SUSTAINALYTICS

THEMATIC RESEARCH

THE ESG RISK RATINGS

MOVING UP THE INNOVATION CURVE

WHITE PAPER – VOLUME 1

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About Sustainalytics

Sustainalytics is a leading independent ESG and corporate governance research, ratings and analytics firm that supports investors around the world with the development and implementation of responsible investment strategies. For over 25 years, the firm has been at the forefront of developing high-quality, innovative solutions to meet the evolving needs of global investors. Today, Sustainalytics works with hundreds of the world's leading asset managers and pension funds who incorporate ESG and corporate governance information and assessments into their investment processes. With 13 offices globally, Sustainalytics has more than 390 staff members, including over 180 analysts with varied multidisciplinary expertise across more than 40 sectors. Over the last three consecutive years, investors named Sustainalytics among the top three firms for both ESG and corporate governance research in the Independent Research in Responsible Investment Survey. For more information, visit www.sustainalytics.com.

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Foreword

Moving up the innovation curve

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The responsible investment (RI) discipline finds itself on the brink of a new era. After many years of being considered an exotic niche by capital markets and investment professionals, it has now gone mainstream. The idea of taking environmental, social and governance (ESG) factors into account in investment decision-making is today a widely accepted practice. The new-generation financial analyst no longer needs to be persuaded (for the most part) about the relevance of extra-financial factors. Indeed, they are not "extra" anymore; they are a natural part of what investment professionals look at when deciding which assets to invest in. It took the capital markets a long time, but it now appears self-evident that ESG integration is creating value.

It is encouraging to see that we have reached this point after so many years, especially for those of us who have been supporting the movement from its early days. The triumph, however, also comes with an enormous challenge. With the new and growing significance of ESG information, be it in valuation models, portfolio construction or corporate engagement, the demand for ESG signals that truly make a difference has increased (and will continue to increase). Investors want to know why, how and when ESG factors will have an impact on the returns and risks of their portfolios.

ESG ratings – A truly amazing development over the last 20 years

Similar to the RI discipline and the industry as a whole, ESG ratings have also gone through a remarkable long-term learning process. Their historical development is truly amazing. More than 20 years ago it started with very simple systems of indicators that were mostly driven by companies' self-reported information, which was very limited in depth, breadth and quality.

Today the situation has completely changed. There is no shortage of data anymore, although data quality and how ESG information is reported by companies remain important issues. In general, one can say that investors today face an abundance of ESG information. The main question is what can be done with this "big data" to arrive at better investment decisions. Clearly, those who provide the underlying analysis and generate the signals that are used as inputs in valuation models or in structured investment approaches are expected to respond to the changes and provide answers that work and add value in practice.

Enormous challenge for the research team

With the new ESG Risk Ratings, we are delivering on this expectation. It has been a long journey to get where we are today. The development of our new rating took three intensive years. At times, it drove those of us directly involved, as well as many others from across our organization, out of our comfort zone. The investment we made was high, and it still is. And this is not only because a lot of time went into the conceptualization, testing and validation, and implementation of the methodology as such.

It is also because a change of this scope brings a need for our analyst teams to adopt the new thinking and philosophy that lie behind the algorithm that generates our new rating.

Investing in capacity building

In the end, it is not a set of equations that alone determines the quality of the rating. The rating can only be as good as the analysis our sector experts provide and the judgement calls they make. Form and content need to come together. And this is why we have massively invested in capacity building and engaged in consultation with our analyst teams during the development of the new approach.

Moving into a new phase in the evolution of corporate ESG ratings

With the release of Sustainalytics' ESG Risk Ratings, we have moved into a new phase in the evolution of corporate ESG ratings. The rating is built on key features including financial materiality, granularity and comparability, and we foresee numerous applications for our clients in the context of investment decision-making. Based on our early testing, which yielded 41 strategies with statistically significant alpha up to 13.2% per annum, we are confident that the ESG Risk Ratings can provide signals to investors that will allow them to structurally improve the risk and return profiles of their portfolios.

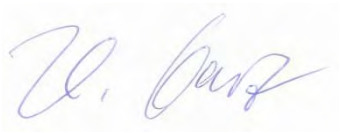
Through the publication of our three-part series of reports on Sustainalytics' ESG Risk Ratings, we deliver on our promise to provide as much transparency as possible for our clients and other stakeholders. In this volume – Volume 1 – we introduce the rating from different perspectives, focusing on why we developed the new rating, how it works, and providing an empirical analysis of our ESG Risk Ratings coverage universe. Volume 2 takes a deeper dive into a case study, looking at a specific subindustry and company, while Volume 3 explores the rating's multi-faceted use cases.

Acknowledgements

I'd like to thank all of those (and there many) who contributed to the product's development and implementation, including colleagues in the client facing teams, in the sector research teams, and in marketing. I'd like to also thank Bob Mann for his guidance, and my team (Clark Barr, Juliette Goulet, Sophia Burress) and in particular my co-lead of the project, Claudia Volk, for all their hard and excellent work, which were needed to bring this project to life. I also don't want to forget former team members, in particular Thomas Hassl, Madere Olivar and Annalisa Werner, who contributed significantly to the final success of the undertaking. Finally, I'd like to thank the Thematic Research team at Sustainalytics for helping to put this comprehensive research report together and for taking on writing the introductory chapter.

I hope you will enjoy reading this report.

Sincerely,



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Executive Summary

Sustainalytics' ESG Risk Ratings

Forward-looking and materiality-focused nature

In the run-up to this year's PRI in Person conference in San Francisco, Sustainalytics launched its new ESG Risk Ratings, the firm's next generation ESG Research and Ratings product. The ratings are designed to help equity and fixed-income investors identify and understand financially material ESG-related risks within their investment portfolios and assess how these risks might affect long-term investment performance. Supported by a robust materiality framework, our new methodology yields a measure of unmanaged ESG risk and distinguishes five levels of risk. With its forward-looking and materiality-focused nature, it has been built to be integrated into valuation models and investment decision-making processes. Some of its key features, such as the cross-sectoral comparability of outcomes and the company-specific exposure context, make us believe that it constitutes a big move up the innovation curve.

Volume 1 of the white paper series

This report is the first in a three-part series of white papers that aim to help our clients understand and fully leverage the opportunities provided by our new rating approach. This report offers an overview of the context and the drivers that guided us in the rating's development process, details the philosophy and methodology of the ESG Risk Ratings, presents an empirical analysis of our research universe and assesses the ESG Risk Ratings' ability to add value in terms of portfolio risk and return.

10 Key Takeaways

- Our new rating measures and adds up the unmanaged risks of a company vis-à-vis a set of ESG issues that are considered financially material. A comprehensive Corporate Governance analysis has been fully integrated into the rating.
- It introduces a second dimension into the rating equation besides management: exposure. Exposure is evaluated at the subindustry level, enhancing the granularity of the rating compared to other systems, and adjusted at the individual company level to take the specific context into account. Ratings are comparable across industry boundaries.
- The rating distinguishes manageable from unmanageable risks, making the rating outcome much more realistic and meaningful from a materiality perspective.
- Controversies play a significant role in the new rating, making it more responsive to new information between disclosure-driven rating updates. The rating is able to take unexpected developments into account in a rigorous manner.
- The new rating distinguishes five levels of risk (frequency distribution of companies across categories in brackets): negligible (1%), low (26%), medium (40%), high (23%) and severe (10%).

- The six most frequently selected material ESG issues (MEIs) across all subindustries are (number of subindustries in brackets): Human Capital (126 out of 138), Business Ethics (113), Product Governance (94), Carbon – Own Operations (79), Occupational Health and Safety (61), and Data Privacy and Security (54).
- Across all companies in our universe, on average 64% of the overall exposure to MEIs is unmanaged. Out of this portion, seven percentage points are considered unmanageable.
- We tested 96 long-only portfolio investment strategies based on the outcomes of our new rating over the period from January 2010/11 to June 2018. Eighty-seven of these strategies yielded an alpha with the expected (i.e. positive) sign, of which 41 were statistically significant.
- The abnormal returns of the three best performing strategies for each of the three major regions (Europe, North America and Asia-Pacific) vary between 4.1% and 13.2% per annum. All nine of them proved to be statistically significant, four of them at the 1% level.
- The most attractive combination of a high average alpha (6.2% p.a.) and a high degree of confidence (statistically significant in 92% of all cases) has been delivered by the 12 Human Capital-based investment strategies that we tested.

A New Era of ESG Ratings

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Sustainalytics is pleased to announce the launch of its new flagship ratings product, the ESG Risk Ratings. These ratings are designed to help investors identify and understand financially material ESG risks within their investment portfolios and how they might affect long-term investment performance.

In a preview note,[1] we briefly touched upon some of the key features of the product and summarized many of the underlying concepts, including exposure, unmanaged risk and ESG issue betas. We also showed how the ESG Risk Ratings fit into the broader evolution of ESG ratings and discussed some results from our quantitative testing of the ratings in the context of portfolio performance and abnormal returns.

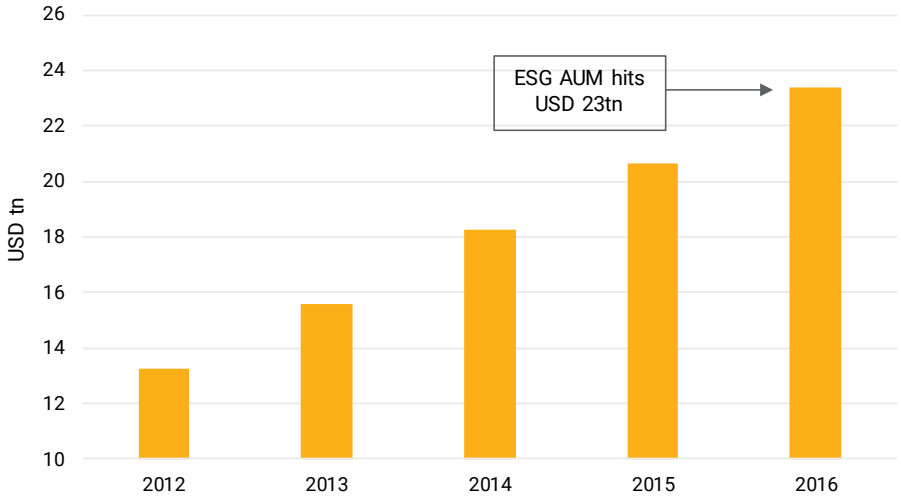
With this more comprehensive white paper, the first in a three-part series, we aim to provide a deeper, more complete explanation of the methodology behind the ESG Risk Ratings. And we deliver a fuller assessment of our portfolio testing, the results of which give us confidence that the ESG Risk Ratings can help investors structurally improve the risk and return profiles of their portfolios. Before turning to these discussions, however, we first provide a brief history of the RI discipline and review the factors that motivated the creation of the ESG Risk Ratings.

Responsible investment goes mainstream

Managed assets that incorporate ESG up 76%

To appreciate the contribution of the ESG Risk Ratings it is important to first understand the history of the RI industry and, relatedly, the evolution of ratings products. In many ways, the proliferation of RI among asset owners, managers and other market participants represents one of the most fundamental changes to have occurred in the global investment industry over the past 20 years.

Figure 1.1: Global ESG assets under management



Source: GSIA[2]

While far from universally practiced, RI has become a mainstream concern across the financial markets. Based on data collected by the Global Sustainable Investment Alliance, the value of global assets under management (AUM) that integrate ESG criteria reached USD 23tn in 2016, up 76% from 2012, as shown in Figure 1.1.[3] It is estimated that ESG investments currently account for 27% of all professionally managed assets worldwide, up from 20% in 2012.[4]

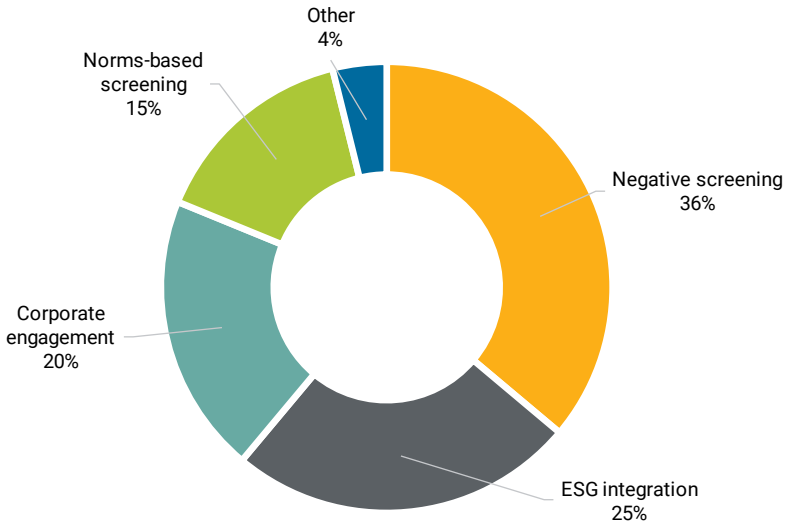
Negative screening accounts for 36% of total ESG AUM

Investors are using a multiplicity of approaches to integrate ESG information into their investment process. As shown in Figure 1.2, prominent techniques include negative screening, which accounts for approximately one-third (36%) of total ESG AUM, followed by conventional ESG integration (25%), corporate engagement (20%), norms-based screening (15%) and other techniques (4%).[5]

Varying degrees of sophistication

The sophistication of investor practices within each of these approach types varies widely: some ESG integration strategies are more advanced than others. But leaving these distinctions aside, the GSIA data conclusively demonstrate the mainstreaming of RI and the main integration approaches investors are employing.

Figure 1.2: Approaches to incorporating ESG



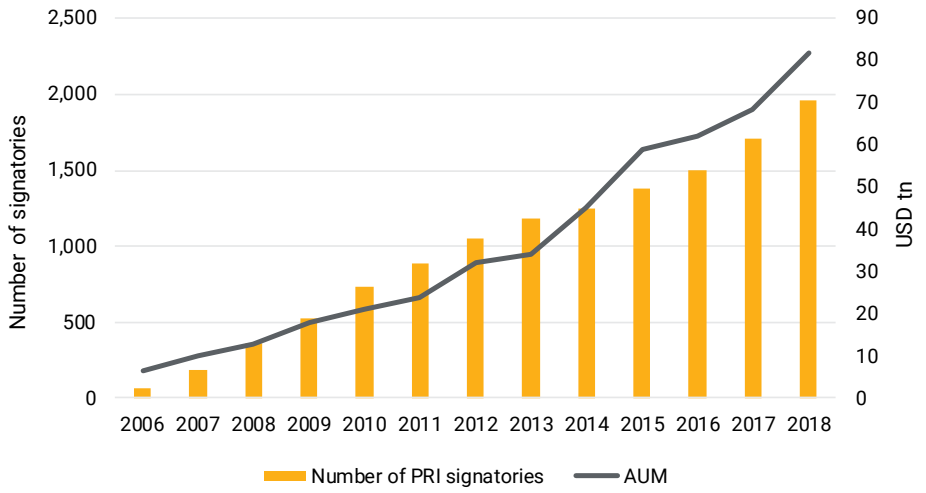
Source: GSIA, Sustainalytics

UN PRI – a watershed development

The PRI has attracted over 1,900 signatories

The uptake of RI is also evident in the growth experience of the United Nations-supported Principles for Responsible Investment (PRI). The notion of responsible investing may have first gained momentum in the late 1990s, but the modern era was ushered in by the formation of the PRI in 2005. The PRI was a watershed development in the RI industry: it introduced a core set of actions that investors could take to incorporate ESG factors into their investment process,[6] and established a framework for investor reporting on ESG issues.[7] As shown in Figure 1.3, the PRI today boasts more than 1,900 signatories with collective AUM of USD 82tn, up from 63 signatories with AUM of USD 7tn in 2006.[8]

Figure 1.3: Growth in PRI signatories



Source: PRI[9]

The PRI will begin delisting signatories

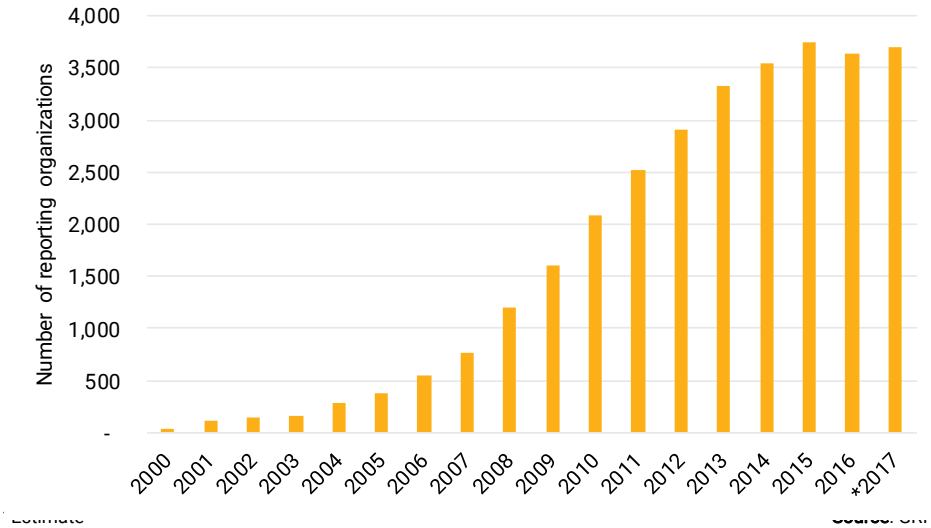
Responding to criticisms that it has become a "paper tiger," the PRI recently signalled that it will begin delisting signatories that do not make sufficient progress in implementing the PRI principles.[10]

Trends in corporate reporting

Approximately 3,700 reports were published through the GRI in 2017

A third signpost of the mainstreaming of RI is the increase in both the amount and quality of corporate ESG information, which includes measures such as carbon emissions, water use, and health and safety data. As shown in Figure 1.4, the number of organizations publishing sustainability reports through the Global Reporting Initiative (GRI), the world's most widely used sustainability reporting framework, increased from 43 in 2000 to 3,700 in 2017.[11] Over 80% of the world's large corporations currently provide ESG information to the market through the GRI.[12]

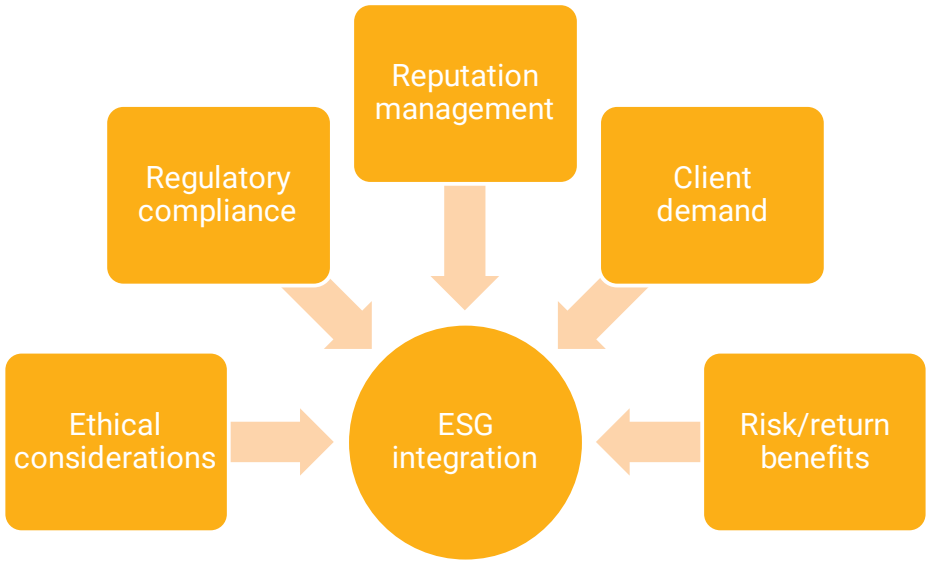
Figure 1.4: Organizations reporting according to GRI standards



Corporate ESG disclosures have improved significantly over time

It is less easy to document the improvement in ESG data quality, but consensus opinion is that corporate ESG disclosures, while far from perfectly standardized, have improved significantly over time. This is partly the result of greater investor pressure, the work of pioneering standard-setters such as the Global Reporting Initiative (1997) and Carbon Disclosure Project (2002), and the influence of more recent initiatives, including the Task Force on Climate-related Financial Disclosures (2015), and the Sustainability Accounting Standard Board (2011). An additional consideration is the rising number of ESG reporting requirements set by governments and regulators, which have increased from 57 in 1990 to 1,009 today.[14]

Figure 1.5: Key drivers of ESG integration



Source: Sustainalytics

RI growth drivers

Five categories

Why are more and more investors ploughing more and more of their assets into RI strategies? Investors have many unique reasons, but we believe the rationale can be organized into five broad categories: ethical considerations, regulatory compliance, reputation management, client demand and risk/return benefits, as shown in Figure 1.5.

Risk/return benefits take centre stage

ESG and financial performance

If ESG integration owes its past to ethical considerations and regulatory compliance, its future is likely to be increasingly driven by the perceived risk/return benefits. This is not to say that ethical considerations or regulation are unimportant – we expect many investors to continue to be drawn to ESG integration for these reasons. Rather, many of the barriers that once prevented fiduciary investors from considering ESG are being brought down by new evidence about the outperformance potential of ESG research and analysis.

Over 90% of sampled studies found a non-negative relationship

Indeed, recent years have seen a spike in the number of academic and practitioner studies that demonstrate a positive (or at least non-negative) relationship between corporate ESG performance and financial return. Two seminal works in the field illustrate this point. First, a 2015 meta-study that aggregated evidence from more than 2,000 empirical studies found that over 90% demonstrated a non-negative relationship between corporate ESG performance and financial returns.[15]

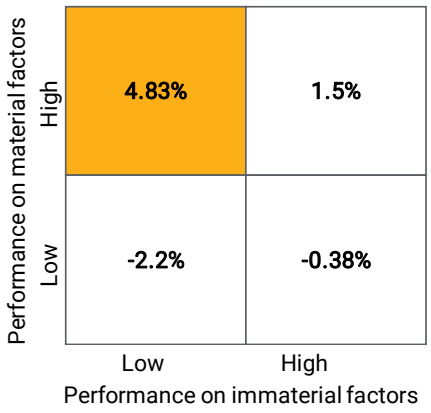
Distinction between material and immaterial ESG issues

The second study, published in 2016 by researchers at Harvard University, raised the bar by (i) distinguishing between material and immaterial ESG factors for industries, and (ii) using risk-adjusted stock returns as a dependent financial variable. Assessing two decades of historical data on more than 2,000 companies, the study found that firms with superior performance on material ESG issues for their respective industry offered higher risk-adjusted stock returns than industry peers with poor performance on the same issues. This idea is powerful – that sustainability may also be linked to greater long-term business value, if management is focused on issues that truly matter to a business.

Annualized alpha of 4.83%

The results of the Harvard study are summarized in Figure 1.6. Firms with high performance on material ESG factors and low performance on immaterial ESG factors delivered 4.83% of annualized alpha.[16] This compares to -2.2% for firms with low performance on both material and immaterial ESG factors, and -0.38% for firms with low performance on material ESG factors and high performance on immaterial factors.

Figure 1.6: Stock returns (in annualized alpha) by type of sustainability performance



Source: Sustainalytics, Khan et al. 2016

At a minimum ESG does not hurt returns

The financial effect of ESG integration remains a contentious issue – not all investors are convinced. But consensus opinion today is that considering ESG factors in security selection and other portfolio activities at a minimum does not hurt performance but may in fact improve risk-adjusted returns.

Moving up the ESG ratings innovation curve

Expectations for ESG ratings have evolved

The transformational change that has characterized the RI market over the past 20 years also extends to company ESG ratings, which play an essential role in many investors' integration strategies. Indeed, given soaring investor interest in ESG research, more and better corporate ESG data, and continued evidence about the out-performance potential of ESG analysis, it is no surprise that client expectations for company ESG ratings have risen over time.

No differentiation between sector-specific issues in Rating 1.0

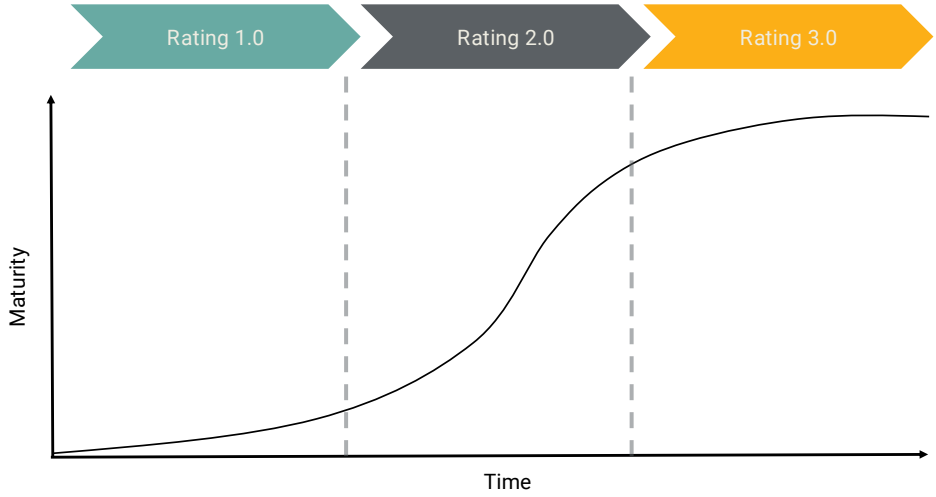
The evolution of ESG ratings can be described as an S-curve that has passed through three distinct stages, as shown in Figure 1.7. We refer to the first stage of this evolution as Rating 1.0. During this initial phase, data service providers typically rated companies with little if any differentiation between sector-specific issues. Nor did they apply weighting schemes to account for material differences in how ESG issues would affect the financial performance of companies in different industries. The primary focus of Rating 1.0 was on attaining and interpreting company disclosures.

Hallmarks of Rating 2.0

As investor demand for financially relevant ESG information increased and company disclosures became more detailed and prevalent, ESG rating providers faced a steep learning curve. During this second phase, which we refer to as Rating 2.0, the ESG ratings industry became highly professionalized and the quality and quantity of ESG research and analysis gradually improved. Academics and industry analysts started investigating whether ESG and financial performance were correlated. As evidence of the links between strong corporate ESG management and financial returns began to accumulate, investors put more resources towards developing novel ways of integrating ESG data into company valuations, engagements and other decision-making

processes. ESG rating firms responded to the mounting investor interest and applications of ESG data by designing new metrics to evaluate and quantify sustainable governance practices and differentiate company assessments based on the materiality of sector-specific topics.

Figure 1.7: The learning curve of ESG ratings



Source: Sustainalytics

Fully integrated ESG analysis

With the launch of the ESG Risk Ratings, we have now entered the third phase of this transformation – Rating 3.0. At this stage of the ESG innovation curve, we have shifted from an approach that assessed companies based on a broad range of stakeholder concerns to one that takes a narrower focus on the financial materiality of each ESG issue for each company in our coverage universe. Whereas Rating 2.0 provided insights about individual ESG criteria, Rating 3.0 complements these insights with a fully integrated ESG analysis of companies' corporate governance capabilities.

Weighting ESG scores to reflect company-specific circumstances

Although Rating 2.0 introduced sector-specific weightings to assess the ESG profiles of companies in different industries, Rating 3.0 goes a step further by weighting overall ESG scores to reflect the relevance of each ESG issue to the unique context of each company in our universe. And whereas Rating 2.0 applied a static weighting matrix, Rating 3.0 uses a dynamic weighting matrix; as a company's exposure to an ESG risk changes over time, so too does the weight assigned to the corresponding issue.

Assessing ESG risks across industries

One of the most distinctive features of the ESG Risk Ratings is the way they synthesize data points about companies' exposure to and management of different kinds of ESG risks. While other rating approaches are one-dimensional, focusing on ESG management regardless of the unique context of an individual company's exposure, the ESG Risk Ratings are two-dimensional, assessing both management and exposure considerations. Combining information about each company's ESG risk exposure and management allows us to compare the ESG profiles of companies across all sectors of the economy using a single metric.

A platform to develop customized ESG solutions

This advanced methodology assesses companies' absolute ESG risk and, hence, allows cross-sectoral comparisons, without limiting its usability in best-in-class analyses. It provides deep insights about multiple exposure factors, including a company's business model, financial strength, geography and incident history. It fully integrates a comprehensive corporate governance analysis and comprises a mechanism that allows us to take unexpected events meaningfully into account. As we discuss in the chapters that follow, the transparency of the ESG Risk Ratings methodology and the multiple levels of data and insights it contains offer our clients the opportunity to develop a large suite of customized ESG solutions.

How do we expect clients to use the ESG Risk Ratings?

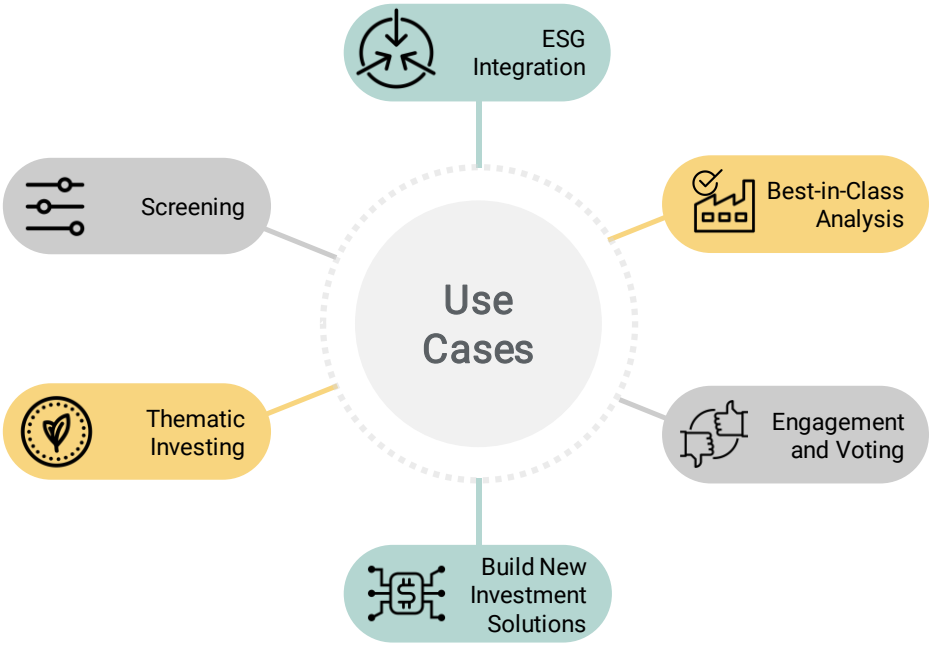
Multiple use cases for the ESG Risk Ratings

We expect that clients will use the ESG Risk Ratings in multiple ways, as shown in Figure 1.8. Clients who are interested in gauging portfolio risk can use the rating to compare risks for one sector, industry group or subindustry to another. For example, clients could decide whether pharmaceuticals appear to be riskier from an ESG perspective than chemicals, or vice versa.

Gauging the ESG performance of subindustry peers

We also expect that clients will use the rating to gauge the relative ESG performance of companies within a subindustry, comparing Exxon to Chevron, for example, in terms of how effectively these companies manage ESG risk. Some clients may also focus on momentum, considering changes in risk assessments over time and how they may affect share prices.

Figure 1.8: Use cases for our new ESG Risk Ratings



Source: Sustainalytics

Taking a thematic approach

In addition, we expect that clients will use the rating thematically, comparing unmanaged risks on Human Capital or Emissions, Effluents and Waste, for example, across a wide array of companies. The rating is specifically designed to allow multiple use cases, which offers clients more flexibility in their ESG integration approaches.[17]

Outline of this series of reports

This white paper is the first of a three-volume series

The remainder of Volume 1 details the philosophy and methodology of the ESG Risk Ratings system (Chapter 2) and assesses the risk ratings' ability to add value in structured investment processes in terms of portfolio risk and return (Chapter 3). Specifically, we present the results of an empirical analysis we performed to test the degree to which our new risk ratings are able to generate value in structured investment processes. We focus on the capability of low ESG risk portfolios to generate alpha in three regions – Europe, North America and the Asia-Pacific – over an eight-year period (2010-2018).

In Volume 2 (forthcoming), we present a case study that illustrates the ESG Risk Ratings' evaluation of an individual subindustry and company. We discuss why and how key ESG issues have been classified as material, go into the details of the assessment for an individual company, and take a look at ratings outcomes and their characteristics.

In Volume 3 (forthcoming), we showcase some of the ways in which the ESG Risk Ratings can be applied in investment decision-making processes. We explore a range of applications, including security selection, portfolio weighting, industry tilts, screening, engagement and voting.

Methodology and Results

Introduction and outline

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In the first chapter of this report, we described the background context in which the ESG Risk Ratings were developed. We showed how the landscape of responsible investing has changed over the last two decades, and how this evolution in turn shaped the requirements for ESG integration and rating approaches. We summarized the transformation of ESG ratings and argued that the launch of the ESG Risk Ratings marks a new stage of innovation, ESG Ratings 3.0.

In this chapter, we present the main features of our new rating methodology in detail. We also take a look at some of the key results, including the distribution of ESG exposure and management scores, which form the two dimensions of the rating, and final unmanaged risk scores. We conclude this chapter by analysing rating outcomes by company size (market cap), region, industry and MEI.

Summary of key features

The ESG Risk Ratings …

- Focus on financial materiality and risk and, hence, are selective with regard to the ESG issues that pertain to a given company;
- Are granular, in the sense that they evaluate a company's material ESG risks by taking the industry and company-specific context into account;
- Explicitly distinguish between two dimensions: exposure and management;
- Fully integrate a Corporate Governance assessment as a baseline assessment in the rating;
- Incorporate an events-driven evaluation of a company's track record that has a meaningful impact on the overall rating and helps to dynamically reflect gaps in reporting;
- And, perhaps most importantly, allow for a cross-sectoral comparison of companies without compromising best-in-class applications.

Driven by market and client feedback

Our analysis of the market and the feedback we received from our clients guided us in the development of our new ESG Risk Ratings, which turned out to be an immense undertaking, not only conceptually and technologically, but also in terms of content and mindset.

The ESG Risk Ratings continue to start with a rigorous impact analysis

Even though our new rating approach is based on financial materiality considerations, our analysis starts with a rigorous analysis of ESG impact from a multi-stakeholder perspective. With the ESG Risk Ratings we add a second layer of analysis. This has been built to help investors make better informed investment decisions and, in turn, to let the capital markets play their pivotal role in transitioning to a more sustainable economy.

Use cases of our new rating

Our new ESG Risk Ratings can be used by investors in multiple ways. They allow for a much better integration of ESG risk-related information into fundamental company analyses and security selection processes. With their risk focus, the ratings speak to the needs of equity and fixed-income investors alike. Investors focused on ESG impact will find value in our assessment of the financial materiality of ESG issues for their company engagement processes. And, last but not least, screening-oriented investors in particular will appreciate the cross-sectoral comparability of rating outcomes.

Creating a single "currency" of risk

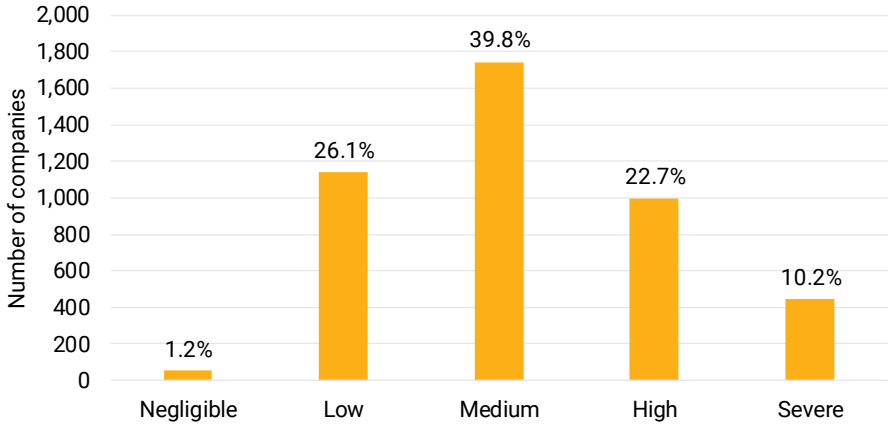
Five risk categories

Our new ESG Risk Ratings measure and add up the unmanaged risks of a company vis-à-vis a set of ESG issues that are considered financially material. The ratings sort companies into five risk categories: negligible, low, medium, high, severe. Figure 2.1 displays the distribution of companies within the ratings universe across these categories based on July 2018 data.

Comparing companies across industries with a single ESG risk metric

With the ESG Risk Ratings, we have created a single "currency" of ESG risk. These risk categories are absolute, meaning that a high-risk assessment reflects a comparable degree of ESG risk across the research universe, regardless of whether it refers to an agricultural company, a utility or any other type of company. One point of risk is equivalent across industries, no matter which company or which issue it applies to. Points of risk add up across issues to create overall scores.

Figure 2.1: Coverage universe by ESG risk categories*



*As of July 2018

Source: Sustainalytics

10% of companies find themselves in the "severe" risk bucket

Our analysis is based on a universe of 4,375 covered issuers, spanning 42 industry groups and 138 subindustries.[18] As shown in Figure 2.1, the distribution resembles a bell curve, albeit with some deviations. The fact that only 1% of companies are in the negligible risk category is consistent with our understanding that it is rather exceptional for companies today to face negligible exposure to financially material ESG risks. On the other hand, it is still a reality that, despite their significance from a multi-stakeholder sustainability perspective, not all of the ESG issues that companies are exposed to lead to

financially material impacts. The 10% of companies that find themselves in the severe bucket, which span multiple subindustries and regions of the global economy, are the ones that we consider to be facing the highest level of material ESG risk.

Defining materiality and risk

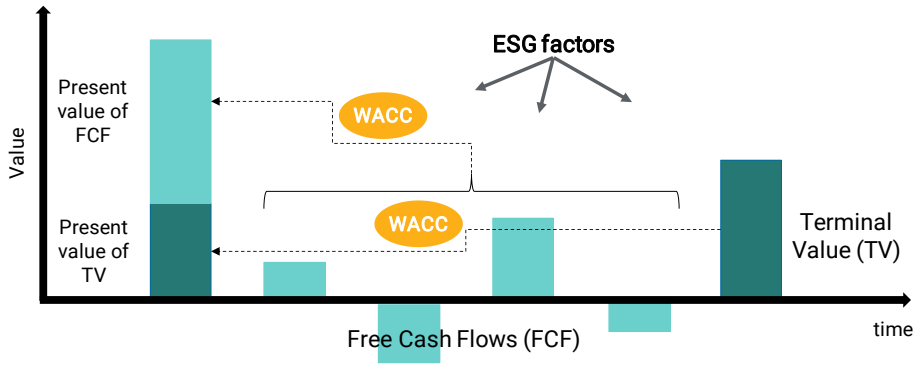
Economic vs. accounting-rules based interpretations of materiality

To be considered material in the ESG Risk Ratings, an ESG issue must have the potential to have a significant impact on the financial value of a company and, hence, the financial risk and return profile of an investment in the company. It is important to distinguish the ESG Risk Ratings' use of materiality as a concept from narrower legal or accounting-focused definitions. More formally, an ESG issue is considered material within the ESG Risk Ratings' framework *if its presence or absence in financial reporting is likely to influence the decisions made by a reasonable investor.*

Superior ESG management is likely to drive enterprise value

The underlying premise of the ESG Risk Ratings is that, with the world transitioning to a more sustainable economy, superior management of ESG risks is likely to help drive superior long-term enterprise value. However, we regard some issues as material from an ESG perspective, even if the financial consequences are not fully measurable today. And not every issue that we consider as material in the rating is legally required to be disclosed in company reporting, i.e. meets the accounting-driven definitions and requirements regarding materiality. Assessments of materiality within the ESG Risk Ratings are in part qualitative and require expert judgement, which is provided by our experienced sector research teams through a structured consultation process.

Figure 2.2: ESG factors and their impact on Discounted Cash Flows



Source: Sustainalytics

Economic materiality requires a significant influence on the drivers of a discounted cash flow model

As depicted in Figure 2.2, for any factor to be considered material, it is required to be of sufficient relevance from an ESG-impact perspective[19] and have a significant influence on the drivers of a discounted cash flow (DCF) model. This means any ESG factor has to enter the equation either via the impact it has on a company's ability to generate future free cash flows (FCF) or via the impact it has on a company's systematic risk and, hence, on its appropriate weighted average cost of capital (WACC) that is used to discount its future free cash flows and terminal value (TV).

Effects on future free cash flow and terminal value

Only if the presence or absence of an ESG factor noticeably changes the present value of expected future FCF and terminal value is it considered material from a financial perspective. This is the corollary to the more accounting-driven definition above. And it is the general philosophy behind our analysts' judgement calls, which, in the end, fill our model with content and life.

The two dimensions of the ESG Risk Ratings

Dimension one – exposure

Adding a new dimension: exposure

The ESG Risk Ratings' emphasis on materiality required the addition of a new dimension to our ratings – ESG risk exposure – which reflects the extent to which a company is exposed to material ESG risks and affects the overall risk score for a company as well as its risk score for each MEI.

Exposure assesses *potential* financial risk

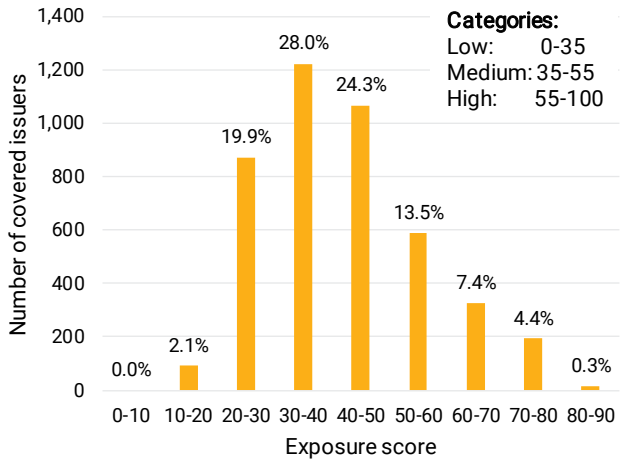
Exposure can be considered as a set of ESG-related risk factors that pose *potential* financial risks for companies. Another way to think of exposure is as a company's sensitivity or vulnerability to ESG risks. Negligible exposure suggests that the issue is of little material importance to a company; higher exposure suggests that the issue is material.

Exposure determines the weight an issue receives in the rating

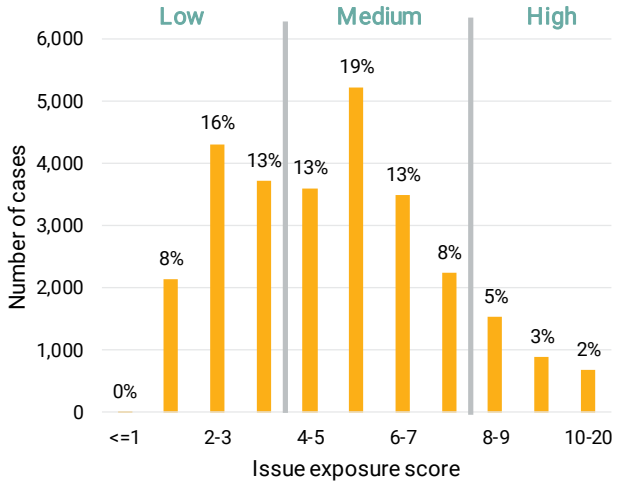
Exposure helps to determine the weight we assign to MEIs; this weight signals how much the issue contributes to a company's overall management score as well as its overall ESG Risk Ratings score. An issue with higher exposure will have a higher weight and an issue with a lower exposure will have a lower weight in a company's overall rating.

Figure 2.3: Distribution of exposure scores

a) Overall exposure



b) Issue exposure



*As of July 2018

Source: Sustainalytics

17% of companies are placed in the high exposure bucket

Figure 2.3a shows the distribution of overall exposure scores across our current coverage universe. As expected, the distribution of the overall exposure scores resembles a normal distribution (central limit theorem), albeit with a skew to the right. With 1,223 covered issuers (28% of overall), the range of exposure scores between 30 and 40 is most heavily populated. Figure 2.3b speaks to issue-level scores, looked at across all issues. Issue-level scores are summed to calculate overall exposure scores.

The assessment of a company's exposure is done in three steps:

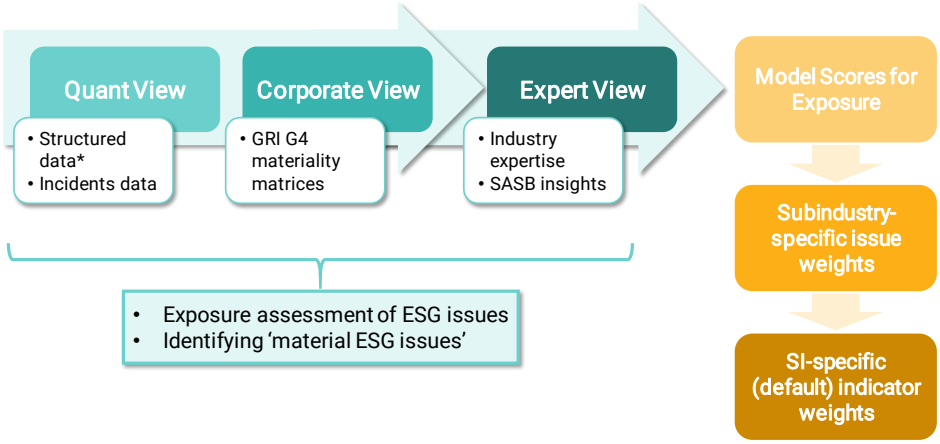
- Step 1: Subindustry Exposure Assessment
- Step 2: Beta Assessment
- Step 3: Calculation of the final exposure score.

Determining exposure – Step 1: Subindustry Exposure Assessment

A Subindustry Exposure Assessment is a structured, data-driven process

In step one, we determine the exposure of companies that operate in a given subindustry (as characterized by roughly similar products and business models) vis-à-vis a set of potentially relevant ESG issues (Subindustry Exposure Assessment). To determine exposure at the subindustry level, we went through a comprehensive, structured consultation process with our sector experts (see Figure 2.4). As a part of this process, we determined management indicators for each subindustry and each issue, and their respective (default weights).

Figure 2.4: How we arrived at exposure assessments at the subindustry level



*Other quantitative data: greenhouse gas emissions, water use, etc.

Source: Sustainalytics

Results will be reviewed on an annual basis

The input used for this process comprised companies' incidents/events track record, quantitative data from external sources, such as greenhouse gas (GHG) emissions or water consumption, materiality assessments as provided by companies, and third-party research, including regulatory news, Sustainability Account Standards Board (SASB) information and assessments from the United Nations-supported Principles for Responsible Investment (PRI). These data were provided to analysts on a common, comparable basis of calculation.

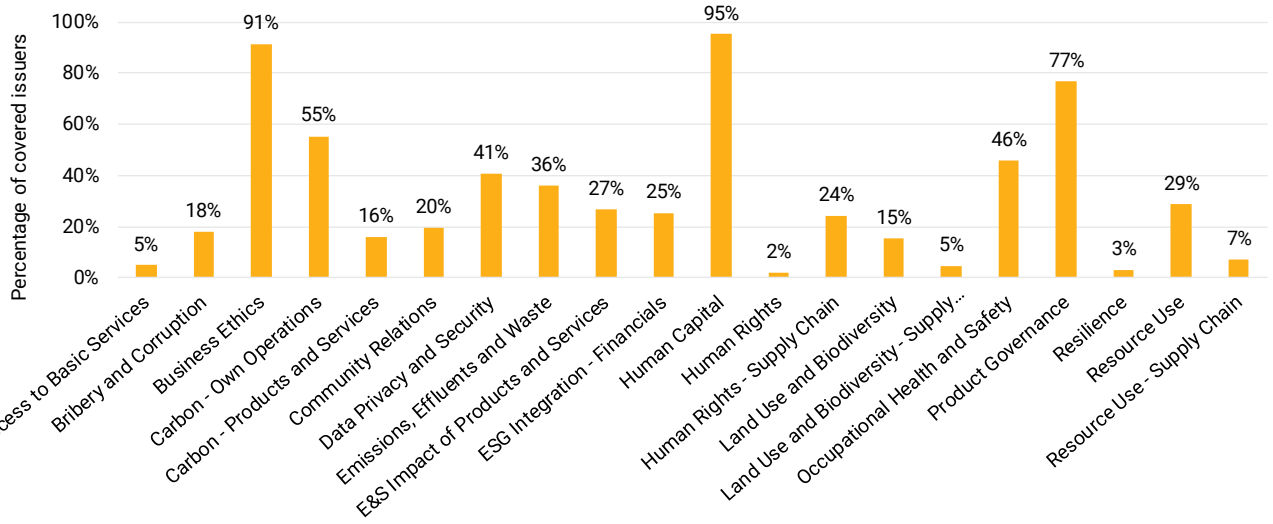
Analysts required to make a case

Based on this structured input data, our analysts make qualitative judgement calls regarding a subindustry's exposure to individual ESG issues. Analysts were asked to provide examples explaining why each issue was material to a given subindustry, which type of impacts a business might experience from the issue, which factors potentially affect exposure (risk drivers), whether the issue primarily affects revenues (top line) or costs (bottom line), and to describe the time horizon (when the issue is normally expected to materialize, in the near or longer term) and the probability of the expected impact. All data inputs and analysts' rationales have been recorded and documented. Going forward, we will review the results of this process annually to assure the up-to-datedness of our assessments.

Exposure scores range from 0 to 10, with the threshold for materiality at 2

The outcome of this process is the subindustry exposure score, which assesses a subindustry's average exposure to an MEI and ranges from 0 to 10, with 0 indicating no exposure and 10 indicating a high level of exposure. We can see in Figure 2.5 which issues have been most frequently selected as material and, hence, considered relevant in our unmanaged risk assessment at the company level. It turns out that Human Capital (material for 95% of companies), Business Ethics (91%) and Product Governance (77%) most commonly show up in the risk rating's equations at the individual company level.

Figure 2.5: Percentage of companies for which the ESG issues are considered material



*As of July 2018

Source: Sustainalytics

Assigning indicator weights for each MEI within each subindustry

During the consultation process, sector analysts also assigned a set of indicators and respective indicator weights for each MEI within each subindustry. This means that the issue Human Capital, for example, may have different indicator sets for software companies than for construction companies. It also means that the same indicator (e.g. Human Capital Development) may be weighted differently for different subindustries, depending on its overall importance as a signal for a specific subindustry and how many other indicators are available to assess the management of the respective issue.

Determining exposure – Step 2: Beta Assessment[20]

The assessment of a company's exposure is done in four steps

The second step in our exposure assessment is part of the regular company research update process executed by an individual sector analyst researching a company. With this second step we turn an assessment that is subindustry-specific into one that takes the particular context of an individual company into account. For example, everything else equal, it can make a big difference in which countries a company is operating (on the production or sales side, or in the context of the water scarcity issue, for instance).

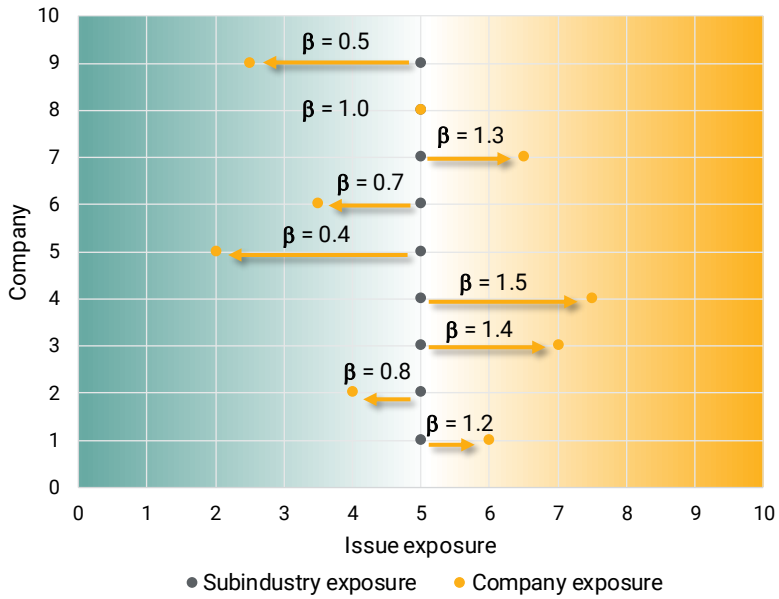
Making the exposure assessment company-specific

We do this by determining a simple multiplier (the beta) at the individual company level, reflecting company-specific deviations from the subindustry norm for all issues that have been identified to be material for that subindustry. Allocating a beta of zero means that an issue is not applicable or relevant for that company, even though it is for most of the company's peers. Technically, in a case like this, we refer to it as issue disabling. Indicators that are not applicable in a given company context are disabled as well. The original default weight of such an indicator is proportionately distributed across the remaining indicators assigned to the respective issue.

Improving the precision of the final rating outcome

Betas are a key conceptual ingredient of the ESG Risk Ratings. They provide an opportunity for analysts to use their expertise and business judgement to improve the precision of the final rating outcome. More technically, betas are multipliers with an average of one for each of the issues and each subindustry. They reflect how a company's exposure score (either for an issue or overall) deviates from its subindustry's exposure score. Deviations sum up to zero, as shown in Figure 2.6.

Figure 2.6: Using the beta concept in company exposure assessments



Source: Sustainalytics

Betas can range between 0 and 10

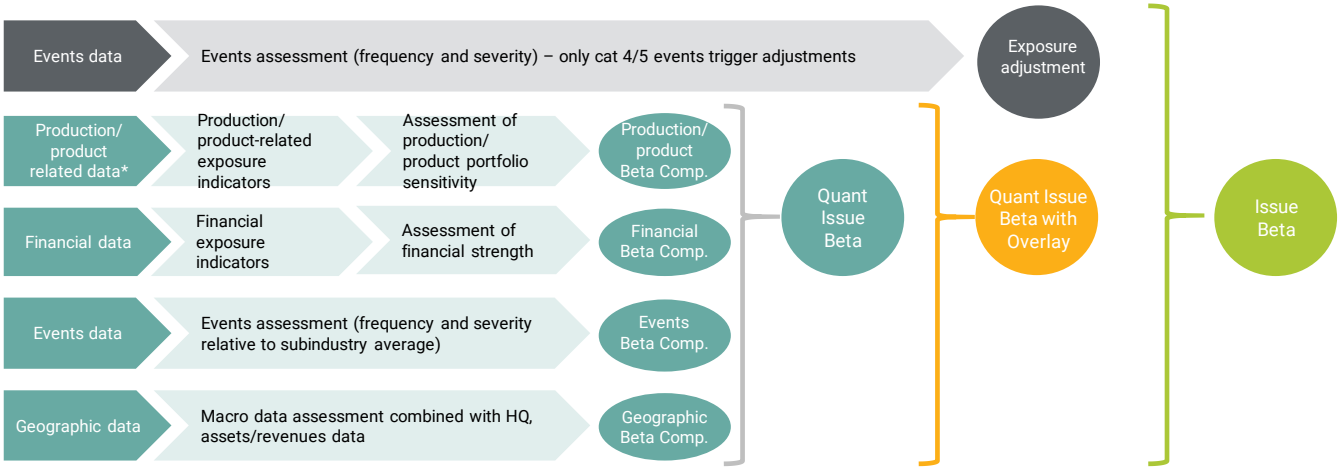
In the ESG Risk Ratings, betas can theoretically range between 0 and 10, with 0 indicating no exposure and 10 indicating an exposure that is significantly above (i.e. 10 times higher) than the subindustry average. A beta of 2, for example, would double an exposure score and would also double a company's unmanaged risk on the issue (ceteris paribus).

The beta for a company vis-à-vis an ESG issue is determined in a two-stage process

The final beta for a company vis-à-vis an ESG issue is determined in two steps. The so-called default beta is purely driven by quantitative factors and is calculated automatically, based on a quantitative model. Subsequently, a qualitative overlay may be applied to reflect factors not captured in the quantitative modelling (step two). Typically, default betas range between 0.5 and 1.5, to leave room for qualitative upward or downward adjustments. Qualitative overlays are usually done by our analysts when they update a company profile. They are guided by a comprehensive set of rules to ensure their consistent application across all companies.

Before the quantitative beta and the qualitative overlay is concatenated with the subindustry exposure score, a company-specific exposure adjustment is applied, as shown in Figure 2.7.

Figure 2.7: Determining the beta for a material ESG issue



Source: Sustainalytics

Exposure adjustment

Part of the process to determine the Issue Beta for a company

This extra layer of adjustment is put in place for Category 4 and 5 event assessments, reflecting and stressing the specific importance we attach to these cases in our assessment of a company's ESG risks.[29] By establishing this mechanism, our intention has been to refine and sharpen the adjustments we make when moving from the subindustry-specific interpretation of exposure to a company-specific one. In that sense, it becomes part of the process to determine the Issue Beta for a company, as shown in Figure 2.7.

The algorithm we apply is relatively simple: it boosts the subindustry-specific exposure score for a given company by +1 if an event has been assessed as Category 4 and requires a minimum score of 6 (for a Category 5 event assessment it is +2 and 8).

Acts as a non-linear, "extreme events" adjustment factor

By taking highly significant events into account, we acknowledge the company's increased vulnerability to an ESG issue that is due to the specific environment and context in which it is operating and that is not already reflected in the exposure of an average company in the respective subindustry. This extreme events adjustment factor comes on top of the more generic picture a company provides in the controversies' context, which is modelled by the quantitative beta already. In this sense, one could see it as a non-linear addendum factor.

Quantitative Betas

The default beta comprises up to four components

For each material issue a company faces, up to four beta components drive the calculation of the quantitative default beta. These four components comprise:

- **Product/Production Beta Component:** assesses production and/or product-related exposure differences between companies in the same subindustry;
- **Financial Beta Component:** assesses the relative financial strength of a company compared to its peers in the same subindustry. For example, a company in financial distress is less likely to survive the transition to a low-carbon economy than a company with significant financial cushion;
- **Events Beta Component:** assess relative exposure within a subindustry based on differences in events track records of companies;
- **Geographic Beta Component:** assesses exposure differences based on a company's geographic presence. The most frequently quoted example for this component is differences in water scarcity.

Components have typically been equally weighted

In most cases, beta components have been equally weighted to arrive at the final quantitative beta score, but in principle we do not fix the weights of the components and adjust them to reflect issue or subindustry specific requirements. The final quantitative beta is then calculated as the weighted average of the four individual components.

Learning over time

Quantitative betas will become more meaningful and precise over time, with the addition of new exposure indicators, for example. Furthermore, quantitative beta calculations are likely to benefit and learn from patterns that we see in the qualitative overlays applied by analysts (see below) over time. All quantitative betas are set under the constraint to average to one at the subindustry level.

Qualitative Overlays

A quantitative model cannot capture all factors that may be relevant

An (optional) qualitative overlay is either applied by individual analysts or centrally to arrive at the final beta for a company or a group of companies. Potential reasons for a qualitative overlay include, for example, situations in which a significant exposure factor is not reflected in the quantitative beta components (e.g. CAPEX data hinting towards investments in areas that will reduce exposure) or situations in which the quantitative beta component score is not yet reflecting recent developments (e.g. M&A activity).

Assuring consistency in our qualitative beta calls

For every MEI in each subindustry, we have developed principles that identify common factors that impact exposure. These principles are maintained by a Beta Committee that meets on a regular basis. The central instrument to assure consistency in the qualitative beta overlays applied by analysts across all sectors and all companies is a beta rule-book that is maintained and updated by the committee and used by analysts in their daily work flow.

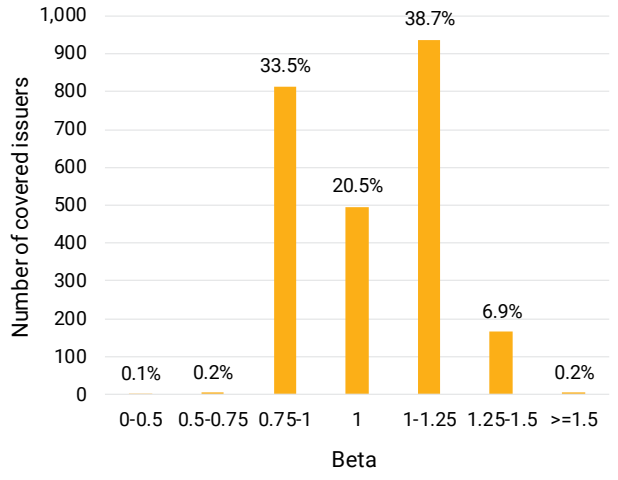
Distribution of Betas

Betas overwhelmingly cluster in a range between 0.75 and 1.25

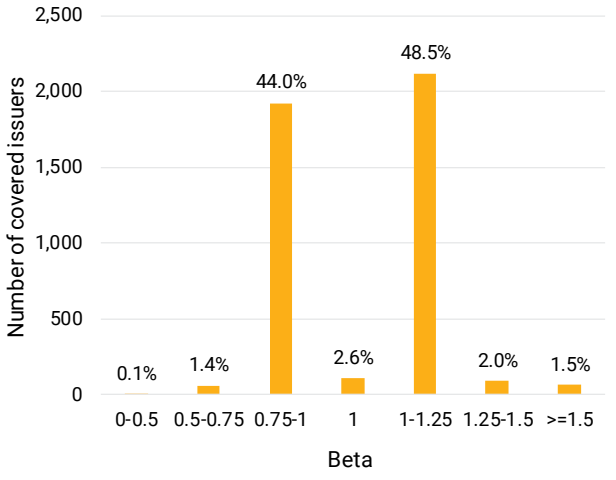
The charts in Figure 2.8 indicate that betas cluster in a range between 0.75 and 1.25, meaning that most companies do not differ significantly from the subindustry average. One reason for this is that most exposure differences between companies are attributable to differences in business models and that the very granular structure of our subindustry-based model already allows for a meaningful differentiation in this regard. Another reason is that we constructed our quantitative model in a cautious manner with the expectation that it probably will become more aggressive over time, based on learning effects.

Figure 2.8 Distribution of Betas

a) Issue level – Example: Carbon Own Operations



b) Overall level



*As of July 2018

Source: Sustainalytics

Determining exposure – Step 3: Arriving at the final exposure score

Multiplying subindustry exposure scores with company-specific betas

The third and final step in the calculation of a company's exposure vis-à-vis an MEI involves combining steps one and two. More specifically, the issue exposure score that has been determined at the subindustry level (step one) is multiplied with the company-specific issue beta (including the qualitative overlay) to arrive at the final exposure score for a company. For example, a subindustry exposure score of 8, which we can find for the Metals and Mining subindustry vis-à-vis the Carbon – Own Operations issue, is multiplied by a beta of 1.5 (which we allocated Rio Tinto, for example, in that subindustry), yielding a final company-specific exposure score of 12.

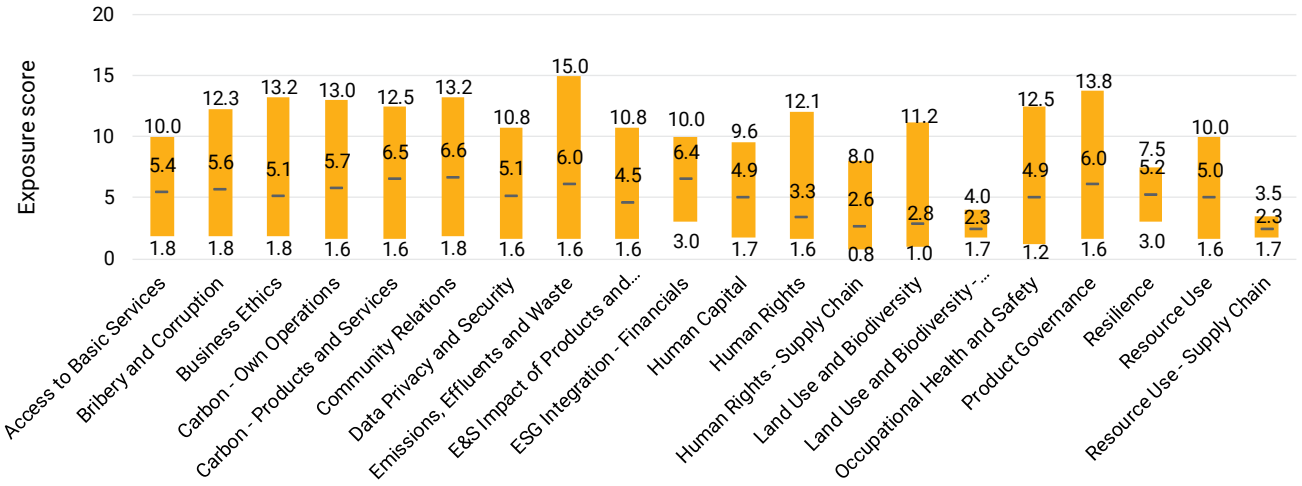
MEIs with the highest average exposure scores across all subindustries

Empirically, average exposure scores, as well the maxima and minima, can be very different depending on the issue. Figure 2.9 below shows that the MEIs with the highest average exposure scores across all subindustries are Community Relations, Carbon – Products and Services, and ESG Integration – Financials, all three with average scores of above six.

An MEI's business impacts partly depend on supply chain

Comparatively low average scores, on the other hand, can be found for Land Use and Biodiversity – Supply Chain, Resource Use – Supply Chain, and Human Rights – Supply Chain, with all three scoring just above two. The fact that these MEIs are at the lower end of the spectrum does not come as a surprise. The potential business impact of an ESG issue decreases the further down the supply chain a company moves, since companies can find more and better opportunities to protect their own cash flows from any negative ESG-related impacts that may occur.

Figure 2.9: Average, minimum and maximum Exposure Score per Material ESG Issue*



*As of July 2018

Source: Sustainalytics

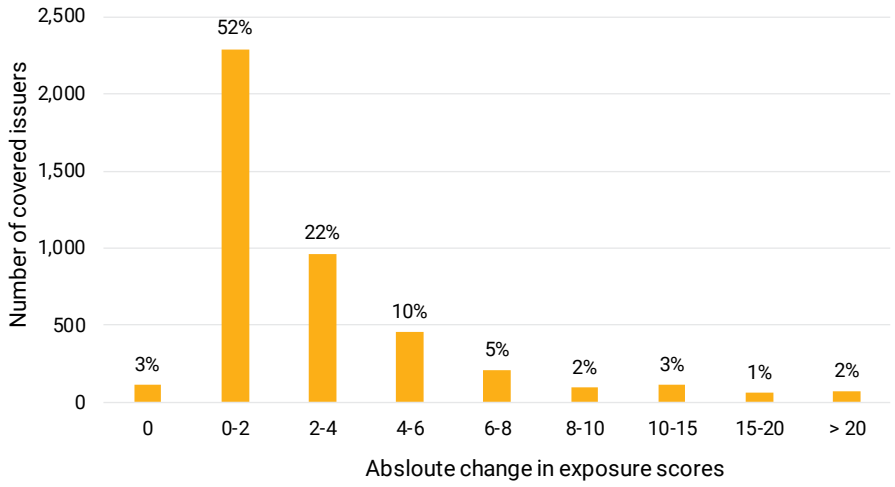
The variance of exposure scores for a given issue is also worth noting. The highest maximum score of around 15 can be found for the issue Emissions, Effluents and Waste, the lowest minimum scores of around one, can be found for Human Rights – Supply Chain, and Land Use and Biodiversity.

Quarterly system updates of beta assessments

Impact of betas on final exposure score assessments

In Figure 2.10, we show the impact of betas on the final exposure score assessments at the company level. At the moment, beta-driven exposure score adjustments cluster in the range between zero and four points (77% of all cases). We consider this to be relatively conservative and expect that adjustments will become more significant over time to reflect learning effects within our system. As of July 2018, the average absolute score change driven by betas is at 3.2 points. Any potential biases in qualitative overlays that, for example, could be driven by analysts' tendency to adjust betas within a subindustry predominantly in one direction, are ironed out with a recalibration exercise that we run through on a quarterly basis together with a regular update of our quantitative betas.

Figure 2.10: Beta impact on exposure scores – distribution of absolute changes in subindustry exposure scores driven by company specific betas*



*As of July 2018

Source: Sustainalytics

Dimension Two – Management

The assessment of the management dimension is based on a set of preparedness and outcome indicators

The ESG Risk Ratings' second dimension is Management. It comprises an assessment of a company's ability and success in managing its material ESG and Corporate Governance issues. Numerically, management scores at the issue level range from 0 to 100, with 0 indicating no (evidence of) management of the issue and 100 (very) strong management of the issue. For each material ESG issue that we determined at the subindustry level, we selected and weighted management indicators such that they collectively provided the best available signal for explaining and measuring how well an average company in a subindustry is managing the issue.

New preparedness indicators have been added to speak to material ESG issues

Our management assessment is based on two subsets of indicators. The first one relates to a company's preparedness to manage these issues via appropriate institutional structures, policies and programmes (preparedness indicators). In principle, the assessment of these indicators has not changed compared to how they have been traditionally used in our ESG ratings. Neither the design of the indicators has changed, nor the way in which they are scored

by our analysts. However, new indicators were added during the development of the new ESG Risk Ratings, mainly to enhance the ratings' ability to reflect subindustry-specific material ESG issues.[21]

The way we use event indicators has fundamentally changed

The second one measures the company's success in implementing its management systems, as reflected in quantitative outcomes (e.g. actual emissions reductions) and its involvement in controversies (event indicators). While we have not changed our approach to quantitative performance indicators, the way that we use and integrate event indicators in our new ESG Risk Ratings has changed significantly compared to our traditional ESG Ratings.

How events drive management scores in the ESG Risk Ratings

Events track record provides a signal for how well a company has implemented its management systems

Let's take a brief step back before we go into the methodological details. In general, we consider the events track record of a company as a signal for how well it has implemented the management systems that we evaluated with the help of our preparedness indicators. By structurally incorporating events in our management assessment of MEIs, we avoid a one-sided discussion on policies, programmes and management structures, and instead balance the conversation with real-world outcomes, as reflected in the events track record. It becomes problematic to claim, for example, that a company has a strong health and safety management system if it has experienced a significant event that resulted in multiple workplace fatalities.

The severity of an event is reflected only in the weight we attach to the respective indicator that enters the equation with a score of zero

The calculation of a management score for a given issue is simple: we add up the weighted scores of the individual indicators that have been selected for this issue. The special role of event indicators, however, becomes apparent only when looking at the simple algorithm that we use to determine their impact on the final management score outcome. As shown in Figure 2.11, the severity of an event is reflected only in the weight we attach to the respective indicator that enters the equation with a score of zero.

Figure 2.11: Impact of event category scores on issue management scores

	Event category					
	No event	Cat 1	Cat 2	Cat 3	Cat 4	Cat 5
Event indicator score	0	0	0	0	0	0
Event indicator weight*	0%	5%	10%	25%	50%	75%

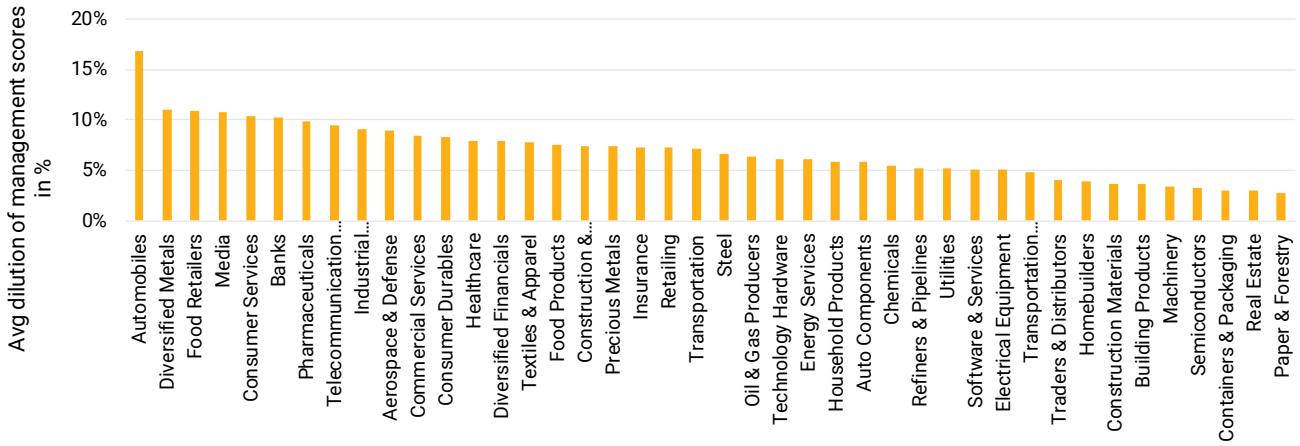
*In case of more than one event, the accumulated weight of event indicators is capped at 90%

Source: Sustainalytics

Diluting effect of event indicators

The event indicator score always equals zero, independent of the event category. The impact of events on the issue management score comes from the respective event indicator's diluting impact on the weights of all management indicators. You could say that the management performance reflected in the management indicator scores is discounted to reflect the fact that the system that the company has set up to manage an MEI is not working as well as expected (as evidenced by the event assessment). Empirically, the dilution effect that our events assessments have on the issue management scores of companies is significant, as Figure 2.12 shows.

Figure 2.12: Dilution effect of events on issue management scores across all companies*



*As of July 2018

Source: Sustainalytics

Not surprisingly, the average dilution effect at the industry group level is strongest for Automobiles

The average dilution effect at the industry group level is strongest for Automobiles, with management indicator scores discounted by around 17% on average, due to the events track record of companies in this industry. This is not surprising, given the emission scandals that have severely impacted auto companies since 2015, triggered by the Volkswagen scandal. Other highly impacted industry groups include Diversified Metals, Banks and Pharmaceuticals, which is also a result that matches a priori expectations. At the lower end, with average dilution effects of less than 5%, industry groups such as Semiconductors and Real Estate can be found. At the individual company level, the dilution effect is capped at a maximum of 90%. As of July 2018, there were 24 cases (e.g. Volkswagen with one Category 5 and one Category 3 event within Carbon Own Operations) to which this cap needed to be applied.

At the end of the day, our approach to incorporating events assures that companies that cannot live up to the expectations raised by the management systems, structures and strategies they have put in place are being penalized by a reduction in their management score.

Indicator disablements

Indicator disablements as a means to make the risk rating company-specific

In line with our overarching objective to make the ESG Risk Ratings as company-specific as possible, which we achieved by introducing the beta concept and issue disablements on the exposure side, we also allow for individual indicator disablements on the management side. This is to account for situations where an indicator is not meaningful in a given company context. For example, Nucor, a steel producer operating out of the US, has the indicator Mineral Waste Management disabled because the company does not have active mining operations. Therefore, it does not have any tailings dams and is not expected to have a system to manage them. The MEI, Emissions, Effluents and Waste, remains relevant and is assessed using other indicators because the company continues to have a large environmental impact through its production and fabrication facilities.

How the weight of an indicator is determined

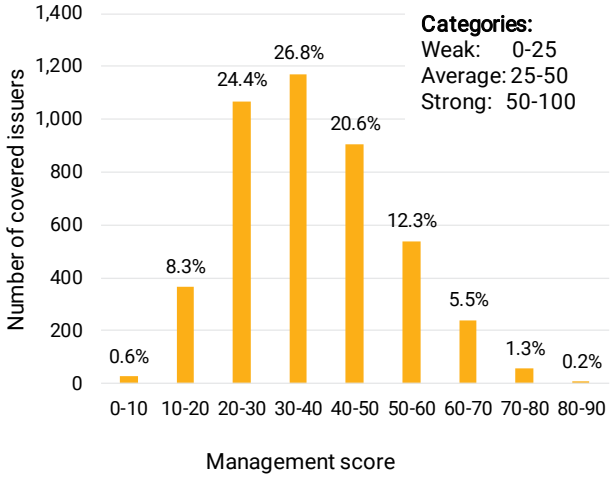
If an indicator is disabled, i.e. its weight goes to 0, the weights of the remaining indicators are proportionally redistributed to account for the missing weight. Weights of management indicators always sum up to 100% within each MEI. Their weight in the overall management score, hence, is determined by multiplying its within-issue weight with the weight of the respective issue, which in turn, is calculated by dividing the final issue exposure score by the overall exposure score.

Any given indicator may show up under different issues

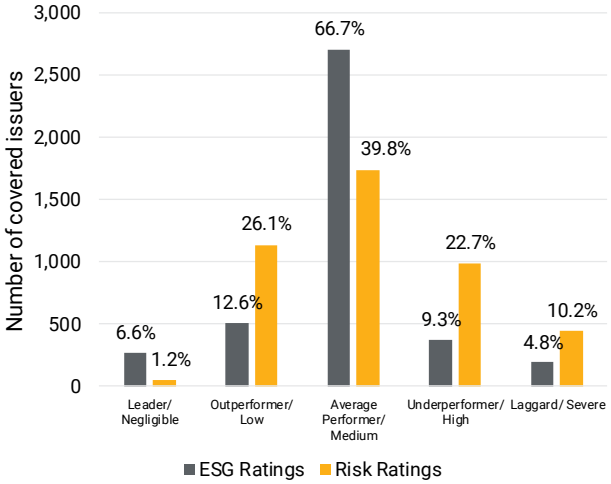
The individual indicators we are working with may be applied to any MEI, depending on their respective relevance, and may, therefore, appear several times in parallel. For example, environmental policy may show up in Carbon – Own Operations, in Emissions, Effluents and Waste, and in Resource Use at the same time, as it is a valuable signal in all three cases. Figure 2.13 shows the distribution of overall management scores, which are calculated as the weighted average of the individual, issue-specific management scores, with the weights being derived from our exposure assessment.

Figure 2.13: Distribution of management scores in the ESG Risk Ratings and comparison between the distributions of final ESG Risk Ratings and traditional ESG Ratings outcomes*

a) Overall management scores, ESG Risk Ratings



b) Final outcomes – ESG Risk Ratings vs. ESG Ratings



*As of July 2018

Source: Sustainalytics

Around 9% of issuers have very low management scores and 1.5% have very high ones

The empirical distribution of management scores closely resembles the shape of the exposure score distribution (see Figure 2.3): a bell-shape with a skew to the right. The most densely populated score range is from 20 to 50, with about 72% of all covered issuers falling into this bracket. Around 9% of the covered issuers have very low management scores between 0 and 20, and 1.5% have very high ones ranging between 70 and 90.

Comparison with our traditional ESG Ratings

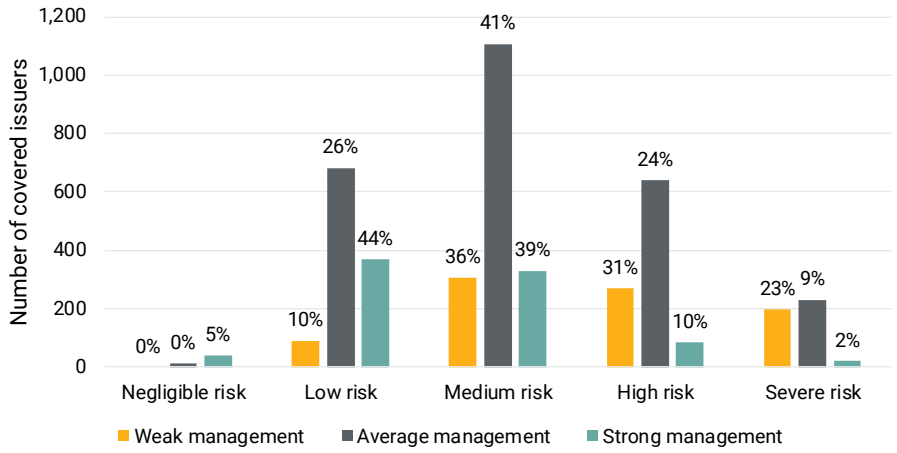
The right-hand side of Figure 2.13 includes a comparison between the distributions of final rating outcomes for the ESG Risk Ratings and our traditional ESG Ratings.[22] We make this comparison because the latter rest on an assessment of companies' ability to manage ESG topics only, which, despite all of the important differences that exist with regard to details, is similar to what the Management dimension within the ESG Risk Ratings seeks to measure. Hence, it should probably not come as a surprise that the overall management score of the ESG Risk Ratings is closely aligned with the traditional ESG Ratings' overall score (correlation coefficient of 0.85). The main differentiation between the two approaches kicks in via the ESG Risk Ratings' exposure dimension and its absolute, rather than "best-in-class only", nature. This, not surprisingly, causes the final rating outcomes of the two ratings to be much less aligned (correlation coefficient drops to 0.28).[23]

Exposure as a driver of the ESG Risk Ratings

A weak management score does not necessarily imply high risk and vice versa

Figure 2.14 shows management category assessments across the five risk categories. Interesting insights can be gained from this analysis, including the fact that 19 covered issuers end up in the high final risk rating bracket, despite having a strong management score (representing 2% of all companies that have a strong management score) and, conversely, 90 covered issuers with a weak management score can be found in the low final risk rating bracket (representing 10% of all issuers that have a weak management score). This shows, among other things, how important exposure is as a driver of the final rating and that it is not (always) sufficient to have strong management capabilities from our new ESG Risk Ratings' perspective.

Figure 2.14: Management assessments across the five risk categories*



*As of July 2018

Source: Sustainalytics

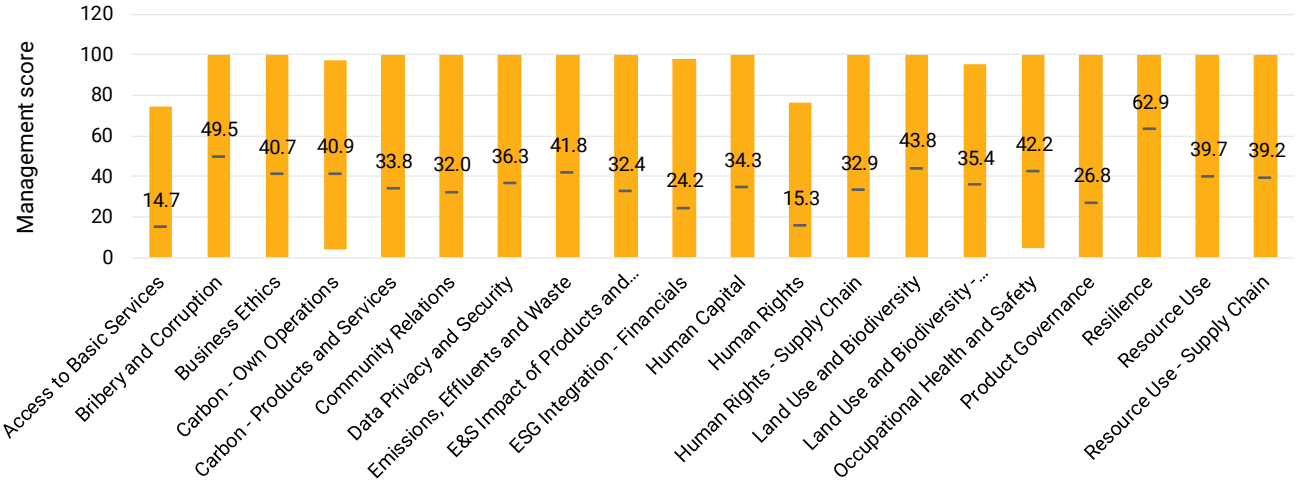
Only around 15% of the risks associated with Access to Basic Services and Human Rights are actually managed

Similar to our analysis of exposure scores in Figure 2.9, here we take a look at management scores on an issue-by-issue basis. In Figure 2.15, we show average scores across all covered issuers, irrespective of their subindustry. Displayed are average scores, as well as minimum and maximum scores per issue. As expected, the minimum score is almost always at zero, reflecting the fact that

across a wide spectrum of companies, one can certainly find examples of companies performing poorly in terms of managing ESG issues that are relevant for them. This is mostly also true for the other side of the spectrum, with management scores in many cases reaching the theoretical upper boundary of 100 points.

Empirically, however, there are two cases where the best performing companies score markedly below 100 (Access to Basic Services and Human Rights, both with maximum scores below 80). These are also the issues that are most poorly managed on average. In the risk rating, management scores do have a percent interpretation. For example, the 14.7 for Access to Basic Services and the 15.3 for Human Rights in the risk rating mean that only around 15% of the risks associated with these two issues are actually managed.

Figure 2.15: Average, maximum and minimum Management scores per Material ESG Issue*



*As of July 2018

Source: Sustainalytics

Calculating the ESG Risk Ratings

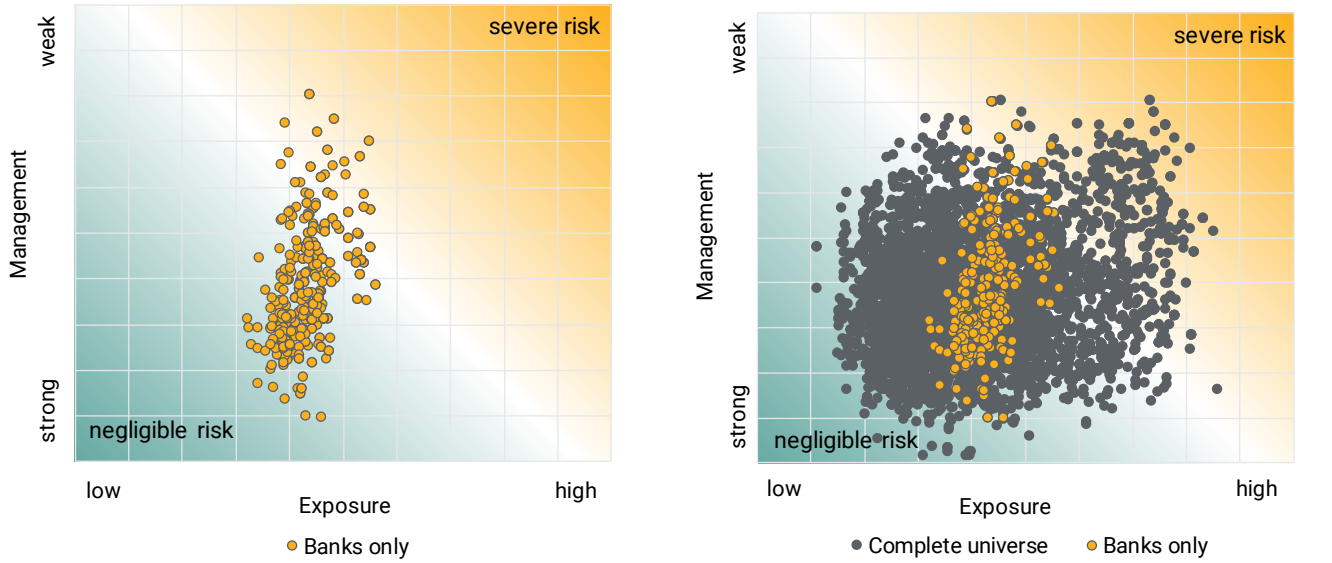
Combining Exposure and Management

Both dimensions contribute to the calculation of the final unmanaged risk score for a company

In the ESG Risk Ratings, exposure and management scores contribute to form an unmanaged risk score for each MEI, and an overall unmanaged risk score which is the final output of the rating, the ESG Risk Ratings score for a company. Based on these scores, companies are assigned to one of the five ESG risk categories (negligible, low, medium, high, severe).

Note that because ESG risks materialize at an unknown time in the future and depend on a variety of unpredictable conditions, no concrete predictions on financial or share price impacts, or on the time horizon of such impacts, are intended or implied by these risk categories.

Figure 2.16: Exposure vs. Management for companies in the industry group Banks, stand-alone and in comparison to the complete universe*



*As of July 2018

Source: Sustainalytics

Heat maps show where individual companies and/or groups of companies are located relative to the overall universe

Figure 2.16 shows how the companies in our coverage universe are positioned in the two-dimensional space spanned by the two dimensions of the ESG Risk Ratings. The graph with the orange dots on the left shows the positioning of companies in the Banks industry group only, which comprises 402 covered issuers at that moment. The graph on the right, on the other hand, displays a cloud of grey dots that represent all other companies in our universe, so that the global positioning of Financials compared to the rest can be assessed. The teal zone in the graph, which is intended to be interpreted as a heat map, indicates that a company is positioned towards the lower-risk end of the spectrum; the gold zone indicates that a company is positioned towards the higher-risk end of the spectrum.

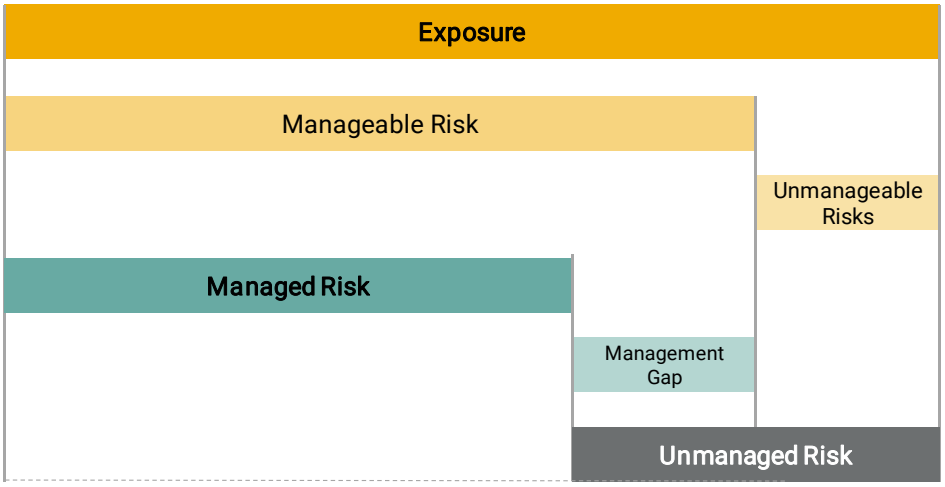
Unmanaged Risk – How we arrive at ESG Risk Ratings

Risk decomposition

Condensing the two dimensions into a single measure of risk

To arrive at our final ESG Risk Ratings for a company, the two dimensions, Exposure and Management need to be brought together and condensed into one single measure of risk. This single measure of risk is what we call Unmanaged Risk. It comprises those MEIs that have not (yet) been managed by a company, and it has two components: the unmanageable risk, which cannot be possibly addressed by company initiatives, and the management gap, which represents risks that could be managed by a company through suitable initiatives, but are not yet being managed. How unmanaged risk relates to exposure and to other types of risk that play a role in our model is best understood by looking at what we call the "risk decomposition," which is shown in Figure 2.17.

Figure 2.17: Risk Decomposition



Source: Sustainalytics

The risk decomposition is valid on the issue level as well as at the overall level

The starting point is the Exposure to ESG risks a company is facing. Moving down the chart, Exposure is broken down to or decomposed into various types of risk. The risk decomposition is valid at the issue level as well as at the overall level, with the starting point for the latter being the overall exposure, hence, the sum of a company's exposure to the individual MEI and to Corporate Governance.

General Principle of ESG Risk Ratings scoring

Strict additivity principle in the calculation of the risk rating allows flexible use and combination of scores

The fundamental concept of points of risk within the ESG Risk Ratings allows smaller components to be aggregated to derive larger ones. Issue-level exposure can be aggregated to arrive at overall scores, for example, or to arrive at scores for combinations of issues that might be of interest for investors from a thematic perspective (carbon risk, for example). Management scores for individual issues can be aggregated to arrive at combined-issue level management scores or an overall management score as well.

Manageable vs. Unmanageable Risks

An airline, for example, cannot manage all of an airplane's flight emissions – it faces unmanageable risks

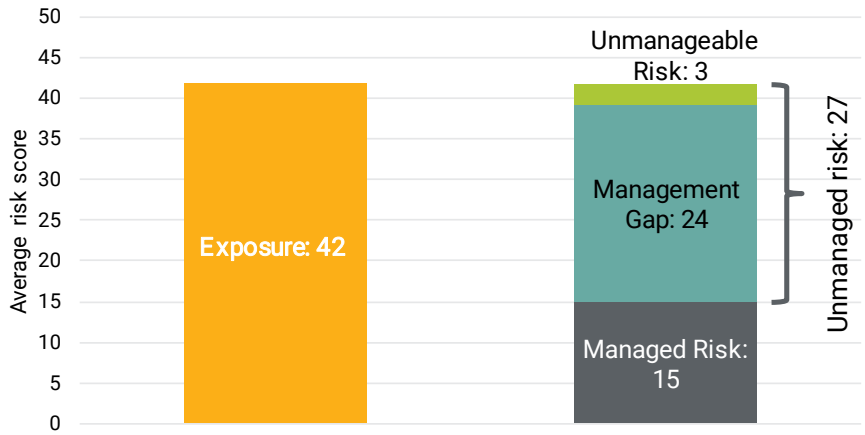
The first component that determines unmanaged risk is the degree of unmanageable risk. Some risks are manageable, like the risk of on-the-job injuries, which can be managed through establishing stringent safety procedures, having emergency response plans, safety drills, promoting a safe culture, etc. Some risks, on the other hand, are not fully manageable, such as the carbon emissions of airplanes in flight. This means that an airline has some unmanageable risk on Carbon – Own Operations, which should contribute to its unmanaged risk score on that issue.

The management gap reflects the failure of the company in managing manageable risks sufficiently

The second component is the management gap. It speaks to the manageable part of the material ESG risks a company is facing and reflects the failure of the company in managing these risks sufficiently. Figure 2.18 displays the empirical decomposition of overall ESG risks that issuers in our coverage universe are currently facing. The average overall exposure is 42 and the overall unmanaged

risk score is 27. This means that, on average, companies manage 36% of their overall exposure to material ESG issues, 64% remain unmanaged. About 7% of risks (3 out of 42) are considered unmanageable within our rating model.

Figure 2.18: Empirical Risk Decomposition – Average across overall universe



*As of July 2018

Source: Sustainalytics

Determining Unmanageable Risks

Introducing the Manageable Risk Factor (MRF)

The share of risk that is manageable vs. the share of risk that is unmanageable on a material ESG issue is predefined at a subindustry level by a manageable risk factor. Every MEI has an issue manageable risk factor (MRF), empirically ranging from 30% (indicating that a high level of the issue risk is unmanageable) to 100% (indicating that the issue risk is considered fully manageable). We have defined values and accompanying rationales for each assigned manageable risk factor at the subindustry level.

Three primary factors were considered when setting MRFs

The ESG Risk Ratings are fairly restrictive in their interpretation of unmanageable risks. We considered three primary factors when setting MRFs: the ability of a company to ensure its employees are compliant with all relevant rules (e.g. looking at issues like Occupational Health and Safety), the effect of outside actors on the ability of a company to manage an issue (e.g. cybersecurity) and the physical limitations on innovation or technology (e.g. airplanes and carbon emissions).

Human Capital as an example

For example, Human Capital is an issue that is difficult to manage. A company can employ hundreds of thousands of people, and it is very hard to imagine management programmes that can eliminate all risk of sexual harassment, low morale or high turnover. We believe, however, that a company has (almost) full control over the measures that, in principle, would allow it to manage the issue, hence yielding an MRF of 95%.

Other good examples for the use of the MRF are the issues Carbon – Own Operations and E&S impact of Products and Services

Other good examples for the use of the MRF are the issues Carbon – Own Operations, and E&S Impact of Products and Services. As Figure 2.19 shows, the MRFs for the former vary between 100% (fully manageable) for subindustries such as Electric Utilities or Department Stores, to just 40% for Airlines, for

example. For Airlines, we consider the carbon footprint of flights as an Own Operations issue (rather than a product issue). The MRF of just 40% reflects the fact that carbon is an issue that airlines can manage only to a limited degree, conditional on today's technology and foreseeable technology developments. Companies can, of course, use new fuel-efficient planes with fuel-efficient engines, turbines, winglets, etc., and they can strive to optimize the seat capacity and capacity utilisation of their planes, while together with airports, they can try to minimize fuel dumps and optimize start and landing cycles. The main part of their operational carbon footprint, however, remains, even if they have done what they can to reduce it – besides not continuing to be an airline.

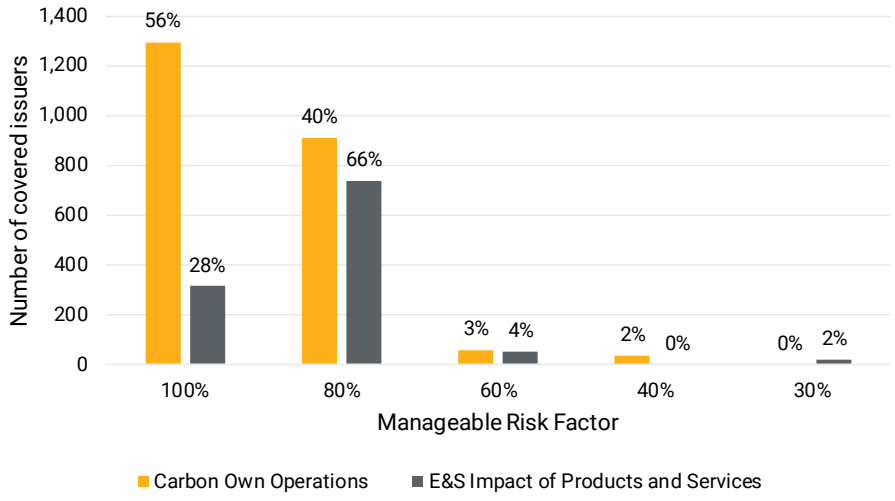
The MRF is not trying to model the strategic option to fundamentally change what the company used to be doing

We note that our MRF is not trying to measure the fact that a company can, of course, reinvent itself and change its business model completely. Think about Nokia, for example. The company started as a producer of rubber boots, then switched to producing TV sets, then became the largest mobile phone producer worldwide and has now turned itself into a mobile phone infrastructure provider. This kind of metamorphosis is not what we try to capture with the MRF. Instead, our intention is to measure the degree to which a company can manage an issue if it stays in the same business.

Volkswagen as an example

Take Volkswagen, for example. Of course, it is a long and costly way for the company to become a pure electric vehicle producer, such as Tesla, but it is certainly not impossible to do so. Hence, the MRF for Carbon – Products and Services in this case is 100%. An integrated oil producer, on the other hand, can have the best management systems and carbon-saving technologies in place, but it will not be able to change the fundamental character of its main product, oil, which finally leads to the stranded value characteristic of its assets and investments.

Figure 2.19: Manageable Risk Factor distribution for Carbon – Own Operations and E&S Impact of Products and Services*



*As of July 2018

Source: Sustainalytics

MRFs range from 30%, which is applied to Tobacco companies only, 60% for Beer, Wine and Spirits, to 100% for various Retail subindustries

Another example, shown in Figure 2.19, is the MRF distribution for the E&S Impact of Products and Services issue. The range of MRFs we work with extends from 30%, which is applied to Tobacco companies only, 60% for Beer, Wine and Spirits, to 100% for various Retail subindustries, for example. The 30% for Tobacco, similar to the oil company example discussed above, reflects the fundamental characteristics of the product, which include adverse health impacts that cannot be managed away by the company as long as it continues to provide tobacco products.

Delivering a more realistic picture of the company

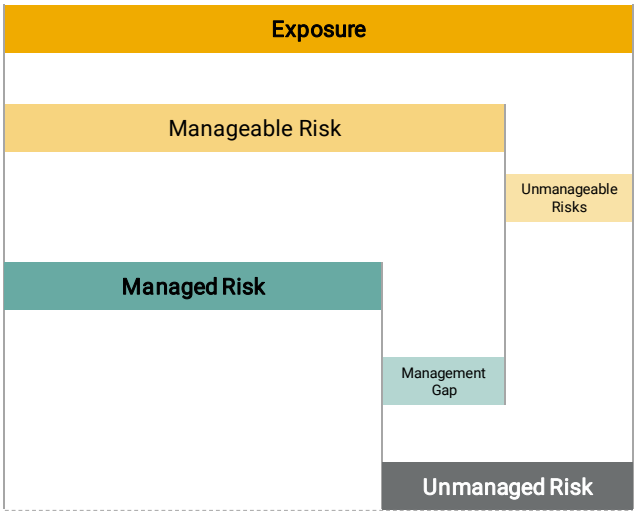
MRFs are intended to achieve more realistic rating outcomes and to achieve full comparability of rating outcomes across sector boundaries. Though MRFs are certainly challenging to determine, we are convinced they add value to our rating and deliver a more realistic picture of the unmanaged ESG risks of a company and their interpretation.

Calculating the Unmanaged Risk score

Example of a fictitious global car manufacturer

The best way to explain how we calculate our Unmanaged Risk scores is to look at an example. Let us say we are looking at a fictitious (albeit close to reality) global car manufacturer and want to determine its unmanaged risk with regard to the Carbon – Products and Services issue. Figure 2.20 shows the calculations we would run through to arrive at the unmanaged risk score at the issue level. The outcome is an unmanaged risk score of 3.9, which means that about 33% of the company's exposure to the Carbon – Products and Services issue have remained unmanaged.

Figure 2.20: Risk decomposition and calculation of the Unmanaged Risk score at the issue level – example of a fictitious auto manufacturer and the risk it is facing regarding the Carbon – Products and Services issue



Company Exposure	=	Subindustry Exposure	*	Issue Beta		
	=	8	*	1.5	=	**12**
Manageable Risk	=	Company Exposure	*	MRF		
	=	12	*	90%	=	**10.8**
Managed Risk	=	Manageable Risk	*	Management score (as %)		
	=	10.8	*	75%	=	**8.1**
Unmanaged Risk	=	Company Exposure	-	Managed Risk		
	=	12	-	8.1	=	**3.9**

Source: Sustainalytics

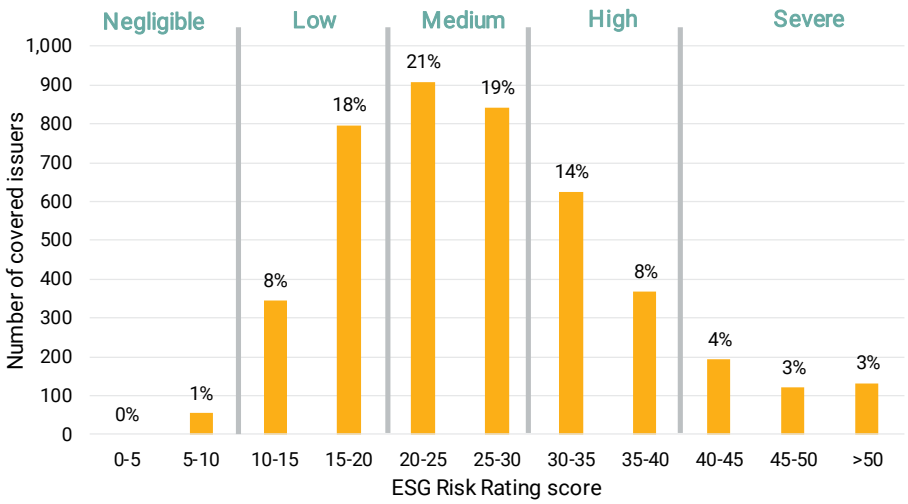
To arrive at the final overall risk rating, we would need to go through this exercise for all other MEIs and the Corporate Governance baseline. All individual, issue-specific scores would then be added up to yield the final overall score. We highlight that the additivity of risk scores is an important feature of our new approach. Most importantly, it is a result of, but also a prerequisite for, the cross-sectoral comparability of our ratings.

ESG Risk Ratings outcomes – a look at the distribution of scores

A look at the five risk categories of our new rating

Figure 2.21 shows (also compare to Figure 2.1) how the covered issuers in our research universe are distributed across the five risk categories, but this time in a more granular manner. About one-third of all issuers find themselves in the high and severe risk brackets. Only 54 (or 1.2%) out of 4,375 issuers have negligible risk only.

Figure 2.21: Allocation of companies across ESG risk categories



*As of July 2018

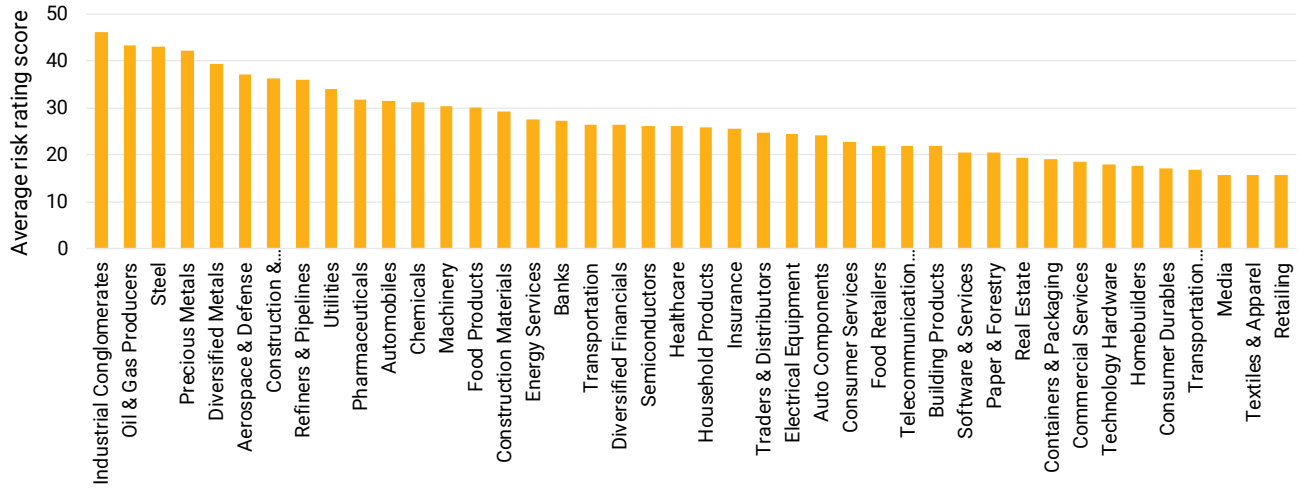
Source: Sustainalytics

ESG Risk Ratings outcomes – a look at the industry group level

The average company in Industrial Conglomerates and in Oil & Gas Producers is considered to have severe unmanaged ESG risks

At the industry group level, the average unmanaged risks of companies vary significantly (Figure 2.22). They range from 46.1 for Industrial Conglomerates and 43.4 for Oil & Gas Producers, which means that the average company in these two industry groups is considered to have severe unmanaged ESG risks, compared to 15.8 for Media and 15.6 for Retailing. This means that the average company in these two industry groups is evaluated to face low unmanaged ESG risks.

Figure 2.22: Average unmanaged risk score per industry group*



*As of July 2018

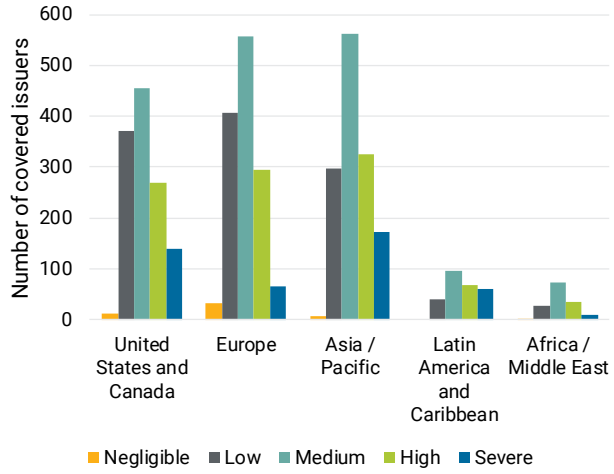
Source: Sustainalytics

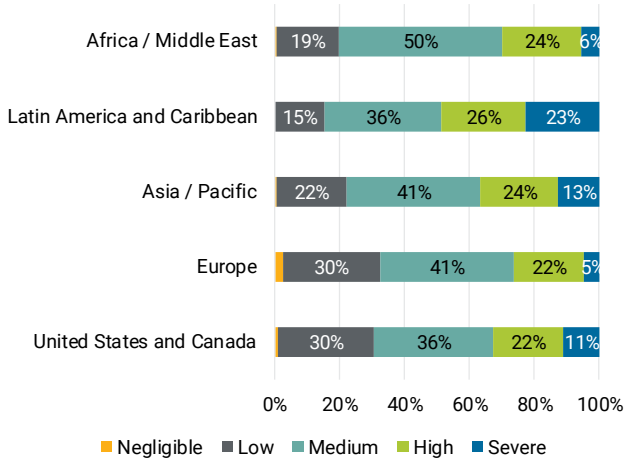
Risk rating outcomes looked at through a regional lens

ESG Risk Ratings outcomes – a look at regional differences

Another interesting lens through which one could look at the final rating outcomes is the regional one. In Figure 2.23, we differentiate between five regions when showing the distribution of the covered issuers in our research universe. All in all, distribution patterns look quite similar and consistent, although there are some notable differences as well. The share of companies in the respective middle bucket ranges from 36% (North America) to 50% (Africa and Middle East).

Figure 2.23: ESG Risk Ratings/unmanaged risk categories – distribution of companies in different regions across risk categories*





*As of July 2018

Source: Sustainalytics

One striking regional divergence, on the other hand, can be found for the combined high and severe risk brackets. While Europe finds itself with just 27% of companies at the lower end of the spectrum, the respective share is almost double that of Latin America and the Caribbean, where 49% of the companies

end up in the high and severe risk brackets. For the big three developed market regions (Europe, North America and Asia-Pacific, we believe it is fair to say that there are no significant fundamental differences in their distribution patterns.

ESG Risk Ratings outcomes – a look at possible size-effects

Size effect in ESG ratings – what are the drivers?

ESG ratings are known to be vulnerable to a size bias, which means that large-cap companies tend to receive better ratings than smaller sized companies. This has been much criticized since it seems to speak against the validity and credibility of rating outcomes. The reasons behind this size effect have been much discussed and, interestingly, the debate sometimes reminds us of the size-effect debate in mainstream empirical finance, which originated in the 1980s.

Smaller companies tend to be neglected, less transparent and generally less researched

One of the drivers for the difference between small and large caps brought forward in both contexts was, and is, that smaller companies tend to be neglected, less transparent and generally less researched. In the context of ESG ratings that traditionally have been based predominantly on information reported by companies, the effect was that larger companies that report a lot and have the resources and means to do so tended to receive higher scores than smaller companies that were not able to invest sufficiently in sustainability teams, consultants and the build-up of reporting systems.

Potential size biases reduced by our new risk rating approach

We do not want to get deeper into this discussion here, but note that possible reporting or transparency-driven size biases are much reduced by our new risk rating approach, mainly due to the introduction of the exposure dimension and the materiality notion that is behind it. For example, a company does not lose points for not reporting on an issue that is not material for its enterprise value.

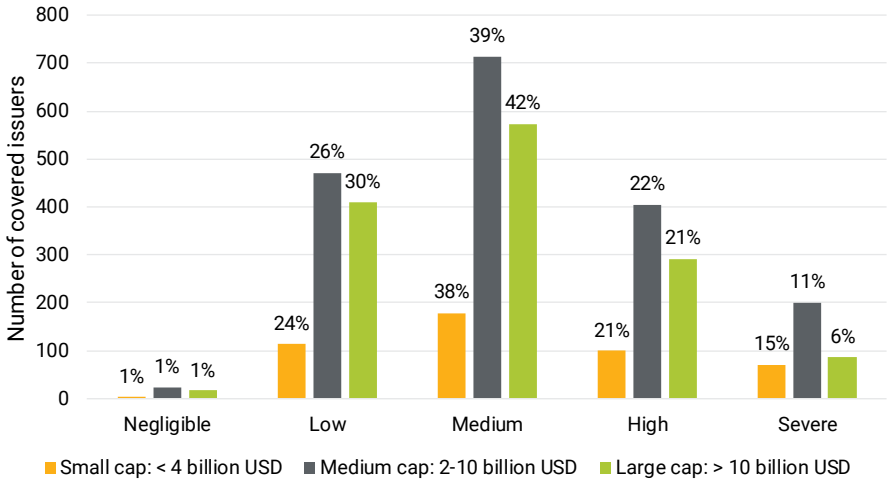
Shapes of size-grouped distributions are quite similar across all five risk categories

Our expectation that the new risk ratings would be less vulnerable vis-à-vis company size related influences was confirmed when we looked at the empirical distributions of final rating outcomes grouped by market cap brackets. As Figure 2.24 shows, the shapes of the distributions are similar across all five risk categories. All three market cap groups (low, medium, high) are represented in each of the risk categories roughly in proportion to the number of companies in each of them.

The only more significant size-driven deviation is noted for the severe risk bracket

For example, 21% of the companies in the low market cap bracket (< USD 4 billion) find themselves in the high ESG risk bracket, while for the medium and high market cap companies, the shares are 22% and 21% respectively. The only more significant deviation, in fact, is noted for the severe risk bracket, for which only 6% of the high market cap companies qualified, in comparison to 11% and 15% of the medium and small cap companies, respectively. We suspect that this result may indeed have been impacted by the typically higher transparency that is provided by large caps. We note, however, that transparency as such has an impact on (investment) risk and, hence, should be reflected in a risk rating, from our point of view.

Figure 2.24: ESG Risk Ratings/unmanaged risk categories – distribution of companies in different market cap groups across risk categories*



*As of July 2018

Source: Sustainalytics

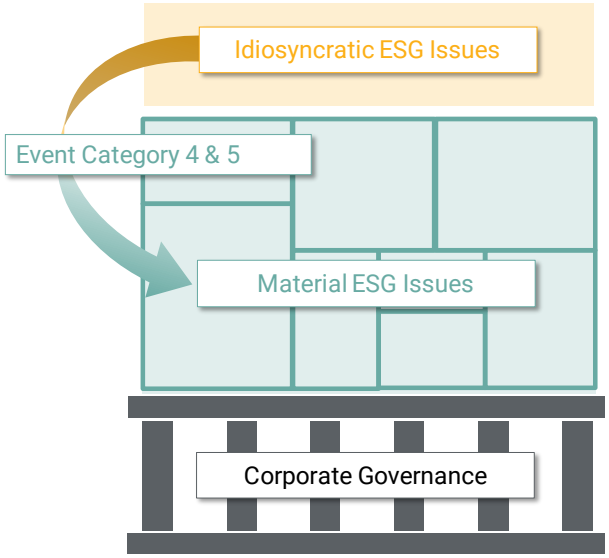
In this chapter, so far, we looked at the two dimensions of our new ESG Risk Ratings and how they are combined to arrive at the unmanaged risk score on which our final rating and risk category assessment is based. To complete our introductory look at our new rating, we now switch perspectives and focus more on some of its structural aspects, i.e. the building blocks of the ESG Risk Ratings.

The building blocks of the ESG Risk Ratings

Corporate Governance, Material ESG Issues, Idiosyncratic Issues

The ESG Risk Ratings is composed of three building blocks that contribute to the overall rating for a company. These building blocks include Corporate Governance, Material ESG Issues, and Idiosyncratic Issues.

Figure 2.25: The three building blocks of the ESG Risk Ratings



Source: Sustainalytics

Building Block #1: Corporate Governance

Corporate Governance is a foundational element in the ESG Risk Ratings

Corporate Governance is a foundational element in the ESG Risk Ratings and reflects our conviction that poor Corporate Governance poses material risks for companies. Our Corporate Governance methodology provides deep insights about the extent to which a company's corporate governance practices detract from or add to the company's ability to execute on its business strategy, including company ESG strategies. Some research studies also indicate that companies with strong corporate governance practices may outperform the market, which makes Corporate Governance a compelling data point in a materiality-focused rating.[24]

Why is Corporate Governance treated separately?

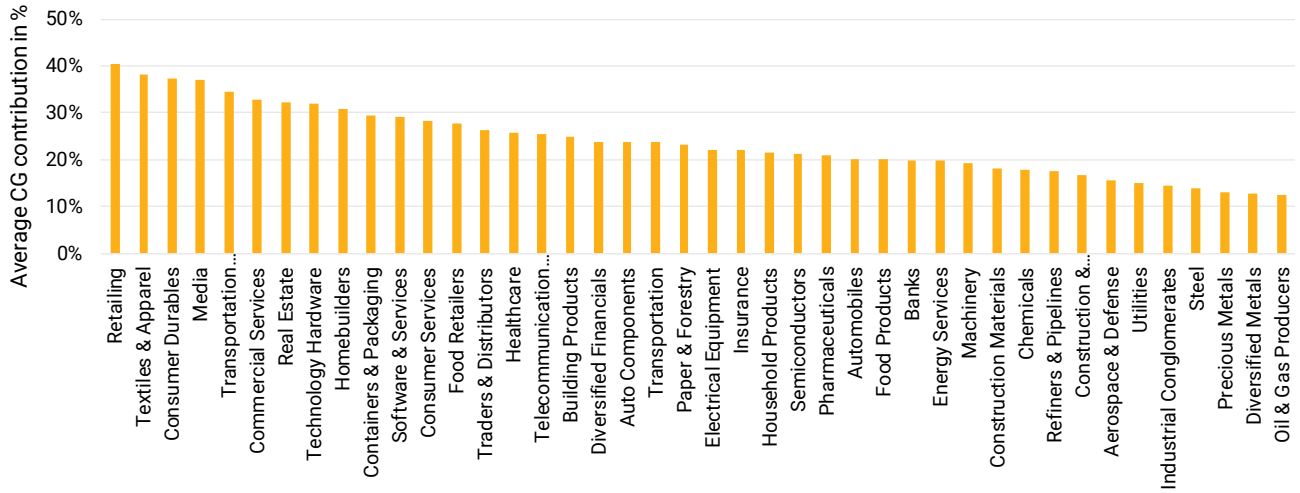
A building block in its own right

Corporate Governance is a material issue; however, within the ESG Risk Ratings model, it is considered foundational and is handled separately, i.e. not as one of the MEIs that form the second building block of the risk rating. MEIs are subindustry specific, and therefore may appear for some subindustries and not for others. Additionally, they have exposure scores that vary by subindustry, as well as company-specific betas. Corporate Governance, however, applies to all companies within the ESG Risk Ratings, and the pillars that comprise it do not vary by subindustry. Hence, it constitutes a building block within our new risk rating in its own right.

Corporate Governance applies to all companies within the ESG Risk Ratings, and the pillars that comprise it do not vary by subindustry

Corporate Governance has a fixed subindustry exposure score of 9 that applies to all publicly listed companies in the ESG Risk Ratings (and 5 for non-public companies). The final contribution of Corporate Governance to our overall exposure assessment is approximately 20% on average. The final actual contribution varies across companies, depending on the number and the significance of the MEIs selected.

Figure 2.26: Average contribution of Corporate Governance to overall exposure assessment, industry group level



*As of July 2018

Source: Sustainalytics

Figure 2.26 shows average contribution at the industry group level. They range from slightly above 10% only for Oil & Gas Producers (due to the high significance of other material ESG issues for this industry group), to around 40% for Retailing, for which there is a general lack of exposure to material ESG issues as compared to other industry groups.

The six Corporate Governance Pillars

Corporate Governance management scores have a similar interpretation as management scores for material ESG issues

Corporate Governance is composed of six pillars (see Figure 2.27). Each pillar includes a set of relevant corporate governance indicators. The Corporate Governance Management score ranges from zero to 100, with zero indicating no evidence of management of the issue and 100 very strong management of the issue similar to the management scores at the issue level. We also use the same three categories (weak, average, strong) to characterize management outcomes. The score is calculated as a weighted average of the underlying six Corporate Governance pillar scores, using a regionally based weighting scheme.[25]

Figure 2.27: Overview of the six Corporate Governance pillars

Board and management quality and integrity	Do the board's experience, track record and behaviour demonstrate its ability to provide strategic leadership and oversight?
Board structure	Do the organization and structure of the board provide sufficient oversight, representation and accountability to shareholders?
Ownership and shareholder rights	Do the constitution of the company and its ownership structures respect the right of outside shareholders relative to the board, management and major shareholders?
Remuneration	Do the company's remuneration policies and practices provide appropriate incentives for management to build value?
Financial reporting	Are the company's financial reports reliable and subject to appropriate oversight?
Stakeholder governance	Does the company have appropriate structures in place to manage ESG issues generally and is the company transparent about these?

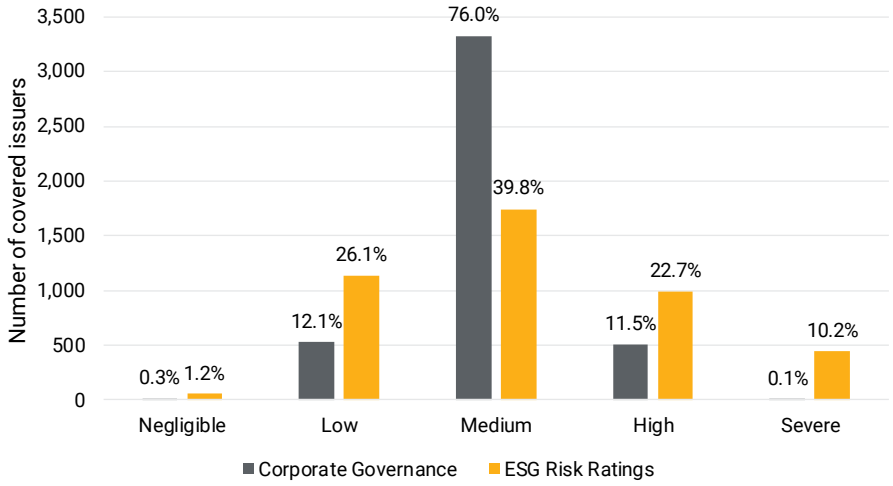
Source: Sustainalytics

Corporate governance scores – empirical outcomes

Relatively strong clustering around the mean

Figure 2.28 shows the empirical distribution of unmanaged risk assessments for the Corporate Governance building block. The distribution is bell-shaped, similar to the distribution of overall unmanaged risk scores, but clearly shows more kurtosis. While only 39.8% of companies are in the medium risk bracket at the overall rating level, for Corporate Governance this number is significantly higher at 76%. Only about 11.6% of companies receive a high or severe risk assessment for Corporate Governance, compared to 32.9% at the overall level. The relatively strong clustering around the mean is a typical empirical feature of Corporate Governance ratings, which is, among other things, driven by the compliance of companies to mandatory listing requirements.

Figure 2.28: Corporate Governance unmanaged risk assessment – distribution across risk categories*



*As of July 2018

Source: Sustainalytics

In our new risk rating, governance aspects also enter the rating equation via other ESG issues in general (including idiosyncratic issues). Their impact can be significant, particularly if governance-related controversies are involved.

Building block #2: MEIs

The heart of our new rating

The heart of our new rating is the second building block – MEIs. The ESG Risk Ratings assess companies on MEIs. An ESG issue is considered material within the risk rating if it has the potential to have a significant impact on the enterprise value of a typical company within a given subindustry and its presence or absence is likely to influence the decisions made by a reasonable investor.

How are the issue boundaries defined?

MEIs are focused on a topic, or set of related topics, typically requiring a common set of management initiatives or a similar type of oversight. For example, the topics employee recruitment and development, diversity, engagement and labour relations are all encompassed by the MEI Human Capital, because they are all employee-related and require HR initiatives and HR oversight. Occupational Health and Safety is also about employees, but the risks to a business are different from general Human Capital risks, and it is managed through a different set of activities. Management indicators provide signals about these management activities, and event indicators provide signals about potential management failures.

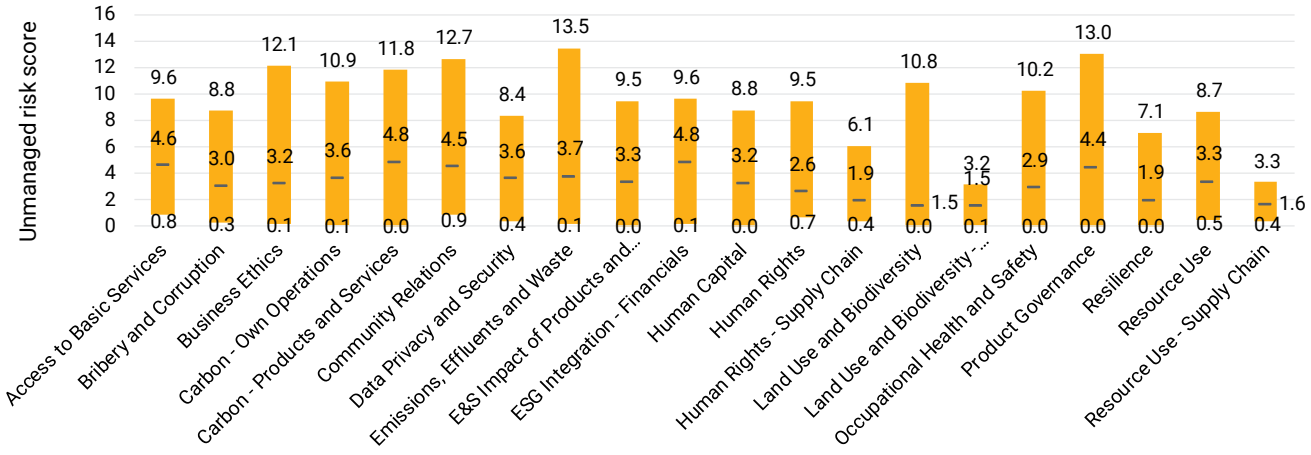
Material ESG issues – empirical rating outcomes

Maximum scores for Emissions, Effluents and Waste and Product Governance, for example, reach values of above 13

Figure 2.29 provides an overview of average unmanaged risk scores for each of our material ESG issues. It shows that average scores vary between one and two at the lower end of the spectrum for issues such as Human Rights – Supply Chain, or Land Use and Biodiversity, and close to five at the upper end of the spectrum for issues like Carbon – Products and Services and ESG Integration – Financials. The chart also shows that the deviations from the average score can be very material. For example, maximum scores for Emissions, Effluents and

Waste and Product Governance reach values of 13 and above. For other issues, maxima hover quite closely above average values only, such as for Resource Use – Supply Chain or Land Use and Biodiversity – Supply Chain.

Figure 2.29: Average, maximum and minimum Unmanaged Risk score per Material ESG Issue



*As of July 2018

Source: Sustainalytics

Twenty out of 29 pre-defined issues found to be material

All in all, we had defined 29 ESG issues that we used as the basis to assess materiality during our consultation process. Twenty out of these 29 selectable issues passed the thresholds of our materiality tests for at least one of the subindustries.[26] The issues are common in the sense that their fundamental definitions do not vary across different subindustries, although their specific interpretations may. The differentiation between subindustries occurs via the assessment of the issues' materiality for each subindustry.[27] In the construction or design of our set of material ESG issues, we applied some basic structural principles, of which the most important one is a clear separation between the different stages of a company's value creation chain (supply chain, production and the customer use phase) into separate MEIs.[28]

Figure 2.30 shows the six most frequently selected MEIs at the subindustry level. Not surprisingly, Human Capital (selected for 126 subindustries out of 138) and Business Ethics (for 113 subindustries) lead the pack.

Figure 2.30: Material ESG issues – The "big six"*

MEI	Number of subindustries*	Comments
Human Capital	126	It is hard to succeed in business without people
Business Ethics	113	Many businesses have material impacts from ethical compliance issues
Product Governance	94	It is also hard to succeed without quality products or services
Carbon – Own Operations	79	Many businesses have heavy GHG emissions or high energy use
Occupational Health and Safety	61	Many businesses have material impacts from occupational safety-related incidents
Data Privacy and Security	54	An increasing number of businesses handle sensitive data and may experience material impacts from data breaches

*As of July 2018; out of a total of 138 subindustries

Source: Sustainalytics

What about events that are not linked to any of the issues that have been assessed as material?

As discussed above, MEIs have been predetermined for each subindustry, and can be disabled if they are not relevant for a company. But what about events that are not linked to any of the issues that have been assessed as material? What if a company has a severe Bribery and Corruption scandal (a Category 4 or 5 event),[29] but does not have Bribery and Corruption selected as a material ESG issue? Is it excluded from the rating? The answer is no, it is not. For these cases, we have introduced the concept of an idiosyncratic issue.

Building Block #3: Idiosyncratic issues

Analogy between the ESG Risk Ratings model's structure and the single index model known from financial market theory

To explain the structure of our new rating and the role of the idiosyncratic issues in general, we, at times, use the concept of the so-called single index model (SIM), known from financial market theory as an analogy. In the SIM, the return of a stock is regressed on a single index: the market index. It is typically used to estimate the (market) beta of a stock. The model has a constant and the deviations from the regression line are considered to result from stock-specific, idiosyncratic risk factors. This basic model has been augmented and developed into different multi-factor variants.

The ESG Risk Ratings can be compared to the single index model

The structure of our risk rating is similar in many ways, although it is not directly comparable with the above described stock return models. The Corporate Governance building block in our risk rating could be viewed as the model constant, and the MEIs could be seen as systematic risk factors, with the latter being illustrated by the ESG Risk Ratings' use of a company-specific beta as an exposure adjustment factor. Finally, the idiosyncratic issues in the risk rating are equivalent to the idiosyncratic risks in single- or multi-factor stock return models.

Responding to unexpected, "black-swan"-type events

With the introduction of idiosyncratic risks, we took into account that unforeseeable events of significance can happen to individual companies, and that issues that were previously considered as immaterial can suddenly and dramatically become material. These issues become material if a Category 4 or 5 event occurs. They allow us to quickly respond to unexpected, "black-swan"-type events. The assessment of unmanaged risk would then purely be based on the event assessment itself. We would expect that the emergence of an idiosyncratic issue, typically, will trigger a systematic re-evaluation of the materiality of the respective ESG issue at the subindustry level. We go through the process of updating our issue selection and exposure scoring at the subindustry level on an annual basis.

Eight cases of idiosyncratic issues

As shown in Figure 2.31, idiosyncratic issues have been activated in eight cases as of July 2018. Due to their characteristics described above (triggered by events, annual MEI update cycle), we expect that the number of idiosyncratic issues will increase during the period between the regular annual MEI updates and then drop down again to a level that is comparable to what we have been seeing when drafting this study.

Figure 2.31: Overview of idiosyncratic issues activated in our new ESG Risk Ratings*

Country	Subindustry	ESG Risk Ratings score	ESG risk category	Idiosyncratic issue - unmanaged risk score	Idiosyncratic issue - event category	Idiosyncratic issue - event name
India	Marine Ports	25	Medium	8	Severe	Land Use and Biodiversity
US	Heavy Machinery and Trucks	37	High	6	High	Society - Human Rights
Israel	Aerospace and Defence	46	Severe	6	High	Society - Human Rights
Canada	Metals and Mining	41	Severe	6	High	Employees - Human Rights
Canada	Agricultural Chemicals	45	Severe	6	High	Society - Human Rights - SC
Austria	Home Furnishings	24	Medium	8	Severe	Accounting and Taxation
Netherlands	Home Furnishings	24	Medium	8	Severe	Accounting and Taxation
Japan	Electric Utilities	61	Severe	6	High	Corporate Governance

*As of July 2018

Source: Sustainalytics

Emergence of an idiosyncratic issue does not automatically lead to a high or severe overall risk rating assessment

The emergence of an idiosyncratic issue, which is based on a Category 4 or Category 5 event assessment, does not automatically lead to a corresponding overall unmanaged risk assessment. In three out of eight cases, the final ESG Risk Ratings category is medium, although in all three cases the events that triggered the inclusion of these issues into risk rating assessments have been assessed as severe. The companies involved in these cases do not face significant unmanaged risks in other areas that add up to a score that is above the threshold for a higher overall risk category. In half of the cases, however, the companies that have an idiosyncratic issue also find themselves in the severe risk bracket. Three out of these four cases are Human Rights-related, while one is Corporate Governance-related.

Making the rating more responsive to the company-specific news-flows between annual reporting cycles

Our concept of idiosyncratic issues shows how important the assessment of controversial events is for the overall rating. And it is not only this one transmission channel that makes them pivotal. In the next and final section of this chapter, we summarize how our events analysis enters the risk rating equation in multiple ways. What guided us in their incorporation was our objective to make the ESG Risk Ratings more responsive to the company-specific news flows between the regular annual full updates of our ratings. We wanted the ratings to become more dynamic, up-to-date and realistic, to maximize its value in investment decision-making contexts. This is of particular importance, for example, in cases like Volkswagen, where the emergence of the emissions scandal in 2015 fundamentally changed how investors, regulators and society viewed the company.

Outlook on chapter three

In the following chapter, we turn our attention to a first empirical analysis of the performance of investment strategies that are driven by actual rating outcomes. This is part of our effort to demonstrate the usefulness of our new rating's claim to provide added value to investors by rigorously focusing on financial material ESG issues.

Portfolio Risk and Return

Can our new ratings help investors outperform?

Model validation & testing – some introductory thoughts

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With the new ESG Risk Ratings, we have established an approach that differentiates between companies based on their degree of unmanaged ESG risk. We do this through the lens of financial materiality, which means that we focus on ESG issues that are considered to have a significant impact on the financial value of a company. Our rating is built on indicators that measure a company's capacity to manage these ESG risks. They are also based on the business judgement of our sector analysts who evaluate information provided by the companies themselves (self-reported information) and third parties, such as media reports, which fuel our incident and event analysis and evaluation. These pieces of evaluated, publicly available pieces of information are combined with the help of a structured, systematic approach – our rating methodology, which you learned about in the previous chapter.

A lot of effort has been put into the validation of the risk rating methodology

In validating the ESG Risk Ratings methodology, we looked at the distribution of rating outcomes across the overall universe and sector-by-sector. We asked ourselves whether the rating could appropriately discriminate between companies with different business models, across different industries and in different regions. We also simulated the sensitivity of rating outcomes with respect to changes in underlying inputs, i.e. indicator and parameter changes. After several iterative validation rounds, the ESG Risk Ratings methodology passed the final approval gate and was deemed to be ready for market launch.

Many investors are likely to wonder whether and how the ESG Risk Ratings can be leveraged to extract more value from their portfolio investments and create alpha. In this chapter, we begin to answer to this question, contributing to the long-lasting debate around the ability of ESG integration approaches to outperform the market.

Is "taking ESG into account" generating investment value?

The question of whether taking ESG into account generates investment value beyond the traditional inputs that are used by active managers is anything less than trivial to answer. Hundreds of studies have looked at it and the evidence seems to indicate that there is good reason to believe that ESG integration, at a minimum, does not harm portfolio performance and, if applied in the right manner, can very well help to outperform the market. The latter is quite a strong statement in light of the financial market's high degree of competitiveness and the fact that ESG is not really a new issue to which the market has not had a chance to adapt. More recent studies indicate that markets have learned over time, but that there are still spots of persistent outperformance that cannot be explained by traditional risk factors.

Compensation for unknown risks or mispricing?

These pockets of unexplained performance may signal the existence of additional risk factors that have not yet been taken into account in asset pricing models. Alternatively, they may indicate that the market is not "fully rational" in its processing of information. Given that these theoretical questions are not the focus of this paper, we leave them to the ongoing academic discourse.

Empirical tests of ESG Risk-Ratings based strategies

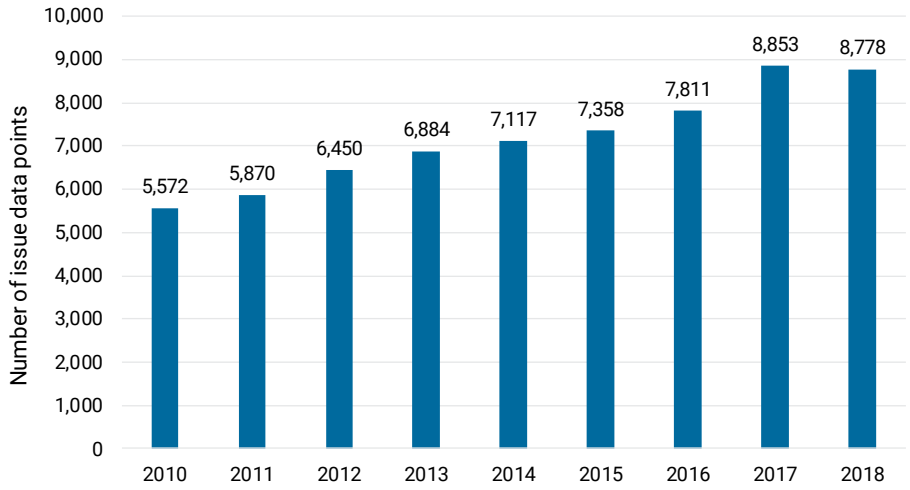
ESG Risk Ratings and market data

We tested a wide spectrum of ESG Risk Ratings-based investment strategies

Based on the available data, we were able to test a wide spectrum of investment strategies that were based on unmanaged risk assessments at the issue level, looking at the three main investment regions North America, Europe and Asia-Pacific (APAC).[31] The time span we looked at is quite considerable. Our time series of simulated risk rating data starts in 2009 and ends in 2017. Figure 3.1 shows the number of data points available for a given year across all eight ESG issues that fulfilled our data availability requirements.[32] These include:

- Business Ethics
- Emissions, Effluents and Waste
- Carbon - Own Operations
- E&S Impact of Products and Services
- Human Capital
- Occupational Health and Safety
- ESG Integration – Financials
- Resource Use

Figure 3.1: Number of issue data points covered in ESG strategy testing*



*The years on the x-axis show the years over which portfolio performance has been measured, based on portfolios that were formed on the basis of end-of-previous-years' risk rating outcomes.

Source: Sustainalytics

Annual rebalancing of our investment strategy portfolios

On the market data side, we looked at total equity portfolio returns in local currency on a monthly basis over the period 2010 to June 2018.[33] Portfolios were formed based on the previous year's issue risk rating assessment of a company. This means that at the end of the year, the ratings of companies that were eligible

for our analysis (i.e. met the minimum data requirements) were used as an input to decide whether a given company would enter the portfolio for the following 12 months or not. After 12 months, portfolios were revised based on the new rating outcomes and rebalanced. We primarily tested market value-weighted versions of these portfolios, but also performed some sanity checks with equally weighted versions.

The pricing model and the investment strategies tested

Carhart's four-factor model was used to measure abnormal performance

An important consideration in setting up any testing methodology is determining the benchmark against which one wants to measure the abnormal return of a portfolio. Looking at equity markets, the Capital Asset Pricing Model (CAPM) has traditionally been used for this purpose. It was later replaced by multi-factor models, such as the so-called Fama/French three-factor model. This, in turn, was superseded by an augmented four-factor version, which is now known as the Carhart model.[34] Over the past decade, in both academic literature and the quant practitioners' world, this model has become the quasi standard for measuring risk-adjusted abnormal returns, i.e. alpha. We therefore used it to evaluate the performance of our ESG Risk Ratings-based investment strategies.[35]

96 investment strategies were tested, half of them based on a cross-sectoral approach, the other half based on a best-in-class approach

The regression model was run over an investment period of 102/90 months (January 2010/11 to June 2018). Over this period, we tested 96 investment strategies that covered eight MEIs and all three main investment regions. For each of the eight issues and the three regions, we tested four ESG Risk Rating-based investment strategies. Figure 3.2 provides an overview of all tested strategy variants.

First, we looked at portfolios that were formed based on the ESG Risk Ratings' absolute notion of unmanaged risk (ABS strategies). In a practical sense, this means that we compared rating outcomes across all sectors with each other and created a single cross-sectoral ranking list from which we chose the companies to populate our investment strategy portfolios.

Figure 3.2: Overview of investment strategies tested*

	Strategy	Based on issue rating level	Based on issue rating delta	Portfolio returns - test period: Jan 2010 - Jun 2018 (102 months)	Portfolio returns - test period: Jan 2011 - Jun 2018 (90 months)	Regional coverage: Europe, North America, APAC
Cross-sectoral/absolute	ABS	x		x		x
	ABS-MOM		x		x	x
Best-in-class	BIC	x		x		x
	BIC-MOM		x		x	x

*ABS: portfolios based on score comparisons across all sectors; BIC: best-in-class score comparisons; MOM: momentum strategies, i.e. strategies based on annual changes of unmanaged risk scores on respective material ESG issues

Source: Sustainalytics

Secondly, we looked at portfolios that were formed based on a best-in-class logic (BIC strategies). This means that we did not compare the final rating outcomes across all sectors but compared rating outcomes within sectors to decide whether a company qualified to enter our respective investment portfolio for the subsequent 12 months.[36]

And finally, for both the cross-sectoral and the best-in-class versions, we also looked at momentum-based derived strategies (MOM strategies), which brings the total number of tested strategies per issue and region to four.

Reasonable degree of diversification

For the cross-sectoral, absolute versions of our investment strategy portfolios we chose to have a constant number of 20 companies.[37] This approach gave us a reasonable degree of diversification, but also allowed us to meaningfully separate companies that qualified for these portfolios from those that did not. Besides the top portfolios that comprise the companies with the lowest unmanaged risks, we also kept an eye on the bottom portfolios that were constructed in a similar manner and comprise the companies with the highest unmanaged risk for a given issue.

For the best-in-class versions of our ESG Risk Ratings-based investment strategies, we used a 30% threshold. This means that the top and the bottom 30% of companies that are ranked according to their unmanaged risk scores qualify for portfolio inclusion in a given year.

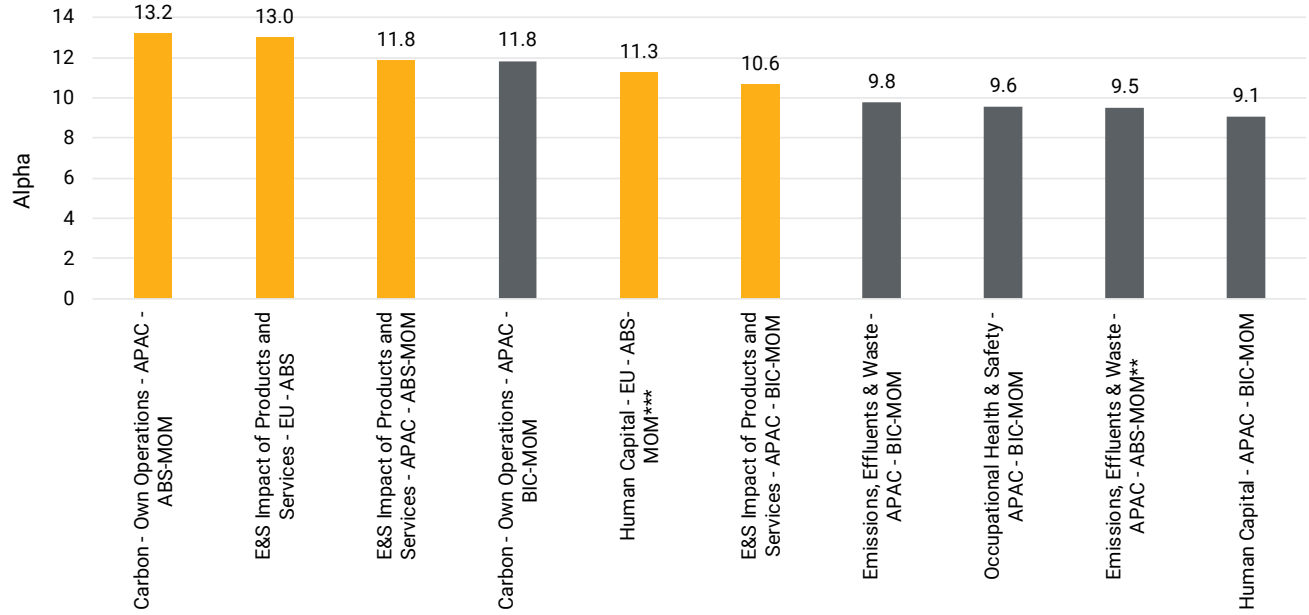
Momentum strategies: test period reduced from 102 to 90 months

For the two momentum-strategy versions, we formed portfolios based on changes in unmanaged risk ratings compared to the previous year. Companies that qualified for the top portfolio had experienced the strongest decrease in unmanaged risk, while the ones that saw the strongest increase in risk went into the bottom portfolio. For the two momentum strategies, the portfolio performance analysis started in January 2011, instead of January 2010, reflecting the need to calculate an annual change number as a prerequisite for portfolio formation. This reduces the portfolio return observation period to 90 months (from 102 months).

Signals to improve portfolio performance

The results we were able to achieve are promising and give us confidence that our new ESG Risk Ratings provide signals to investors that may allow them to structurally improve the risk and return profiles of their portfolios. Before we dive into some of the detail for a selected number of strategies, we would like to give an overview of the best performing investment strategies based on our ESG Risk Ratings below.

Figure 3.3: The 10 best ESG Risk Ratings investment strategies, Carhart model-based alphas in % p.a.*



*Jan. 2010/11 – Jun. 2018, gold bars: statistically significant at 1% level; grey bars: 5% level; ABS: portfolios based on score comparisons across all sectors; BIC: best-in-class score comparisons; MOM: momentum strategies, i.e. strategies based on annual changes of unmanaged risk scores on respective material ESG issues; **30 companies per portfolio; ***50 companies per portfolio

Source: Sustainalytics

Financially highly material and statistically significant abnormal returns have been detected

The abnormal returns of our 10 best-performing strategies vary between 9.1 and 13.2% per annum, which is highly material, although returns are measured before transaction costs (these are probably relatively low anyway, due to the annual rebalancing and comparatively low turnover). All of these estimates of alpha have a high statistical significance as well (five of them at the 1% level, five at the 5% level, based on a two-sided t-test).

Overall, 41 out of the 96 tested investment strategies yielded statistically significant positive – and therefore reliable – alphas, spanning from 2.2% p.a. to the already shown 13.2% per annum.

The share of statistically significant results is at 43%

The share of significant results (43%) is much higher than one would expect based solely on random chance. Hence, there is good reason to believe that our rating outcomes create value for our clients from a portfolio return and risk perspective. This result may either reflect another missing priced risk factor or a market anomaly that could be arbitraged away over time once the market has learned about the value of ESG risk signals as produced by our new rating model.

In the spotlight – Human Capital in Europe

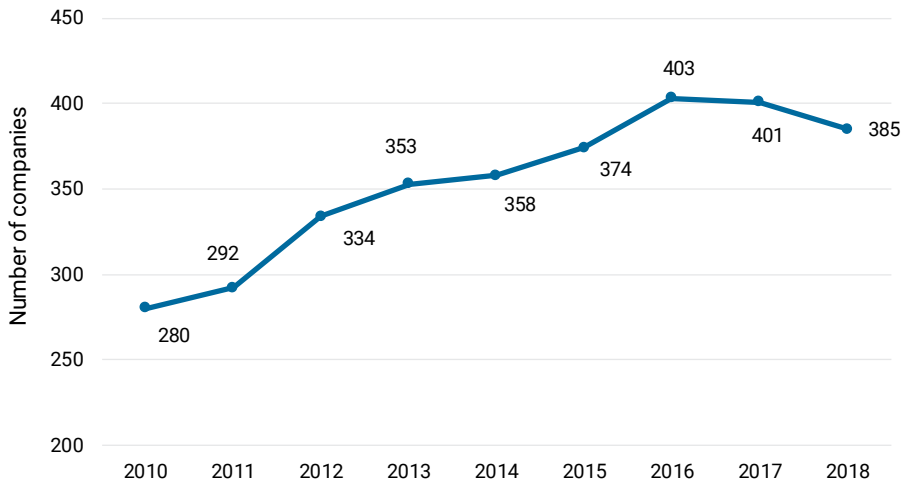
Going into more detail for one of the best-performing investment strategies we had tested

Out of the 41 investment strategies that generated a statistically significant alpha for low unmanaged risk portfolios, we would like to showcase one example and share a little more detail about the test procedure used and the empirical results we arrived at. We picked the issue Human Capital, which overall, i.e. across all three regions and across all four strategies (per issue) we looked at, yielded one of the strongest results among all 96 alternatives.[38]

Sufficient data available for eight out of a total of 10 sectors

As the graph below shows, the total number of companies that we worked with when forming the Human Capital strategy portfolios varied between 280 in 2010 and 385 in 2018, with a maximum of 403 in 2016. Sufficient data was available for eight out of a total of 10 sectors we looked at over the full 2010 to 2018 (102 months) investment period (90 months for momentum strategies).

Figure 3.4: Number of companies eligible for investment strategies, Human Capital – Europe



Source: Sustainalytics

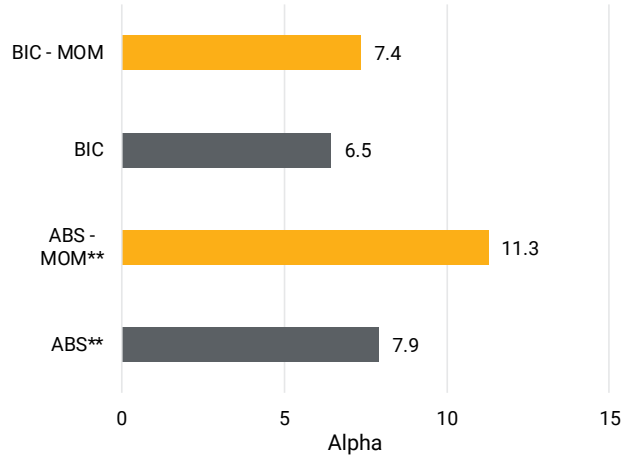
The results are impressive – for all four Human Capital unmanaged risk-based investment strategies we found a financially material and statistically significant alpha

The results for investment strategies based on unmanaged risk scores for the Human Capital issue in Europe are quite impressive. For all four strategies, the alpha is positive, economically material and statistically significant. Carhart model-based abnormal returns range from 6.5% p.a. for the best-in-class (BIC) level-based strategy to 11.3% for the momentum-based absolute strategy (ABS-MOM). As indicated by the different colours used in Figure 3.5 in the chart on the left-hand side, there were two strategies with a statistical significance at the 1% level and the other two at the 5% level.[39] The chart on the right-hand side shows the indexed total return development of the ABS-MOM investment strategy portfolio compared to the market benchmark.[40]

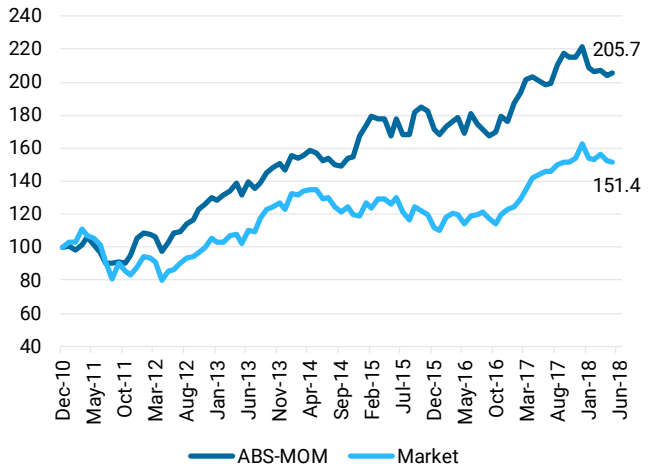
For all four strategies shown in Figure 3.5, the gross portfolio returns were significantly above market returns, ranging from 8.32% p.a. (ABS) to 13.03% p.a. (ABS–MOM), compared to just 6.31% (Jan. 2010-Jun. 2018) or 5.06% (Jan. 2011-Jun. 2018) for the Fama/French market factor return. All four Sharpe ratios were also higher than that for the market, with a maximum of 0.32 (ABS-MOM) compared to 0.13.

Figure 3.5: Human Capital – Europe: Performance of low-unmanaged risk portfolios*

a) Carhart-Alphas (in % p.a.)



b) Total return index development (ABS-MOM strategy)



*Jan. 2010/11-Jun. 2018; gold bars: statistically significant at 1% level; grey bars: 5% level; **50 companies per portfolio **Source:** Sustainalytics

Conclusion – Nothing points at a "random walk" or data snooping result

In conclusion, our analysis suggests that the measure of ESG risk we are generating with our new ESG Risk Ratings is a signal that demonstrated considerable value in a structured equity portfolio investment context. Beyond their financial materiality, they demonstrated considerable robustness and consistency. From our point of view, nothing appears to point at a pure "random walk" or data snooping result.

Regional differences between Europe, North America and APAC

Have our ESG Risk Ratings-based investment strategies been equally successful in North America and APAC?

The results presented only apply to the European market. However, as shown in Figure 3.6, Human Capital, for example, turns out to be of similar relevance and materiality in North America (USA and Canada) and APAC.

Figure 3.6: Human Capital – Alpha (in % p.a.): Comparison of across regions*

	Europe	North America	APAC
ABS**	7.9	4.1	6.4
ABS - MOM**	11.3	2.4	9.0
BIC	6.5	2.3	5.1
BIC - MOM	7.4	3.8	9.1
Average Alpha	8.2	3.2	7.4
Overall materiality score[3i]	49	33	27

*Jan. 2010/11–Jun. 2018; Gold-coloured fields: statistically significant at 1% level; grey-coloured fields: 5% level, teal-coloured fields: 10% level; white/no colour: statistically not significant
50 companies per portfolio **Source: Sustainalytics

Our measure of unmanaged Human Capital risks provides significant value in all three major investment regions, with Europe ranking on top of the list

The average alphas vary between 3.2% p.a. for North America, 7.4% for APAC and 8.2% for Europe. All alphas are positive, i.e. show a positive abnormal return for the portfolio that invests in low unmanaged risk companies. In 11 out of 12 cases, the alpha is statistically significant. We conclude that our measure of unmanaged Human Capital risks provides significant value when used in structured, smart beta-like investment processes in all three major investment regions, with Europe ranking on top of the list. Europe's leading position is not

only reflected in the highest average alpha provided by ESG Risk Ratings-based investment strategies, but also by the highest Overall Materiality Score we calculated for this region, compared to 33 for North America and 27 for the APAC region.

The overall picture is similar – the ESG Risk Ratings signal added value independent of the investment region and across all eight ESG issues

The regional differences in results for the Human Capital risk-based investment strategies are quite representative for the overall picture our empirical tests provided. As Figure 3.7 shows, the average alpha for the low unmanaged risk portfolios across all eight issues we looked at is positive. It ranges from 2.2% p.a. for North America to 6.8% p.a. for the APAC region. The share of statistically significant alphas, though, is highest for Europe. According to our materiality scoring model, Europe is the region for which one can most reliably assume positive risk-adjusted abnormal returns for portfolios that invest in companies with low unmanaged ESG issue risks.

Figure 3.7: Regional differences in the performance of investment strategies based on unmanaged risk assessments summarized across all issues*

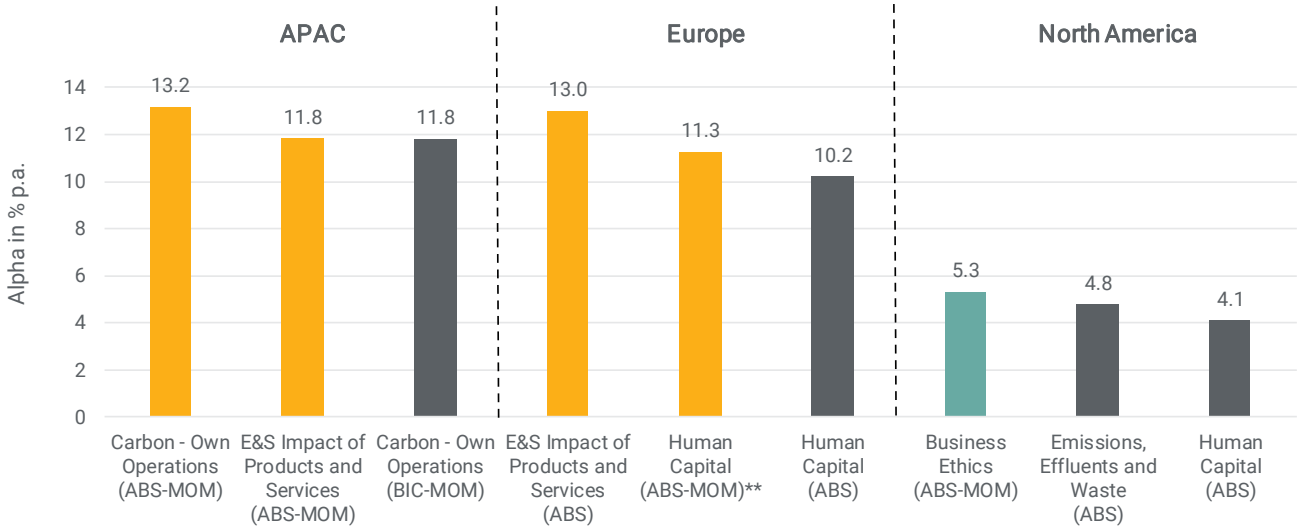
			Materiality Score[38]	
	Average Alpha (in % p.a.)	# of stat. sign. Alphas (in %)	Average Alpha Score	Average Total Score
North America	2.2	21.9	18	27
Europe	6.2	59.4	24	33
APAC	6.8	46.9	17	25

*Jan. 2010/11 – Jun. 2018 **Source:** Sustainalytics

Highest and most reliable alphas have been identified for the APAC region

This is also confirmed when looking at the top three of the best-performing strategies per region. As shown in Figure 3.8, APAC leads the pack with all three of the top strategies showing an alpha of above 10% p.a., with two of them being statistically significant at the 1% level, and one of them at the 5% level. Interestingly, all three are momentum-based strategies. Europe comes in second, with results that are statistically significant at roughly the same level, but with the alphas themselves being a little bit lower than for the APAC region. The results for North America are markedly different. Alphas are roughly only half of the size of those found in the two other regions. The statistical significance drops as well, with two cases coming in at a 5% level and one at a 10% level only. Nevertheless, one can say that also for North America, we were able to identify financially relevant and reliable risk-adjusted outperformance potential for risk rating-based investment strategies.

Figure 3.8: Selection of our best performing investment strategies based on the ESG Risk Ratings, 2010-18, Carhart model-based alphas in % p.a.*



*Gold columns: statistically significant at 1% level; grey columns: 5% level; teal columns: 10% level; ABS: portfolios based on score comparisons across all sectors; BIC: best-in-class score comparisons; MOM: momentum strategies (based on annual changes of unmanaged risk scores on respective material ESG issue); ** 50 companies per portfolio

Source: Sustainalytics

Can differences in omitted risk factors or difference in the maturity of markets explain our results?

The root causes behind the differences in results are not obvious. One possible explanation is that systematic risk factors that might have been omitted from the pricing model play a different role in the three regional markets we consider. Or more concretely, perhaps the four-factor model that we have used is more appropriate for the North American market than it is for the APAC and European markets. There is possibly another risk factor that is important in these markets and has been omitted from the four-factor model we have used to benchmark returns. Maybe this risk factor is related to a sustainability factor.

Another possible explanation lies in the different degrees of maturity and learning effects on these markets. Following this train of thought, however, one would need to argue that the equity markets in North America are more mature in pricing in ESG-related factors, which many would certainly consider to be a rather surprising result. Deeper dives and further research, in particular on the academic side, are needed to find answers to the questions raised by this part of our results.

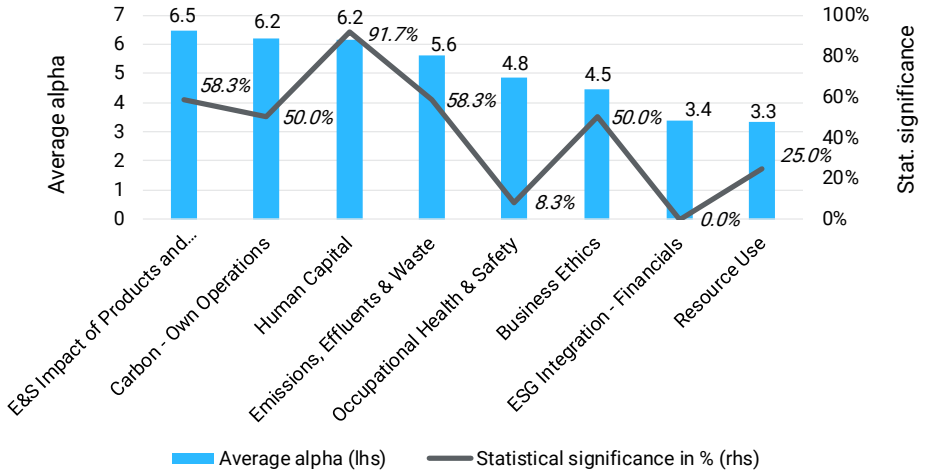
In conclusion, the overall picture conveyed by our empirical tests is that it could be worthwhile for investors to take ESG issue risks systematically into account in their portfolio construction processes, and to do this independent of the region they are investing in.

Differences across eight MEIs

ESG issues that provided the strongest investment signals when looked at from a risk perspective

It is also interesting explore the degree to which the deviations from the benchmark return provided by the Carhart model differ across the eight MEIs we looked at. In other words, do some of these issues yield higher abnormal returns than others when using unmanaged risk metrics to construct portfolios? Figure 3.9 summarizes the results of an analysis we did to address this question. For all eight material ESG issues we looked at, we found a positive average alpha, ranging from a minimum of 3.3% p.a. for Resource Use to 6.5% p.a. for E&S Impact of Products & Services. The most attractive combination of a high nominal alpha (6.2% p.a.) and statistical significance or confidence is provided by the Human Capital-based investment strategies. In 92% of the cases, these deliver a statistically significant positive abnormal return.[41]

Figure 3.9: Differences in the abnormal returns of investment strategies based on issue-specific unmanaged risk assessments summarized across all three main investment regions (Europe, North America, APAC)*



*Alphas in % p.a.; Jan. 2010/11-Jun. 2018 **Source:** Sustainalytics

Long/short strategies – A look at the other end of unmanaged risk

How do high ESG risk portfolios perform in terms of risk and return, and how can investors benefit?

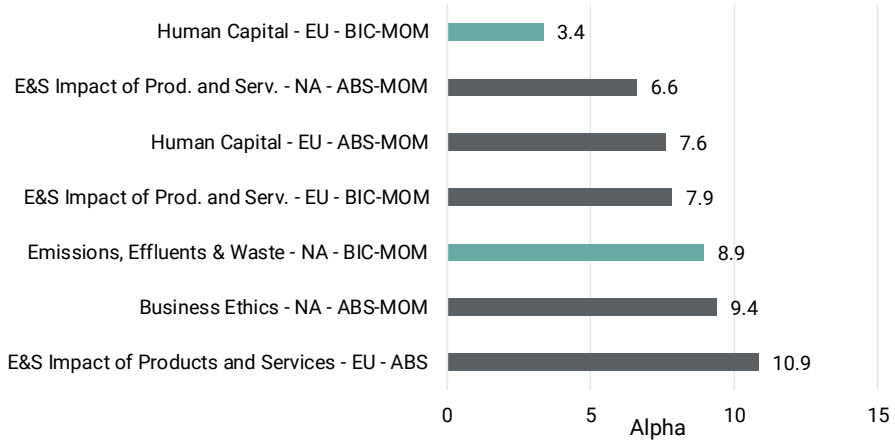
Finally, we would like to examine the other end of the unmanaged risk spectrum. So far, we have focused on low ESG risk portfolios only, but what about high ESG risk portfolios? How do they perform in a similar test setting? Is it possible to form long/short strategies that yield significant positive alphas, which would make these strategies particularly interesting from a hedge-fund perspective?

Similar to how we formed our low risk portfolios, by picking the top 20 or top 50 (or 30% in the best-in-class case) companies, we used the companies at the bottom of these lists to form high risk portfolios. Once again, these portfolios were market cap weighted and rebalanced at the end of each calendar year.

Performance of long/short strategies

Figure 3.10 shows the results of regressions that simulate a hedge portfolio going long in companies with low unmanaged ESG issue risks and short in companies with high unmanaged issue risks.

Figure 3.10: Carhart-Alphas of investment strategies going long in low unmanaged risk companies and short in high unmanaged risk companies*



*In % p.a.; Jan. 2010/11-Jun. 2018, grey columns: statistically significant at 5% level; teal columns: 10% level

Source: Sustainalytics

Mostly momentum-based, APAC not represented

In Figure 3.10, we list all long/short investment strategies that yielded positive and statistically significant abnormal returns. Abnormal returns range from 3.4% p.a. for a Human Capital based strategy to 10.9% p.a. for an E&S Impact of Products and Services strategy. Two out of seven strategies delivered statistically significant results at the 10% level, five did so at the 5% level. Europe is represented three times, North America four times. Interestingly, APAC is missing here, despite leading the pack for the long-only strategies. Six out of the seven strategies are momentum based. There no striking difference between best-in-class and cross-sectoral approaches.

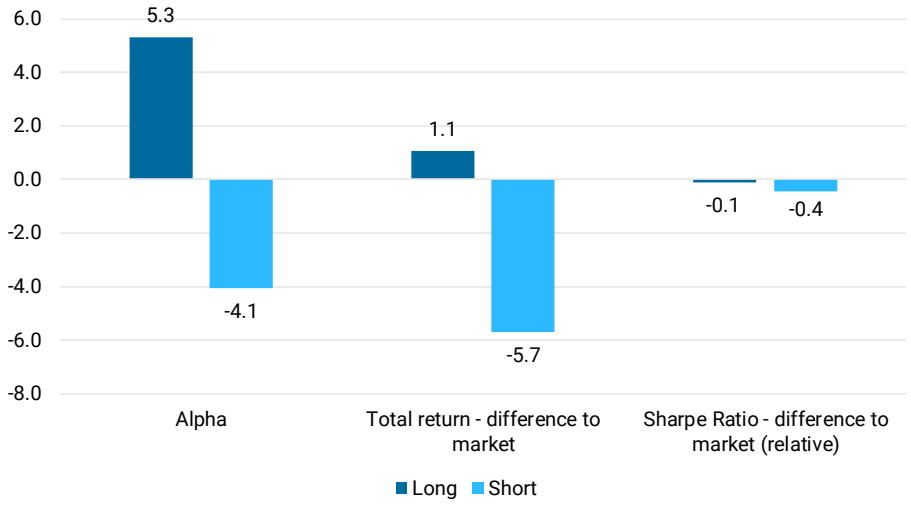
A deeper dive into Human Capital and Business Ethics based strategies

Among the top performers, once again, a Human Capital-based investment strategy can be found. Unmanaged Human Capital risks already proved to be a strong signal of potential risk adjusted performance through several lenses. In the case we look at here, the risk-adjusted return based on an absolute momentum strategy for the European market is at 7.6% p.a. and proved to be statistically highly significant at the 5% level.

How much do the long and short components contribute to overall abnormal returns?

Going a little further into the details, we notice that the low unmanaged risk component of the hedge portfolio provides an alpha of 7.9% p.a., whereas the high unmanaged risk component yielded a significantly lower 0.3% per annum. Hence, although the alpha for the short component is not negative, the difference compared to the long component is large, finally leading to the highly material risk-adjusted return of the long/short strategy. Even more striking is the pattern that we detected for the same strategy type applied to the Business Ethics issue in North America, with the alpha for the high-risk component of the portfolio clearly being below zero and the soundness of the long/short approach supported from a total return and Sharpe Ratio perspective as well, as demonstrated in Figure 3.11.

Figure 3.11: Business Ethics North America, ABS-MOM strategy; summary of long- and short portfolio component characteristics*



*Alpha and total return difference in % p.a.; Jan. 2011 – Jun. 2018 **Source:** Sustainalytics

For some investment strategies, we found a U-shaped alpha pattern

U-shape: What if high risk outperforms the market as well?

Going long in companies with the lowest unmanaged risks and short in companies with the highest unmanaged risk did not always yield a positive alpha. Interestingly, in some cases, we found a U-shaped pattern, with both the low and the high unmanaged risk portfolio showing risk-adjusted outperformance vis-à-vis the market. One example of this is the absolute momentum strategy, based on the E&S Impact of Products and Services issue applied to the APAC region, as shown in Figure 3.12. Both portfolios, the low risk one and the high risk one, yielded an alpha well above 10% p.a., both statistically significant at the 1% level. A hedge portfolio combining the two components in the usual manner would not have worked, with the two alphas more or less neutralising each other.

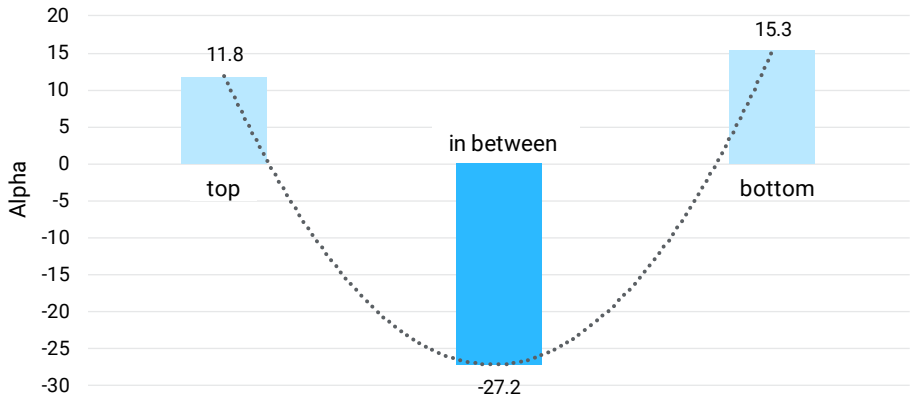
What are the possible root causes for this result? Is it similar to the well-known "sin stock" phenomenon?

Why do portfolios with a high unmanaged ESG risk outperform the market on a risk-adjusted basis by such a wide margin? First of all, we would like to point out that this outcome seems to be similar to the well-known and much debated outperformance of "sin stocks" phenomenon (see Hong/Kacperczyk, 2009), that raised a lot of questions about the financial viability of negative screening/ exclusion approaches that prevailed in the Responsible Investment industry for a long time.[42] One of the explanations given in this debate may also apply here, and that is, that the high abnormal return for companies that perform poorly from an ESG perspective reflect a risk premium that is not contained in the traditional measures of systematic risk. While this may be true, and we certainly cannot reject this hypothesis outright, it seems; however, it is fair to say that the equally significant alpha on the other side of the risk spectrum is not consistent with this hypothesis.

U-shape may result from a combination of two factors, risk compensation and neglect

We would, therefore, suggest that the empirical result we see may be a combination of two effects: an expected return/compensation for higher risk effect on the one hand, and a neglect effect on the other hand. For the latter, the story would be that the market systematically underestimated the opportunities that arose from managing E&S Impact of Products and Services and was subsequently surprised about positive outcomes, still not understanding where these were coming from. A further exploration of the root causes of this result needs to be left to future research.

Figure 3.12: U-shape of Carhart alphas; E&S Impact of Products and Services, APAC, ABS-MOM*



*In % p.a.; Jan. 2011-June 2018. The alpha calculation for the "in between portfolio" is based on the assumption that abnormal returns at the market level need to sum up to zero. Obviously, this is a simplifying assumption here, because not all companies that are constituents of the APAC market portfolio had been eligible for the strategy formation process. Hence, the middle column in the graph above is for illustrative purposes only.

Source: Sustainalytics

Concluding remarks

Yes, the results appear impressive …

The results appear quite impressive, and some of our findings go beyond what we were expecting when we started our empirical tests. In many cases, we found alphas that are financially material, statistically significant and robust. Our empirical results give us confidence that investors will find significant value in using the outcomes from our new ESG Risk Ratings as strong signals in their investment processes in multiple ways, a topic we elaborate on in Volume 3 of the ESG Risk Ratings White Paper series. We will also continue to run empirical tests of our new ESG Risk Ratings in lockstep with our efforts to close historical data gaps and publish their results in our ESG Spotlight series.

… but also need to be interpreted carefully

Independent of how impressive our results may be, they need, like any empirical backtest result, a careful and differentiated interpretation. For example, the fact that we detected significant abnormal returns may signal the presence of an unknown systematic risk factor as well as mispricing. The difference between the three regions may point at the maturity of learning processes that the respective markets are going through. Similarly, differences in abnormal returns across ESG issues may be driven by materiality considerations or may simply reflect the degrees to which these risks are priced in already.

Mainstreaming of ESG integration means that abnormal returns will disappear over time

With the mainstreaming of RI in general and ESG integration in particular, we need to expect that robust abnormal returns, such as we found them in this study, will eventually disappear. Over the long run, there is no free lunch in the capital markets. In that sense, ESG integration may very well become the victim of its own success. This (potential) outcome should be viewed as a positive message, however, since the hope of many in the RI community is that financial markets come to fully price in ESG factors, which would help steer capital to flow in the right, i.e. long-term sustainable, directions. The intention of our new ESG Risk Ratings is to help investors make better long-term and sustainable investment decisions, thereby contributing to achieving this higher market-level goal.

Appendix

Glossary of Terms

Beta

See Issue Beta

Corporate Governance

A foundational building block (baseline) in the ESG Risk Ratings that applies to companies across all sectors and in every subindustry. A company's Corporate Governance practices can affect its ability to execute on its business strategy as well as its ESG strategy. Corporate Governance comprises six pillars (corporate governance pillars), indicating foundational structures that can contribute to the management of environmental and social risks.

Like material ESG issues, Corporate Governance is assessed via two dimensions: the exposure dimension and the management dimension. However, as exposure to Corporate Governance issues is not considered to be subindustry or company specific, a fixed exposure score of nine applies to all public companies regardless of subindustry, and company-specific betas are not applied to Corporate Governance exposure scores.

Corporate Governance Pillar

The six pillars that comprise the Corporate Governance assessment include: Board/Management Quality & Integrity; Board Structure; Ownership & Shareholder Rights; Remuneration; Audit & Financial Reporting; and Stakeholder Governance.

ESG Risk Category

A company's ESG Risk Ratings score is assigned to one of five ESG risk categories in the ESG Risk Ratings:

- negligible risk (overall score of 0-9.99 points): enterprise value is considered to have a negligible risk of material financial impacts driven by ESG factors;
- low risk (10-19.99 points): enterprise value is considered to have a low risk of material financial impacts driven by ESG factors;
- medium risk (20-29.99 points): enterprise value is considered to have a medium risk of material financial impacts driven by ESG factors;
- high risk (30-39.99 points): enterprise value is considered to have a high risk of material financial impacts driven by ESG factors;
- severe risk (40 and higher points): enterprise value is considered to have a severe risk of material financial impacts driven by ESG factors.

Note: Because ESG risks materialize at an unknown time in the future and depend on a variety of unpredictable conditions, no predictions on financial or share price impacts, or on the time horizon of such impacts, are intended or implied by these risk categories.

ESG Risk Ratings Score (Overall Unmanaged Risk Score, ESG Risk Ratings)

The company's overall score in the ESG Risk Ratings; it applies the concept of risk decomposition to derive the level of unmanaged risk for a company, which is assigned to one of five risk categories. The score ranges from 0 and 100, with 0 indicating that risks have been fully managed (no unmanaged ESG risks) and 100 indicating the highest level of unmanaged risk. It is calculated as the difference between a company's overall exposure score and its overall managed risk score, or alternatively by adding the Corporate Governance unmanaged risk score to the sum of the company's issue unmanaged risk scores.

Event Indicator Category (Event Category)

Sustainalytics categorizes events that have resulted in negative ESG impacts into five event categories: Category 1 (low impact); Category 2 (moderate impact); Category 3 (significant impact); Category 4 (high impact); and Category 5 (severe impact).

Event Indicator	An indicator that provides a signal about a potential failure of management through involvement in controversies. An event indicator for a material ESG issue has an increased weight within the issue management score as the event category rises (see events logic). If it relates to an ESG issue that was not previously selected as material for a company, the issue becomes material if there is a category 4 or 5 event (see idiosyncratic issues).
Exposure Dimension (Exposure)	One of the two dimensions of the ESG Risk Ratings, this dimension reflects the extent to which a company is exposed to material ESG risks. Exposure can be considered as a sensitivity or vulnerability to ESG risks.
Exposure Score (Exposure)	A score between 0 and 100 to assess the Exposure Dimension of the ESG Risk Ratings.
Idiosyncratic Issue	An idiosyncratic issue is an issue that was not deemed material at the subindustry level during the consultation process but becomes a material ESG issue for a company based on the occurrence of a Category 4 or 5 event. Idiosyncratic issues are represented only by the respective event indicator and receive an exposure score according to a specific predetermined scheme.
Issue Beta (Beta, β)	A factor that assesses the degree to which a company's exposure deviates from its subindustry's exposure on a material ESG issue. It is used to derive a company-specific issue exposure score for a material ESG issue. It ranges from 0 to 10, with 0 indicating no exposure, 1 indicating the subindustry average (as represented by the subindustry exposure score), and 2 indicating exposure that is twice the subindustry average. Betas above 2 are extreme cases and very rare.
Manageable Risk	Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives. Note that fully manageable does not mean that Sustainalytics believes there are no challenges or difficulties to managing the issue – rather, fully manageable indicates that there are no evident physical or structural barriers that make it impossible to fully manage the issue. Furthermore, fully managed does not mean that there is never a problem; rather, it means that a problem can be dealt with proactively to avoid material risks.
Managed Risk	Material ESG Risk that has been managed by a company through suitable policies, programmes or initiatives.
Issue Management Gap Score (Issue Management Gap, Management Gap)	Refers to the amount of manageable risk that the company could address through policies and programmes, but which is has not yet managed. It is calculated by subtracting the issue managed risk score from the issue manageable risk score. The score ranges from 0 to a company's issue manageable risk score (maximum of 20), with 0 indicating that all of a company's manageable risk pertaining to a material ESG issue has been managed, and a score equalling a company's issue manageable risk score indicating that none of the company's manageable risk pertaining to a material ESG issue has been managed. issue management gap score = issue manageable risk score – issue managed risk score
Management Dimension (Management)	One of the two dimensions of the ESG Risk Ratings, this dimension measures a company's handling of material ESG issues through policies, programmes, quantitative performance and involvement in controversies, as well as its management of Corporate Governance.

Management Indicator	An indicator that provides a signal about a company's management of an ESG issue through policies, programmes or quantitative performance, for example. Management indicator raw scores range from 0 to 100, with 0 indicating no (evidence of) management of the issue and 100 indicating very strong management.
Material ESG Issues	A core building block of the ESG Risk Ratings. An ESG issue is considered to be material within the rating if it is likely to have a significant effect on the enterprise value of a typical company within a given subindustry and its presence or absence in financial reporting is likely to influence the decisions made by a reasonable investor. Material ESG issues were determined at a subindustry level in the consultation process but can be disabled for a company if the issue is not relevant to the company's business. A disabled material ESG issue has a weight of 0. Note that no specific predictions about financial impacts at the company level are implied by the presence or absence of an issue as a material ESG issue.
Unmanageable Risk	Material ESG Risk inherent from the intrinsic nature of the products or services of a company and/or the nature of a company's business, which cannot be managed by the company if the company continues to offer the same type of products or services and remains in the same line of business. For example, a coal company cannot fully manage the carbon emission risks of coal without exiting the coal business, as coal will continue to emit carbon when burned, regardless of a company's management initiatives. The only option to fully manage this risk would be to diversify out of the coal business. This risk cannot be meaningfully modelled by assessment of management indicators and is therefore regarded as unmanageable.
Unmanaged Risk	Material ESG Risk that has not been managed by a company, and includes two types of risk: unmanageable risk, which cannot be addressed by company initiatives, as well as the management gap, which represents risks that could be managed by a company through suitable initiatives, but which may not yet be managed.

Endnotes

1 Sustainalytics, last accessed (11.10.2018) at: https://www.sustainalytics.com/esg-ratings/

2 Global Sustainable Investment Alliance, The 2016 Global Sustainable Investment Review (2017), last accessed (11.10.2018) at: http://www.gsi-alliance.org/wp-content/uploads/2017/03/GSIR_Review2016.F.pdf; Data for 2013 and 2015 interpolated by Sustainalytics.

3 Global Sustainable Investment Alliance, (11.10.2018), op. cit.

4 PricewaterhouseCoopers, Asset & Wealth Management Revolution: Embracing Exponential Change (2017), last accessed (11.10.2018) at: https://www.pwc.com/gx/en/asset-management/asset-management-insights/assets/awm-revolution-full-report-final.pdf; Global Sustainable Investment Alliance, (11.10.2018), op. cit.

5 Global Sustainable Investment Alliance, (11.10.2018), op. cit. The GSIA uses seven categories: negative/exclusionary screening, positive/best-in-class screening, norms-based screening, ESG integration, sustainability themed investing, impact/community investing and corporate engagement/shareholder action. We used "negative screening" to refer to "negative/exclusionary screening," and "corporate engagement" to refer to "corporate engagement/shareholder action." Due to double counting in the GSIA methodology, the segmentation based on ESG AUM is in excess of USD 23tn.

6 Principles for Responsible Investment, last accessed (11.10.2018) at: https://www.unpri.org/pri/what-are-the-principles-for-responsible-investment

7 Principles for Responsible Investment, (11.10.2018), op. cit.

8 Principles for Responsible Investment, last accessed (11.10.2018) at: https://www.unpri.org/Uploads/n/l/l/PRI-Global-growth-2006-2018.xlsx; Principles for Responsible Investment, last accessed (11.10.2018) at: https://www.unpri.org/Uploads/l/n/c/PRIWorkProgramme2017.pdf. Presented 2018 data is as of Q3.

9 Principles for Responsible Investment, last accessed (11.10.2018) at: https://www.unpri.org/Uploads/n/l/l/PRI-Global-growth-2006-2018.xlsx

10 Robinson-Tillett, S. (29.05.2018), "PRI opens board elections as it begins placing signatories on 'watch list'," responsible-investor.com, last accessed (11.10.2018) at: https://www.responsible-investor.com/home/article/pri_opens_board_elections_as_it_begins_placing_signatories_on_watch_list/

11 Global Reporting Initiative, last accessed (11.10.2018) at: http://database.globalreporting.org/search/

12 Kell, G. (11.07.2018), "The remarkable rise of ESG," Forbes, last accessed (11.10.2018) at: https://www.forbes.com/sites/georgkell/2018/07/11/the-remarkable-rise-of-esg/#15ee5a7d1695

13 Global Reporting Initiative, (11.10.2018), op. cit.

14 Climate Disclosure Standards Board and the World Business Council for Sustainable Development, Insights from the reporting exchange (2017), last accessed (11.10.2018) at: https://www.cdsb.net/sites/default/files/cdsb_report_1_esg.pdf

15 Friede G., Busch T. and Bassen A. (09.11.2015), "ESG and financial performance: aggregated evidence from more than 2000 empirical studies," Journal of Sustainable Finance & Investment, Vol. 5, No. 4, last accessed (11.10.2018) at: https://www.tandfonline.com/doi/pdf/10.1080/20430795.2015.1118917

16 Mozaffar, K., Serafeim, G. and Yoon A. (2016), "Corporate sustainability: first evidence on materiality," The Accounting Review, Vol. 91, No. 6, last accessed (11.10.2018) at: http://www.aaajournals.org/doi/abs/10.2308/accr-51383?code=aaan-site

17 For a more detailed discussion of use cases, see Volume 3 of the ESG Risk Ratings White Paper Series (forthcoming). We are also planning to address individual use cases for our new rating in more detail in our ESG Spotlight series.

18 The classification of companies is based on Sustainalytics' proprietary Industry Classification scheme that comprises three levels of granularity: Subindustry, Industry Group, and Universe. For more information contact us via the usual communication channels.

19 What sufficiency means in this context may, for example, be defined by structured frameworks such as the UN Sustainable Development Goals (SDGs). United Nations, Sustainable Development Goals, last accessed (11.10.2018) at: https://www.un.org/sustainabledevelopment/sustainable-development-goals/

20 In mainstream finance, beta measures the risk of a security relative to a market benchmark. It reflects the portion of a security's total risk that is systematic (as opposed to unsystematic), meaning that it cannot be diversified away. As a consequence, the average beta (i.e. the beta of the market) is always one, with a larger deviation from the average signifying a larger difference between the security and the overall market. A beta of less than one signals a level of systematic risk that is below market average, and a beta greater than one signals a level of systematic risk that is above market average. A similar interpretation of betas is applied when moving from a one-factor model (the CAPM) to so-called multi-factor models. The concept of a multi-factorial beta has been figuratively applied in the ESG Risk Ratings, in which betas determine a company's exposure to the selected material ESG issues respectively. In our model they are measured relative to its subindustry's exposure to the same issue. They assure that the exposure scores used to determine the final rating more accurately reflect different companies' levels of risk. It is a way of sharpening or refining the ESG risk signal. See, Fama, E. F. and French, K. R., (1993), "Common risk factors in the returns on stocks and bonds," Journal of Financial Economics, Vol. 33 (1), pp. 3-56.

21 For a full list of indicators used for the new ESG Risk Ratings, please contact us via the usual communication channels.

22 For more information about our traditional ESG Ratings, please contact us via the usual communication channels.

23 To summarize some key points regarding the differences in the distributions of rating outcomes (Figure 2.13): (1) the share of companies in the middle bracket drops from 67% in our traditional ESG Ratings to 35% in the new ESG Risk Ratings; i.e. there is less mass in the middle; (2) one can find significantly more companies in the two lower brackets of the ESG Risk Ratings that represent higher risks (together 1,439 companies or 33%) compared to the two lower brackets of the ESG Ratings that represent weaker management (together 568 companies or 14%); (3) there are significantly less companies in the top bracket of the ESG Risk Ratings that represents negligible risk (53 companies or 1%) vs. the top bracket of the ESG Ratings that represents leaders (268 companies or 7%).

24 For example, Gompers, Ishii and Metrick (2003) study the impact of corporate governance on firm performance during the 1990s. They find that stock returns of firms with strong shareholder rights outperform, on a risk-adjusted basis, returns of firms with weak shareholder rights by 8.5% per year during this decade. See, Gompers, P., Ishii, J. and Metrick A. (2003), "Corporate governance and equity prices," Quarterly Journal of Economics, Vol. 118 (1), pp. 107-156, last accessed (11.10.2018) at: https://academic.oup.com/qje/article-abstract/118/1/107/1917018. Other, more recent papers, however, found rather mixed evidence, when looking at corporate governance metrics and firm performance (stock prices and operational performance).

25 Corporate Governance practices tend to have significant regional variations, because they are determined in part by regional regulations.

26 A full list with definitions is available for our clients upon request. Please contact us via the usual communication channels.

27 The exact ways in which issues have an impact on companies in a given subindustry is summarized in what we call Issue Narratives. They are available to our clients upon request. More than 839 of them are available (number of subindustries * number of material ESG issues selected for each of them). Issue Narratives are reviewed and updated on an annual basis.

28 There is one exception to this principle: ESG Integration – Financials. For this issue, there were too many practical barriers in company reporting to allow for further splitting.

29 Our assessment of events rests on a five-stage classification scheme: Category 1 (low impact); Category 2 (moderate impact); Category 3 (significant impact); Category 4 (high impact); and Category 5 (severe impact). For more information about our Events methodology in general, please contact us via the usual communication channels.

30 Many thanks to those who contributed to the empirical testing of our new ESG Risk Ratings methodology, in particular to Thomas Hassl, who did some of the pioneering work at the start of the project, and Victor Ursulescu, who managed data inputs and displays.

31 The fact that the ESG Risk Ratings were developed as a completely new approach/methodology, a true innovation, made it unavoidable that we would face some data constraints in back-testing. For example, new indicators were introduced to assure that we were able to measure how well a company is able to manage its financially material ESG issues. Obviously, there was no track record for these new indicators. Similarly, the second dimension of the rating, the exposure dimension, was also newly developed and introduced with the ESG Risk Ratings, which meant an absence of historical data points. We dealt with this situation by (1) backfilling historical data gaps as feasible, and (2) making simplifying assumptions or reducing completeness requirements. For example, we assumed that exposures did not change during the testing period. We also assumed that only two thirds of the management indicator weight needed to be covered in order to make an issue eligible for the testing. Overall, the data constraints we faced for some issues made it impossible to back-test the overall rating, an outcome that would have required a complete dataset. We are planning to continue our back-testing efforts and will present further results in lockstep with the progress we make in backfilling further data gaps.

32 Note that these numbers are not equivalent with the net number of companies per year we were able to work with due to overlapping sub-samples.

33 The share price and market cap data has been sourced from Bloomberg.

34 Carhart, M. (1997), "On persistence in mutual fund performance," The Journal of Finance, Vol. 52, last accessed (11.10.2018) at:
https://onlinelibrary.wiley.com/doi/full/10.1111/j.1540-6261.1997.tb03808.x

35 In technical terms, the Carhart α is nothing else than the intercept (α) of the following four factor regression:

$$R_t - Rf_t = \alpha + \beta_1 * RMRF_t + \beta_2 * SMB_t + \beta_3 * HML_t + \beta_4 * UMD_t + \varepsilon_t$$

R_t is the monthly return of an investment strategy portfolio and Rf_t is the risk-free rate in month t. RMRF is the difference between market return and the risk-free rate, SMB is the difference in return between a small-cap portfolio and a large-cap portfolio, HML is the difference in return between a portfolio of high book-to-market stocks and one of low book-to-market equities and UMD is the difference in return between equities with upward and downward share price momentum. We used monthly factor return data from Kenneth French's data library, available at:
http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

36 We worked with sectors here instead of industry groups or subindustries to assure the availability of a sufficient number of choice options for the portfolio construction process.

37 Either to test the impact of the degree of diversification or to reflect the lack of data points for a given issue and region, we deviated from the standard specification with 20 companies per portfolio in some cases. We will make this transparent when speaking to the results of our tests.

38 The benchmarking of strategies was done based on a simple scoring algorithm that allocated scores based on whether alphas displayed the right sign and their degree of statistical significance. For the issue at hand, which is Human Capital, the four strategies we tested achieved a score of 40 out of a (theoretical) maximum score of 100. The average score across all 96 strategies is 20. The Overall Materiality Score is a metric that has been calculated as an

"all in one" measure that summarizes the expected ("right") sign of outcomes for the Carhart-Alpha, the total return, the Sharpe Ratio AND the statistical significance of results.

39 Both ABS portfolios comprise a number of 50 companies for the entire investment period. The availability of data allowed us to increase the level of diversification which in turn helped to reduce return variance and increase the statistical significance of results.

40 As part of our sanity checks, we also looked at equally-weighted instead of market value weighted portfolio returns. The results were less significant but did not contradict our initial main findings. In general, our impression is that the empirical results for the equally weighted portfolio returns are less significant than the ones for the value-weighted versions. Interestingly, these results show that the findings of our analysis are not impacted by the equal-weighting effect found in empirical studies.

41 The weakest results according to this metric are observed for Occupational Health & Safety (8%) and ESG Integration – Financials (no statistical significance at all). Does this mean these ESG issues should not be considered financially material? Not at all. One explanation could be that these risk factors are fully priced by the market already, which means that differences in ESG risks are fully reflected in traditional, priced risk factors already. The same logic applies here as for any other financial metric as well. Differences, let's say in the profitability of companies, should also not lead to risk adjusted return differentials in efficient and competitive markets. In particular for the Occupational Health & Safety issue, one may assume that the market has reached some maturity in understanding the financial risks that are associated with the exposure of companies to this issue – hence, market prices may already fully reflect differences in these risks which are considered to be part of market risk.

Another, less theoretical explanation may be that our empirical tests for both issues suffered from data availability constraints. As the A.1 shows, in this case for the issue Occupational Health & Safety, the number of companies eligible for the inclusion in our issue risk-based strategy portfolios, varied roughly between 50 and 80 during the years 2010 to 2016, exclusively coming from the Industrials sector. For the years 2017 and 2018, we were able to add companies from the Utilities and Materials sectors, but overall numbers remained relatively low and the full spectrum of differences in the exposure of companies to this issue across the entire universe was certainly not represented in our sample. As said above, we will continue to fill historical data gaps and will update our empirical tests accordingly going forward.

Figure A.1: Number of companies eligible for our Occupational Health & Safety based investment strategy portfolio; 2010 – 2018

	Industrials only		Utilities and Materials added	
	2010	2016	2017	2018
APAC	56	65	130	126
Europe	53	84	177	170
North America	49	62	140	148

Source: Sustainalytics

42 Hong, H. and Kacperczyk, M. (2009), "The price of sin: The effects of social norms on markets," Journal of Financial Economics, Vol. 93, last accessed (11.10.2018) at: http://pages.stern.nyu.edu/~sternfin/mkacperc/public_html/sin.pdf

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