ESG Data Primer: Current Usage & Future Applications

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The Sustainable and Green Finance Institute:

The Sustainable and Green Finance Institute (SGFIN) is a research institute established by the National University of Singapore (NUS). SGFIN aims to develop deep research capabilities in sustainable and green finance with a focal point on Asia, and to provide thought leadership and shape sustainability outcomes in policymaking across the financial sector and the economy at large. Supported by exceptional domain experts across NUS, SGFIN will equip businesses with critical cross-disciplinary knowledge, training, and toolkits to integrate sustainability dynamics into their business strategies and investment decisions to better quantify the environmental and social impacts of their business developments, operations, products, and services. In essence, SGFIN aims to help companies embed sustainability as a key pillar in their business decisions.

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Foreword

Benchmarking progress towards meeting corporate environmental and social ambitions has become a mainstream practice. In many ways it has always been so. The sound governance of organisations is a virtuous foundation of business quality and durability. However in recent years the scope of corporate governance has evolved to embrace more comprehensively defined notions of social and environmental performance.

Stakeholder awareness gradually transitioned into monitoring, implicit benchmark, and eventually into today's landscape wherein the data of environmental, social and governance (ESG) attributes of modern corporations underpins stakeholder actions. This has stimulated demand for ESG data, and this has been met with a vast supply of data purporting to offer consistent, comparable and timely representations of corporate ESG performance.

The accuracy and comparability of ESG data has material consequences to investor decisions. As a growing number of investors sustainability linked investment decisions, ESG data is an increasingly pivotal reference point for establishing the hierarchy of investment choices.

Despite this, and around two decades of ESG data reporting, there are many misconceptions and incomplete understandings of ESG data. This whitepaper offers a valuable primer on ESG data, seeking to unveil trends in data usage, highlighting and contrasting the major ESG data providers, illustrating among other things that ESG raters can offer conflicting evaluations of ESG performance.

Trends in data usage, are also established on the basis of research output in top tier accounting, finance and management related journals. This provides a grounded overview of what issues ESG data can be used to examine, and sheds some additional light on the gaps in research, establishing grounds for future applications. We hope that you find this a useful and insightful primer!
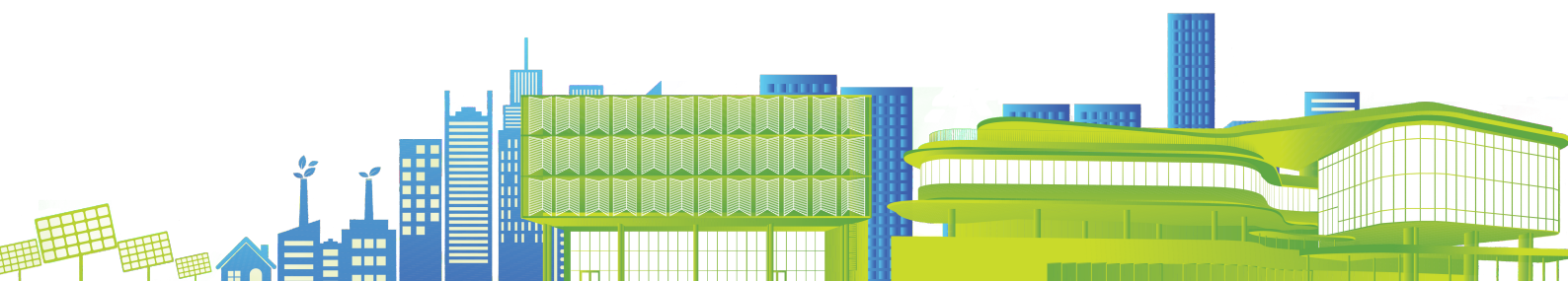
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Executive Summary

Responsible investing has elevated in status from a niche concept to a mainstream paradigm. It displays a potential to direct capital flows to addressing social issues such as gender equality, net-zero tilted investments to avoid climate-change, or more broad-sweeping human and economic development in line with the sustainable development goals.

An effective implementation for a responsible investment strategy all begins with data, and specifically environmental, social and governance (ESG) data.

Despite the increasingly mainstream use of ESG data, there remain many misconceptions and incomplete understandings. Therefore a digestible primer outlining a clear and succinct introduction to ESG data is provided in this whitepaper.

We position our primer around several fundamentally important questions:

- Why do we need ESG data?

- Who is providing ESG data, and why do their approaches differ?

- How consistent are the data within and across ESG ratings providers, and in comparison with company ESG disclosures?

- What are the types of research questions that can be addressed using ESG data?

The insights gleaned here are relevant to both industry based researchers and academics alike, with a very broad possibility of use cases.

The durable value of understanding ESG data is undeniable, as the mainstreaming of ESG driven business models has already passed an important inflexion point. Failure to actively adopt good ESG practices is a tangible business risk.

The whitepaper is also particularly timely, as the data for ESG is increasingly widely available, permitting many important research applications to be tested by researchers. Despite the profound advances of scientific scrutiny in this topic, yet there is room for both more expansive data collection, and still potentially new data points or data types to complement more conventional ESG measures. In other words ESG data is important, and will become even more so as time progresses.

The marriage of a review of ESG data principles and collection practices, and a careful review of academic research using ESG data brings to the fore several insights:

- There remains a prevalent use of combined ESG scores instead of E, S and G specific pillar scores;

- The use of combined ESG, and pillar specific scores may themselves detract focus away from crucial underlying raw data;

- Empirical research depends heavily on a small number of ESG data providers;

- That some data providers focus more on the E than the S - creating a need for data users to make sure the scoring ethos of each provider aligns with their expectations and requirements;

- There is a potentially material quantity of ESG data inconsistencies which could result in unintended investment allocation.

Biographies of Authors

Tifanny Hendratama is a Research Fellow with the Sustainable and Green Finance Institute (SGFIN) of the National University of Singapore (NUS). Her research interests focus on the analysis and validation of environmental, social and governance data. Her current work is primarily focused on the development of sustainability performance assessment frameworks and refining sustainability reporting practices, particularly for Asian companies. She obtained her Ph.D. in Business and Management from Southern Taiwan University of Science and Technology (STUST), and holds Bachelor and Master degrees in Accounting. Tifanny's research has appeared in a number of peer-reviewed academic journals including the Journal of Applied Accounting Research, the China Journal of Accounting Research and the Review of Integrative Business and Economics Research.

David C. Broadstock is Senior Research Fellow and Energy Transition Research Lead with Sustainable and Green Finance Institute (SGFIN) housed within the National University of Singapore (NUS). Through these roles David regularly interacts with financial institutions, government agencies, research foundations, policy makers and industry leaders to develop and implement impactful research into the successful deployment of transition finance to support sustainable economic development for Singapore. David is an economist with around 15 years of experience, most of which in Asia. He has worked within academia, consulting and strategic policy research (thinktanks) and is specialized in the areas of energy and environmental economics, with recent research concentrating on areas of green and sustainable finance. David places a special emphasis in the emerging area of 'transition finance', seeking to better appreciate how trust and confidence behind net-zero commitments can be fostered and sustained so as to facilitate an organised, timely and scalable flow of capital to achieve national decarbonization ambitions without sacrificing on economic competitiveness.

Johan Sulaeman the Director of the Sustainable and Green Finance Institute (SGFIN). He is also a Dean's Chair and an Associate Professor in the Department of Finance at the NUS Business School. He currently serves as one of the Scientists at AIDF (Asian Institute of Digital Finance). He has been involved in designing and delivering executive programmes for large companies and financial institutions in the region, primarily on topics related to sustainability, finance, and technology. His current research focuses on corporate social and environmental performance. His research has appeared in top economics and business journals, and been covered in various international publications, including The Wall Street Journal and The New York Times. He also contributes opinion pieces to the Straits Times and Channel News Asia.

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Part **1**

Navigating Sustainability with ESG Data

ESG data is a key instrument for assessing and evaluating sustainability practices of companies.

Key takeaways:

- There is a rapid growth of demand for ESG data, and in the number of ESG data providers and ratings agencies.

- With a growing number of data providers, a trust gap has emerged between stakeholders and the corporations they evaluate.

- The trust gap driven by a combination of corporate disclosure and ESG data provider coverage - noting that not all disclosing firms are covered by data providers.

- The regulation and alignment of ESG data are still in their infancy, but rapidly evolving.

Navigating Sustainability with ESG Data

In today's dynamic business landscape, the widespread adoption of sustainability reporting is seen as a crucial business practice. Regular and high-quality sustainability reporting allows organizations to demonstrate their commitment to societal and environmental well-being and respond to the increasing demand for transparency from stakeholders.

Rising stakeholder demands to concretely understand the environmental impacts of businesses originates from the 'wicked problem' that is climate change, and the urgency to transform business and economic models to reflect the costs of environmental damage that come with economic activity. We can refer to this as the 'demand for decarbonisation'. Complementary to this are a broader suite of social responsibility objectives which align with the seventeen Sustainable Development Goals (SDGs) set out by the United Nations, which address issues such as education for all, concepts of social justice (such as gender equality) among other important issues.

> ...environmental, social and governance (ESG) data has emerged as the mechanism for consistently recording, tracking and benchmarking corporate sustainability performance.

Satisfying the demand for decarbonisation is complicated as it is far from straightforward for stakeholders to intuitively gauge the environmental performance of companies using traditional financial data or company reports. As businesses strive to substanti-

ate their commitment to social responsibility and decarbonisation, there is a growing need to measure, compare, and validate the impact of these initiatives on company-specific performance. Stakeholders want to evaluate corporate efforts and performance, upon which they decide where to invest (or which businesses to do business with), basing their choices both on performance and core alignment of social and environmental values.

At the core of the evaluation process environmental, social and governance (ESG) data has emerged as the mechanism for consistently recording, tracking and benchmarking corporate sustainability performance. ESG data is rapidly growing in availability as well as use by stakeholders to facilitate their capital allocation decisions. It has become a key instrument for assessing sustainability practices and their influence on organizational performance.

Notwithstanding the rising prevalence of ESG data, its availability, and application, there are still many incomplete, or mixed understandings of it. Despite the growing data availability, the data is usually not free, and the costs involved with purchasing information from different data providers can be very high. This whitepaper offers a primer on ESG data, and provides a broad overview of the sustainability evaluation processes used by ESG data providers, a high-level summary of the sustainability data landscape, a description of the factors influencing rating prevalence, and an overview of the scrutinies levied towards ESG data. Based upon these elements, we lay down some preliminary guiding principles and strategies for improving evaluation reliability together with an 'action plan' for ESG data users.

With the objective of presenting a qualified appraisal of the roles and uses of ESG data, we complement documented applications of ESG data as a tool for responsible investing and sustainable and green finance with a review of the uses of ESG data in academic research. Our exploration of the prevalence and application of ESG in research uncovers a complex landscape reflecting the changing dynamics of modern business practices and the increasing demand for transparency and accountability from stakeholders. Moreover this highlights just how powerful ESG data is in describing and evaluating corporate actions in ways that traditional company data was not well suited for.

1.1 Bridging the Trust Gap

A central theme of this whitepaper is that of 'trust in ESG data'. Trust is definitional in the financial decision making process. In order for stakeholders to reliably make use of ESG data, there must be strong accountability and trust.

An absence of trust in ESG data can emerge in several ways, which will be more carefully unpacked later in this whitepaper. One particularly salient location comes with the use of 'ESG ratings'. Rating agencies, such as S&P, Bloomberg, Refinitiv and a number of others, take efforts to recover ESG related data from companies, either by way of scanning company reports and filings (including their sustainability reports) or in some cases through direct engagement and surveys. These data are amalgamated, and the rating agencies use them to develop ESG ratings along the separate E, S and G dimensions as well as providing a combined ESG rating, typically as a weighted average of the E, S and G components.

With rising global attention towards sustainable and responsible investment, clients–particularly institutional investors and asset managers–are closely scrutinizing ESG ratings provided. Discerning clients engage in independent due diligence, cross-verifying the provided evaluations and have set upon a mission to address observed ratings divergence, and in some cases inconsistencies that have been identified. This in turn has spurred questions around ESG data reliability and highlighted the requirement to ensure the rigor of raters' assessments. The importance of these concerns follows from the increasingly pivotal role played by ESG ratings, and the underlying data and processes used in generating them, in determining investment decisions and managing risks. Their control over substantial assets amplifies the ability of such discerning clients to influence the regulatory discussion and context.

Creating, facilitating and maintaining trust in ESG data is within the lens of many financial institutions and market regulators across the globe. Taking into account the heightened scrutiny levied towards ESG data, recent regulatory developments are emerging, notably in the European Union (EU), the United Kingdom (UK), and Japan, where entities such as the European Securities and Markets Authority (ESMA) and the UK's Financial Conduct Authority (FCA) are advocating for the assessment of ESG ratings and aiming to enhance the quality and transparency on data and evaluations (ESMA, 2022a,b; FCA, 2023; FSA, 2022; IRSG, 2023). In addition to the Call for Evidence on ESG ratings published by ESMA, the ESG Data and Ratings Code of Conduct Working Group (DRWG), with the support of International Regulatory Strategy Group (IRSG) and the Inter-

national Capital Market Association (ICMA), has released a draft voluntary Code of Conduct for ESG data and ratings providers for consultation. The Japanese Financial Services Agency (JFSA) has gone one step further, having developed a Code of Conduct for data and rating providers.

These regulations have a primary goal of enhancing the quality and reliability of data and evaluations, emphasizing comparability, consistency, integrity and transparency. This underscores the need for a cautious approach by raters, investors, and companies alike.

Definitions:

ESG (Environmental, Social, and Governance): Factors serving as holistic evaluation of an organization's sustainability commitment.

ESG data: Specific metrics and information pertaining to ESG factors, offering insights to assess and benchmark an organization's sustainability performance.

Rating: Assessment of sustainability performance based on the analysis of sustainability data. In addition to ratings, rating providers amalgamate sustainability data into scores and rankings. Scoring applies numerical scores to aggregate sustainability data, whereas rating uses letters (for example AAA to CCC from MSCI). Rankings allow companies to be ranked 'best to worst' either generally or within a particular industry.

Rating provider: Any entity that provides scores, ratings, and/or rankings. Typically, these providers offer multiple rating-related products to meet diverse customer needs.

This report primarily focuses on (environmental) sustainability

Part **2**

The ESG Data Landscape

Multiple types of data are required to objectively capture the range of environmental, social, and governance attributes falling within the domain of ESG.

In addition, evaluations of ESG are unavoidable subjective due to the comprehensive scope, and ratings agencies differentiate in their evaluations of firms due to the alternative values-driven scoring criteria they prioritize.

Key takeaways:

- Data requirements for comprehensive ESG evaluation are both large and complex involving many data points, with mixtures of quantitative and non-quantitative information.

- Corporate reporting practices differ, but additionally corporate reporting is not always captured and reflected in ESG data provider coverage.

- ESG data providers differ in the extent, frequency and methodology for their reporting, and many users are unable to observe, compare, and integrate ESG data from multiple providers.

The ESG Data Landscape

Information is everything, and within the realm of sustainable and green investing ESG data is the engine driving crucial capital allocation decisions. High-quality and timely data enable meaningful cross-comparisons, trend analyses, and informed decision-making by stakeholders and investors alike.

In both academic and industry contexts, the credibility of research findings is dictated by the quality of data in capturing and measuring features of importance. Modern research thrives on data rich environments comprising various data types. Amidst the evolving sustainability landscape, an extensive range of data points measuring attributes of ESG performance and resilience play a vital role in empirical analysis.

We first provide an overview of the broad nature of ESG data, before briefly reviewing the types of ESG data that are collected for ESG monitoring and benchmarking. We then introduce the major ESG data providers. The list of providers is not intended or claimed to be comprehensive, rather it reflects the most prevalent data providers based on the use of their data within academic research on sustainable finance.[1]

2.1   Nature of ESG Data

ESG data is rich in the scope of its content, owing to the nature of what it is intended to capture as the scope of social responsibility is expansive. While our focus here is tilted towards the environment related information, this gets compiled alongside the social and governance attributes at the reporting and collection phase.

While some of the attributes are quantifiable in standardizable and intuitive denominations, others are less obviously defined, or even necessarily non-standardized such as testimonials from stakeholder engagement.

Notwithstanding this, there are some common features that characterise the nature of information made available by ESG data providers.
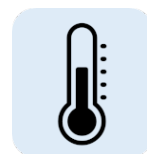
Environmental metrics, including green-house gas (GHG) emissions, energy consumption, water consumption, and waste generation. These data items help quantify progress and provide critical insights into environmental patterns that reflect companies internal climate resilience strategies. They typically serve as baseline environmental conditions and are essential to understanding the context in which companies operate. They are crucial for identifying risks, opportunities, and challenges while evaluating the organization's alignment with its defined sustainability goals.

Disclosures. Information on disclosures is provided by ESG data providers to convey the narrative of ESG transparency of a firm, on the basis of provision and quality of voluntary and (where appropriate) mandatory ESG disclosures. This includes variables indicating whether a company publishes sustainability reports, complies with GRI reporting guidelines, assures its sustainability reports, as well as whether the company declares its impacts on bio-

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[1]Additional detail on the screening process for identifying these academic papers follows later in the whitepaper.

diversity. Disclosures and informational data document the company's level of relative openness on sustainability factors, including the presence or absence of characteristics such as environmental regulations or certifications.

Financial metrics, such as carbon futures prices and environmental expenditures, act as bridges connecting responsible practices and profitability. They quantify the economic performance and financial implications associated with sustainability factors, including costs, investments, and profitability directly linked to sustainability practices and initiatives. With financial metrics offering insights into the financial implications, risks, and opportunities associated with environmental practices, these metrics can seamlessly gain traction among investors as they incorporate sustainability factors into their decision-making on a dollar-value basis.

Geospatial data, which primarily focuses on location-specific information, such as facility size and proximity, has garnered increasing interest due to its potential role in generating sustainability insights. It facilitates the assessment of specific assets and provides insights into the environmental impacts and exposures of commercial activities.

Scoring, Rating, and Ranking mechanisms emerge as instruments to evaluate entities across different dimensions and indicators. These mechanisms aim to provide a holistic assessment of the company's sustainability performance as well as its exposure to risks and/or opportunities. Balancing quantitative analysis with analyst over-

sight is often deployed in these mechanisms, each in varied proportions.

Surveys, interviews, and experiments offer in-depth insights and contextual understanding, making them crucial components of sustainability research. Surveys capture attitudes, views, and opinions about sustainability practices, awareness, and disclosures. Interviews offer rich qualitative data that can provide subtle insights and comprehensive contextual data, facilitating a deeper understanding of complex problems. Experiments, when feasible, help evaluate the efficacy of interventions and policies in affecting behavioral changes in sustainability research.

2.2 Types of Data

Underlying data. The foundation of an assessment lies in underlying raw data, constituting information available from company disclosures – either via publicly accessible channels (such as regulatory filings) or third-party data providers – and industry databases. This essential information includes various metrics such as Scopes 1 and 2 GHG emissions, energy consumption, water withdrawal, and waste generated. These metrics offer a granular understanding of the company's commitment to sustainable practices, enabling comprehensive analyses that go beyond surface-level evaluations.

Scoring, Rating and Rankings offer a quantitative viewpoint of how closely an organization adheres to environmental, social, and governance principles. These metrics are intended to make it possible to evaluate and compare ESG performance, offering both a hierarchical view and numerical scores that provide a reflection of a com-

pany's sustainability standing.

Building on underlying data on performance, policies, and initiatives/projects, materiality assessment takes place to ensure that evaluation focuses on issues that are significant for the company's operations and stakeholders.

Figure 1:
Conceptual overview of ESG scoring methodology.

Underlying Data: Data points on performance, policies, and programs from publicly accessible sources, surveys, third-party data providers, and industry databases.

Materiality: ESG data providers evaluate the (typically financial) materiality of ESG factors, based on the relative importance of the indicators for each company/industry.

Category Weights: Scoring weights are assigned to underlying data, based on ESG data provider's assessment and focus.

Pillar Score: Pillar scores are obtained using underlying data and category weights.

Overall Score

(Source: Author generated.)

Each indicator is assigned a weight based on its deemed materiality. Indicators that are deemed more critical carry greater weight(s) in the final score. The individual scores then contribute to the scoring within each E, S, and G pillars. Aggregating the scores from these pillars results in the overall ESG score, providing a comprehensive measure of the company's sustainability performance across different areas. Subsequently, rating providers leverage these numerical scores to assign ratings to companies, categorizing them based on their respective scores.

2.3 Who are the ESG Data Providers?

The ESG data providers industry is fragmented, featuring numerous entities. These firms have varied backgrounds, representing a blend of financial data providers (e.g., Bloomberg, Refinitiv, and MSCI), credit rating agencies (e.g., S&P), and specialized ESG providers (e.g., CDP and Sustainalytics). Additional details on the providers covered within this whitepaper are provided in the Appendix (see Table A1).

Bloomberg offers a wide range of sustainability data products, including as-

reported data, derived ratios, sector- and country-specific fields, third-party data, as well as proprietary scores. Bloomberg's scoring approach for disclosures involves separate assessments of companies on their environmental (E), social (S), and governance (G) performance, with industry-specific materiality considerations (Basar, 2021).

CDP offers a data platform enabling companies, cities, states, regions, and public authorities to report their environmental impact, including reporting on climate change, water security, and forests. CDP employs sector-specific questionnaires, containing both general inquiries and sector-specific questions tailored to sectors with substantial environmental impact. CDP also generates scores based on data from the responses (CDP, 2023).

FTSE Russell, owned by the LSEG, relies solely on publicly disclosed information. An independent committee of experts oversees the data model, which considers exposure, management of, and issues across multiple dimensions with over 300 individual indicators. The ESG framework covers five environmental, five social, and four governance themes (FTSE Russell, 2023). The ESG scores, based on an exposure-weighted averaging, include an overall score, pillar, and thematic exposures.

MSCI acquired RiskMetrics, which owned KLD, an early sustainability data provider, in 2010 (MSCI, 2010). They collect data from company filings, government, regulatory, and NGO databases, and other media sources. Their regular monitoring allows for timely updates within a week if specific data changes. MSCI focuses on 33 key ESG issues, contributing to 10 themes categorized under the environmental, so-

cial, and governance pillars, reflected in the industry-adjusted score for each company. The primary outcome of the evaluation is the industry-relative company ESG rating, presented on a seven-point scale from AAA to CCC (MSCI, 2023).

Refinitiv, previously Thomson Reuters, provides data from various sources, including annual reports, company websites, NGO websites, stock exchange filings, CSR reports, and news sources (Refinitiv, 2019, 2022). Refinitiv utilizes over 630 company-level ESG measures —a subset of 186 driving the overall company assessment. Grouped into 10 categories, these measures are aggregated under three pillar scores (environmental, social, and governance) and the final ESG score. Each ESG pillar score reflects the company's performance, commitment, and effectiveness based on publicly reported information.

S&P Trucost covers environmental impact data consisting of both raw and calculated values at company and sector levels, covering diverse disclosure types, from exact values to derived data, and estimations using an environmental profiling model (S&P Global Market Intelligence, 2023). In addition, S&P uses Corporate Sustainability Assessment (CSA)-derived data to produce its ESG score, aggregating Environmental (E), Social (S), and Governance (G) dimension scores with sub-industry-specific weightings (S&P Global, 2022).

Sustainalytics, with a track record of over 25 years, was acquired by Morningstar in 2010 (Sustainalytics, 2020). Sustainalytics takes a different approach in measuring corporate sustainability, by focusing on sustainability-related risk. Its ESG Risk Ratings ex-

amine a company's exposures to ESG risk, categorizing them into manageable and unmanageable risks. Manageable risks undergo an assessment based on company commitments, actions, and outcomes, resulting in either managed risk or a management gap. Unmanaged risk encompasses risks not properly managed by the company. Sustainalytics then calculates each company's its ESG Risk Rating based on the difference between the company's overall ESG exposure score and its overall managed risk score (Morningstar , 2021).

2.4 A Note on the Frequency and Timing of ESG Data

Data providers may offer access to their information through online portals, specialized terminals, or platforms designed for more dynamic and interactive engagement. Most also allow for bulk data retrieval through API access.

The frequency of data delivery may vary among providers. Some adopt a weekly data-sharing approach, while others may adopt a monthly schedule, offering relatively frequent supply of data. Meanwhile, some provide an annual reporting cycle, likely reflecting their more deliberative methodology.

For instance, Carbon Disclosure Project (CDP) typically follows an annual reporting cycle for the collection and delivery of environmental data.

In terms of rating and scoring updates, data providers typically follow structured update cycles. Some opt for an annual refresh of ESG scores, aligning with the fiscal year and corporate reporting patterns. Refinitiv aligns with this practice, updating ESG scores annually in line with companies' own ESG disclosure (Refinitiv, 2022).

On the other hand, some providers opt for more frequent updates. S&P updates its ESG scores and underlying data on a monthly basis (S&P Global, 2022). Meanwhile, MSCI takes a responsive approach—when specific data points are updated by MSCI ESG Research, corresponding scores are automatically updated within a week, although updates to scores may not necessarily result in an immediate rating action (MSCI, 2023).

2.5 Reported Versus Augmented ESG Data

Reported data refers to information gathered from company disclosures, regulatory filings, third-party data providers, and industry databases. Given the diverse transparency levels among companies, the completeness of reported data may vary. In contrast, augmented data is the result of a process of estimation to supplement the reported information. Data providers utilize proprietary models to estimate missing data points, such as emissions data, aiming to improve comparability and address the need for comprehensive information. However, users must understand that while estimation adds to the completeness and timeliness of information, it introduces a level of uncertainty and an additional layer of potential reliability concern to the analysis.

2.6 Revised Vintages/Back-Filling of Scores

The concept of revised vintages has garnered increasing attention. Notably, across different data downloads for identical firm-years, Berg et al. (2020) observed "widespread and repeated changes" to historical scores, particularly in the case of Refinitiv. They

argue that while initial data does not show correlation with stock returns, a positive relationship is observed in the rewritten data.

Figure 2:
Rate the Raters: Corporate and investor views on ESG ratings.

Investor Survey

	Average Quality	Average Usefulness
Bloomberg	3.00	3.21
CDP	4.09	3.90
EcoVadis	4.20	3.20
FTSE4Good	3.00	2.45
ISS–ESG	4.06	3.63
JUST Capital	3.00	2.40
Moody's	2.91	2.75
MSCI	3.38	3.24
Refinitiv	3.18	3.00
RepRisk	3.92	3.46
S&P	3.75	3.08
Sustainable Fitch	3.20	2.67
Sustainalytics	3.68	3.29

Corporate Survey

	Average Quality	Average Usefulness
Bloomberg	3.07	2.95
CDP	4.09	3.93
EcoVadis	3.24	3.19
FTSE4Good	2.98	2.68
ISS–ESG	3.27	3.35
JUST Capital	3.18	2.89
Moody's	3.05	2.95
MSCI	3.23	3.41
Refinitiv	2.97	2.61
RepRisk	3.22	3.32
S&P	3.80	3.56
Sustainable Fitch	2.95	2.85
Sustainalytics	3.46	3.55

(Adapted from Rate the Raters 2023)

Despite the stated policy of Refinitiv (2022) assuring users that "Scores will be marked as 'definitive' for all historical years excluding the five most recent... Definitive scores remain unchanged, even if there are changes to the underlying data due to company restatements or data corrections," the study documents an ongoing practice of rewriting scores without publicly announcing the modification.

2.7 Industry Perceptions of ESG Data

Despite the challenges due to data inconsistencies and questionable

methodologies, investors rely on ESG ratings and data (Brock et al., 2023). The SustainAbility Institute by Environmental Resources Management (ERM) publishes annual "Rate the Raters" report, providing insights into corporate sustainability ratings.

Respondents rated the quality and usefulness of the rating providers on a scale of 1-5, with Figure (2) highlighting the rating providers with the highest average scores among investor respondents. CDP, known for its lengthy questionnaire requirements and recognition as an "active" ESG rater, stands out as the leader in terms of usefulness, while securing the second position in quality.

In parallel, Rate the Raters also took the corporate perspective on evaluating the quality and usefulness of different ESG rating providers. Similar to the investor survey, CDP came out on top of the ratings.

The study revealed that corporate respondents most frequently shared their views on MSCI, CDP, and Sustainalytics. This may not necessarily indicate how highly they view these rating providers, but rather their familiarity with these raters.

Comparing 2022 with 2018/2019 responses unveiled shifts in investor perceptions. Notably, MSCI's "high quality responses" saw a decline while results also suggest that investors' estimation of Bloomberg's quality and usefulness improved.

Definitions:

Augmented data: The result of an estimation process by data providers to supplement reported information. A typical approach would involve proprietary models to estimate missing reported data points.

Pillars: Typical sustainability reporting and assessment focus on three aspects of sustainability, which we refer to as "pillars": E(nvironment), S(ocial), and G(overnance).

Underlying data: Raw information, including key metrics such as Scope 1 GHG emissions, drawn from diverse sources such as company disclosures.

Part **3**

Unveiling ESG Research Trends

With the availability of sufficient data to facilitate rigorous data analytics, there has been a rapid growth of academic research output with an ESG orientation.

We review the research published in leading academic journals covering finance and accounting related subject matter.

Key takeaways:

- ESG research is highly concentrated on a small number of ESG data sources.

- The aggregate ESG score is the most widely used data point, followed closely by indicators representing the balance of ESG related strengths versus concerns.

- The subject matter coverage of academic research utilising ESG data is quite broad, albeit with some potential gaps to be addressed.

Figure 3:
Citation weighted wordcloud of N-grams appearing in academic research. The size and colour of the words reflects the relative frequency of appearance.
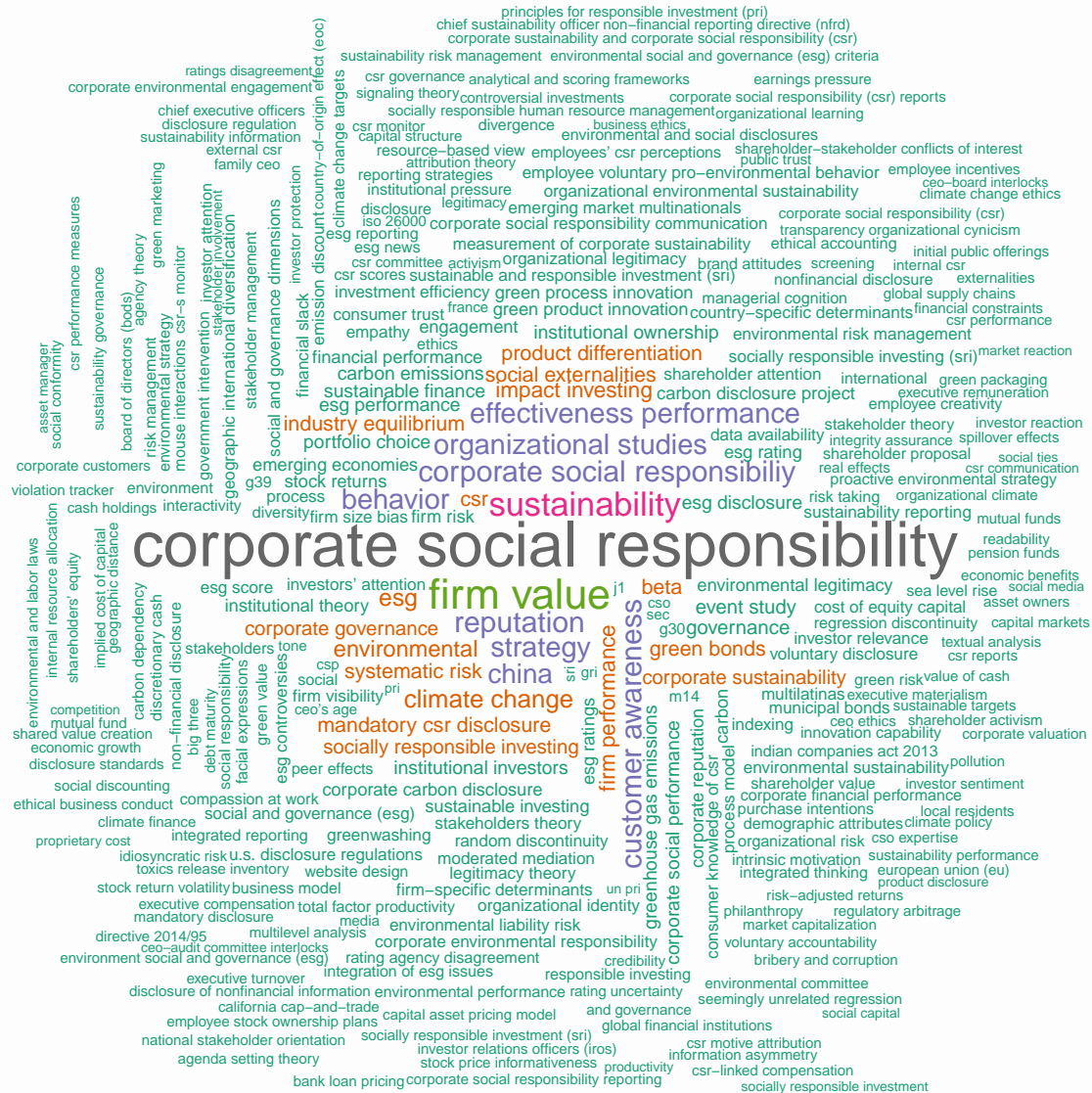
(Source: Author generated)

Unveiling ESG Research Trends

In this section we offer an overview of the topics and questions that have been addressed in scientific research using ESG data. In doing so we paint a clearer picture upon where ESG data is facilitating more advanced under-standings of corporate actions and/or investor choices. Moreover, we can offer a lens on some of the more apparent gaps.

3.1 Methodology at a Glance

The literature collection process began with a broad search across re-

spected journals, with a focus on finance and accounting. Journal selection criteria considered relevance and widespread recognition in the academic community. We frame the discussion around research output emerging from the following academic journals:

Finance

- Journal of Finance

- Journal of Financial and Quantitative Analysis

- Journal of Financial Economics

- Review of Finance

- Review of Financial Studies

Accounting

- The Accounting Review

- Contemporary Accounting Research

- Journal of Accounting and Economics

- Journal of Accounting Research

- Review of Accounting Studies

Others

- Journal of Business Ethics

- Management Science

We conduct searches within each journal to identify research contributions focused on sustainability, ESG, environmental sustainability, and environmental performance in the period from 2017 to 2023, with the requirement that the identified studies make explicit use

of ESG data in their empirical investigations. The identified output contained a total of 171 articles making use of more than 50 ESG data sources and utilising more than 200 distinctly measured variables relating to various dimensions of corporate ESG performance. We obtain the full text articles, which together form our 'research corpus', together with the article meta-data from Scopus, which provides clean access to keywords, authors, citation counts and a number of other variables of interest.

12	Journals
171	Articles
7	Years

Our review of academic research papers helps to develop complementary insights surrounding the use of ESG data:

- **Who are the most 'favoured' ESG data providers?** We do not qualify why, although data integrity and data cost are likely to be among the leading principles.

- **What are the topics of research for which ESG data is being used?** This sheds a light upon the range of real-world applications of ESG data.

Figure (3) provides something of a preview to our findings, offering a wordcloud of the author-provided keywords, with the size (and colour) weighted by the sum of citations accruing to papers in which that keyword is used by its author(s). We observe that 'FIRM VALUE' emerges as the second

most frequent term (after 'CORPORATE SOCIAL RESPOSIBILITY' which needs no introduction by itself), underlining the critical need and desire to link sustainability and commercial success. Other prevalent terms include, 'BEHAVIOUR', 'REPUTATION', 'STRATEGY', 'ORGANIZATIONAL STUDIES', and 'CUSTOMER AWARENESS'.

Figure 4:
Frequency of appearance (prevalence) of different ESG data providers in academic research.

Provider	Percentage	Count
MSCI/KLD	40.00%	69
Refinitiv	26.00%	45
Sustainalytics	8.00%	13
Bloomberg	8.00%	13
Trucost	6.00%	10
Reprisk	5.00%	8
Disclosures	5.00%	8
EPA/TRI	4.00%	7
Vigeo Eris	4.00%	6
Morningstar	3.00%	5
CDP	3.00%	5
RobecoSAM	2.00%	3
SHELDUS	2.00%	3
United Nations PRI	2.00%	3
Burning Glass	1.00%	2
CSR–S Monitor	1.00%	2
Factset	1.00%	2
GHGRP	1.00%	2
Google Patents	1.00%	2
Prowess	1.00%	2
Violation Tracker	1.00%	2
Wind	1.00%	2
WSJ Climate Change News Index	1.00%	2
Others	1.00%	1

(Source: Author generated)

This section proceeds as follows: first we summarise which ESG data sources are being used by ESG analysts and researchers, together with an overview of the specific ESG data points/measures that researchers are using to inform their analyses; second we conduct a more formal assessment of the subject matter being addressed in our identified research corpus using machine learning/classification tools.

3.2 ESG Data Sources Used by Researchers

Progress in the efficient allocation of financial capital towards sustainability oriented investments is plagued by a problematic information gap. There is

an enduring mismatch between the level of demand, and the forthcoming accessibility and availability (supply) of ESG data. To tackle this issue, data providers are continuously working on solutions to offer better insights with broader coverage. In practice, these efforts manifest in different (and likely complementary for the ESG data users perspective) information being offered under multiple products to cater to the growing demand for sustainability-related information, adapting to cover emerging areas of focus and interest. Nonetheless the task of discerning useful variation in ESG data providers ratings, versus differences in information that may result in inefficient investment choices is important for all ESG data users to remain aware of.

Some of the common data products include access to the raw (or underlying) data, which can be as-reported or estimated/augmented,[2] as well as indices, controversy alerts for tracking and monitoring practices, and screening tools. On top of that, most providers analyze data to deliver scores, ratings or rankings, typically using numerical or letter grades. These evaluations can be applied to countries, sectors, and companies. Given the limited skills to process sustainability data in many financial intermediaries and institutions, the availability of these products is crucial for making investment decisions

and for various other applications.

In academic research, data providers such as MSCI/KLD and Refinitiv have historically taken center stage. Researchers frequently rely on these resources for access to ESG data and insights related to sustainability issues. Figure (4) indicates the utilization (prevalence) of the ESG data sources in our research corpus, with MSCI/KLD taking the lead with a usage rate of 40%. This substantial prevalence highlights its considerable influence in shaping academic narratives around sustainability considerations. Refinitiv follows with a utilization rate of 26%. These numbers underscore a heavy historical reliance upon a relatively limited set of data sources within the research community, leaving other contributors with less prominence.

> In academic research, data providers such as MSCI/KLD and Refinitiv have taken center stage.

While MSCI/KLD and Refinitiv wield substantial prevalence, it is instructive to assess the changing nature of the ESG data landscape, as many new ESG data providers are emerging. For this we use a Herfindahl-Hirschman Index (HHI) calculation which provides a lens on the competitive dynamics and con-

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[2]Data providers sometimes refer to the process of data imputation as 'data-augmentation'. This implies something is added which can distract away from the fact that it is a process used to address missing data problems. This is a potentially important issue for empirical research, as it could manifest in problems of statistical identification by construction in regression type analyses or other statistical summaries.

[3]The Herfindahl-Hirschman Index, or HHI, is defined as:

$$HHI_t = \sum_{i=1}^{N}(MS_{it})^2$$

Where MS_{it} reflects the share of use of ESG data from rating agency i in the year t. An HHI value between 1,500 to 2,500 indicates a moderately concentrated market, while scores between 100 to 1,500 imply an unconcentrated (or in others competitive) market structure.

centration levels of ESG data provider prevalence over the years.[3] The calculations show that the ESG data landscape was moderately concentrated in 2017, reflecting the dominance of a few data providers,[4] with an HHI of 2,180. The landscape has shifted by 2020, with the HHI declining to 1,073, indicating a more competitive and diversified ESG data landscape—this trend persists in the recent years. This reflects what is broadly understood within the ESG data community, that there is an intense competition underway among data providers to become the quintessential, or go-to provider of ESG data and ratings. Thus new ratings providers are emerging, and will likely continue to do so for some time. Inevitably, much like with traditional company financial ratings, there will be a shakeout of the landscape in the future, as vested stakeholders align con-

fidence in a small set of reputable ESG data providers.

For now however, the dependence on a select few data providers is shifting towards a growing dependence on a more diverse range of data sources, as (i) ESG data providers collect non-overlapping data points in terms of variables as well as company coverage and (ii) ESG data users are increasingly addressing more nuanced questions, requiring more diverse data points than a single provider may be able to offer.

The changing dynamics of the competitive structure of ESG data use underscores the importance of ongoing evaluation, and adaptability to emerging trends, diverse inputs and more advanced methodologies. These practices become fundamental for fostering meaningful academic discourse.

Figure 5:
The concentration of usage of different ESG data providers within academic research, as measured using a Herfindahl-Hirschman Index.
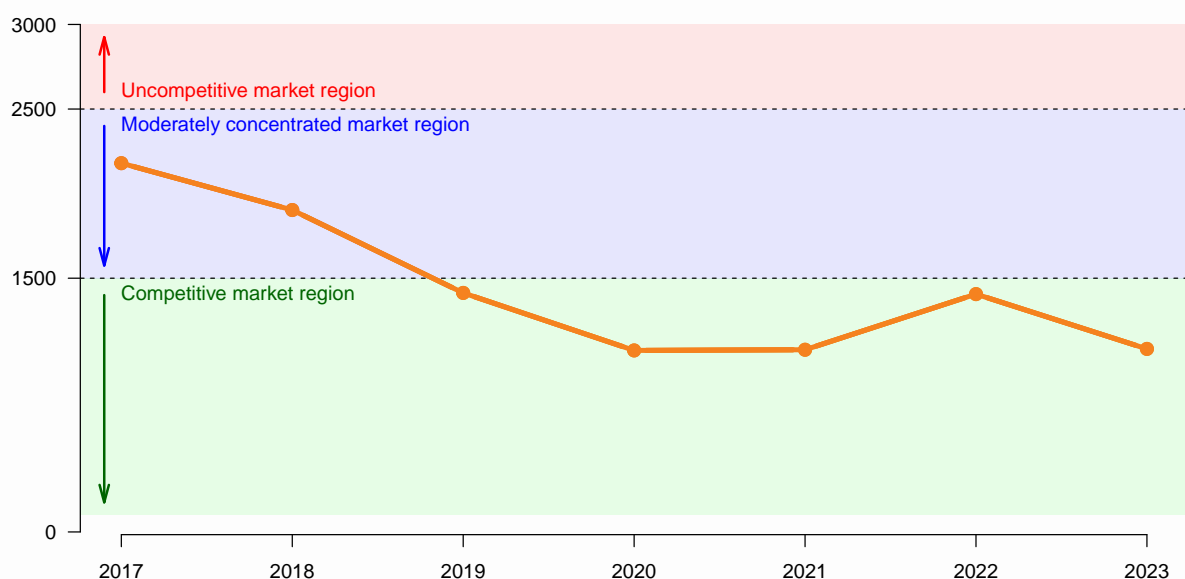
(Source: Author generated)

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[4]This fact is also evident from Figure (4) where it can be seen that a few data providers have been used more widely among researchers.

3.3 Specific ESG Indicators / Variables Used

ESG data is expansive. The nature of ESG is that it covers vast areas, including the environmental, social as well as governance issues. Moreover, within each of these pillars there can be many subjective interpretations around what can and should be measured. To further complicate things, some measures might be precisely but vaguely defined - imagine a question of whether or not a company has a decarbonisation strategy? While precise, it is vague around the depth and quality of the strategy, permitting only a coarse dichotomy of do or do-not.

Figure 6:
The frequency of use (prevalence) of ESG related data, including scores, ratings, underlying data and transformations thereof, within academic research. Variables highlighted in **black** are based on scores provided by ESG data providers, while variables highlighted in **blue** use underlying data.

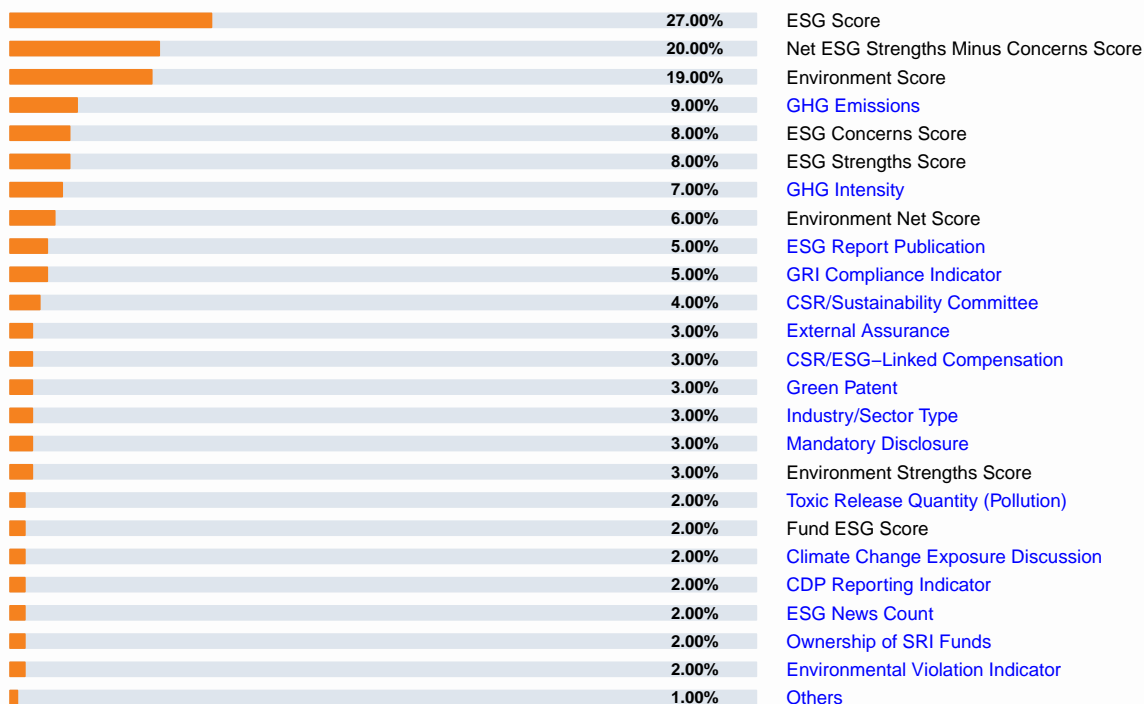| Percentage	Variable
27.00%	ESG Score
20.00%	Net ESG Strengths Minus Concerns Score
19.00%	Environment Score
9.00%	GHG Emissions
8.00%	ESG Concerns Score
8.00%	ESG Strengths Score
7.00%	GHG Intensity
6.00%	Environment Net Score
5.00%	ESG Report Publication
5.00%	GRI Compliance Indicator
4.00%	CSR/Sustainability Committee
3.00%	External Assurance
3.00%	CSR/ESG–Linked Compensation
3.00%	Green Patent
3.00%	Industry/Sector Type
3.00%	Mandatory Disclosure
3.00%	Environment Strengths Score
2.00%	Toxic Release Quantity (Pollution)
2.00%	Fund ESG Score
2.00%	Climate Change Exposure Discussion
2.00%	CDP Reporting Indicator
2.00%	ESG News Count
2.00%	Ownership of SRI Funds
2.00%	Environmental Violation Indicator
1.00%	Others

(Source: Author generated)

Due to the encompassing, and inherently subjective nature of attributes of ESG, the suite of ESG data related points that has emerged is often in the territory of hundreds of raw/underlying data points. These are used by ESG data providers together with their proprietary evaluation methodologies to construct a reduced-dimensional snapshot of companies' efforts and performance in relation to E, S and G pillar. Accordingly, a handful of variables have assumed prominence in use among academic researchers. Around 27% of articles make direct use of combined *ESG scores* (ratings). The combined, or aggregated, ESG score offers a bird's-eye and holistic view of

a company's overall sustainability performance, considering factors related to its environmental impact, social responsibility, and governance practices simultaneously.

In close pursuit are other metrics such as *Net ESG Strengths Minus Concerns* (20%) and *Environmental score* (19%), pointing towards a dependence on score-based mechanisms in exploring ESG-related themes and underscoring the significance of these metrics in evaluating corporate sustainability practices.

At the other end of the spectrum, directly reported data points such as *GHG emissions* (9%) and *GHG intensity* (7% also) see a reasonable share of use. These continuous quantitative metrics reflect a company's environmental impact and carbon footprint, offering a more granular view of its sustainability performance.

Some researchers also consider other variables, including ESG news count. Additionally, they explore key reporting metrics such as whether a company publishes an ESG report, adherence to the Global Reporting Initiative (GRI), and the presence of external assurance.

3.4 A Topic Classification of ESG Related Research

We now turn our attention towards classifying the topics of ESG research within our research corpus. For this we apply a topic classification close in spirit to that in Broadstock and Wang (Forthom-

ing) which builds upon a standard application of langugage classification tools known as structural topic models (Roberts et al., 2019).

The conventional approach when working with topic models considers words independently of each other, and can often result in models that fail to properly capture obvious multi-part keywords. For example the words 'CLIMATE' and 'CHANGE' appear as independent terms when their appearance in sequence as the term 'CLIMATE CHANGE' is a valid multi-part keyword which if treated as such can be utilised to increase the contextual understanding of topic model results.

Achieving this in practice is straightforward and involves bridging multi-part keyword terms into an interpretable single-string item e.g. 'CLIMATE_CHANGE' at the right point of the language cleaning process, such that the topic model treats it is a single term. The dictionary of multi-part keywords for such substitution is readily available from the author supplied keywords contained in each paper's Scopus meta-data.

We develop a dictionary of keyword n-grams for the documents in our research corpus where author provided keywords are available. We restrict our focus to multi-part terms of length $n = \{2, 3, 4\}$. We then manually review the n-gram dictionary to ensure that expected keywords are captured, and also that any remaining terms with little contextual relevance are dropped from consideration.[5]

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[5]This step of manual requires reasonable contextual understanding of the literature under study. Our project team has this. Moreover, as noted in Broadstock and Wang (Forthoming) the process includes identifying keyword pairs, triplets etc. to be treated as single terms within our structural topic model, but this is not equivalent to pre-imposing topics. The topics recovered from structural topic models reflect complex evaluations of the repeat occurrences of combinations of keywords within and across corpus items. Our approach instead aids contextual refinement and model interpretability.

Table 1a:
Results for topics 1 to 5 obtained from structural (correlated) topic modeling of academic literature on sustainability. Topic names are are subjective but plausible interpretations of top keywords core theme of research they imply.

Topic number: Topic name:	Topic 1 CSR & supply chains	Topic 2 Board composition / compensation	Topic 3 Stakeholder perceptions	Topic 4 Pollution and waste	Topic 5 ESG investing
Highest probability terms:					
Term 1 :	CSR	CEO	S	FIRMS	ESG
Term 2 :	FIRMS	FIRMS	CSR	FIRM	S
Term 3 :	FIRM	BOARD	E	S	RETURNS
Term 4 :	S	FIRM	MANAGEMENT	YEAR	E
Term 5 :	YEAR	S	RESEARCH	ENVIRONMENTAL	MARKET
Frequent and exclusive (FREX) terms:					
Term 1 :	CSR	CEO	ORGANIZATIONAL	POLLUTION	STOCKS
Term 2 :	SUPPLIER	CSP	EMPLOYEES	TOXIC	ESG RATING
Term 3 :	STRENGTHS	BOARD	ORGANIZATION	EMISSIONS	RETURNS
Term 4 :	SUPPLIERS	CEOS	CONSUMERS	MANDATE	DISAGREEMENT
Term 5 :	FIRM VALUE	DIRECTORS	PERCEPTIONS	TREATMENT	NEWS
'Lift' weighted terms:					
Term 1 :	STOCK RETURN VOLATILITY	SOFT	LABEL	PLANTS	FRONTIER
Term 2 :	SIMILARITY	CSP	BRAND	TOXIC	CAPM
Term 3 :	SUPPLIER	EXECUTIVE COM-PENSATION	QUESTIONABLE	MANDATE	ALPHAS
Term 4 :	CSR SCORES	AGENCY THEORY	INTENTIONS	ABATEMENT	HML
Term 5 :	PRODUCT DIFFERENTIATION	[COM]PENSATION	ATTITUDES	FACILITY	DISAGREEMENT
Distribution of topics:					
Proportion (%):					
All (n=159)	21.38	11.95	11.32	10.69	8.81
Finance (n=42)	9.52	0.00	0.00	9.52	19.05
Accounting (n=39)	23.08	7.69	0.00	20.51	7.69
Other (n=78)	26.92	20.51	23.08	6.41	3.85
Of which:					
Management Science (n=9)	5.13	2.56	0.00	2.56	0.00
Journal of Business Ethics (n=69)	21.79	17.95	23.08	3.85	3.85

Note:
CAPM = Capital Asset Pricing Model; CDP = CDP (formally Carbon Disclosure Project); CEO/CEOS = Chief Executive Office (and its plural); CSP Corporate Social Performance; CSR = Corporate Social Responsibility; E = Environmental; ESG = Environmental, Social and Governance; G = Governance; HML = High Medium Low market pricing factor; PRI = Principles of Responsible Investing; S = Social; SRI = Socially Responsible Investing

To ease exposition we assume there are $k = 10$ topics in the literature. The 'usual' approach for reporting topic models is to list the top ranked terms, and these are given in Tables (1a) and (1b) for topics 1-5 and 6-10 respectively. In addition to providing the top-5 ranking terms based on raw probabilities of occurrence, structural topic mod-els permit weighting terms for their 'frequent and exclusive' presence within a topic (FREX). We also include 'Lift' ordered terms which "...*weights words by dividing by their frequency in other topics, therefore giving higher weight to words that appear less frequently in other topics*" (Roberts et al., 2019).

Table 1b:
Results for topics 6 to 10 obtained from structural (correlated) topic modeling of academic literature on sustainability. Topic names are are subjective but plausible interpretations of top keywords core theme of research they imply.

Topic number:	Topic 6	Topic 7	Topic 8	Topic 9	Topic 10
Topic name:	International comparisons	Debt finance	CSR reporting practices	Responsible investing / engagement	Climate change (physical risk)
Highest probability terms:					
Term 1 :	S	S	CSR	ESG	CLIMATE
Term 2 :	COUNTRY	FIRMS	INFORMATION	FUNDS	RISK
Term 3 :	ESG	BOND	ACCOUNTING	FUND	CLIMATE CHANGE
Term 4 :	COUNTRIES	E	REPORT	PRI	FIRMS
Term 5 :	FIRMS	FIRM	ASSURANCE	INVESTORS	RISKS
Frequent and exclusive (FREX) terms:					
Term 1 :	COUNTRY	BOND	ASSURANCE	PRI	CLIMATE
Term 2 :	COUNTRIES	LOAN	CSR REPORTS	FUND	CLIMATE CHANGE
Term 3 :	SENTIMENT	BONDS	AUDIT	FUNDS	CDP
Term 4 :	CULTURE	CRISIS	CSR REPORTING	SRI	RISKS
Term 5 :	LEGAL	DEBT	CSR REPORT	MUTUAL FUNDS	WEATHER
'Lift' weighted terms:					
Term 1 :	SENTIMENT	PROPERTY	IMMATERIAL	SHAREHOLDER PROPOSALS	HEDGE
Term 2 :	PORTUGAL	LOAN	CSR REPORTS	PRI	TEMPERATURE
Term 3 :	POLAND	BOND	CSR REPORT	MORNINGSTAR	WEATHER
Term 4 :	GREECE	SPREADS	ASSURANCE	HEDGE FUND	CLIMATE
Term 5 :	JAPAN	LOANS	AUDITOR	FUND	CDP
Distribution of topics:					
Proportion (%):					
All (n=159)	8.18	8.18	6.92	6.29	6.29
Finance (n=42)	7.14	21.43	0.00	14.29	19.05
Accounting (n=39)	0.00	7.69	23.08	5.13	5.13
Other (n=78)	12.82	1.28	2.56	2.56	0.00
Of which:					
Management Science (n=9)	0.00	0.00	0.00	1.28	0.00
Journal of Business Ethics (n=69)	12.82	1.28	2.56	1.28	0.00

Note: CAPM = Capital Asset Pricing Model; CDP = CDP (formally Carbon Disclosure Project); CEO/CEOS = Chief Executive Office (and its plural); CSP Corporate Social Performance; CSR = Corporate Social Responsibility; E = Environmental; ESG = Environmental, Social and Governance; G = Governance; HML = High Medium Low market pricing factor; PRI = Principles of Responsible Investing; S = Social; SRI = Socially Responsible Investing

3.4.1 Identified Topics of Research Using ESG Data

One challenge which comes with the use of topic models lies in their interpretation. The model results rank keywords in terms of their likelihood of appearing together, on the basis of raw probabilities as well as the FREX and 'Lift' based probability weightings. It falls upon the analyst(s) to 'allocate' a topic name if desired, which can aid in the interpretation of the output. In this case the keyword combinations under the ten topics do not require much effort to assign high-level topic names to. In order of their frequency of occurrence, the topics of research using ESG data and

a brief justification of their assignment are as follows:

- **Topic 1 - CSR and Supply Chains (21.38%):** The topic classificaiton follows from multiple references to supply.

- **Topic 2 - Board Composition / Compensation (11.95%):** Terms including BOARD, CEO(S), DIRECTORS imply this is about upper level management while terms on 'EXECUTIVE COMPENSATION' and 'AGENCY THEORY' suggest this to be connected with the way pay and reward structures may overlap with agency problems.

- **Topic 3 - Stakeholder Perceptions (11.32%):** Representation of different stakeholder groups including CONSUMERS, EMPLOYEES, ORGANISATION, together with terms such as BRAND, INTENTIONS, QUESTIONABLE imply this topic to be around the identification of legitimate intentions.[6]

- **Topic 4 - Pollution and Waste (10.69%):** Qualified by references to TOXIC, EMISSIONS, POLLUTION, and TREATMENT.

- **Topic 5 - ESG Investing (8.81%):** Terms including CAPM, ALPHAS, HML and RETURNS indicate this topic to be about asset pricing analysis.

- **Topic 6 - International Comparisons (8.18%):** Reference to COUNTRY, COUNTRIES, CULTURE, LEGAL and several different country names.

- **Topic 7 - Debt Finance (8.18%):** References to LOANS, DEBT, BOND(S) and PROPERTY indicate this to be around debt finance, potentially with an infrastructure orientation.

- **Topic 8 - CSR Reporting Practices (6.92%):** Justified by references to REPORTS, ASSURANCE, AUDIT, AUDITOR.

- **Topic 9 - Responsible Investing / Engagement (6.29%):** Presence of terms including 'HEDGE FUND', 'MUTUAL FUNDS' and INVESTORS, together with reference to ESG data provide MORNINGSTAR, imply a focus on institutional responsible investing practices.

- **Topic 10 - Climate Change (physical risk) (6.29%):** Terms including CLMATE, 'CLIMATE CHANGE', RISKS together with TEMPERATURE and WEATHER.

We refer to the ten defined topics as 'high-level' topics yet recognise that within each topic there will unambiguously be studies covering specific and nuanced subject matter. For example Topic 9 includes the term 'SHAREHOLDER PROPOSALS' which may correlate with investor lobbying. It is not within the scope of this primer to unpack these more nuanced details.

3.4.2 What Different Disciplines Are (and Are Not) Discussing

Our research corpus, as indicated earlier, spans leading journals from connected but distinct disciplines. These broadly include Finance, Accounting and 'Other', where we might consider the last category as reflecting management oriented journals, including Management Science, and the Journal of Business Ethics.

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[6]GREENWASH did not emerge as a leading keyword, but that is very likely within the scope of this topic.

At the bottom of Tables (1a) and (1b), in addition to showing how the full corpus is distributed (classified) into the ten topics, we additionally show classifications according to the different disciplines, and in the case of 'Other' we further show journal specific classifications.

Finance research is dominated by focus in four topics: Topic 7 - **Debt Finance (21.43%)**, Topic 5 - **ESG Investing (19.05%)**, Topic 9 - **Climate Change (physical risk) (19.05%)** and Topic 2 - **Responsible Investing / Engagement (14.29%)**. Topics that are not covered within Finance include Topic 8 - **CSR Reporting Practices (0.00%)**, Topic 3 - **Stakeholder Perceptions (0.00%)** and Topic 2 - **Board Composition / Compensation (0.00%)**.

Accounting research is defined closely around three topics: Topic 1 - **CSR and Supply Chains (23.08%)**, Topic 8 - **CSR Reporting Practices (23.08%)** and Topic 4 - **Pollution and Waste (20.51%)**. Areas that have not fallen within the view of accounting research include Topic 6 - **International Comparisons (0.00%)** and Topic 3 - **Stakeholder Perceptions (0.00%)**.

Research falling under our 'Other' category is primarily defined around works appearing in the Journal of Business Ethics, from which 69 of the 78 articles appearing in this category are drawn from. Topics that define this branch of literature include: Topic 1 - **CSR and Supply Chains (26.92%)**, Topic 3 - **Stakeholder Perceptions (23.08%)**, Topic 2 - **Board Composition / Compensation (20.51%)** and to a lesser degree Topic 6 - **International Comparisons (12.82%)**. Only Topic 10 - **Climate Change (Physical Risk) (0.00%)** is not discussed within the 'Other' research category, although only very limited

discussion is given to: Topic 4 - **Pollution and Waste (6.41%)**, Topic 5 - **ESG Investing (3.85%)**, Topic 8 - **CSR Reporting Practices (2.56%)**, Topic 9 - **Responsible Investing / Engagement (2.56%)** and Topic 7 - **Debt Finance (1.28%)**, in descending order of coverage.

The balance of subjects addressed and their distribution across the different disciplines is quite intuitive, but at the same time isolates possible gaps in our appreciation of certain topics.

For example, the absence of research under the 'Other' category on Topic 7 - **Debt Finance** may warrant straddling if the ethical boundaries of transition finance are to be adequately appreciated, particularly given the current focus on the need to transition away from fossil fuel in a just and orderly manner.

Conversely, Accounting and Finance have paid little attention to Topic 3 - **Stakeholder Perceptions**. It would be remiss, if not naive to claim that there is no research spanning these specific topic-discipline gaps, but on the basis of our review, more directly targeted research in these and several other areas among leading scholars would be well justified.

Part **4**

Why the Pervasive Use of Combined ESG Scores?

Many investors are under increasing pressure to include sustainability in their investment strategies, driven by various stakeholders, including clients, employees, customers, and regulators.

Due to the growing emphasis on sustainability performance, evaluations including ratings and rankings are more widely used than ever.

Key takeaways:

- Investors value the straightforward comparability that ESG ratings provide across companies and industries, enabling investors to quickly calibrate which companies perform better or worse than their peers.

- Critics contend that ratings can dangerously oversimplify sustainability performance, losing sight of important detail.

- The trade-off between being comprehensive and having limited capabilities is in reality a factor that contributes to the prevalence of ratings in the field.

Why the Pervasive Use of Combined ESG Scores?

In the previous section it was highlighted that the most widely used ESG data point across existing sustainability oriented research is the aggregate / combined ESG score, which is more prevalent in application than individual pillar scores, or other underlying data points. This trend seems concerning given the lack of precision it offers over pillar specific ESG performance.

Despite concerns regarding the consistency and transparency of sustainability evaluations, the ESG data industry continues to gain prominence within the business and finance community. Due to the growing emphasis on sustainability performance, evaluations including ratings and rankings are more widely used than ever. While investors are aware of the concerns and limitations, they continue to utilize ratings due to the practical benefits offered in terms of meeting stakeholder demand(s), aligning with regulatory requirements, simplifying complex information, and managing risks.

4.1 Increasing Stakeholder Pressure and Regulatory Compliance

Many investors are under increasing pressure to include sustainability considerations in their investment strategies. This pressure can be driven by various stakeholders including clients, employees, customers, and regulators among others.

The growing demand for the adoption of sustainable and green investment strategies stems from the realization that sustainability considerations may be relevant for regulatory compliance,

risk management, and long-term value creation. Utilizing ratings facilitates regulatory compliance and reporting on sustainability integration efforts in a relatively low-risk manner insomuch as investors need only justify the way they use the ratings data in their investment screens, but need not spend time rationalising the ratings and scores themselves. This can lower the barrier to entry into the sustainable investment space.

4.2 The First Filter

The prevalence of ratings is linked with the inherent complexity of sustainability research, a multidimensional field that demands meticulous scrutiny. While these evaluations are not without their share of criticisms and challenges, they continue to be one of the most accessible and widely adopted methods for evaluating a company's sustainability performance.

> While investors are aware of the concerns and limitations, they continue to utilize ratings due to the practical benefits offered in terms of meeting stakeholder demand(s), aligning with regulatory requirements, simplifying complex information, and managing risks.

Critics claim that ratings frequently oversimplify sustainability performance, potentially overlooking critical details. Excessive dependence on ratings could indeed discourage more in-depth investigations. On the other hand, carrying out a comprehensive study often demands extensive resources, access to data, and an in-depth understanding of the complex dynamic of sustainability. This is exacer-

bated by the multidimensional nature of the issues, varying data quality, and data availability.

ESG data providers presumably have a critical mass of technical experts to conduct such evaluations with much greater accuracy than individual investors can easily guarantee, and arguably with a higher level of impartiality.

4.3 Efficient Comparison

Investors value the straightforward comparability that ratings provide across companies and industries, enabling investors to quickly determine which companies perform better or worse in the context of sustainability. This comparison streamlines the decision-making process, enabling investors to efficiently implement risk mitigation strategies and identify opportunities that align with their criteria while managing diversified portfolios without the need for in-depth analyses.

To arrive at a rating, rating providers typically perform separate evaluations of the major factors contributing to each component pillar. For example, Refinitiv identifies the following subcomponents of its environmental pillar (Refinitiv, 2022):

- **Resource use.** The company's performance and capacity to reduce material use, energy, and water, as well as to find more eco-efficient solutions by improving supply chain management.

- **Emissions.** The company's effectiveness and commitment to decreasing environmental emissions throughout its operational and production processes.

- **Innovation.** The ability of a company to lower customer's environmental costs and burdens, creating new market opportunities through eco-designed products as well as new environmental technologies and processes.

Refinitiv claims that its environmental score is calculated using a set of 68 metrics. Handling this number of variables requires rating providers to make simplifying assumptions. One such decision entails evaluating materiality, taking into consideration that not all variables are equally material to various industries and companies. Consequently, rating providers need to modify their weighting to appropriately reflect relevance, with some factors potentially excluded entirely. Even when a variable is deemed essential, the availability of relevant data may be limited. The reported ratings are ultimately shaped by these conditions and features of the underlying data.

> In terms of academic research, striking the balance between needing to be comprehensive in coverage and having limited access to resources, is an important factor behind the prevalent use of ratings.

Ultimately, the specific needs and priorities if individual ESG data users will determine whether or not to use ratings. Users who may be constrained by time and resources may find ratings, rankings, and scores as a practical starting point for their investigations. However, it is essential to recognize and appreciate the trade-offs made between ease of use and depth of granularity.

Scrutiny Levied Against Ratings (In-)Consistency

Rating providers are facing heightened scrutiny.

Variations in scoring methodology, data coverage and consistency in reporting coupled with the high procurement cost for ESG data can raise questions of trust in the use of ESG data.

Key takeaways:

- While most ESG rating providers provide easily accessible documentation of the rating's methodology, there remain clear absences of transparency.

- There are discernible inconsistencies in ratings within and between data providers reflecting subjective evaluations.

- There are significant concerns that the superior market-valuation attached to good ESG performance creates an incentive for strategic disclosure(s) of ESG related information by firms.

Scrutiny Levied Against Ratings (In-)Consistency

Rating providers, owing to the very nature of their work, are often subject to scrutiny and challenge. The rated firms have a natural incentive to challenge poor scores, while those who use ratings have high expectations around data coverage and timeliness, among other things.

ESG ratings providers are recently facing heightened levels of scrutiny. A survey conducted by ERM's SustainAbility Institute revealed that over half of both corporates and investors express only moderate trust in the evaluations (Brock et al., 2023). For corporates, the accuracy and completeness of the ratings are pivotal, given investors' heavy reliance on such assessments. To make investment decisions this underscores the need for a high level of trust in the information provided by rating providers.

When data and evaluations turn out to be misleading, irrespective of the root cause, mis-information will propagate and potentially lead investors to make decisions that do not align with their original intentions. This can erode trust in ESG data in general. This trust challenge is further intensified by increasing competition among data providers, efforts to improve sustainability perceptions, and regulatory requirements demanding transparency and fair methodologies.

5.1 Lack of Transparency

Methodologies, including the weightings they assign to different ESG features and indicators, are often not fully disclosed by rating providers. This lack of transparency makes it challenging for ESG data users to verify information and assess its relevance, particularly when they do not have clarity on the specific data sources that rating providers rely on.

Respondents to a fact-finding exercise conducted by the International Organisation of Securities Commissions (IOSCO) highlighted that some rating providers change their methodologies without notifying companies or market participants. This practice can lead to confusion, particularly when methodologies are not made public. Additionally, some companies claimed that specific rating providers would assign low scores or ratings if certain data is not provided, yet they fail to explain how such omissions affect the rating or outcome (IOSCO, 2021). Without clear insights, ESG data users may struggle to compare different company profiles, thus increasing their risk of making misguided investment decisions.

5.2 Ratings Inconsistency

In a report titled "Rate the Raters", Brock et al. (2023) emphasizes the importance of having "greater consistency & comparability" in ratings, a viewpoint shared by over half of the surveyed investors and nearly half of the surveyed companies. While the pursuit of consistency among the rating providers appears to be a worthy endeavor, it is essential to recognize the intricacies involved in the sustainability ratings process. As discussed earlier measures and data points articulating attributes of the individual E, S and G pillars are a mixture of well defined and objective variables, alongisde more subjective ones.

Figure 7:
ESG rating discrepancy among rating providers. This figure shows difference in ESG overall and E, S and G pillar scores for Singapore Airlines for the year 2022.

(Source: Author generated)

Evaluations involve not only quantitative analysis but also qualitative assessments as well as individual analysts' subjective final judgments. These differences and departures are intended to be value-adding for ESG data users, but at the same time require ESG data users to place a lot of reliance in the value judgments of external parties. Differences in data providers' orientation in favour of E or S dimensions for examples, may have consequences to the types of data collected, potentially resulting in rationalisable points of divergence between rating providers, and thereby highlighting the inherent value of differences among rating providers.

Another justification for differences in ESG data providers' coverage and consistency includes the sheer volume of potentially relevant ESG information. It is difficult for any single data provider to convincingly and comprehensively cover all relevant angles of ESG with

equal quality and accuracy. This introduces some value in having multiple rating providers with different lenses and perspectives.

The nuances of rating assessments require data providers to make judgments around the materiality of ESG related information. Differing perspectives on the importance of specific indicators, and the diverse approaches to weighting applied by different rating providers and analysts could potentially add value for ESG rating users that have access to them.

Taking Singapore Airlines as an example, two prominent data providers assess the airline's sustainability performance differently, resulting in differing scores, see Figure (7). Refinitiv gives it a score of 71 out of 100, breaking down to 73 for Environmental (E), 67 for Social (S), and 74 for Governance (G) dimensions. In contrast S&P Global rates it

considerably lower at 48, comprising sub-scores of 34 for Environmental, 53 for Social, and 54 for Governance. Not only are the scores markedly different, but perhaps more surprisingly, the balance of judgment around relative performance in the E and S pillars is juxtaposed. These discrepancies in ESG performance scores are not marginal, and what makes them concerning is that in principle both sets of scores are likely properly justified. This type of example, easy to find in the data, highlights the importance of understanding how each provider arrives at their scores.

5.3 Potential Inconsistencies in Aggregation

Another data feature which exists concerns the visible subjectivity applied in aggregating pillar scores into overall ESG scores. Figures (8) and (9) illustrate how companies that come from the same sector, exchange, and incorporation country may share similar overall ESG scores but exhibit different component scores. Moreover, in both cases, although both firms have the same overall ESG score, one firm outperforms the other in *all* individual pillar scores. Specifically, for Figure (8) DX.N has a higher score than BFST.OQ in each of the E, S and G pillars, yet BFST.OQ and DX.N are both afforded the same overall ESG score of 38. Similarly in Figure (9) LADR.N has a higher score than CCB.OQ in each of the E, S and G pillars, yet LADR.OQ and CCB.OQ receive the same overall ESG score of 20.

These cases highlight the complexity, potential inconsistency, and context-dependent nature of these evaluations, emphasizing the need for a detailed understanding of each company's strengths and weaknesses in ESG aggregation.
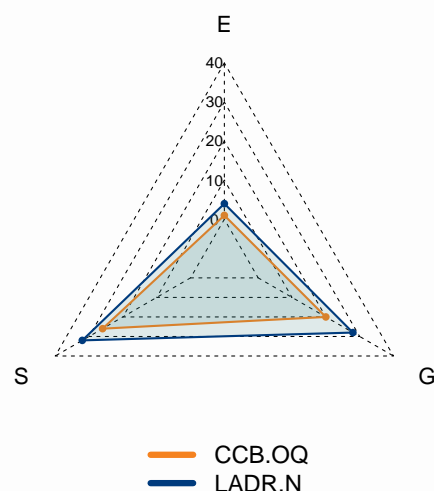
Figure 8:
Comparison of E, S and G pillar score permutations for overall ESG score of 38 for the year 2022.
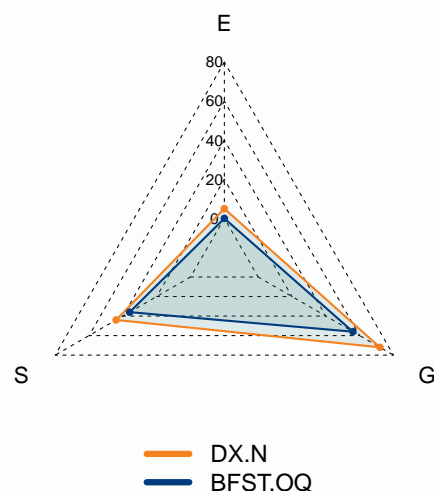
(Source: Author generated)

Figure 9:
Comparison of E, S and G pillar score permutations for overall ESG score of 20 for the year 2022.

(Source: Author generated)

5.4 Evaluation Inaccuracy

Rating providers are not immune to making errors in their evaluation pro-

cess. This may include inaccurate analyses of company data, due to taking into consideration incomplete and incorrect metrics or not taking into consideration relevant disclosures. Methodological flaws can further contribute to these inaccuracies. The opacity surrounding the methodologies, as pointed out above, hinder third parties from validating the rating providers' scores and ratings. Thereby adding complexity to the evaluation process.

5.5 Risk of Erroneous Data

Users may find additional confidence by delving into the underlying data. A closer examination of the granular details can provide more understanding and help bypass potential concerns associated with ratings. However, exploring the risk of erroneous data reveals that some challenges may remain even with this approach.

In our own on-going assessment of ESG data precision across firms in 'a Southeast Asian country', we compared sustainability data that we extracted from company-issued sustainability reports with the same data provided by an ESG data provider.[7]

The information in Figure (10) details the consistency between our collected data and the data from the ESG data provider across different matching thresholds e.g. whether they are an exact match, approximately equivalent within a 1% deviation threshold, or loosely matched within a 10% threshold of deviation. We observe that anywhere between 12-16% of observations are more than 10% misaligned, and no more than 54% of data recorded by

the data provider in question precisely matched each firms own sustainability report.

Factors contributing to data differences are in some cases quite clear such as accidental data entry errors, precision issues due to rounding, data aggregation and calculation methods, conversion errors. Nevertheless, certain deviations pose greater challenges to rationalize. Users should thus exercise caution when interpreting and relying on ratings, keeping in mind the complexity involved in ensuring data accuracy and consistency across various datasets and methodologies.

5.6 Risk of Selective or Strategic Reporting of Data

Beneath the complexity of developing an aggregated rating calculation lies yet another significant challenge: the risk of creating misleading impressions, which can result from issues such as "greenwashing" or poor data collection and reporting.

Greenwashing occurs when companies strategically manage their reporting practices so as to appear more environmentally or socially responsible than they genuinely are. Such manipulation may be carefully crafted in sustainability narratives that emphasize the company's commitment, projecting a positive image. As a result, their aggregated ratings may look impressive, but these ratings could hide important differences within each category. The singular focus on obtaining high ratings may inadvertently lead companies to allocate resources to specific areas that carry more weightings in the rating system, all the while neglecting

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[7]This is a preview of an ongoing work, and for this reason we keep the country and data provider's identity anonymous, as such the numbers reported here and the corresponding discussion should be treated as indicative and subject to confirmation/change.

critical sustainability aspects that are equally, if not more, important in the company's context.

Data providers can play a positive role in mitigating the potential for greenwashing or data inadequacies. Provid-

ing transparent methodologies and rigorous evaluation and reporting of data sources in the rating process can contribute to a more accurate representation of a company's sustainability impact and efforts.

Figure 10:
Comparing ESG related data consistency: Hand-collected from company sustainability reports vs. data available from an ESG data provider.
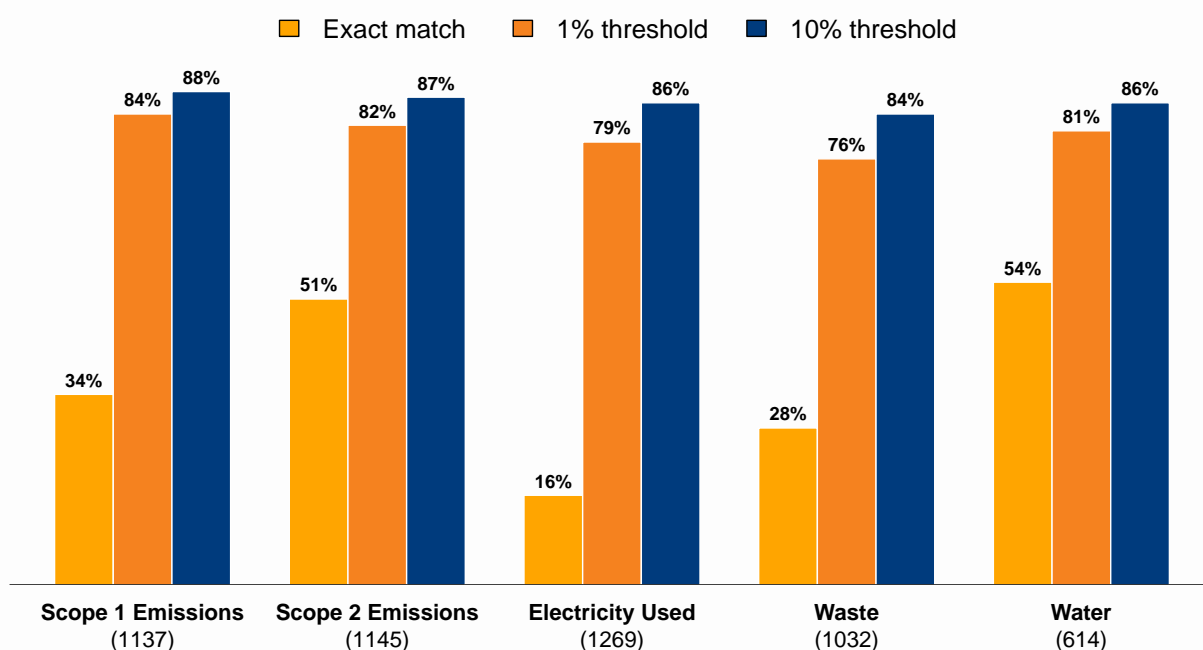
(Source: Author generated)

5.7 What Academic Research Has to Say About ESG Data (In-)Consistencies

Recent research findings have unveiled critical insights into the challenges of using ratings, emphasizing the need for careful examination of these nuances. Lindsey et al. (2023) analyzed seven data providers, including Refinitiv, KLD, MSCI, RepRisk, S&P Global, Sustainalytics, and S&P Trucost, revealing close-to-zero correlations across providers. This highlights the disagreements among various ESG

measures and exposes a disparity in core principles and processes across data providers.

Berg et al. (2022) explored the divergence in ESG ratings using data from six providers (Sustainalytics, S&P Global, Moody's ESG, Refinitiv, KLD, and MSCI) and revealed substantial discrepancies among these ratings, with correlations ranging from 0.38 to 0.71. They argue that the main driver behind this is measurement divergence, emphasizing that it is not simply a matter of varying definitions, but rather a funda-

mental disagreement about the underlying data. Our analysis in Section (5.5) provides consistent evidence. As such, resolving rating divergence may prove challenging.

While these findings primarily center on aggregated ESG evaluations, it is important to note that disagreements may also extend when examining specific E, S, and G dimensions. Berg et al. (2022) further reveal that even categories primarily relying on easily accessible public record data do not display high levels of correlation.

Score misalignment across data providers often introduces uncertainty regarding a company's true ESG performance/status. The importance of this is amplified when such ratings are used as benchmarks or as investment screens. Consequently, differentiating leaders from average performers becomes a complex task, leading ESG data users to question the underlying causes of such discrepancies, and establish which providers are more trustworthy and/or most closely aligned with their core investment principles.

5.7.1 Observed Correlations in ESG Scores Across Data Providers

To illustrate the score disparity problem identified in Lindsey et al. (2023) and Berg et al. (2022), Table (2) presents a (Pearson) correlation analysis of aggregate ESG score ratings taken from Bloomberg (BBG), Refinitiv (REF), and Sustainalytics (SUS). At the aggregate ESG level, we observe a respectable correlation of 0.73 between Bloomberg and Refinitiv ESG scores. Sustainalytics data exhibits a weak correlation with both Bloomberg (0.15) and Refinitiv (0.30). This may be in part due to the different frequency of ESG score evaluation by Sustainalytics, who provides

monthly score information. For the correlation analysis we take the annual average of sustainalytics scores.

Table 2:
Aggregate ESG score discrepancies among differing ESG data providers, measured in terms of pairwise correlations between overall ESG scores.

	BBG	REF	SUS
BBG	1.00		
REF	0.73	1.00	
SUS	0.15	0.30	1.00

(Source: Author generated)

To identify pillars with larger disparities in scores, Table (3) presents correlations for the individual E, S and G pillar scores. We restrict the analysis to Bloomberg and Refinitiv, noting their reasonably high correlation in overall ESG scores of 0.73. We observe that across the three E, S and G dimensions, the environmental dimension exhibits the highest correlation at 0.77, but score consistency deteriorates in other dimensions. The social dimension is still fairly highly correlated between the data providers at 0.62, however the governance dimension is markedly less correlated at 0.26.

The results underscore the difficulty in achieving consistency in ESG ratings. The discrepancies in ESG scores among rating providers act as a reminder of the complex nature of ESG features and evaluations.

While the idea of a having single, unified rating source may seem attractive for simplicity, it overlooks the fundamental principle that diverse viewpoints can serve to enhance the evaluation process, rendering the pursuit of uniform ratings counterproductive. The diversity among sustainability rating providers is not merely a consequence

of varying methodologies; it also represents the many aspects and interpre-

tations of a company's sustainability performance.

Table 3:
Pillar-specific E, S, and G score discrepancies among differing ESG rating providers, measured in terms of pairwise correlations.

		BBG			REF		
		E	**S**	**G**	**E**	**S**	**G**
BBG	**E**	1.00					
	S	0.76	1.00				
	G	0.25	0.32	1.00			
REF	**E**	0.77	0.66	0.12	1.00		
	S	0.58	0.62	0.23	0.70	1.00	
	G	0.35	0.37	0.26	0.41	0.41	1.00

(Source: Author generated)

Table 4:
GHG emissions discrepancies among differing ESG data providers, measured in terms of pairwise correlations on Scopes 1 & 2 GHG emissions data.

		S&P	BBG	REF	CDP	S&P	BBG	REF	CDP
Scope 1	**S&P**	1.00							
	BBG	0.97	1.00						
	REF	0.98	0.99	1.00					
	CDP	0.98	0.96	0.98	1.00				
Scope 2	**S&P**	0.46	0.46	0.51	0.40	1.00			
	BBG	0.47	0.49	0.55	0.42	0.93	1.00		
	REF	0.50	0.55	0.52	0.46	0.92	0.95	1.00	
	CDP	0.42	0.42	0.49	0.43	0.96	0.94	0.95	1.00

(Source: Author generated)

5.7.2 Strong Correlations in the Underlying GHG Data Across Data Providers

Looking further beyond the question of correlation in ESG scores between different ESG data providers, here we examine the patterns of correlation in the Scope 1 and Scope 2 GHG emissions[8]

across various data providers. The results in the top left quadrant of Table (4) highlight a high degree of consistency among different data providers for Scope 1 emissions with the lowest observed correlation being 0.96, indicating a strong consensus across data providers. Similarly, the corre-

[8]Scope 1 emissions are defined by the International Organization for Standardization (ISO) as direct "GHG emission[s] from greenhouse gas sources owned or controlled by the organization", while Scope 2 emissions are 'energy indirect' greenhouse gas emission which capture "GHG emission[s] from the generation of imported electricity, heat or steam consumed by the organization." [SOURCE: ISO 14064-1:2006, 2.9], see https://www.iso.org/obp/ui/fr/#iso:std:iso:tr:14069:ed-1:v1:en

lation of Scope 2 emissions reported in the bottom-right quadrant also suggests general alignment in its reporting albeit with slightly lower correlations ranging between 0.92-0.95.

The consistently high correlations in Table (4) suggests a more reliable reporting of GHG-related metrics, particularly Scopes 1 & 2. Users seeking a more detailed and accurate understanding regarding corporate exposures to transition risk may find value in relying on raw GHG data. To some extent this adds some validity to the conjecture that differentiated ESG scores are at least about differences in scoring methodology, and less about inconsistencies in key underlying data points. Though again we note our earlier discussions about reporting inconsistencies and materially erroneous data that can be identified between companies own reports and data providers records (see Figure 10).

In summary for ESG data users and analysts it is important to recognize and appreciate the distinction between raw data and aggregated scores, which in their use often involves a trade-off between depth and efficiency of processing required to facilitate 'sufficiently robust and timely' decision making. Raw data can indeed offer more granularity and detail but as a result require more time and effort to properly process and contextualise, while aggregated scores offer a quick overview.

6

Addressing Concerns of ESG Data Reliability

We have presented an ESG data primer detailing key understandings of research uses cased for ESG data, an overview data providers methodologies, and a review of the disparities (and why they may exist) in scores and ratings.

Our inquiry highlights the importance of carefully understanding and navigating ESG data reliability concerns.

Key takeaways:

- Navigating reliability concerns in using ESG data demands a thorough awareness of data complexities and strategic thinking.

- Variations in ratings between different rating providers are to be anticipated, given the differences in methodologies, assessment criteria, and focus areas of these entities.

- Underlying data enables a transparent and detailed evaluation, providing insights into the company's sustainability practices beyond surface-level evaluations.

Addressing Concerns of ESG Data Reliability

6.1 Improving Evaluation Methodology

The soundness of the evaluation methodology and its transparency are often considered the most essential factors in improving the reliability and rigor of evaluations. Methodology soundness ensures that the rating provider consistently applies a methodology that effectively captures meaningful sustainability factors. A methodology that is clearly defined is essential.

Transparency entails being clear about the specific criteria utilized, factor weightings, data sources, and the evaluation process. While objective data and quantitative metrics play a crucial role in assessments, analysts' opinions cannot be entirely eliminated, nor should they be disregarded. Subjective analysis and expert opinions may provide valuable interpretation and insights that enhance the understanding of complex sustainability issues particularly in the context of commercial operations. Rating providers can make things clearer by explaining the rationales behind subjective judgments, including the qualitative factors considered. This transparency allows users to understand how judgments are made and assess the validity of evaluations provided, ultimately building trust in the system.

Feedback loop. Establishing open lines of communication between rating providers and the organizations they evaluate, including feedback on evaluation results, as well as communication with other data sources is important. These mechanisms facilitate not only the validation of data accuracy but also the clarification of discrepancies or ambiguities. By fostering ongoing engagements, these feedback loops contribute to the reliability and transparency of ratings.

External validation and collaboration. Rating providers may take into account external validation or third-party reviews of their methodologies and processes. This can enhance their credibility and provide an independent perspective to ensure the objectivity and reliability of the assessments. Collaborating with academic institutions, research organizations, and/or industry associations can also help develop best practices for evaluations. Rating providers should remain committed to continuously assessing and refining their methodologies, incorporating feedback, emerging best practices, and evolving standards. Staying open to new insights and information is crucial for ensuring continued relevance and accuracy of evaluations.

Ensuring independence. Rating providers must diligently manage and disclose any potential conflicts of interest that can jeopardize the objectivity of their evaluations, including connections to rated companies or other organizations that can be perceived to be capable of influencing the evaluations. Conflicts might also stem from different aspects of the organization, such as ownership, investment, funding, and compensation for executives and staff. Proactive identification and resolution of situations and activities that could undermine neutrality, objectivity, and independence are essential to prevent or mitigate critical conflicts.

Recognizing these concerns marks the essential first step in improving and refining the evaluation process, aiming to address the struggle to make sense

of sustainability data and rating irregularities, and bolstering user confidence in using the data and ratings. Consequently, as data and rating providers, companies, investors, and regulators work collectively to address these issues, the possibility of achieving meaningful change and progress remains promising.

6.2 ESG Data Users' Action Plans

Navigating reliability concerns in using ESG data demands a thorough awareness of data complexities and strategic thinking. Users can employ several strategies to tackle these challenges effectively.

Understanding Rating Methodologies: Gaining a comprehensive understanding of the methodologies underpinning ratings is essential. Each rating provider employs a unique approach to assessing performance, including the selection of criteria, weightings, and data collection methods. Users should be aware of the limitations inherent in rating methodologies and manage them accordingly.

> Variations in ratings between different rating providers are to be anticipated, given the differences in methodologies, assessment criteria, and focus areas.

Variations in ratings between different rating providers are to be anticipated, given the inherent differences in methodologies, assessment criteria, and focus areas of these entities. While such differences are expected, a more critical consideration lies in scrutinizing the consistency or inconsistency of ratings for a particular company over

time as this may raise questions about the company's performance and may cast doubt on the rating provider's methodology.

Leveraging Sensitivity Analysis: Sensitivity analyses are indispensable when dealing with both raw quantitative data and ratings. They provide a means for users to evaluate the robustness of their findings to various variations and uncertainties. This scrutiny is particularly important for ratings, where disparities between rating providers can be substantial. By embracing sensitivity analyses, users can enhance the robustness of their results.

Embracing Raw Quantitative Data: In the analytical process, it is imperative to consider the integration of more raw quantitative data. While convenient, ratings can obscure substantial variations within each performance dimension. Raw quantitative data, as opposed to aggregated dimensions or overall ratings, allows for a more detailed evaluation of individual performance categories. In general, raw data is intrinsically more transparent than ratings as users can scrutinize how each indicator is measured and calculated.

This approach is particularly valuable when focusing on specific areas, and organizations such as CDP highlight the advantages of this approach. While it may not be suitable for broad research questions, it serves as a valuable tool for granular insights.

The choice between underlying data and ratings should align with the specific needs and goals of the users. Users focusing on specific dimensions or metrics relevant to their strategy may find value in both perspectives.

Underlying data offers more detailed insights, delving deep into the nuances of sustainable performance. Ratings (including scores) provide a consolidated overview, offering a quick snapshot of a company's standing.

Striking a balance between these approaches is instrumental, allowing for a comprehensive and holistic assessment of the company's sustainability performance.

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Appendix

This appendix provides supplementary information for the different rating agencies discussed in this Whitepaper.

Contents:

- **Appendix Table A1:** Summary information for ESG data providers.

Appendix Table A1:
Summary information for ESG data providers.

Summary information for ESG data providers				
Data Provider	**Ownership**	**Coverage**	**Sources**	**Data Management**
Bloomberg	Private Company	Nearly 12,000 companies	Company reports, third-party ESG sources	Separate assessments of E, S, and G performance with industry-specific materiality considerations; Employs more than 700 research analysts
CDP	Nonprofit	Over 18,700 companies, 1,100 cities, states, and regions	Questionnaires with general and sector-specific questions	CDP does not verify individual responses; Generates scores based on provided data
FTSE Russell	LSEG	Approximately 8,000 securities in 47 markets	Relying solely on publicly disclosed information	ESG framework covers environmental, social, and governance themes
MSCI	Public Company	Over 8,500 companies (14,000 issuers)	Company filings, government, regulatory, NGO databases, and media sources	Conducts weekly updates for specific data changes, as well as annual and mid-cycle reviews, responding to changes in controversy severity or other exceptional circumstances; Employs a team of over 200 analysts
Refinitiv	Acquired by LSEG in August 2019	Over 12,500 companies	Annual reports, company websites, NGO websites, stock exchange filings, CSR reports, and news sources	Regular updates, score recalculations, incorporation of new controversies; Employs over 700 research analysts
S&P	Public Company	Over 16,000 companies, including their direct operations and supply chains	Annual reports, direct disclosures, scientific literature, national, international, and industry databases, and Corporate Sustainability Assessment (CSA)	Data includes raw and calculated values, derived data, and estimations; Utilizes data from various sources, including engagement via CSA
Sustainalytics	Acquired by Morningstar in 2020	40,000 global companies	Companies' track record, external quantitative data, companies' materiality assessments, and third-party research, including regulatory news, SASB information and PRI assessments	Provides ESG data, research, ratings, and other products; Collaborates with asset managers, pension funds, and companies for sustainability integration; Employs over 650 professionals
End of summary information for ESG data providers				

SGFIN

Sustainable&Green
Finance Institute