO_2 intensity	11061	0.717431	23.64925	-0.77179	-0.46752	-0.07616	0.04562	2.042289	-1	1239.454
CO_2 emissions	19147	4754574	9.77E+07	88	960.6	125387	784826	6.27E+07	0	7.63E+09
% change in CO_2 emissions	11085	0.751729	28.15589	-0.72571	-0.40932	-0.0565	0.034882	1.898946	-1	1184.993

TABLE B.2 **CONTD.**

	count	mean	sd	p1	p5	p50	p75	p99	min	max
					SLB issuer					
Marketvalue	467	9336095	1.20E+07	75600	260230	4590730	1.22E+07	5.38E+07	37160	6.30E+07
Leverage	388	0.364217	0.160481	0.059502	0.114849	0.346979	0.465132	0.806854	0.001981	0.821968
Tobin's Q	384	1.165135	1.0558	0.238922	0.433998	0.906923	1.279325	7.409423	0.145726	10.88121
ROA	384	0.100288	0.066011	-0.12784	0.023482	0.097068	0.130254	0.31884	-0.2742	0.40664
log(Assets)	388	16.0417	1.473899	12.14187	13.61951	16.1579	16.96123	18.8913	10.63024	22.26344
Total Assets	385	1.87E+07	2.41E+07	β187563	822012	1.03E+07	2.25E+07	1.32E+08	41367	1.60E+08
Total Debt	380	6006218	7215513	54535	193244	3384040	7405906	3.40E+07	3482	3.93E+07
ESG Score	286	65.48822	17.01249	19.35	35.6	70.595	78.87	90.46	5.04	92.64
E Pillar	286	65.64241	19.79165	12.96	28.39	69.135	81.18	96.87	0	97.97
S Pillar	286	68.33206	20.99605	11.18	26.72	74.365	84.81	95.44	1.39	96.64
G Pillar	286	60.20374	21.15788	11.17	25.64	63.335	77.53	95.16	7.79	99.48
Board Diversity	281	28.06541	16.87908	0	0	33.33	42.86	60	0	60
CO_2 intensity	266	829.7184	2331.294	0.08	1.63	68.3	386.88	13487.83	0.06	15899.03
% change in CO_2 intensity	162	-0.04921	0.257409	-0.4919	-0.395	-0.07074	0.046596	1.04311	-0.67593	1.157621
CO_2 emissions	266	9180126	3.75E+07	17	2176	645740.5	2341000	2.33E+08	11	3.36E+08
% change in CO_2 emissions	162	-0.03406	0.22583	-0.52598	-0.34278	-0.0584	0.035175	1.158599	-0.58425	1.205727
Environmental KPI	286	0.926573	0.261293	0	0	1	1	1	0	1
Governance KPI	286	0.153846	0.361434	0	0	0	0	1	0	1
Social KPI	286	0.157343	0.364762	0	0	0	0	1	0	1

TABLE B.2 **CONTD.**

	count	mean	sd	p1	p5	p50	p75	p99	min	max
					Total					
Marketvalue	154457	2072003	6314417	0	310	156700	951670	3.58E+07	0	6.36E+07
Leverage	99280	0.238321	0.304818	0	0	0.168391	0.351783	1.387242	0	3.915254
Tobin's Q	90016	2.35113	5.055017	0.145183	0.286763	1.064673	2.120274	25.4023	0.101713	76.5
ROA	88214	-0.01795	0.347085	-1.72832	-0.56833	0.06487	0.118389	0.330301	-3.44586	0.425405
log(Assets)	100805	12.3305	2.943433	3.988984	7.26333	12.48675	14.17565	18.95091	0	22.46425
Total Assets	99134	3718697	1.33E+07	142	1794	262018	1364724	7.42E+07	25	1.70E+08
Total Debt	99645	959377.8	3398893	0	0	27080	290685	1.89E+07	0	3.98E+07
ESG Score	34216	48.18597	21.34722	7.84	14.74	47.91	65.59	89.17	0.72	95.6
E Pillar	34212	39.10538	30.12739	0	0	37.725	65.38	94.85	0	99.2
S Pillar	34183	49.96571	23.97854	3.83	11.8	49.5	70.03	94.24	0.26	98.23
G Pillar	34216	52.13536	22.49569	6.62	14.76	53.08	70.34	93.21	0.16	99.48
Board Diversity	34167	22.37408	14.15596	0	0	22.22	33.33	55.56	0	100
CO_2 intensity	19382	1200.454	46947.87	0.09	0.9	31	173.93	7594.7	0	5591078
% change in CO_2 intensity	11223	0.706364	23.47813	-0.76139	-0.46667	-0.07616	0.045638	2	-1	1239.454
CO_2 emissions	19413	4815214	9.71E+07	87.94	965.99	128000	798500	6.30E+07	0	7.63E+09
% change in CO_2 emissions	11247	0.74041	27.95253	-0.72226	-0.40874	-0.0565	0.034882	1.852789	-1	1184.993

CENTRE FOR ECONOMIC POLICY RESEARCH

There is growing interest globally in responsible investing, whereby institutional investors incorporate environmental, social and governance (ESG) issues into their investment processes. This report explores a series of issues relating to the responsible equity and fixed-income investment choices of institutional investors.

The report starts by analysing what motivates institutional investors to act as responsible investors in their equity investments, and also studies the extent to which institutional investors use specific responsible investment strategies. It then explores whether the risk and return characteristics of institutional investors' equity portfolios correlate with the responsible investment strategies that they employ. The report also investigates whether the use of specific responsible strategies is related to better ESG portfolio outcomes. Relying on their own research and the emerging academic literature on greenwashing, the authors also evaluate whether responsible investors who promise to invest responsibly actually do so in practice and 'walk the ESG talk'.

The second part of the report focuses on fixed-income sustainable markets by examining a new class of sustainability-related fixed-income instruments: sustainability-linked bonds (SLBs). The authors demonstrate that SLBs are predominantly issued in Europe by large, levered and profitable firms and that they can be incentive compatible for the issuers if their coupon penalty is large enough. They may prompt 'real effects', such as leading the underlying firms in which they invest to significantly curb their CO_2 emissions. Building on their own recent research findings, the authors further explain why greenwashing is more prominent in the United States than in the rest of the world and also emphasise the most important challenges faced by responsible investors when they implement their equity and fixed-income investment strategies. The report concludes with an outlook on the key questions that will shape the future path of ESG investing.

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33 Great Sutton Street | LONDON EC1V ODX | UK
187 boulevard Saint-Germain | 75007 Paris | France
TEL: +44 (0)20 7183 8801 | FAX: +44 (0)20 7183 8820
EMAIL: CEPR@CEPR.ORG
WWW.CEPR.ORG