

# A Detailed Look at Climate Transition Risk Data

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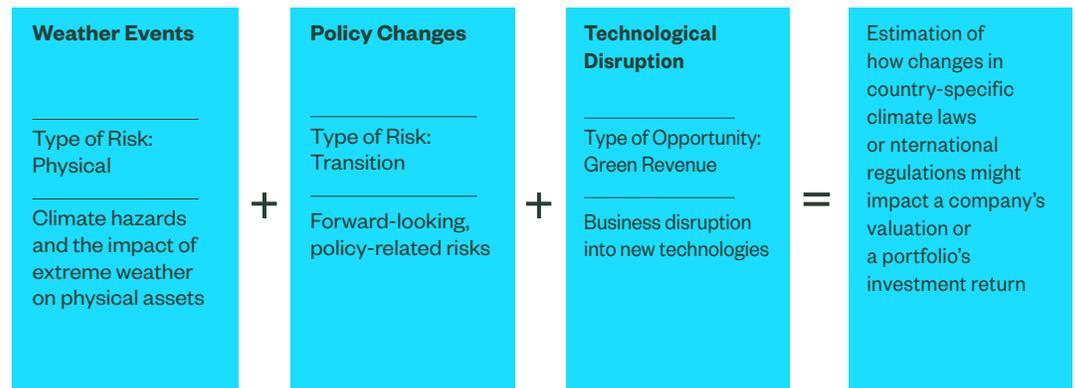
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In this piece, we discuss various environmental, social and governance (ESG) vendors' approaches to transition risk, which relates to future changes in environmental policy. Assessing transition risk matters because it is one of the major components of climate risk for companies, alongside physical risk (see [Physical Climate Risk Data: A Primer and Evaluation](#)). By modeling climate risk and green revenue opportunities across global business, investors can gain insight into a company's resilience to the transition (Figure 1). The majority of datasets and models related to the transition are closely aligned with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations to perform scenario analysis on investment portfolios.

Figure 1  
**How Climate Risk and Opportunity Modeling Can Provide Insights into Future Performance**



Source: State Street Global Advisors, as of September 20, 2023.

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## Transition Data Lacks Standardization

Vendors generate climate transition risk data in an assortment of ways — just as they do for many other types of ESG data. Different ESG vendors have adopted various proprietary methodologies and employed different climate pathways, criteria, and considerations to drive their transition risk models. Therefore, we believe that investors should take a closer look at the methodologies of each vendor.

That said, the vendors' common goal is to capture a company's exposure to climate transition and policy risk according to different potential future scenarios, as well to calculate what the current value of a company or portfolio could be due to future cash outflows from carbon pricing and/or a reliance on green and low-carbon technology opportunities.

We analyzed the current approaches to transition risk of three climate data vendors: MSCI, ISS, and S&P Trucost. While their approaches are current as of the date of publication of this collateral, this is a rapidly evolving space. Vendors have been modifying their transition risk solutions in recent months, and more changes are expected in the future.

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## MSCI

MSCI tackles transition risk by focusing on two key components:

- 1 Policy Risk** MSCI calculates the projected carbon emission reductions needed to meet the particular carbon price and temperature objectives for several future scenarios. The net present value of future additional costs is normalized by the company's market value to attain a Policy Risk Climate Value-at-Risk (VaR) (see: [Climate VaR and Financial Value: Assessing the Empirical Evidence](#)).
- 2 Technological Opportunities** Similar to the policy risk model, this provides an estimate of future profits that a firm might derive thanks to its involvement in green or low-carbon technologies. MSCI identifies those technologies by evaluating companies' estimated low-carbon revenues and analyzing a database of millions of patents. The net present value of future profits is then normalized by the firm's market value in order to calculate the Technology Opportunity Climate VaR.

The Policy Risk and Technology Opportunity results are equally weighted to calculate an aggregated Transition VaR. The assessment of how climate change may affect investment returns for a particular company takes the form of a percentage change from a company's current valuation.

MSCI also has a second distinct tool to identify transition risks and opportunities. MSCI designed this tool, named the "Low Carbon Transition Risk Assessment" (LCR), to identify potential leaders and laggards in transition risk by measuring companies' exposure to and management of risks and opportunities related to the low carbon transition. The assumption behind this rating mechanism, which scores companies using a 0–10 scale, is that if a low-carbon transition takes place, demand for carbon-intensive products would decline in favor of low/net-zero carbon products.

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## ISS

ISS also has two main focuses:

- 1 Carbon Risk** ISS's Carbon Risk Rating is a proprietary scoring system that is comparable to MSCI's Low Carbon Transition Risk Assessment. ISS created the Carbon Risk Rating (CRR) to evaluate how well a particular company or portfolio is prepared to face the low-carbon economy of the future.

**The CRR is split into two complementary sub-scores** The first one is the Carbon Risk Classification, which aims at evaluating a company's exposure to climate change risks, given its industry, products, and business lines. The second sub-score is the Carbon Performance Score, which quantifies how well the firm is able to capitalize on climate-related opportunities and manage risks.

- 2 Geographic-related Risk** ISS's transition VaR dataset is similar to MSCI's Transition CVaR tool. However, ISS has created a more specialized Transition VaR model. This dataset leverages two available scenarios. Both scenarios take into account policy risks as well as market and technology risks.

The ISS TVaR model links each company's geographical exposure profile to each scenario's carbon prices, and evaluates the impact of transition risks and opportunities<sup>1</sup> on the valuation of each company. To do so, ISS employs its proprietary Economic Value Added methodology. ISS can calculate a total TVaR by estimating the change in share price resulting from the financial impact of transition risks and opportunities.

Separately, ISS calculates a final Risk Rating that is an aggregated score indicating a company's overall climate-related risk. The final Risk Rating accounts for transition risk, as it indicates how a particular firm's baseline risks may impact how it can mitigate transition risk.

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## S&P TRUCOST

S&P Trucost has focused its approach on the development of its Carbon Earnings at Risk (CEaR) dataset. The dataset assesses the potential impact of the global carbon transition on a company's current earnings. To quantify a company's potential exposure to carbon price increases, Trucost identifies sectors that would be particularly impacted by that risk. In addition, Trucost considers the countries or jurisdictions in which those companies operate to estimate the percentage of unpriced carbon cost that an investor is exposed to.

## Comparing and Evaluating the Approaches

Figure 2  
The Leading Climate Data Vendors Have Varied Approaches to Transition Risk

In Figure 2, we highlight some of the key features, similarities and idiosyncrasies of the three datasets.

	ISS	MSCI	S&P Trucost
<b>Policy Risk</b>	Y	Y	Y
<b>Technology Opportunities</b>	Y	Y	N
<b>Emission Data</b>	Only Scope 1 and 2	Scope 1, 2, and 3	Only Scope 1 and 2
<b>Coverage (# of Companies)</b>	11,000+ companies	11,000+ companies	17,000+ companies
<b>History</b>	Q4 2021 onwards	2022 onwards	2018 onwards
<b>Numerical Outputs</b>	TVaR (% and absolute values); Estimated change in sales due to transition risk (%); Carbon Risk Classification, Carbon Performance Score (1–4 scores); and Carbon Risk Ratings (0–100 scores).	Policy Risk Climate VaR (%); Technology Opportunities Climate VaR (%); Transition Climate VaR (%); Climate VaR (%); Low Carbon Transition Score (0–10 scores); Low Carbon Transition Category (5 qualitative brackets).	Unpriced carbon costs in \$M, as well as percentages of earnings at risk due to carbon pricing.

Sources: ISS, MSCI, and S&P Trucost, as of June 30, 2023.

## Comparative Analysis: MSCI TVaR versus ISS TVaR

Table 1 illustrates that MSCI and ISS each have strong geographic and market-size coverage. Beyond large-cap developed markets, emerging markets are also robustly covered. In addition, both vendors have employed the ideas of traditional financial modeling for this metric formation.

## General Correlation

Due to the variances in Integrated Assessment Models (IAMs),<sup>2</sup> scenarios, and temperature goals, MSCI has a stronger variety: MSCI aggregates 15 pairs of TVaR attributes, while ISS provides only 2. MSCI aggregates 15 TVaR attributes mainly according to four different IAMs, including NGFS, AIM CGE, GCAM, and IMAGE, where each IAM has one or more target temperatures within the set of 1.5°C, 2°C, and 3°C. MSCI also includes the variation of scenarios to expand the number of attributes into 15. On the other hand, ISS include two different scenarios following the IAM of IEA WEM.

Quantitatively, an initial comparison is made by running the correlations of MSCI TVaR and ISS TVaR, using the MSCI All-Country World Index (ACWI) universe.

Figure 3  
Correlations Between MSCI TVaR and ISS TVaR

Correlation	ISS Transition Risk — Value at Risk by 2050 Pct Change — NZE
MSCI 2°C Aggregated Transition Risk Company Climate VaR (IAM of <b>REMIND NGFS</b> , scenario of <b>DISORDERLY</b> ) (%)	-34.87 (%)
MSCI 2°C Aggregated Transition Risk Company Climate VaR (IAM of <b>REMIND NGFS</b> , scenario of <b>ORDERLY</b> ) (%)	-36.03 (%)

Sources: MSCI and ISS, as of December 30, 2022.

We observe a negative correlation between ISS TVaR attribute and the corresponding MSCI TVaRs. These two attributes are selected from the 15 MSCI TVaRs for two reasons. First, NGFS is the one of the most widely accepted IAMs; second, the selected MSCI attributes have the same target temperature as the ISS attribute. A negative correlation is expected due to the heterogeneous direction of the two vendors. While ISS TVaR gives a smaller value to companies with lower transition risks, MSCI provides a larger value. Therefore, the oppositional directions caused negative correlations in the analysis. Taking a deeper look at the magnitude, according to Figure 3, keeping target temperature constant, a moderate correlation is present across the two data vendors, which indicates TVaR attributes in the two vendors show a moderate tendency of co-movements. Due to the different IAMs applied by the two vendors, a moderate but not strong pattern of co-movement is not surprising.

## Industry Overlap

Other insights can be gathered by looking at the industries that are most heavily exposed to climate transition risk, according to the vendors. Not surprisingly, carbon-intensive industries make up the bulk of the industry groups with the worst TVaR, with ISS and MSCI listing Coal companies, Iron And Steel Producers, and Extractives, as the worst TVaR firms.

Figure 4  
**Carbon-Intensive Industries Have the Worst TVaR, Per MSCI and ISS**  
Worst TVaR Industries

MSCI	ISS
Iron and Steel Producers	Iron and Steel Producers
Airlines	Coal Operations
Coal Operations	Construction Materials
Construction Materials	Agricultural Products
Electric Utilities and Power Generators	Oil and Gas — Midstream
Marine Transportation	Oil and Gas — Exploration and Production
Cruise Lines	Pulp and Paper Products
Metals and Mining	Rail Transportation

Sources: MSCI, ISS, State Street Global Advisors. Results derived from average results at the industry level within MSCI ACWI universe as of December 30, 2022.

Conversely, the list of industries that tend to see the lowest level of climate transition risk is significantly more heterogeneous. Several industries are part of low-carbon sectors such as Technology and Finance, but we also see industries from the Consumer Discretionary, Consumer Staples and Industrials sectors listed here. Importantly, MSCI and ISS seem to disagree substantially on which industries might suffer the lowest impact from transition risks (Figure 4).

Figure 5  
**MSCI and ISS Have Different Perspectives On the Lowest-Transition Risk Industries**  
Least Affected Industries

MSCI	ISS
Electrical and Electronic Equipment	Consumer Finance
Auto Parts	Security and Commodity Exchanges
Industrial Machinery and Goods	Investment Banking and Brokerage
Aerospace and Defense	Managed Care
Automobiles	Software and IT Services
Hardware	Fuel Cells and Industrial Batteries
Home Builders	Asset Management and Custody Activities
Engineering and Construction Services	E-commerce

Sources: MSCI, ISS, State Street Global Advisors. Results derived from average results at the industry level within MSCI ACWI universe as of December 30, 2022.

## Geographic Overlap

We performed another, similar exercise, but this time breaking down which countries, rather than industries, might be the most and least affected by transition risks. Once again, we focused on the MSCI ACWI universe, aggregating companies by country and calculating average results at the country level.

MSCI and ISS almost entirely disagreed on which countries might be most and least affected by climate transition risks. We are also unable to identify significant trends for emerging or developed markets, since both the riskiest and the least risky countries are located in very different geographical areas and regions. Developed and emerging markets are represented in both lists, though emerging markets do seem to fare a bit worse. Indeed, countries such as Malaysia and Turkey are singled out by both vendors as particularly risky.

Figure 6  
**MSCI and ISS Exhibit Staunch Differences in Thought on Country-Related Climate Transition Risks**  
 Most-Affected countries

MSCI	ISS
GREECE	CHILE
TURKEY	MEXICO
POLAND	FINLAND
THAILAND	MALAYSIA
INDONESIA	TURKEY
INDIA	KOREA, REPUBLIC OF
MALAYSIA	AUSTRALIA

Sources: MSCI, ISS, State Street Global Advisors. Results derived from average results at the industry level within MSCI ACWI universe as of December 30, 2022.

Figure 7  
**MSCI Designates Belgium and Japan as Two of the Least-Affected Countries**  
 Least-Affected countries

MSCI	ISS
BELGIUM	NORWAY
JAPAN	QATAR
UNITED KINGDOM	SINGAPORE
SWITZERLAND	SWITZERLAND
UNITED ARAB EMIRATES	ITALY

Sources: MSCI, ISS, State Street Global Advisors. Results derived from average results at the industry level within MSCI ACWI universe as of December 30, 2022.

## Comparative Analysis: MSCI LCT vs. ISS CRR

Earlier we noted that ISS's CRR is a proprietary scoring system that is comparable to MSCI's LCT. We begin by running a correlation between the LCT and CRR for companies in the MSCI ACWI:

Figure 8  
**Correlations Are Modestly Strong Between the MSCI LCT and the ISS CRR**

	MSCI Low-Carbon Transition Score	ISS Carbon Risk Rating Score
MSCI Low Carbon Transition Score	1	56.1 (%)
ISS Carbon Risk Rating Score	—	1

Sources: MSCI, ISS, as of December 30, 2022.

A correlation of 0.561 indicates that there is a moderately strong positive correlation between the CRR and LCT.

Both datasets further classify companies into a specific category depending on its MSCI LCT score or ISS CRR score (Figure 9). MSCI applies a tilting adjustment to some industries; for example, companies in Construction Materials will automatically be upgraded to the Transition category if they started out in the Asset Stranding category.

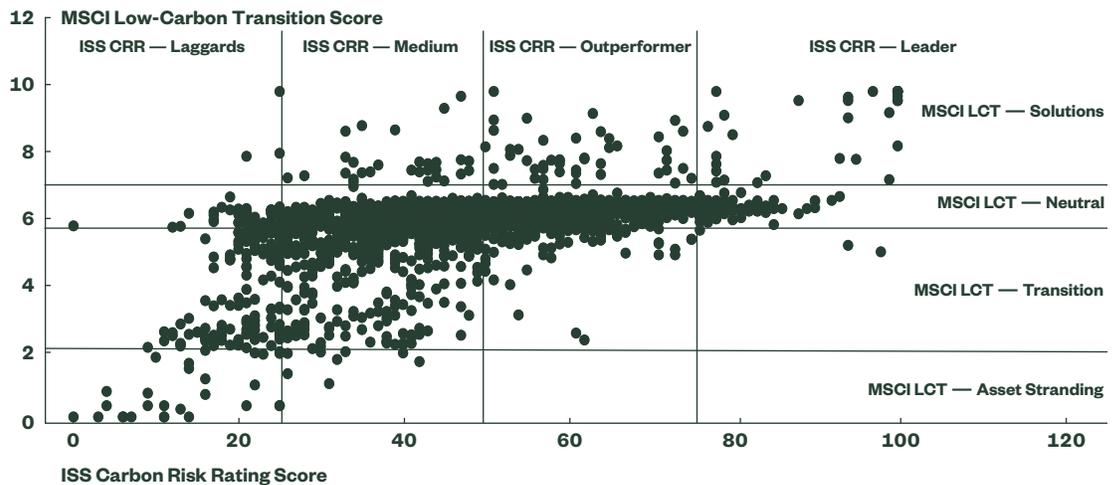
Figure 9  
**MSCI and ISS Classify Companies into Groups Based on CRR or LCT Scores**



Sources: MSCI, ISS, as of December 30, 2022.

In Figure 9, we can assign rankings of 1 (worst) through 4 (best) to the 4 categories for each vendor, Figure 10 illustrates that ISS has more companies in category 1 — perhaps indicating a stricter criteria. Comparing the number of companies that are classified as the “worst” category by each vendor, ISS classified more companies as Laggards, as compared to the number of companies classified as Asset Stranding by MSCI. Moreover, MSCI has the most companies in Category 3, while ISS has a similar number of names in Categories 2 and 3. (Note that Figure 10 is showing a comparison according to category levels, not on category names.)

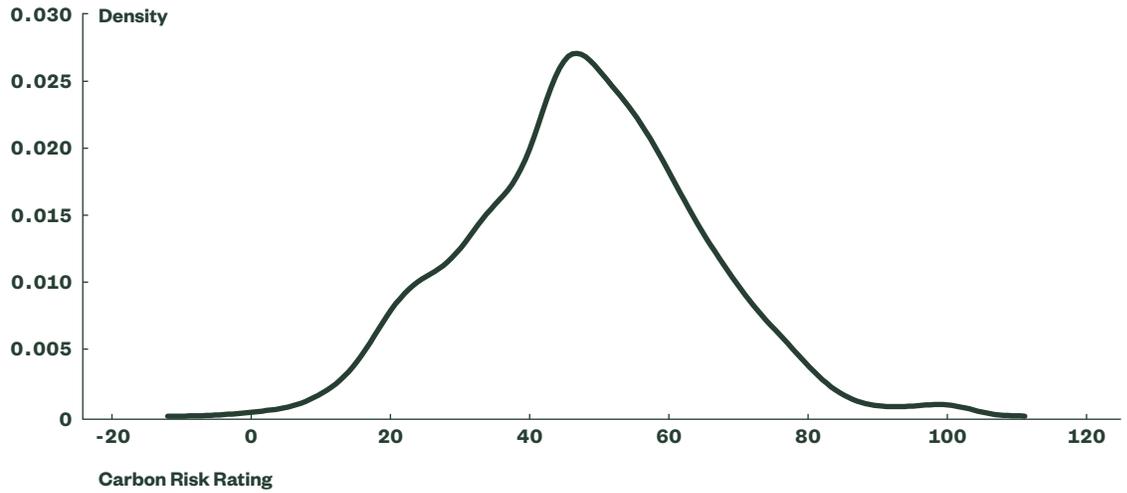
Figure 10  
**ISS Had a Higher Number of Names in the Worst Carbon-Risk Classification**  
 ISS CRC vs MSCI LCT within MSCI ACWI universe



Sources: MSCI, ISS, State Street Global Advisors, as of December 30, 2022.

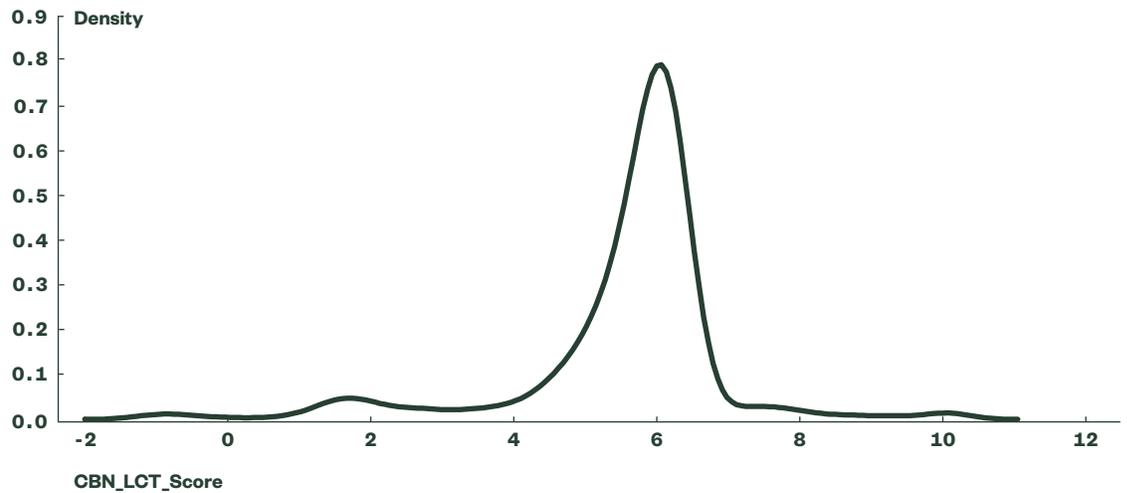
Corresponding to the scatter plot in Figure 10, the Kernel density plots of the two ratings show comparable results (Figure 11). MSCI's distribution is skewed to the left, while ISS is more normally distributed. Specifically, MSCI LCT has the most companies categorized as "Neutral" (5.72-6.94), while ISS has the most companies rated as "Medium" and "Industry Outperformers" (25-75).

Figure 11  
**With ISS, Names Are Skewed to the Lower Carbon-Risk Categories**  
 ISS Carbon Risk Ratings  
 Kernel Density Distribution



Source: ISS, State Street Global Advisors, as of December 30, 2022.

MSCI Low-Carbon Transition Score  
 Kernel Density Distribution



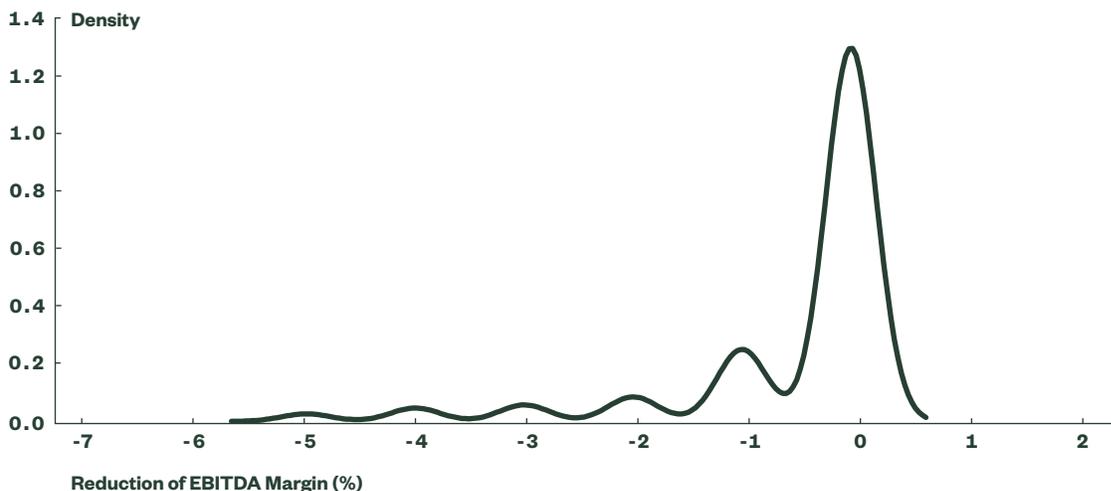
Source: MSCI, State Street Global Advisors, as of December 30, 2022.

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## S&P Trucost Analysis

Trucost's CEaR dataset is drawn from a wide range of data, including future carbon prices derived from the scenarios by IEA and IRENA, current carbon prices based on country-specific sources, companies' financial performance data, companies' emission data, and companies' geographical emissions breakdown. The CEaR attributes show strong sparsity. When considering a forecast year of 2030 and setting the scenario level as Medium (which we believe is the most comparable criteria to the MSCI and ISS temperature targets of 2C), more than half of the companies have a CEaR value of 0 (Figure 12). This is significantly different from the results we can extrapolate from ISS and MSCI.

Figure 12  
**Strong Sparsity in Trucost CEaR**  
Trucost CEaR Kernel Density Distribution



Source: S&P Trucost, State Street Global Advisors, as of December 30, 2022.

Despite the structural differences between Trucost and MSCI/ISS, we do find some compatibility between the Trucost CEaR and ISS TVaR, since they are applying some related measurements. Therefore, we further investigated and calculated a moderate 0.381 correlation between Trucost CEaR with ISS TVaR, within the MSCI ACWI universe.<sup>3</sup> The negative sign is expected, due to the opposite direction of attribute indication. ISS TVaR adopts a “the smaller the better” approach, whereas Trucost reverses that.

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## Use Cases, Opportunities, and Challenges of Transition Climate Risk Data

ESG data providers face several challenges in the generation of climate risk data, in our view. We believe one of the biggest challenges is the sheer lack of history, and another hurdle is that these datasets and models are heavily dependent on hypothetical scenarios and estimates, and may not reflect the actual carbon price in future years. Moreover, companies tend to be classified according to their primary sectors for ease of analysis, making conglomerates and companies with complex operations difficult to assess robustly, in our view. There seems to also be ambiguity around the potential use of this information.

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However, we believe transition risk data can be employed in various ways:

- Measuring the potential climate costs of a company or portfolio according to a variety of climate scenarios
- Complying with climate regulatory reporting requirements (such as the EU Taxonomy or TCFD)
- Incorporating specific metrics and indicators into environmental risk management tools and matrices
- Informing stewardship activities and engagement with companies, especially to discuss firms' plans for reducing potential climate costs to their assets and operations
- Building and optimizing scenario-resilient portfolios by assessing future costs associated with specific climate change scenarios

As opposed to the complex TVaR models, we believe the usage of more traditional scoring-based models — such as the ISS Carbon Risk Rating or MSCI Low Carbon Transition Assessments — can more easily lead to the incorporation of policy risk criteria into the construction of investable products. These scoring-based models may more easily inform tilted or optimized strategies, screening tools, or other similar investment applications.

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## Conclusion

In this paper, we provide an introduction to new and exciting climate policy risk and technology opportunities. Key conclusions that can be drawn from this analysis are:

- ESG providers have been tackling policy risks and opportunities from various angles, employing more traditional ESG ratings approaches as well as more complicated scenario analysis tools.
- Even though vendors' approaches to transition risk may be comparable, TVaR correlations between ISS and MSCI were moderate, and MSCI and Trucost arrived at significantly different conclusions about industry/geographic risk. Results vary substantially depending on which pathways, scenarios, horizons, and other criteria are selected.
- Whereas the robustness of these models and their utilization in an investable context (be it portfolio construction, environmental risk management, climate reporting, and engagement activities) are still up for debate, there are encouraging signs about the important role that these considerations will play for asset managers and other market participants in the coming years in our view.
- Transition risk data can help stakeholders to have a more comprehensive and fully formed opinion of portfolio climate risks.

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## Endnotes

- 1 These opportunities include the growth opportunities linked to products and services created to mitigate climate change.
- 2 Integrated Assessment Models are complex scientific models and frameworks that combine economic and societal issues with climate, biodiversity, and other, similar considerations.
- 3 Correlation between ISS TVaR and Trucost CEaR. Trucost CEaR is based on the reduction of EBIDA margin (%), and the correlation is based on ISS Transition risk — Va\$ by 2050, Percent Change — NZE.

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