

Climate change risk metrics: The rising tide



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The industry is now seeing an expansion in data-driven practices, with new climate datasets emerging and becoming mainstream. Climate change itself is a phenomenon comprised of many interlinked processes, each with their own risks and uncertainties. To cater to the growing demand for quantitative climate change risk metrics, vendors have begun to explicitly model climate change risk.

Climate change consists of many complicated sub-processes that interact with one another through flow-on effects, which increases modelling complexities. Many of the underlying processes that govern climatic variables are dynamically evolving over time,¹ resulting in modelling difficulties when solely using historic climate data to forecast the future.²

What are climate change risk metrics?

Initially, climate risks were proxied mainly using portfolio carbon exposure. Developments in climate risk metrics now allow investors to consider multiple avenues of climate risk, in which multi-asset exposures to various climatic variables can be used in risk analysis. As a result, investors are now able to use quantitative data that maps their portfolio sensitivity to climate change scenarios.

Climate change risk metrics are indicators of investment exposure to a variety of climate risks. These climate risks include various physical risks and transitional risks (categorised by the Task Force on Climate-Related Financial Disclosures as policy and legal, technology, market and reputational risks).³ Both physical and transition risks are comprised of separate factors that investors should be concerned with, as each individually poses their own risk.

Providers of climate risk metrics vary in the individual drivers of climate risk that they model.

Some providers of climate change risk metrics choose to generate separate climate risk metrics for several climate risk factors independently. Other data providers choose to amalgamate climate risk metrics into broader categories, such as total exposures to aggregate transition or physical shocks. The advantage of this approach is that it implicitly accounts for the interrelated processes of the sub-factors that make up the broader categories of climate risk.

Unlike conventional investment variables, climate risk metrics are typically not presented as continuous metrics. Instead, they are more often estimated as sensitivities to climate factor shocks through a scenario analysis framework.

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How are climate change risk metrics estimated?

Exposures to each type of transition and physical risk are calculated differently and require different datasets. In contrast, exposures to regulatory costs are a function of a firm's emissions trajectory and ability to pass on regulatory costs.

Ultimately, many models that estimate climate risk metrics rely on proprietary models that may seem like black boxes with all their interrelated, moving parts. However, this is often by construction. Due to the complicated interrelationships between economic and climate variables, there is a need for sophistication, which can result in modelling complexity. Translating economic and environmental shocks into portfolio outcomes (in return-space) adds an additional layer of complication, as assumptions must be made on how efficiently markets are pricing in these future shocks.⁴ If a baseline scenario is already priced efficiently, models would assume that climate-related costs and opportunities are already factored into prices, which would then be relatively insensitive once the expected climate events transpire. The impact under additional scenarios will be felt relative to the baseline scenario that the model assumes the market is expecting.

How are climate change risk metrics used?

At Russell Investments, we are looking to incorporate these variables in a multifaceted approach. Firstly, projected climate change distributions are useful information when creating overall capital market forecasts. Secondly, our in-house risk management practices are also exploring how to use these metrics in a more granular, portfolio-specific approach to estimate the climate risk. We also expect that these metrics will also play a big role within our managed funds, with managers being able to better identify risks and opportunities associated with the climate. Asset managers will soon be able to use more sophisticated metrics within the reports generated by their management and consulting functions. Lastly, additional climate risk data will enable greater engagement, encouraging companies to incorporate climate change measures into their management strategies.

Where is the industry headed?

As a nascent industry, climate change risk metrics are fast developing and will soon be more readily available to better inform the strategies and decisions of financial market participants. As awareness of climate risk increases among investors, we can expect to see greater sophistication in the modelling of these risks, more availability of metrics from a larger number of providers, a growing role of industry specialists in climate, better quality outputs and a greater number of use-cases of the final data.

FOOTNOTE

¹ In statistics, climate change and other processes which have moving distributions through time are referred to as 'non-stationary' processes.

² For example, if one were to predict future long-term average temperatures using only historic temperatures, or the likelihood of future regulatory changes based only on historic climate change regulation, one might be creating biased forecasts due to structural regime shifts in processes.

³ An example of policy and legal risks includes higher carbon prices, while an example of technology risk includes new developments in abatement technology. An example of market risk includes shocks resulting from changing demand and supply curves, and an example of reputational risk includes consumers' preferences shifting towards 'green' substitutes.

⁴ Anecdotally, we find that a number of climate risk data vendors assume that the market has under-priced the true costs of expected climate risks, and as a result, securities with exposure may be overpriced and exposed to a return shock once pricing becomes more 'efficient'. Some investors also have adopted this viewpoint in their portfolio strategy.

