

Peeling Back the Onion

Understanding What Goes into an ESG Rating

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The divergence of environmental, social, and governance (ESG) ratings across providers is an area of increasingly greater focus given their increased use by regulators for policymaking and by investors for investment decisions. Here, the authors discuss at a granular level what goes into an ESG rating, particularly the modeling choices involved in their construction.

In this piece, we provide a step-by-step illustration using companies in the global automobiles industry with “raw” ESG data from four leading ESG data providers. They discuss the differences in the metrics measured, how they are measured, and how they are combined and aggregated. ESG ratings are complex, but just because something is complex does not mean it isn’t useful or informative. The authors highlight the rich set of information that underlies ESG ratings, which can be used by investors. They also stress the need for analyses using ESG ratings to acknowledge (at a minimum) and address (ideally) the differences between rating frameworks.

ESG Ratings: A Subject Well-Trod, but Not Well Understood

Once an evolving concept, ESG ratings have become a term almost everyone, investors and non-investors alike, is familiar with. In the US, ESG ratings have come under scrutiny in recent years; Hester Peirce, commissioner at the Securities and Exchange Commission (SEC) was famously quoted in *The Economist*¹ as decrying ESG ratings as “labelling based on incomplete information, public shaming, and shunning wrapped in moral rhetoric.” We believe the blowback against ESG ratings in recent years is at least partly a function of investors not fully understanding how they are constructed.

Whether it is because ESG ratings have complicated methodologies or because they tend to use a multitude of data inputs (more so, for instance, than typical income statement or balance sheet measures), most investors and casual observers of ESG investing cannot readily describe what goes into a rating.

In this article, we lay out what is actually involved in an ESG rating. We believe this is a critical first step for anyone trying to understand or analyze ESG ratings and their implications for financial modeling and investment applications. With the explosion of empirical analysis concerning ESG ratings, we fear that the underlying traits and dynamics of rating systems are not fully appreciated. Most concerningly, broad claims about ESG ratings and their relationship to returns, risk, or other security characteristics are often made based on a specific ESG rating system/provider.

ESG ratings and what goes into them reflects a rich set of information likely not yet fully utilized. We will see that understanding the differences between ESG rating systems and thinking through how that might impact any empirical analyses is a necessary first step for all ESG ratings research in our view.

We are not the first to point out that ESG ratings are different. Chatterji et al. were among the earliest researchers to document a lack of agreement;² they analyze six social rating data providers. More recently, Berg, Kölbl, and Rigobon show the low level of correlation between six ESG ratings providers, about 54%.³ Jacobs and Levy discuss how the rating disparities can make it difficult to assess whether ESG ratings are aligned with companies' ESG performance and ESG investing affects investment performance.⁴

This piece is meant to complement this ongoing discussion about ESG ratings' divergence by bringing intuition around what we mean when we talk about modeling choices made in building a rating. These include the choice of measurement, the weighting of metrics, and the normalization of metrics, among others. Overall, we aim to help further the discussion of ESG ratings by going under the hood of model decisions, illustrating in detail the different choices that vendors make and the impact of these modeling choices.

An Abbreviated History: How ESG Ratings Came To Be and Their Importance Today

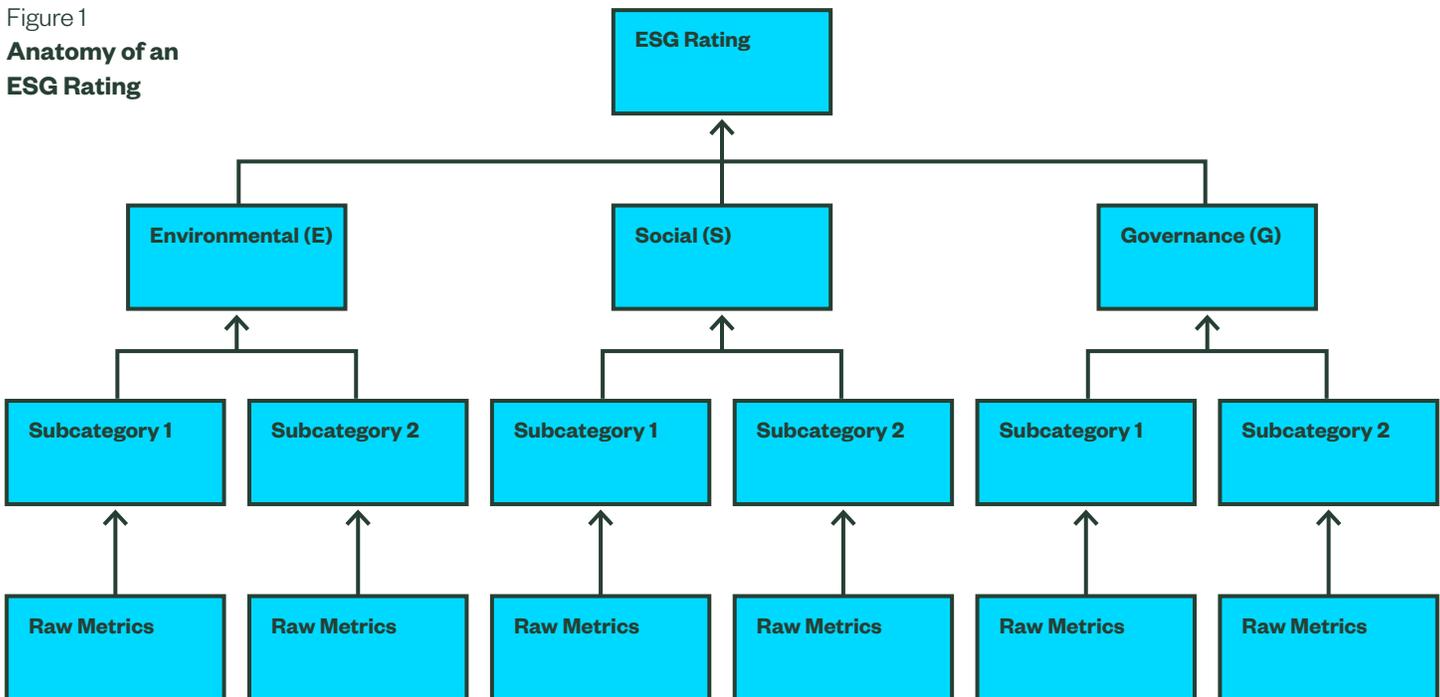
While ESG has only recently exploded into the mainstream lexicon, an earlier form was around as early as the 1960s, when socially responsible investing (SRI) began to gain popularity. At the time and still largely true today, SRI means selecting what to invest in based on a company's social or environmental impact, in addition or sometimes irrespective of its financial performance. Examples of early providers of SRI screens and data include KLD, founded in 1988, and Jantzi Research, founded in 1992. (The approaches to SRI created by KLD and Jantzi Research now underly the rating frameworks for MSCI and Sustainalytics, respectively.) Early firms offering SRI assessments had a broad, loosely defined approach to evaluating firms. They analyzed the environmental and social "worthiness" of companies in how they conducted their business but also how they "impacted" the larger world around them. (The notion of "impact investing," the latter aspect, eventually became its own concept, and today refers to investing in a way that creates positive environmental or social impact.) During the 2000s and 2010s, as SRI evolved into ESG investing, whether a firm was SRI/ESG "friendly" or not really came down to individual analysts' assessment of these firms, since actual hard data were extremely rare and difficult to come by.

Today's ESG rating systems really came about in the 2010s, as computing power and available data (everything from company websites to employee reviews to business analytics) rapidly increased. Throughout these years, the amount and granularity of information that could be used for ESG assessments exploded. MSCI acquired RiskMetrics (KLD's acquirer) in 2009 and GMI Ratings in 2014, revising and expanding its ESG ratings framework. Sustainalytics expanded its framework as well during this decade, eventually being acquired by Morningstar in 2020, where the framework now powers Morningstar ESG fund ratings. Other major vendors also invested heavily in ESG data and analytics, including S&P, which acquired the ESG division of RobecoSAM, an affiliate of Robeco, in 2019 and the London Stock Exchange, which consolidated various ESG ratings (FTSE, Beyond Ratings, and Refinitiv). Moody's Vigeo Eiris, ISS, FactSet, and RepRisk round out the list of leading providers today.

Anatomy of an ESG Rating

Typically, ESG ratings are constructed as an amalgamation of raw data points. (We focus here only on ESG ratings that are “structured” ratings, as opposed to “unstructured” ratings, which can use artificial intelligence and machine learning techniques or other black-box algorithmic approaches to creating ratings.) Most structured ESG ratings are centered on the E, S, and G pillars of ESG; see Figure 1. Usually, the ESG rater starts with identifying broad themes within E, S, and G (for instance, human capital management within the “S” pillar would be a subcategory). Then a range of raw metrics are identified to measure the subcategory (raw metrics for human capital management in Figure 1 might include employee satisfaction from surveys, employee turnover, paid leave policy, training opportunities, etc.). Note that some rating frameworks may have more than two layers, the implications of which we will discuss later.

Figure 1
Anatomy of an ESG Rating



Source: State Street Global Advisors, as of July 1, 2023.

The leading providers we analyze in this article — MSCI, Sustainalytics, Moody’s Vigeo Eiris, and ISS — all employ E, S, and G pillars. However, we note that not all ESG ratings use the E, S, and G subpillars. SASB, for instance, groups activities into five “sustainability dimensions” — environment, human capital, social capital, business model and innovation, and leadership and governance. For the rest of this article, we will use the SASB categories, given SASB’s prominence in disclosure standards and the transparency of its framework. (In full disclosure, we centered on SASB to build R-factor™, an ESG rating used at State Street Global Advisors.)⁵ While SASB does not use E, S, and G subpillars, all the concepts we describe here are directly portable to those ratings frameworks that do.

We start with the choice of metrics and how they are measured.

Raw Ingredients: What Actually Goes into an ESG Rating?

Here, we first dive deeper into the choice of metrics. What are the actual data points that go into a rating? To illustrate for the rest of the article we focus on companies in the automobile industry. Figure 2 shows the SASB materiality map applied to the automobile industry. (Three other industries from SASB's 77 industries are also shown for comparison.) The four industries have very different sustainability risks and opportunities according to the SASB standards. SASB identifies four general issues financially material to the automobile industry out of a total of 26 general sustainability issues in the five dimensions of environment, social capital, human capital, business model and innovation, and leadership and governance. The four general issues identified as financially material to the automobile industry are (1) product quality and safety issues (under social capital); (2) labor practices issues (under human capital); (3) product design and life cycle management issues (under business model and innovation); and (4) materials sourcing and efficiency issues (under business model and innovation).

Figure 2
**Only Material ESG Metrics Are Typically
Used in ESG Ratings**

Dimension	General Issue Category	Health Care Delivery	Nonalcoholic Beverages	Electric Utilities and Power Generators	Automobiles
Environment	GHG Emissions				
	Air Quality				
	Energy Management				
	Water and Wastewater Management				
	Waste and Hazardous Materials Management				
	Ecological Impacts				
	Social Capital	Human Rights and Community Relations			
Customer Privacy					
Data Security					
Access and Affordability					
Product Quality and Safety					
Customer Welfare					
Selling Practices and Product Labeling					
Human Capital	Labor Practices				
	Employee Health and Safety				
	Employee Engagement, Diversity and Inclusion				
Business Model and Innovation	Product Design and Life Cycle Management				
	Business Model Resilience				
	Supply Chain Management				
	Materials Sourcing and Efficiency				
	Physical Impacts of Climate Change				
Leadership and Governance	Business Ethics				
	Competitive Behavior				
	Management of the Legal and Regulatory Environment				
	Critical Incident Risk Management				
	Systemic Risk Management				

Source: The Sustainability Accounting Standards Board (SASB), as of July 1, 2023. (Material issues according to SASB, are highlighted in teal.)

We examine four ESG data providers — Sustainalytics, ISS, Moody's Vigeo Eiris, and MSCI. Even when we limit ourselves to the data metrics that are related to the four general issues material to the automobile industry, we identify 123 metrics from the four providers. (Note that we have mapped these data metrics to the closest SASB issues, leaving out those metrics without obvious relevance.) The automobile industry-specific ESG metrics are listed in Figure 3; all related metrics that are candidates for measuring the automobile material issues available from the four providers are listed.

We determine whether a metric is related or not based on intuition and reasonableness, which is a crucial set of decisions all ESG ratings providers must start with in our view. This is the “what is getting measured” decision identified by Berg, Kölbel, and Rigobon.⁶ There is a great deal of subjectivity in this part of the ratings process in our view; without a formal disclosure/reporting framework akin to the way companies determine financial statements, each ratings framework must reasonably determine this mapping themselves.

One clear takeaway from Figure 3 is that data vendors may use different metrics to gauge the same ESG issue. Consider labor practices as an example. Sustainalytics has three metrics related to labor practices — a Collective Bargaining Agreement score, a Working Conditions Policy score, and a Freedom of Association Policy score. ISS has similar measures but provides additional metrics (a total of 16), measuring aspects such as dependent care and special leave, employment security, workplace flexibility and working time reduction, and staff rating. Moody's Vigeo Eiris has eight metrics related to labor practices, including responsible management of restructurings and career management and the promotion of employability. Last, MSCI has four metrics, including employee satisfaction monitoring and professional development.

Figure 3

Raw Metrics Relevant to the Automobile Industry’s Material Issues

	Sustainalytics (Risk Ratings)	ISS	Moody’s V.E.	MSCI
Product Design & Lifecycle Management	Eco-Design	Customer and Product Responsibility (Num)	Criterion level score — Development of Green Products and Services	Opportunities in Clean Tech Exposure Score
	Product Stewardship Programmes	Products and Services (Num)	Subdomain level score — Incorporation of Environmental Considerations into the Manufacturing and Distribution of Products	Packaging Material & Waste Exposure Score
	Sustainable Products & Services	CR Score — Development of the packaging ratio (Num)	Subdomain level score — Environmental Considerations in the Use and Disposal of Products/Services	Opportunities in Clean Tech Management Score
	Recycled Material Use	CR Score — Env. aspects in investment due diligence (Num)	Criterion level score — Management of Environmental Impacts from the Use and Disposal of Products/Services	Opportunities in Renewable Energy Exposure Score
	Responsible Product Offering	CR Score — Env. friendly product design (Num)	Criterion level score — Environmental Strategy and Eco-Design	Opportunities in Renewable Energy Management Score
	Policy on Emerging Technologies	CR Score — Env. responsible final disposal of the fleet (Num)	Criterion level score — Contribution to General Interest Causes	Packaging Material & Waste Management Score
		CR Score — E-waste collected for recycling and reuse (Num)		
		CR Score — E-waste recycling schemes in dev. countries (Num)		
		CR Score — Extension of useful product life (Num)		
		CR Score — Use of life cycle assessments in prod. design (Num)		
		CR Score — Life cycle assessments (Num)		
		CR Score — Measures good research & consulting practices (Num)		
		CR Score — Measures to reduce the impact of packaging (Num)		
		CR Score — Measures promoting eco. & social products (Num)		
		CR Score — Other env. issues of products and services (Num)		
		CR Score — Percentage of certified office IT equipment (Num)		
		CR Score — Perc. of products with free take-back service (Num)		
		CR Score — Policy on good research & consulting practices (Num)		
		CR Score — Real estate projects with high social benefit (Num)		
		CR Score — Recall management (Num)		
	CR Score — Promotion of recycling of scrap metal (Num)			
	CR Score — Research & pro. dev. emerging soc. & env. risks (Num)			
	CR Score — Responsible end-of-life management of hardware (Num)			
	CR Score — Retail insurance products with env. benefit (Num)			

	Sustainalytics (Risk Ratings)	ISS	Moody's V.E.	MSCI
Product Design & Lifecycle Management (cont'd)		OR Score — Socially responsible investment products (Num)		
		OR Score — Strategy to promote use of alternative raw mat. (Num)		
		OR Score — Facilitation of take-back and recycling (Num)		
		OR Score — Take-back options for used products (Num)		
		OR Topic — Environmental impact of products and services (Num)		
		OR Topic — Packaging (Num)		
		OR Topic — Product Lifecycle (Num)		
		OR Topic — Social impact of products and services (Num)		
		OR Topic — Take-back and recycling of products (Num)		
Product Quality & Safety	Hazardous Products	OR Score — Ban of subst. of concern from use in production (Num)	Criterion level score — Product Safety (process and use)	Chemical Safety Exposure Score
	GMS Certifications	OR Score — Certification of a quality management system (Num)		Chemical Safety Management Score
	Product Health Statement	OR Score — Controversies relating to product safety (Num)		Product Safety and Quality Exposure Score
	Product and Service Safety Programme	OR Score — Disclosure of key materials used in products (Num)		Product Safety and Quality Management Score
		OR Score — Disclosure of regulated substances produced (Num)		
		OR Score — Measures to ensure product security (Num)		
		OR Score — Product and substance testing and monitoring (Num)		
		OR Score — Product safety management (Num)		
		OR Score — Implementation of a quality management system (Num)		
		OR Score — Reduction of substances of concern in products (Num)		
		OR Topic — Substances of concern (Num)		
		OR Score — Safe product design and development (Num)		
		OR Score — Safety assessments of products (Num)		
		OR Score — Strategy to reduce substances of concern (Num)		
		OR Score — Strategy to red. subs. of concern in production (Num)		
		OR Score — Substances of concern mgmt. outsourced prod. (Num)		
		OR Score — Substances of concern in single-use med. prod. (Num)		
		OR Score — Use intensity of substances of concern (Num)		
		OR Topic — Material efficiency (Num)		
	OR Topic — Product Safety (Num)			

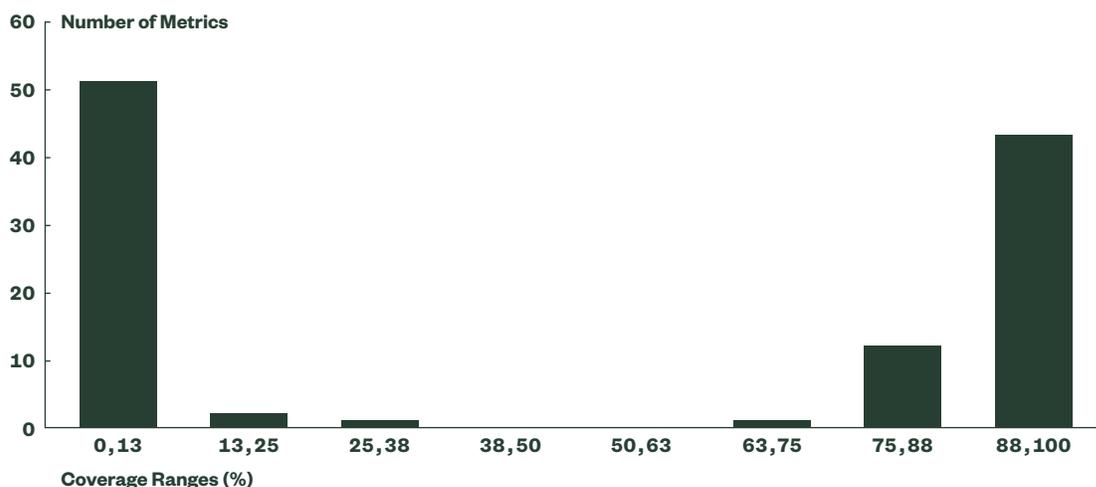
	Sustainalytics (Risk Ratings)	ISS	Moody's V.E.	MSCI
Labor Practices	Collective Bargaining Agreements	CR Score — Controversies freedom of association (Num)	The score of the Issuer in the Human Resources domain.	Labor Management Exposure Score
	Working Conditions Policy	CR Score — Dependant care and special leave (Num)	The Leadership score of the Issuer in the Human Resources domain.	Labor Management Management Score
	Freedom of Association Policy	CR Score — Policy on employment security (Num)	The Implementation score of the Issuer in the Human Resources domain.	Monitoring Employee Satisfaction Score
		CR Score — Measures freedom of association & collect. barg (Num)	The Results score of the Issuer in the Human Resources domain.	Professional Development Score
		CR Score — Measures to ensure resp. workforce restruct. (Num)	Subdomain level score — Continuous Improvement of Industrial Relations	
		CR Score — Position on non-regular employment (Num)	Criterion level score — Responsible Management of Restructurings	
		CR Score — Policy freedom of association & collect. barg. (Num)	Criterion level score — Career Management and the Promotion of Employability	
		CR Score — Large-scale redundancies and sig. job cuts (Num)	Criterion level score — Respect for Freedom of Association and the Right to Collective Bargaining	
		CR Score — Disclosure of different types of employment (Num)		
		CR Score — Workplace flexibility & working time reduction (Num)		
		Staff (Num)		
		Staff and Suppliers (Num)		
		CR Topic — Employment security and types of employment (Num)		
		CR Topic — Freedom of association & collective bargaining (Num)		
		CR Topic — Work-life balance (Num)		
CR Score — Add. controversies relating to staff issues (Num)				
Material Sourcing & Efficiency	Conflict Minerals Policy	CR Score — Raw materials from controversial sources (Num)		
	Conflict Minerals Programmes	CR Score — Disclosure of key raw materials & goods traded (Num)		
	Green Procurement Policy	CR Score — Material efficiency in production processes (Num)		
	Fair Trade Products	CR Score — Material efficiency of products (Num)		
		CR Score — Percentage of recycled materials (Num)		
		CR Score — Procurement raw mat. from controvers. sources (Num)		
		CR Score — Material effcy. strategy for outsourced prod. (Num)		
CR Topic — Operating and raw material efficiency (Num)				

NOTES: The four material issues are those defined by SASB. Raw metrics are those we selected from the full available ESG “raw” data sets from Sustainalytics, ISS, MSCI, and Vigeo Eiris.

Sources: State Street Global Advisors, SASB, MSCI, Vigeo Eiris, Sustainalytics, and ISS, as of July 1, 2023.

What about the coverage for these metrics? We analyze data coverage for a sample of 37 firms, the companies in the automobile industry, as defined by GICS, in the MSCI All Country World Index as of December 31, 2022; see Appendix A for the list of companies. We find that raw metrics tend to have either very good or very poor data coverage. Figure 4 shows the coverage for the 123 metrics that we identified as linked to material SASB automobile industry issues (across the four vendors). These are the percentage of automobile firms in our data set that have data points for the data metric in question. We note that this “barbell” pattern persists even when we look at the individual vendors. This result may be surprising for those used to looking at financial metrics. For ESG metrics, it might be explained by the very breadth of metrics companies are self-reporting (so they prioritize self-reporting some metrics over others) and/or the fact that ESG data providers may prioritize the metrics they collect data for or provide estimation models for. For instance, if a metric is not deemed material, a provider may not bother collecting data or filling in missing values.

Figure 4
Coverage of Indicators Relevant to the Automobile Industry



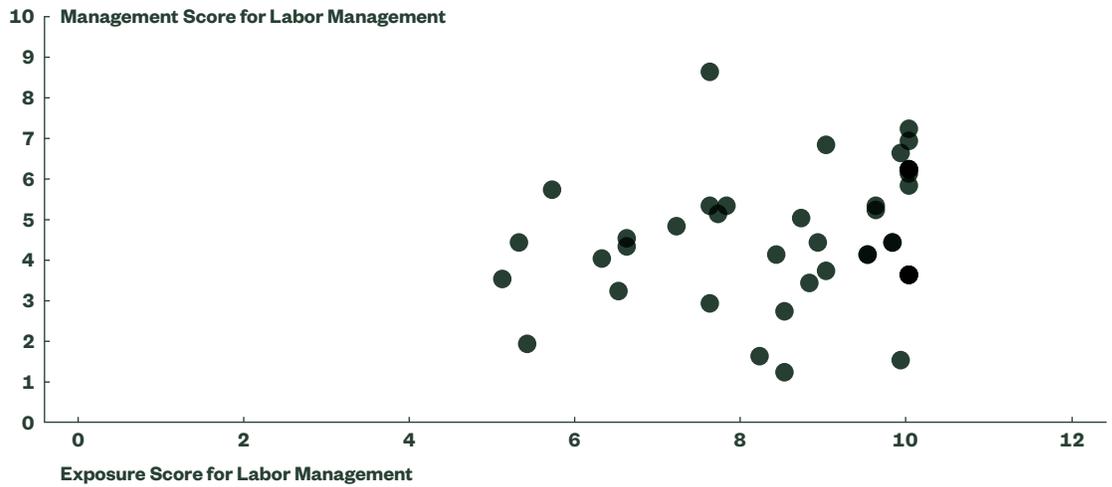
Sources: State Street Global Advisors, SASB, MSCI, Vigeo Eiris, Sustainalytics, and ISS. Data based on SASB industry, MSCI All Country World Index constituents, as of December 31, 2022. The information contained above is for illustrative purposes only.

Nearly half of the metrics in Figure 4 have extremely sparse data (available for less than 25% of the firms). The other half cover more than 75% of the firms. For example, of the metrics that link to the product design and life cycle management issue, ISS has one metric called “Use of life cycle assessments in product design” and one metric called “Life cycle assessments.” The two metrics appear to be related to each other; however, one of them does not have any data for our sample and the other has data for 36 of the 37 automobile companies. The reason behind the stark differences in coverage for closely related metrics is not readily apparent. This examination highlights the importance of data quality checks and missing data treatments in ESG ratings construction. Overall, we observe that the coverage varies significantly by vendor and by topic.

How similar are conceptually related metrics from the same vendor? It turns out that even related metrics can give very different information, even when the same vendor provides them. In Figure 5, we plot two metrics from MSCI that relate to labor management: exposure score and management score. (Detailed descriptions of these metrics are in Appendix B.) The two MSCI scores concerning labor management have a correlation of only 0.26.

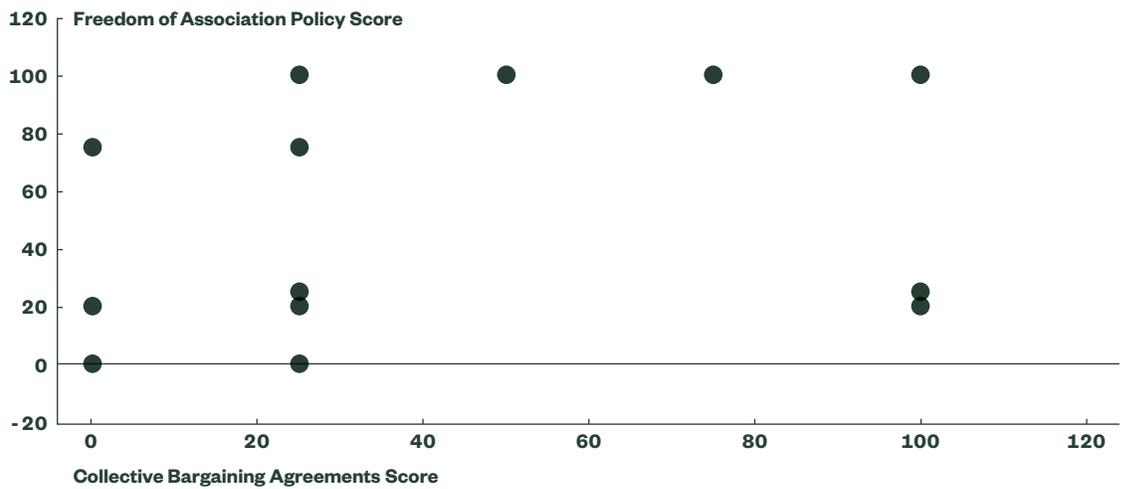
Conceptually Related Metrics Can Vary Even from the Same Data Provider

Figure 5
MSCI



Sources: State Street Global Advisors and MSCI, as of December 31, 2022.

Figure 6
Sustainalytics



Sources: State Street Global Advisors and MSCI, as of December 31, 2022.

Labor Management Exposure Score: Exposure indicators capture to what extent a company's business is vulnerable to the ESG risk covered in a Key Issue. Examples of criteria assessed include: the products and services a company provides; location of company operations; and the nature of those operations. Higher scores on exposure indicate greater risk on the Key Issue. See the IVA Methodology for details. (Score: 0–10).

Labor Management Management Score: Management indicators measure how well a company manages ESG risk and opportunities. These metrics are grouped into the following broad categories: Strategies & Policies, Targets & Implementation, and Demonstrated Performance. Higher scores on management indicate greater capacity to manage risk. See the IVA Methodology for details. (Score: 0–10).

The scatter plot in Figure 5 shows little relationship between the two seemingly related metrics. In Figure 6, we show another pair of metrics, this time from Sustainalytics, that seemingly have little relationship to each other. The two metrics are the Freedom of Association Policy score and the collective Bargaining Agreement score (see Appendix B for descriptions). The rank correlation here again is low, at 0.54.

Thus, even the same vendor can give entirely different assessments on the same ESG issue depending on the specific metric in question. That finding highlights the importance of the metric selection process when analysts are picking and choosing which ESG metrics to include.

Finally, in Figure 7, we show the cross-sectional correlation between vendors for metrics related to collective bargaining agreements. (The vendors are ISS, Sustainalytics, and Moody's Vigeo Eiris. MSCI's score is binary so we exclude it from our analysis.) These correlations are calculated as of December 31, 2022, for the 37 automobile companies in our sample. We see that correlations even for the same metric can be quite low — 0.55 and 0.62 for the pairs in Figures 5 and 6.

Figure 7
Correlation between Collective Bargaining Agreement Metrics

	ISS	Sustainalytics	Moody's Vigeo Eiris
ISS	1	—	—
Sustainalytics	0.55	1	—
Moody's Vigeo Eiris	0.62	0.55	1

Based on a cross-sectional correlation of automobile companies in the MSCI All Country World Index, December 31, 2022.

To recap, in the examples above, we show that:

- 1 ESG data metrics are numerous.
- 2 Data vendors may use different metrics to gauge the same ESG issue.
- 3 Coverage can be barbell shaped.
- 4 Conceptually related metrics from the same vendor can provide different information.
- 5 Vendors can give different assessments on the same ESG issue.

None of these insights is necessarily surprising for ESG analysts and researchers. They may, however, be quite surprising for the rest of the investment industry given the stark differences from typical financial data.

One point we want to highlight here is that ESG ratings are often compared with credit ratings, such as Moody's, Fitch, and S&P ratings. There are in theory some parallels, in that credit quality and ESG are both difficult to assess and better performed by objective third-party unaffiliated entities. However, for anyone familiar with credit ratings, ESG ratings in practice bear little resemblance under the hood. Credit ratings for corporate bonds are highly correlated, which is not surprising given that much of the underlying data used are the same. This includes the company's use of leverage, its liquidity, profitability, and so forth. These inputs are much more "quantifiable" and homogeneous than the inputs that go into an ESG rating.

Aggregating Metrics into an Overall ESG Company Rating

So far, we have focused on the underlying metrics that are mapped to a dimension of ESG that has been deemed material for that industry. In our example, we now turn to the way the metrics are aggregated into a single rating or score for each of the automobile companies.

Most rating frameworks aggregate the raw ESG data metrics through multiple layers. For example, MSCI first aggregates ESG data into 35 key issues, then into 3 pillars (E, S, G), and finally into the ESG rating. On the other hand, Moody's Vigeo Eiris first aggregates what it calls ESG indicators into 38 criteria scores, then into 6 domain scores, then into 3 pillars (E, S, G), and finally into an ESG score.

Sustainalytics' first aggregation produces 20 material ESG issue scores before arriving at the same clusters (E, S, G) in a second step. Last, ISS first aggregates ESG data into 30 topics, followed by 6 categories, which roll up into E and S&G dimensions before the final rating is constructed.

To drill down even further, we focus on the automobile companies in our sample using only ISS raw data concerning a specific issue: labor practices; recall that labor practices are identified as a financially material issue in the human capital category under SASB. We first identify 16 raw data metrics from ISS that are relevant for evaluating the issue of labor practices for automobiles. These are shown in Figure 8.

Figure 8

Data Metrics Relevant for Evaluating Labor Practices

Data Metrics	Coverage (%)
Controversies relating to staff issues	8
Controversies freedom of association	22
Dependent care and special leave	97
Policy on employment security	97
Measures freedom of association and collective bargaining	97
Measures to ensure resp. workforce restructuring	27
Position on nonregular employment	97
Policy freedom of association and collective bargaining	97
Large-scale redundancies and sig. job cuts	97
Disclosure of different types of employment	97
Workplace flexibility and working time reduction	97
Staff rating	97
Staff and suppliers rating	97
Employment security and types of employment	97
Freedom of association and collective bargaining	97
Work-life balance	97

Sources: State Street Global Advisors, ISS, as of 2022. The information contained above is for illustrative purposes only.

Figure 9
**Tesla's Score Card on the
 16 Data Metrics Relevant
 to Labor Practices**

Figure 9 shows the raw inputs for Tesla for the 16 metrics.

Indicators	Tesla, Inc.	NIO Inc.
Controversies relating to staff issues	N/A	N/A
Controversies relating to freedom of association	1	N/A
Dependent care and special leave	1.875	N/A
Policy on employment security	1	N/A
Measures relating to freedom of association and	1	N/A
Measures to ensure responsible workforce restructuring	1	N/A
Position on nonregular employment	1	N/A
Policy on freedom of association and collective bargaining	1	N/A
Large-scale redundancies and significant job cuts	1	N/A
Disclosure of different types of employment	1	N/A
Workplace flexibility and working time reduction	1	N/A
Staff rating	1.632	N/A
Staff and suppliers rating	1.826	N/A
Employment security and types of employment	1	N/A
Freedom of association and collective bargaining	1	N/A
Work-life balance	1.437	N/A

Sources: State Street Global Advisors, ISS, as of December 31, 2022.

To combine these 16 metrics into a single score for Tesla, the easiest way is to weight them equally. However, ratings frameworks will often weight metrics differently based on their relative importance. Florian Berg notes that:

Weight divergence happens when rating companies have different views of the relative importance of various issues. For instance, occupational health and safety are commonly measured by looking at injury rates in factories. Some raters might give more weight to how companies perform on this score than, for example, the companies' lobbying practices. But other raters think that lobbying practices are much more important, as companies might try to reduce accidents in their own factories but at the same time lobby against regulation aimed at making all factories safer — which could add up to more injuries nationwide.⁷

A ratings framework can assign different weights to metrics. However, often overlooked is that by grouping some metrics together and creating multilayer frameworks, an implicit nonequal weighting is created.

To show how layering and grouping decisions can affect the aggregation of scores, we compare three approaches:

- 1 All labor practice related metrics are equally weighted.
- 2 The Labor Practice–related metrics are first grouped into six “like” categories. An aggregate subscore is calculated by category before these subscores are equally weighted to form a final score. The groupings are shown in Figure 9.
- 3 The Labor Practices–related metrics are grouped into two distinct categories — employee satisfaction and all other metrics. For instance, one might reasonably do so if employee satisfaction is viewed as the most critical dimension to labor practices (i.e., much research has shown that employee satisfaction can impact morale and productivity). An aggregate subscore is calculated by category before these subscores are equally weighted to form a final score. The groupings are shown in Figure 10.

Figure 10

Scores Under Different Grouping Schemes: The Labor Practice Score Calculated from the Same 16 Metrics with Different Grouping Schemes

Panel A: Grouping Scheme A:
Grouping 16 Metrics into 6 Topics

Topics	Data Metrics	Score	Average of Topics	Average Labor Practices Score
Freedom of Association and Collective Bargaining	Controversies relating to freedom of association	1	1	1.19
	Measures of freedom of association and collective bargaining	1		
	Policy on freedom of association and collective bargaining	1		
	Freedom of association and collective bargaining	1		
Workplace Flexibility and Support	Dependent care and special leave	1.875	1.44	
	Workplace flexibility and working time reduction	1		
	Work–life balance	1.437		
Employee Security and Types of Employment	Policy on employment security	1	1	
	Position on nonregular employment	1		
	Disclosure of types of employment	1		
	Employment security and types of employment	1		
Restructure and Job Cuts	Measures to ensure resp. workforce restruct.	1	1	
	Large-scale redundancies and sig. job cuts	1		
Staff and Supplier Satisfaction	Staff rating	1.632	1.73	
	Staff and suppliers rating	1.826		
Other	Controversies relating to staff issues	1	1	

Source: State Street Global Advisors, ISS, as of July 1, 2023.

Panel B: Grouping Scheme B: Grouping 16 Metrics into 2 Topics

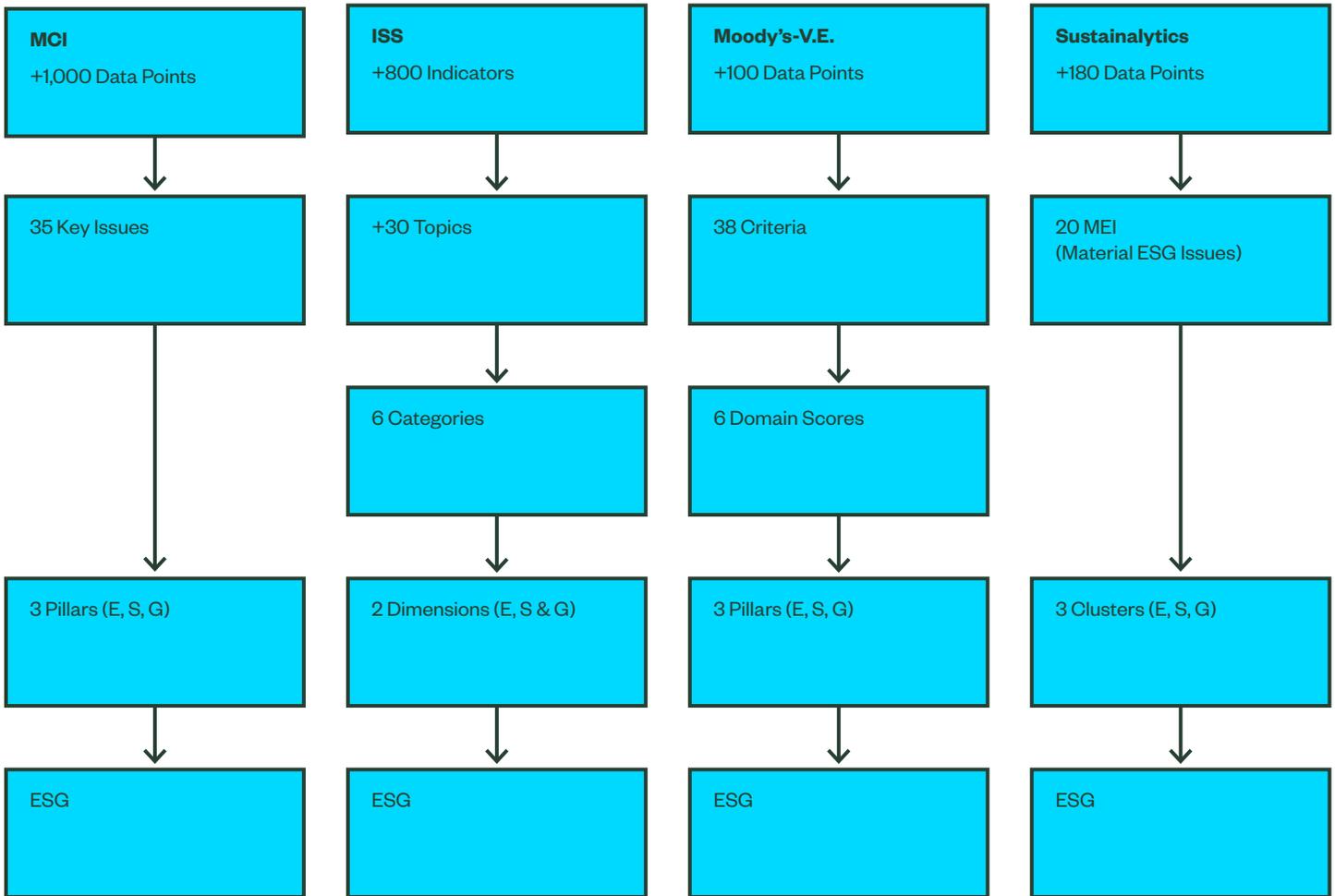
Topics	Data Metrics	Score	Average of Topics	Average Labor Practices Score
Staff and Supplier Satisfaction	Staff rating	1.632	1.73	1.41
	Staff and suppliers rating	1.826		
Other	Controversies rel. to freedom of association	1	1.09	
	Measures of freedom of association and collective bargaining	1		
	Policy on freedom of association and collective bargaining	1		
	Freedom of association and collective bargaining	1		
	Dependent care and special leave	1.875		
	Workplace flexibility and working time reduction	1		
	Work-life balance	1.437		
	Policy on employment security	1		
	Position on nonregular employment	1		
	Disclosure of types of employment	1		
	Employment security and types of employment	1		
	Measures to ensure responsible workforce restructuring	1		
	Large-scale redundancies and sig. job cuts	1		
	Controversies relating to staff issues	1		

Source: State Street Global Advisors, ISS, as of July 1, 2023.

In the first approach (no layers, equal weighting), Tesla’s labor practices score is 1.17. In the second approach (two layers, where the first layer groups metrics into 6 subcategories), Tesla’s labor practices score is 1.19. In the third approach, when the 16 metrics are grouped into two topics, employee satisfaction and other, Tesla’s LP score is 1.41. These differences are nontrivial.

Grouping and layering decisions vary across providers. Figure 11 shows how different the approaches are for the leading rating frameworks. And as we have already seen, these grouping decisions are in fact an important determinant in a company’s ESG rating.

Figure 11
**Groupings/Layers
 in Leading ESG
 Frameworks**



Source: State Street Global Advisors, MSCI, Sustainalytics, ISS and Moody's Vigeo Eiris, as of July 1, 2023.

As part of the aggregation process, missing data treatments also play an important role. To understand the impact the treatments can have, we examine several popular approaches to filling in missing data. Figure 12 shows these alternatives and their rationale.

Figure 12
Missing Data Treatments

Missing Data Treatments	Rationale of the Treatment
Missing value filled with the minimum value	Companies tend to have incentives not to make the metric available when they know the evaluation is not favorable; lack of disclosure suggests that the company is not willing to put effort into managing ESG-related issues
Missing value filled with value worse than the minimum value	Same as the treatment above, but missing values are viewed as worse than even the worst reported value
Missing value filled with average of comparable peers	Missing data due to coverage limitation of the ESG dataprovider, and the proxy can be average or median of its industry or peers with similar characteristics
Missing value left as is	Filling in missing data introduces more noise than information

Source: State Street Global Advisors, as of July 1, 2023.

We next compare two specific automobile companies — Tesla and NIO (a Chinese multinational manufacturer of electric vehicles) — to show how the missing data treatments affect their scores. Tesla is chosen for having very high coverage of raw data, while NIO is chosen for having very low data coverage. As shown in Figure 13, the labor practices score can vary significantly based on the missing data treatment we apply. The differences are especially stark for NIO, for whom the missing data problem is more acute.

Figure 13
Labor Practices Score Calculated with Missing Data Treatments

■ Tesla, Inc
■ NIO Inc.



Sources: State Street Global Advisors, ISS, as of December 31, 2022.

Once a set of missing data rules is assigned, the raw data must be aggregated into a single score. For example, if we wanted to use raw data from multiple vendors (ISS, Sustainalytics, and Moody's Vigeo Eiris) and aggregate them into a single score, we might start by equally weighting their raw metrics. Here, we must consider that the distributions and means of the metrics might be very different. Figure 14 shows the descriptive statistics of the collective bargaining metrics. The units for the raw metrics are different, as seen in the mean and standard deviations. To combine these metrics, we would have to transform the scores to be comparable. The choice of whether to normalize the metrics during transformation, and if so whether to normalize data within industries, countries, country-industry blocks, or broad universes, is one more decision that must be made.

Figure 14
Descriptive Statistics of Data Metrics that Measure Collective Bargaining Agreements

	ISS	Sustainalytics	Moody's Vigeo Eiris
Coverage	36	36	29
Mean	1.89	38.19	33.28
Std	0.73	36.59	12.91
Min	1	0	5
25% Percentile	1	18.75	22
Median	2.11	25	32
75% Percentile	2.47	75	39
Max	3.33	100	60

Sources: State Street Global Advisors, ISS, Sustainalytics, and Moody's Vigeo Eiris as of December 31, 2022.

The example above concerns just one metric — collective bargaining rights — which is one of many metrics that might be used in a human capital management score. And the latter might be one of many inputs into the “S” pillar in a final ESG score. As the information is aggregated, some of the modeling decisions we have walked through may be amplified, while others might be more muted, depending on the aggregation approach.

A final comparison across the four vendors is shown in Figure 15. The final ESG ratings are calculated by equally weighting the scores of the four issues material to the automobile industry, while the scores of four issues are calculated by equally weighting the data metrics relevant to the issue respectively, when missing data are left as is. The rank correlations as of December 2022 are quite low across the vendors for our automobile sample, which is not surprising given the many different choices made along the way that we have highlighted.

Figure 15
Correlation across Four Leading ESG Ratings for Global Automobiles
 Rank Correlations of Constructed ESG Score in Automobiles

	MSCI	ISS	Sustainalytics	Moody's Vigeo Eiris
MSCI	1	—	—	—
ISS	0.39	1	—	—
Sustainalytics	0.41	0.75	1	—
Moody's Vigeo Eiris	0.44	0.82	0.78	1

Based on the MSCI ACWI Index Automobile Companies, as of December 2022.
 Sources: State Street Global Advisors, ISS, Sustainalytics, Moody's Vigeo Eiris, and MSCI.

In sum, the aggregation of raw metrics can be complex and not as straightforward as one might think. There may be multiple groupings/layers in the construction of a final score. There are multiple ways to treat missing data. And when combining data, different normalization techniques can be used. These differences in “aggregation” techniques are in addition to the differences concerning measurement that we identified in the first section.

Implications of ESG Ratings Being Different

The discussion so far has shed light on the specific details concerning how and why ESG rating frameworks are different. At its heart, the divergence among ESG ratings is due to the lack of regulatory disclosure and reporting standards, which has resulted in a wide range of ways ESG ratings providers have developed to define materiality, to collect and process raw data, and to aggregate data.

As mentioned earlier, Berg, Kölbel, and Rigobon find that the average correlation between popular ESG ratings is about 54% at the final rating level.⁸ They find that the largest contribution to the overall low level of correlation between ESG ratings data is measurement divergence: the ways ESG data vendors use to measure the same concept. The second largest contribution is scope divergence: whether some topics are included or not in the final ESG ratings. This lines up neatly with our discussion; as we have seen, many of the metrics that go into the ESG ratings are qualitative in nature. Just like intangible assets in accounting, the very nature of these qualitative variables implies that different vendors may approach the same concept in different ways. In addition, the vast majority of ESG data come from company self-disclosures. Currently, there is very little consistency across firms as to how to disclose ESG information. Therefore, vendors need to use different techniques to standardize the data. We further note that we believe some divergences are intentional. Data vendors tend to invent their own methodologies to differentiate themselves from the rest of the market in our view.

What are the implications of ratings divergence? The main point we stress is that we believe *any* and *all* empirical analysis using ESG ratings inherently starts with a significant “data approach” bias. Unlike with empirical analysis using income statement or balance sheet items or even credit ratings, the sizable differences across ESG ratings make extrapolation of empirical results inherently tenuous. Empirical research by its nature is dependent on the characteristics of the data, whether it be the measurement approach, the time period involved, or the sample universe. Financial research is already sensitive to data mining, given there are a limited number of markets and securities, a limited number of time periods, and a finite number of metrics we can extract from income statements and other financial reports. When we add the possibility of ESG data, where hundreds of new metrics can be constructed, massaged, and made to fit whatever the hypothesis in question is, the risk of data mining rises significantly in our view.

A couple of clear takeaways emerge. First, we believe any empirical analysis involving ESG ratings should start with a discussion of the particulars of those ratings — from how metrics are identified to how they are measured to how they are normalized/aggregated, as well as the way missing data are treated. Where possible, robustness tests that “alter” those ratings or use subsamples of those ratings in a way that removes bias should be considered. Second, where possible, we believe multiple ESG rating frameworks should be used, although we acknowledge that it greatly expands the amount of effort and the potential data costs. Third, most of all, we believe researchers should be wary of reaching broad conclusions about the nature of ESG ratings, whether the research is related to return or risk implications, fund characteristics, investor behavior, or any other issues.

Another approach that can ameliorate the “data approach bias” is to focus on narrower definitions of ESG. For instance, these would include tests focusing on single characteristics such as carbon emissions or board diversity or supply chain management. Narrowing the definition of ESG removes some of the biases we have outlined. An extension of this approach is to cluster or aggregate metrics in simple, intuitive ways, for instance by taking groups of (not too many) metrics that are highly correlated and capture a specific issue.⁹ We believe not over-engineering the construction of the metric is important here.

In our view, some of the most egregious examples of ESG research we have seen are found in articles that define sustainability or ESG worthiness as membership in a particular portfolio or index. Not only are there the same challenges we have described, but there is one more nontrivial decision layered on top, which is the security selection methodology of the portfolio or index!

We conclude this section by pointing out that if there are dozens of ESG ratings and signals being tested, statistically speaking we would expect that, even if there is information in ESG ratings, quite a few of these studies will produce results that contradict each other. Atz et al. surveyed 1,141 peer-reviewed articles and 27 meta-reviews (based on about 1,400 articles) and concluded that “financial performance of ESG investing has on average been indistinguishable from conventional investing.”¹⁰ That result is not surprising if we imagine that these 1,141 articles may quite possibly be employing dozens, if not hundreds, of ways of defining/measuring ESG.

Divergence of ESG Ratings May Be Informative

Perhaps the divergence itself provides investors with useful information. An interesting area of research has emerged along those lines, including research by the following:

- Billio et al. compare the financial performance of a portfolio that contains only stocks all four ESG rating agencies agree upon with that of a non-ESG portfolio.¹¹ They show that the disagreement in ESG ratings is large enough to dilute the effect on asset prices of ESG investors’ preferences such that even a portfolio with stocks that all ESG ratings agree on does not outperform a non-ESG portfolio.
- Avramov et al. show that ESG uncertainty could distort the risk–return trade-off and reduce economic welfare.¹²
- Brandon, Krueger, and Schmidt document a positive relationship between ESG rating disagreement and stock returns, implying that those names with a higher ESG rating uncertainty demand a risk premium.¹³
- Christensen and Serafeim also find that ESG disagreement is positively correlated with return volatility, large price movements, and lower likelihood of obtaining external financing.¹⁴

This area remains a fruitful one for future research.

Conclusion

Ask anyone in investment management what is the key to ESG investing, and the most likely answer you will get is ESG data. According to the management consulting company Opimas, the global ESG data market surpassed US\$1 billion for the first time in 2021 and has seen a 28% annual increase during the past five years.¹⁵ Assets under management in ESG is expected to grow from US\$18.4 trillion in 2021 to US\$33.9 trillion by 2026.¹⁶ As ESG becomes mainstream, the importance of ESG data and ratings cannot be overstated in our view. Based on a 2022 survey from the Sustainability Institute by ERM,¹⁷ the average spend on ESG (including data, ratings, and consultant services) was \$487,000 per annum. Because ESG data/ratings are what regulators, investors, and companies rely on, we believe the implications for policymaking, investment decision-making, and economic resource allocation are enormous.

Our goal in this article was to illustrate what is involved in an ESG rating, specifically going into detail concerning the modeling process and choices involved in constructing a rating. We provided a step-by-step illustration using companies in the global automobile industry with granular “raw” ESG data from four leading ESG data providers. We discussed the differences in the metrics measured, how they are measured, and how they are combined and aggregated. Our article cannot replace a read-through of the four ESG ratings providers’ detailed methodology guides; our hope is to bring clarity to the broader framework of ESG ratings construction so that users of ESG ratings can appreciate the detailed decisions that go into the ratings and what implications they might have for use of the ratings.

We believe divergence is not necessarily a bad thing if the users of the ratings understand the methodology and the sources behind divergence. We posit that the survival-of-the-fittest theory would imply that whoever can better estimate the financial materiality of ESG impacts will eventually win the race. Or perhaps, disclosure guidelines will become standardized over time and ESG data will converge toward something that more resembles financial data. In the meantime, we believe research on ESG data and ratings should acknowledge this “data approach” bias and attempt as much as possible to address the bias using multiple rating frameworks, well-crafted robustness tests, and/or at the very least a discussion of the way the results might change under certain conditions if the ESG ratings had taken a different form.

Appendices

Appendix A: Companies in the GICS Automobiles Industry That Are in the MSCI ACWI Index

Company	Country	Market Value (\$USD MM)
Bayerische Motoren Werke Aktiengesellschaft	Germany	58,613
BYD COMPANY LIMITED	China	94,118
Chongqing Changan Automobile Company Limited	China	15,436
DONGFENG MOTOR GROUP COMPANY LIMITED	China	1,639
Dr. Ing. h.c. F. Porsche Aktiengesellschaft	Germany	46,061
Ferrari N.V.	Italy	41,434
FORD MOTOR COMPANY	United States	45,934
FORD OTOMOTIV SANAYI ANONIM SIRKETI	Turkey	9,832
GEELY AUTOMOBILE HOLDINGS LIMITED	China	14,689
GENERAL MOTORS COMPANY	United States	47,792
Great Wall Motor Company Limited	China	29,507
Guangzhou Automobile Group Co., Ltd	China	13,775
HONDA MOTOR CO., LTD.	Japan	41,625
HYUNDAI MOTOR COMPANY	Korea	29,213
ISUZU MOTORS LIMITED	Japan	9,115
KIA CORPORATION	Korea	19,010
Li Auto Inc.	China	17,011
Lucid Group, Inc	United States	11,477
MAHINDRA AND MAHINDRA LIMITED	India	18,773
MARUTI SUZUKI INDIA LIMITED	India	30,681
Mazda Motor Corporation	Japan	4,812
Mercedes-Benz Group AG	Germany	70,106
NIO INC.	China	15,527
NISSAN MOTOR CO., LTD.	Japan	13,374
PT Astra International Tbk	Indonesia	14,823
RENAULT SA	France	9,871
Rivian Automotive Inc	United States	16,829
SAIC Motor Corporation Limited	China	24,218
Stellantis N.V.	Italy	44,505
SUBARU CORPORATION	Japan	11,819
SUZUKI MOTOR CORPORATION	Japan	15,898
TATA MOTORS LIMITED	India	16,844
TESLA, INC.	United States	388,972
TOYOTA MOTOR CORPORATION	Japan	224,115
Volkswagen Aktiengesellschaft	Germany	72,121
Volvo Car AB	Sweden	13,549
XPENG INC.	China	6,764

Sources: State Street Global Advisors, MSCI, SASB, as of December 31, 2022.

Appendix B: Description of Labor Metrics

The MSCI Labor metrics used in Figure 4 are as follows:

- Exposure Score for Labor Management: Labor Management Exposure Score, Exposure indicators capture to what extent a company's business is vulnerable to the ESG risk covered in a Key Issue. Examples of criteria assessed include the products and services a company provides; location of company operations; and the nature of those operations. Higher scores on exposure indicate greater risk on the Key Issue (Score: 0–10).
- Management Score for Labor Management: Management of Labor Management Score. Management indicators measure how well a company manages ESG risk and opportunities. These metrics are grouped into the following broad categories: Strategies & Policies, Targets & Implementation, and Demonstrated Performance. Higher scores on management indicate greater capacity to manage risk (Score: 0–10). The Sustainability Labor metrics used in Figure 4 are as follows:
- Freedom of Association Policy Score: This indicator provides an assessment of the quality of a company's freedom of association and collective bargaining policy.
- Collective Bargaining Agreement Score: This indicator provides an assessment of the extent that the company's employees are covered by collective bargaining agreements.

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Contributors

Jennifer Bender, Ph.D.

Head of Solutions
Senior Managing Director
Systematic Equity Team

Chen He

Vice President
Senior Quantitative Research Analyst
Systematic Equity Team

Stefano Maffina

Vice President
Senior ESG Research and Data Analyst
ESG Research and Development

Xiaole Sun

Vice President
Senior Researcher
Systematic Equity Team

Endnotes

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