

The Value and Current Limitations of ESG Data for the Security Selector

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Abstract

Many mainstream investment managers cite ambiguous evidence on the financial impact of specific environmental, social, and governance (ESG) factors as well as data sufficiency and quality challenges as obstacles to fast adoption of ESG integration. Those in ESG integration roles must demonstrate the incremental value of incorporating ESG information, despite its cost, into the security selection process, identify the data sources to mine and monitor that may provide decision-relevant information, determine what ESG topics are material to a security's industry, and determine the relevant ESG metrics and benchmarks necessary to develop sound security selection and portfolio construction.

We build on previous attempts to construct roadmaps for integrating ESG considerations into the security selection process such as the Practical Guide to ESG Integration (PRI, 2016) and How Investors Integrate ESG (IRRC Institute, 2017). We outline a survey of the literature on the value-relevance of specific ESG metrics that demonstrates the business case for incorporating ESG information. We describe the diverse range of data sources, including structured issuer-level key performance indicators (KPIs) available from ESG data providers to unstructured geographic, industry, or relationship-level data not currently organized by ticker. We consider the data generation process and its limitations for the security selector. We identify line item level metrics, document research on their relevance for valuation and construct specific questions to ask in the due diligence process.

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Introduction

Assets controlled by managers focused on environmental, social, and governance (ESG) integration continue to grow sharply.¹ Large institutional investors in the United States such as BlackRock,² CalPERS,³ and Vanguard⁴ have made statements on the importance of incorporating ESG into their investment strategies and have implemented processes for ESG integration in their portfolios. The largest pension fund in the world, Japan's Government Pension Investment Fund, has allocated 3 percent of its domestic stock portfolio to ESG strategies and expects to increase that to 10 percent.⁵ The rapid growth in the assets under management deployed in responsible investment strategies has led to this segment controlling more than a quarter of all professionally managed assets.

Nevertheless, ESG integration remains a daunting task for many portfolio managers. Many mainstream investment management companies cite ambiguous and contingent results as

well as data sufficiency and quality challenges as obstacles to fast adoption. In a survey of 461 large asset owners and managers, BNP Paribas found that 55 percent of respondents cited "lack of robust data" as the significant barrier to greater adoption of ESG across the investment portfolio (BNP Paribas, 2017).⁶ Those in ESG integration roles must identify the specific ESG data sources to mine and monitor that may provide decision-relevant information, determine what ESG topics are material to a security's sector and industry, determine the relevant ESG metrics and benchmarks necessary to develop sound analysis, and, last but not least, demonstrate that the cost of incorporating ESG due diligence processes is justified by enhanced financial return. Additional details on the growth and challenges of ESG integration are outlined in the paper by Dan Esty and Todd Cort entitled *Corporate Sustainability Metrics: What Investors Need and Don't Get*.

¹ According to the 2016 Global Sustainable Investment Review, assets managed according to socially responsible principles doubled between 2012 and 2016.

² In his most recent letter to the CEOs of portfolio companies, Larry Fink, CEO of BlackRock, said "Environmental, social, and governance (ESG) factors relevant to a company's business can provide essential insights into management effectiveness and thus a company's long-term prospects."

³ CalPERS adopted a set Investment Beliefs in September 2013 among which are the following: A long time investment horizon is a responsibility and an advantage; Long-term value creation requires effective management of three forms of capital: financial, physical and human.

⁴ Vanguard's responsible investment policy states "We believe responsible investment is inherently part of Vanguard's culture and is consistent with our fiduciary duty to manage investments in the best interest of clients."

⁵ "Biggest Pension Fund Craves More After Foray Into ESG Assets" by Yuko Takeo & Shigeki Nozawa. Bloomberg July 13, 2017.

⁶ Anne Simpson, (Investment Director, Sustainability at CalPERS) is quoted in the survey thus: "There is a blizzard of information out there, but it's not so much quantity that is the problem, but quality, consistency and relevance."

As ESG integration becomes more widespread, the apparent challenges and opportunities afforded by ESG due diligence processes will be closely followed even by mainstream investors not educated about ESG integration (currently the majority among investors). This is because *all* rational investors, including those without a mandate to consider social responsibility, would eventually choose to adopt any due diligence process that is demonstrated to enhance value in the security selection and portfolio construction procedure. Admittedly, the demonstration period might be drawn-out – its duration will depend on the speed and ease with which signals from ESG data can be shown to select winners that other accounting information does not select, or, conversely, avoid losers that signals from other data fail to avoid.

There is now also an extensive body of academic and practitioner oriented literature on the benefits of integrating ESG information into security selection and risk management. We build on previous attempts to construct roadmaps for integrating ESG considerations into the security selection process such as the Practical Guide to ESG Integration (PRI, 2016) and How Investors Integrate ESG (IRRC Institute, 2017). We outline a survey of the literature on the value relevance of composite ESG metrics that demonstrate the business case for incorporating ESG information at an aggregated level. We also provide references to the literature that correlates specific aspects of ESG to financial performance, and link these with associated due diligence questions. We outline the increasing availability of a diverse range of ESG data sources and describe the data generation process and its limitations for the security selector. We describe the data generation and reporting process for a full range of data sources, including structured issuer-level KPIs available from ESG data providers to unstructured geographic, industry, or relationship level data not currently organized by ticker or ISIN. We conclude by describing two specific examples where careful review of ESG information might have generated warnings, whereas other standard sources provided no such signal.

Why Incorporate ESG Data?

For an investor that has no mandate to consider the ethical value of investment choices, the extra cost of information processing in ESG integration must be justified by a corresponding increase in expected risk-adjusted returns. Given the variety of ESG data sources, even ESG-focused investment managers must make a business case for each *additional* ESG data source. That is, each data source must not only add value to the security selection process, but it must add value that is *incremental* to other sources already being utilized.

The Decision Theoretic Basis for Integrating ESG Information

A well-established truth in decision theory states that combining multiple forecasts (generated by different methods, models, or experts) leads to significantly increased forecast accuracy (Clemen, 1989). The principle of averaging multiple diverse sources of expertly generated information to produce more accurate estimates underpins many applications in climate and meteorology forecasting, real-time macro-economic forecasting, electricity demand forecasting, demographic prediction, and psychiatric diagnosis, among other fields. It has been demonstrated, for example, that while currency trading strategies based on fundamental macroeconomic variables and those based on technical trading rules are both value-enhancing, trading strategies based on a combination of fundamental and technical methods exhibit improved risk-adjusted performance over both single-method strategies (de Zwart, Markwat, Swinkels, & van Dijk, 2009). It should not be surprising, therefore, that investment managers would expect to improve the security selection process by combining standard accounting and financial information with ESG data.

The Value-Relevance of ESG Information

A segment of the accounting literature considers whether there is incremental explanatory power or value to non-financial ESG disclosures. Accountants refer to this as the “value-relevance” of nonfinancial (i.e. ESG) information. The question is investigated by testing a general valuation model inspired by Ohlson (1995). Ohlson argued that if the stock price is the present discounted sum of future expected net dividends, then the price will be a function of book value, abnormal earnings and “other information,” such as non-financial information. In an early application of this method, Hughes shows that nonfinancial measures of air pollution in the electric utility sector are value-relevant (Hughes, 2000). Environmental liability information disclosed by the EPA is found to be value-relevant for credit ratings of new bond issues (Graham, Maher, & Northcut, 2001). More recent studies find that corporate social performance is value-relevant and associated with greater earnings persistence (Gregory, Whittaker, & Yan, 2016) and that short-sellers rationally avoid firms with high ESG scores (Jain, Jain, & Rezaee, 2016). Crucially, Clarkson et al. find that voluntary environmental disclosures are *incrementally* informative over current environmental performance measures available to the public, as proxied by the firm’s Toxics Releases Inventory (TRI) emissions data reported by the EPA (2013).

The Financial Impact of Specific Aspects of ESG Performance

Composite ESG scores can only be a starting point of investment due diligence on an issuer. In the Appendix, we present a due diligence checklist with specific ESG questions for a security selector to ask about each issuer. The questions are organized into four categories:

input efficiency and reliability, customer loyalty, employee engagement, and other stakeholder relationships. These questions are associated with specific results from the literature that support the relationship to financial performance. For example, for raw materials and waste product management practices (under Input Efficiency and Reliability), we note that, based on an event study methodology, the implementation of environmental management systems such as ISO 14001 certification amongst publicly traded U.S. firms between 1996 and 2005 is followed by significant financial improvement relative to matched firms in the long run (Jong, Paulraj, & Blome, 2014). Similarly, corporate carbon performance is positively related to financial performance (Busch & Lewandowski, 2017) and continuous investment in energy efficiency is associated with higher productivity in manufacturing industries (Bergmann, et al., 2017). Corresponding results are cited for customer loyalty, employee engagement, and other stakeholder relationships in the Appendix.

Sources of ESG Data

Where there once was a dearth of ESG data and data sources, there now is increasingly more data available. Issuers are aware of the demand for disclosure of their ESG performance due to the numerous requests they receive from various stakeholders and third-party ESG raters. In addition, there are more data frameworks such as those produced by the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB) to help guide the process of generating and managing ESG data and reporting ESG-related performance.

While interest in ESG data from consumers, prospective clients, management, and civil society has increased, the stakeholders with the most demanding information needs are security selectors – that is, asset owners, investment managers, securities analysts, and portfolio managers. In monetary terms, security selectors have the most to gain from ESG data and are therefore the stakeholder most likely to be able to fund the resource costs of data collection and processing. They are hence the key stakeholder that the ESG data industry must satisfy.

Security selectors generally value a diversity of sources for information, subject to the costs of extra information processing, which we address in the next section. Diversity of sources helps to reduce the adverse effects of the information asymmetry between investor and corporate management and can help to mitigate agency problems.⁷ The variety of sources enables comparison of issuer-sourced information with third-party product certifications,

⁷ The principal-agent problem, or the agency problem between shareholders and managers occurs whenever managers have incentives to pursue their own interests at shareholder expense. The problem is a by-product of the separation of ownership and control.

employee commentary, civil society perceptions, media stories, and unstructured publicly available data. This comparison and crosscheck is essential to developing a comprehensive understanding of an issuer, but does make the analyst's task more difficult. She must develop procedures to parse that which is unsubstantiated hearsay or a poorly-formed opinion from that which is accurate and material to an issuer's future performance.

It is now feasible for the security selector to tap a significant diversity of sources of ESG data. We describe briefly the range of source types below:

Issuers: Issuers are generally the first source for ESG data. The corporate responsibility and sustainability report supplemented by annual reports, or the integrated annual report of the issuer provides an overview of how companies are integrating ESG strategies into their strategy and operations, and increasingly, a data-rich picture of their ESG performance.⁸ What is often missing, though, is how that performance links to financial performance. A strong example, however, of the connections can be seen in SAP's 2016 Integrated Report, where they state "We believe that social, environmental, and economic performance are interrelated, with each creating tangible impacts on the others." In it, SAP reports on metrics such as their one-percent decrease in carbon emissions that would have a €5 million impact on non-IFRS operating profit and a +/- one percentage point change in Employee Engagement Index that had a €45–55 million impact on non-IFRS operating profit.

ESG Data Providers/Raters: In response to questionnaires, issuers disclose detailed ESG data to a number of ESG data providers who in turn make that data available to investors through a subscription-based or licensed-based model, with varying levels of verification and data-processing. ESG data providers generally supplement the data with analytics, including proprietary ESG scores, ratings, rankings, indices, and visualization tools. The Global Initiative for Sustainability Ratings (GISR) is a multi-stakeholder initiative whose mission is to drive ratings transparency and excellence. GISR's Ratings Directory, which aims to be a comprehensive database of rating organizations, lists 250 different ratings product families offered by 130 different owners. Between 2010 and 2012, SustainAbility, an ESG consultancy, conducted a research effort entitled *Rate the Raters*, among whose outputs are unedited, publicly available responses from a number of rating providers to a questionnaire covering rating description, governance and transparency, inputs to the rating process, the research process, and rating outputs.

⁸ An integrated report includes performance on both direct and indirect financial information and specifically, how ESG-related strategies are feeding the bottom line. Companies that issue integrated reports generally follow a triple bottom-line approach where goals and targets are set in three areas: people (the "S" in ESG), planet (the "E" in ESG) and profits (the results of integration of E, S, and G into business strategy).

Information Aggregators: ESG data is available from mainstream information aggregators such as Bloomberg, Thomson Reuters, and FactSet. These aggregators make information available from other sources without further processing of their own and also carry out their own aggregation and analytics to construct their own scoring models.

Index Providers: A number of indices of high-performing ESG issuers exist. Index providers may simply list index members, or may provide underlying KPIs that support the index composition choice. Examples of index providers are MSCI KLD, Dow Jones Sustainability Index (DJSI), FTSE4Good, *Newsweek* Green Rankings, DiversityInc, and the Ethisphere Institute.

Algorithmic ESG Data Processors: The broad availability of unstructured data on the Internet has created an opportunity for algorithmic data processors that convert unstructured, keyword-based information into structured data organized by issuer-identifiers such as ticker and ISIN. Examples of algorithmic data processors include Datamaran (developed by eRevalue), CSRHub, and RepRisk.

Stakeholder-derived Information Processors: Websites like Glassdoor contain “insider” perspective from employees and others who claim to know a company’s operations. Glassdoor provides reviews of 600,000 companies and ratings in the form of net promoter scores (whether the company would be recommended to others), CEO approval rating, and various top company awards and recognition. Brand Finance issues the World’s Most Valuable Brands/Global 500, which calculates the values of brands by estimating the likely future sales that are attributable to a brand and a royalty rate that would be charged for the use of the brand if it were to be purchased.

Product Certification Organizations: There are now numerous product certification schemes, particularly in the environmental arena, and websites that offer ranking and ratings such as EPA Energy Star and Environmental Working Group (EWG) programs. The EWG VERIFIED™ program, for example, provides certification for products that are free of contaminants that pose health, ecotoxicity, and/or contamination concerns. EWG also maintains databases such as Skin Deep® that rate products on the same criteria. Skin Deep® ratings are provided for all versions of products, showing increases or decreases in ratings over time as ingredients change. Its existence has incentivized many companies to improve their transparency, quality, and safety of ingredients.

Supply Chain Certifiers: EcoVadis provides ratings and scorecards for the global supply chain, including a benchmarking tool that helps companies monitor environmental, ethical, and social practices of suppliers and business partners across 150 purchasing categories and 110 countries. For many companies, understanding and managing the ESG

performance of suppliers is as important to risk as it is to managing its own ESG performance.

Industry-level Sustainability Initiatives: Lastly, an often underused source of ESG information on both private and public companies are ESG-related industry associations, such as the Conflict Free Smelter Initiative (CFSI) and The Better Cotton Initiative, as well as signatory initiatives such as the Principles for Responsible Investing (PRI) and the United Nations Global Compact (UNGC).

ESG Data Availability on Private Companies

There are very few regulations, particularly in the United States, requiring ESG disclosure. As such, what and how much publicly traded companies disclose varies; there is even less information on private companies and public sector entities. Additionally, only public companies qualify for most of the ESG-related recognition (e.g. DJSI, *Newsweek* Green Rankings) so the credibility incentive for private companies to disclose voluntarily is virtually nonexistent. CSRHub, RepRisk, GRI (the GRI Sustainability Disclosure Database), and CDP are comprehensive sources of information on private companies, governments, universities, and even nonprofit organizations. The other options for analysts of private companies and public sector institutions are tools that cater to ESG-specific topics, supply chain information, and “listening tools” or software that uses natural language processing technology (NLP) to aggregate perception of a brand or company from sources across the Internet and social media. Many of these tools are also helpful in analyzing public companies.

The Cost and Limitations of ESG Data

The increase in the availability of ESG data does not necessarily ease the work of a security selector. Depending on the nature of ESG information incorporated, the cost of data acquisition and processing and the potential for economies of scale can vary considerably.

Most rating organizations, including for-profit and nonprofit providers, sell their data in some form – through a subscription to access data and scores, licensing of indices, consulting services, memberships, research papers, industry briefs, and other related products and services. Some offer high level data or a subset of the data to the public without subscription. While most ratings providers generate revenues from the users of data and analysis, some also charge issuers an administrative fee to disclose their data.

ESG integration necessarily broadens the range of issuer-level metrics that must be tracked by a security selector. Investment managers must systematically incorporate both financial

and ESG information into their decision process. Given a fixed information-processing capacity in the human brain and associated information aggregation costs, the question of whether additional information is useful (that is, value-enhancing) to the process of security selection must be raised. In addition to subscription fees, the extra information has significant resource costs associated with it, comprising analyst time and the potentially significant costs of making incorrect decisions based on information that is wrong or badly processed. Automated information processing or algorithmic security selection processes can reduce the expenditure of human resource time and perhaps subscription fees, but it may increase the expected costs of bad decisions if it increases complexity and model risk and reduces the likelihood that incorrect data or faulty inferences will be discovered. For an investor that has no mandate to consider the ethical value of investment choices, the extra cost of information processing in ESG integration must be justified by a corresponding increase in expected risk-adjusted returns. Crucially, as noted earlier, each data source must not only add value to the security selection process, but it must add value that is *incremental* to other sources already being utilized.

The research to establish the incremental value of each type of data source (for example, the value of algorithmic ESG data processors or natural language processing for those who already incorporate structured ESG data) has yet to be completed. As the number and type of data sources increase, an investment manager must ask whether it is worth paying the extra cost in resources and complexity to incorporate each additional source. While most commercial data providers have conducted studies that demonstrate the business case for the value of their own data and readily provide such studies as part of their marketing materials, the credibility of these analyses is reduced due to the absence of peer review and common standards of objective academic research.

Reliance on ESG data for investment decisions has its limitations. It is as important to understand how the data are prepared and collected as it is to understand the strategies for analyzing them. The data preparation and collection process can affect their efficacy, reliability, and comparability. The security selector must consider these limitations when incorporating ESG data into investment analysis and in some cases may want to engage companies directly to elaborate on ESG disclosures.

It is therefore highly recommended that analysts do not rely solely on one source of ESG data and, wherever possible, engage issuers directly. It can also be helpful to understand the source within companies that manages the data reporting process. While the traditional approach to active engagement in investment management most often includes contact with investor relations (IR) staff, ESG data is not often “owned” or housed in IR, but rather lies with the corporate responsibility and/or sustainability (CR&S) function. Depending on the level of CR&S integration into the business, there are often data owners across the

company; but, generally, the CR&S department (or sometimes corporate communications, marketing, or corporate affairs) is responsible for reporting and disclosure, and is therefore the main point of contact. In companies that are advanced in managing ESG, or where ESG issues are in the mainstream for their industry, IR is often the main point of contact.

Materiality

When ESG performance is managed well, it is preceded by a materiality analysis, which determines the specific types of ESG risks and opportunities that are significant to a particular issuer. The GRI Standard and framework defines material topics as follows: “Relevant topics are those that may reasonably be considered important for reflecting the organization’s economic, environmental and social impacts, or influencing the decisions of stakeholders, and, therefore, potentially merit inclusion in the report. Materiality is the threshold at which Aspects become sufficiently important that they should be reported.” SASB utilizes the U.S. Securities and Exchange Commission (SEC) definition as follows: “ ‘Material information’ is defined by the Supreme Court as presenting a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the total mix of information made available.”⁹

Whereas GRI suggests the process of assessing materiality should relate to all stakeholders, SASB suggests it should relate solely to the investor stakeholder. It is important for an analyst to understand what stakeholders a company has identified as key and the associated definition of materiality.

Materiality is industry-specific. What is an important operational requirement or reputational issue to one company may not be to another in a different industry. In the absence of regulations requiring ESG disclosure in most jurisdictions, companies determine their own materiality and therefore, strategize, implement, manage, measure, report, and disclose accordingly. Several frameworks, standards, and guidelines on KPIs continue to co-exist and there is no uniform consensus on the salience of specific KPIs. Companies manage and report on those KPIs they deem to be material and choose the frameworks, standards, and guidelines that best fit them.

Companies therefore decide what they believe is key to their operations, which may or may not be a perspective shared by peers. Within an industry, variation in business models implies that the relevance of specific ESG metrics may vary across peers. If a security selector makes her own determination of a company’s industry segment without confirmation, she may not be clear on which material issues the company is focused on and

⁹ TSC Industries, Inc. v. Northway, Inc., 426 U.S. 438 (1976).

why. This may lead to an analysis and scoring based on ESG information that is not relevant or, worse, non-existent. If a company issues little to no information in a particular ESG area because they deem it non-material, an analyst who incorrectly categorizes a company may misinterpret that as a signal of poor management or evasion.

The Data Collection Process

Each rating organization has its own methodology, collection, and reporting cycle. Among those that engage issuers directly, raters may receive corrections or updates from companies that are off-cycle. Such updates are rarely incorporated into analysis mid-cycle. For a security selector, accessing issuer disclosures and engaging a company directly may provide clarity, timely updates, and corrected data not immediately reported by rating organizations. The discussions during engagement may provide investors with information about upcoming initiatives that have not yet generated concrete metric-level disclosure.

Data collection questionnaires vary in length and complexity. Some, like the Corporate Sustainability Assessment (CSA) from RobecoSAM, which underlies the DJSI, consist of approximately 100 questions, depend on sector and industry, take months to complete, and require the participation of 30-50 internal subject matter experts (SMEs). Others, such as the *Newsweek* Green Rankings, comprise approximately 10 questions and require the involvement of only a few SMEs. Depending on investment style and rating methodology, a security selector will need to select among different ratings providers, use multiple providers as crosschecks, and review variation and correlation across providers.

The information requests may involve the completion of a blank survey by the issuer or review of a report completed by an analyst at the rating provider. Some analysts are industry or sector specialists and may write the entire report while other reports are written by several analysts who specialize in one or more ESG areas. The rules for completion of the requests also vary – some rating and ranking agencies accept corrections or augmented data from publicly available sources only, others accept all information, maintaining confidentiality for the inputs and disclosing only the analysis. Others are completed by in-house analysts who interpret publicly available data. Certain providers outsource the rating computation process to third-party analysts. There are also certain providers that do not engage the company unless approached proactively by the issuer. Their analysis and scores are independent of knowledge gained when speaking directly to the source and could therefore be inaccurate, out-of-date, or miscategorized. Often, the rationale for this approach is not a consequence of strategy, but rather a lack of resources. A notable exception is RepRisk, an ESG tool that chooses to capture and analyze data from media, stakeholders, and other public sources external to the company. RepRisk argues that this “helps balance and substantiate the information provided by the company itself,

and helps assess whether a company's intention – policies, processes, and commitments – translates into practice.”

Data Assurance and Comparability

The data reporting process may be targeted towards different audiences. This may reduce the comparability of ESG measures across sources. The GISR directory categorizes each data product as being targeted to investors, customers, or companies. While the security selector might gravitate toward data targeted to investors, the need to crosscheck and validate the diversity of sources implies that data targeted to companies or consumers may also be decision-relevant. The GRI Standard and the Natural Capital framework, a method of natural capital accounting,¹⁰ assume that ESG data should target an even broader range of stakeholders, including communities, regulators, the environment, and society at large.

Not all CR&S annual reports are verified by external, independent third-parties. A 2015 survey (KPMG, 2015) found that 63 percent of the world's largest 250 companies assured their CR&S reports, and that just half of these assured the entire report. The French government requires listed, and some non-listed, companies to publish third-party verified corporate responsibility information in the annual directors' report. Consequently, 96 percent of CR&S reports from French companies are assured. The United States is not among the five countries with the highest percentage of assured CR&S reports. When companies assure a portion of the report, it tends to be the area(s) that are either most material or contain the most data, which is often environmental sustainability. When externally assured, letters from third-party assurers detailing the level of assurance and observed irregularities, inconsistencies, or inappropriate practices are almost always included in the CR&S report. Some companies choose only to internally assure their reports. This is not best practice and therefore provides a limited level of credibility.

How to use ESG Data in the Security Selection Process

The dimensions of ESG performance are industry-specific because what is material to a company in relation to ESG depends largely on the business model, industry, and sector. SASB, focused on the investor as the key stakeholder, suggests those that analyze companies take into account performance factors that meet one or more aspects of the following Five-Factor test (Sustainability Accounting Standards Board, 2015):

1. **Financial impact and risk:** ESG issues that may have a financial impact or may pose a risk to the industry in the short-, medium-, or long-term.

¹⁰ Whereby a company manages and reports on what is material to them in relation to natural (e.g. forests, water), built (infrastructure, roadways) and human (workforce) capital.

2. **Legal, regulatory, and policy drivers:** ESG issues that are being shaped by emerging or evolving government policy and regulation (e.g., carbon emissions regulation).
3. **Industry norms and competitive drivers:** ESG issues that are reported by companies in specific industries and recognized as important drivers for their type of business.
4. **Stakeholder concerns and social trends:** ESG issues that are of high importance to stakeholders, including communities, nonprofit organizations, and the general public, or reflect social and consumer trends, and which rise to the level of interest to investors when they have economic implications.
5. **Opportunities for innovation:** competitive advantages created from potential ESG-related innovative solutions that benefit the environment, customers, and other stakeholders.

The range of ESG data sources can help analysts access the information on which to apply the five factors. Once an analyst has determined the type of data needed to assess each company, she can begin to manipulate it to better understand a company's ESG risks and opportunities and its practices for managing them.

Normalization and Comparison

Given there is little to no uniformity in the disclosure of ESG data, analysts will generally need to normalize KPIs to render them comparable to benchmark. This means applying activity or scale metrics such as revenue, number of sites or employees, products sold, or asset size, and taking into account contextual information such as dispersion and year-over-year (YOY) performance.

Once data is normalized, analysts can consider the dispersion of normalized metrics between and within industries. Contextual information that must be taken into account includes societal trends (shifts in consumer preference), the regulatory climate (legislation and compliance costs), company's operating environment (the business and economic climate, industry trends, commodity prices) and the region(s) in which the company operates (that includes differences in cultural norms). In recent years, consumers have become more sophisticated in purchasing, researching how and where a product is made and a company's brand reputation before buying. It is important for analysts to take into consideration consumer trends specific to a given industry to determine whether companies are leveraging that to their advantage or lagging behind.

Taking all these factors into account as a full set of information and data, and not one metric in isolation, will provide an overall ESG performance picture for a company. Once this analysis is complete, an analyst can start the process of linking ESG performance to

financial performance in the areas of revenues and costs, assets and liabilities, and cost of capital.

Analysts will want to deliberate on the following factors when seeking linkages: the likelihood, severity, and timeframe in which negative or positive impacts from ESG issues could affect a company and whether the company is actively managing these impacts due to the incorporation of ESG into its strategy or is simply managing each crisis as it develops. Is the company likely to experience a low-probability, high-intensity, near-term impact such as customer data breach or a high-likelihood, high-intensity, long-term impact from extraction of water in water-stressed regions? In these cases, is it systemic or a one-time event? Asking the following questions may be helpful in understanding the depth of impact:

1. Is the incident highly public with the potential to affect the brand?
2. Is the issue likely to persist and affect the company over a period of time?
3. How do the costs to remediate this issue affect short-term earnings and the long-term bottom line?
4. How often does this incident happen to the company and happen in the industry?

Two Examples of Missed Signals from Unstructured ESG Data

Taking ESG factors into consideration during the portfolio construction process provides analysts, portfolio managers, and investors with a more complete picture of corporate performance in relation to all the risks and opportunities posed by its operating environment. Analysts may also uncover risks or opportunities not generally considered when solely factoring financial information into a valuation model. For example, soon after the 2010 Deepwater Horizon oil spill, the Center for Public Integrity's review of government safety records showed that two refineries owned by British Petroleum (BP) accounted for 97 percent of all flagrant violations found in the U.S. refining industry by government safety inspectors in the preceding three years. BP accounted for 829 of the 851 willful violations among all refiners cited by the Occupational Safety & Health Administration (OSHA) during the period analyzed by the Center (Morris, 2010). The violations cost the company a capped \$70,000 per incident, a direct financial effect, but the spill cost \$18.7 billion in settlement dollars alone, yielding a larger effect to financials, reputation, license to operate, and many more operational aspects. Fines from violations are a "G" ESG issue and comparison of that metric would have alerted analysts to a possible systemic governance issue leading to bottom line and stock price effects. While OSHA records were not easily available at the time in the form of data fields in an ESG data source organized by ticker, they were available in letters published in response to Freedom of Information Act requests on their website.

Similarly, a review of Datamaran analysis on Volkswagen (VW) CR&S reports demonstrates that non-carbon gases were mentioned less often in VW's sustainability disclosures in recent years, despite the fact that the reports themselves grew in size (Vittorio, 2015). About a year before the tailpipe emissions cheating scandal broke in 2015, VW reports essentially went silent on the topic of tailpipe nitrogen oxides (NOx) emissions, instead devoting more space to the topic of carbon emissions. While an analyst studying this would not necessarily know that malfeasance was occurring, this red flag would have been helpful to the analytical process and may have promoted a deeper dive and, therefore, more data to contemplate impacts. The case demonstrates the importance of noticing what is not being said as well as what is said.

Concluding Remarks

There is a strong case for analysts to incorporate ESG data into their security selection process. The impetus stems from the uptick in corporate ESG integration into business strategy as a business value-driver, coupled with the increase in ESG reporting standards and frameworks, research-based evidence, ESG data sources, and stakeholder demand, particularly from investors. The efficacy of the portfolio construction process, however, must include an understanding of the underlying methodologies with which the ESG data was collected, prepared, and reported. Analysts who rely solely on scores, rankings, or high-level data may lack the benefit of a full understanding of the ESG performance of a company, and, consequently, may not have an accurate, complete picture of corporate operations. This can affect the analysis of stock performance potential.

The recommendation, therefore, is to carry-out a due diligence process that includes an understanding of an issuer's industry-based materiality assessment, a large scope of ratings and rankings from several sources whose methodologies vary, a deeper dive into key risks and opportunities based on data sources cited in this paper and resourced elsewhere, and corporate engagement, where applicable and possible. It is also advisable to develop a set of key industry-based and ESG issues-based questions, which can be contemplated as part of a due diligence questionnaire that applies a uniform process across areas of significance for a security.

We also recommend more dialog and linkages between academic research that attempts to test the incremental value of types of ESG data and the analyses performed by ESG data providers. An industry repository for historical data available at low cost for academic purposes that can be used for peer-reviewed analyses would reduce the barriers to objective, provider-neutral studies. Such studies are essential to demonstrating that the benefits of ESG integration exceed the costs and to establishing a credible business case for incremental sources of ESG data.

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Appendix: Due Diligence Checklist

Input Efficiency

Metrics	Questions	Established Relationships	Source for Relationship
Raw materials and waste product management	Does the company have ongoing initiatives to maximize raw material efficiency? Has the company adopted environmental management systems (such as ISO 14001) in its operations? How automated or routinized is the system? How extensive is the company's voluntary environmental disclosures?	Implementation of EMS is associated with longer term improvements in ROA. Direct relationship is mixed and varies by industry, but management focus is an indicator of strategic leadership.	(Jong et al., 2014) (Suh, et al., 2014)
Greenhouse gas (GHG) Emissions management	Does the company have science-based, aggressive targets for emission reduction and a history of meeting them? Are Scope 2 & 3 included in the reduction goals?	Corporate carbon performance is positively related to financial performance.	(Busch & Lewandowski, 2017)
Energy Efficiency	Does the company utilize decision support tools such as cost-benefit analysis to evaluate the energy efficiency of business processes?	Continuous investment in energy efficiency is associated with higher productivity in manufacturing industries.	(Bergmann et al., 2017)