

Climate big data: Getting the edge

Climate-related responsibilities, risks and opportunities are in the focus of investors and have become an important component of portfolio construction. A science-based and data-driven approach helps navigate the way forward.

By Dr. Jieyan Fang-Klingler

Global warming is the challenge of our time. The growing number of signatories to initiatives such as the Institutional Investors Group on Climate Change (IIGCC) and the Net Zero Asset Owner Alliance reflect the commitment of asset owners and managers to drive significant and real progress towards net zero. At the same time, investors must also fulfil their mandate to deliver performance for their stakeholders. Therefore, their approach to climate investing should seek to capture the economic potential as well.

To accurately spot risks and opportunities, institutional investors need to identify those asset managers that have mastered climate data

to best meet their regulatory requirements, commitments and stakeholder objectives. Understanding the data is key.

Data and science as the foundation for investment decisions

Science-based means that the selection of data is based on the use of rigorous, systematic and objective methodologies to generate reliable and valid insights. ESG data, and the scores or signals derived from the data, should be selected using the same rigorous process as financial investing.

Quantitative asset managers seek to identify trends and patterns based on data relevant to active manage-

ment. The expertise of quant managers lies in the development of signals, but also in the sophisticated combination of individual raw metrics and their integration into investment models. These skills can be applied to the selection and use of ESG data in portfolio management. A key factor is a single investment platform for selecting ESG data and integrating it into portfolio construction. This also allows client portfolios to be managed according to the client's targeted KPIs.

Exciting insights behind the climate-related data

When approaching a new data project, like climate related data, the first step is to understand the data and the relationship between the many metrics. Important keywords here are distribution of data, coverage and correlation. In this context, we have identified two types of indicators used to measure climate risks and opportunities.

On the one hand, investors can use backward-looking indicators for portfolio

construction – a look in a rear-view mirror. These include, for example, Scope 1, 2 and 3 data, the level of a company's CO₂ emissions, the changes in these emissions over the past years and the CO₂ intensity, that is the CO₂ emissions in relation to the company's turnover. An analysis of mutual fund holdings showed that a rear-view mirror approach is more common practice. Backward looking data is also commonly used for exclusion lists and climate indices that are used for the implementation of passive investment strategies.

On the other hand, there are forward-looking metrics that give us an indication of how certain values will develop in the future. For example, does the company have a defined climate or CO₂ reduction target? How many green patents does it hold? What plans does management have in the area of clean technologies? This can help identify companies that are likely to make a significant contribution to climate change mitigation in the future.



'If an investor wants to drive progress towards net zero, incorporating forward-looking data into the portfolio construction process may contribute to real world reduction.'

The number of companies with climate targets has risen sharply. According to MSCI ESG data, there were only 193 companies with climate targets in 2007. By 2022, more than 4,000 companies had defined climate targets.

To delve deeper, we first examined the relationship between forward-looking and backward-looking climate metrics. Our research shows that the correlation between absolute carbon emission regarding Scope 1 and/or Scope 2 and the existence of climate targets is positive, suggesting that companies with higher absolute Scope 1 and/or Scope 2 carbon emissions are more likely to define their climate targets. Cohen, Gurun, and Nguyen (2021) find a similar relationship between carbon emissions and green patent ratios.

Second, we examined the relationship between forward-looking measures and future carbon emission changes in different time periods and markets. We used a multivariate analysis to examine this relationship. We regressed future changes in carbon emission on the forward-looking climate metrics. Meanwhile, we controlled for time, sector, country effects and firm characteristics that may impact firms' future carbon emission changes.

Our results show that companies with climate targets are associated with lower future rates of change in carbon emission than similar companies without climate targets. This difference is both statistically and economically signifi-

cant. For example, in the period between 2007 and 2021, a firm with active carbon reduction targets is associated with a 0.92%/1.65% lower future change rate in absolute carbon emissions related to Scope 1 and absolute carbon emissions related to Scope 2, respectively, compared to a similar firm without active targets. This negative relationship becomes even stronger after the Paris Agreement in 2015 (1.56%/2.25% lower). We also observe the regional difference. The relationship is stronger in developed countries than in emerging markets.

Third, we examined whether mutual fund managers consider forward-looking and backward-looking climate metrics in their investment decisions. We regressed mutual fund ownership on various backward-looking and forward-looking climate metrics. We also controlled for time, sector, country effects and firm characteristics. Our analyses show that most mutual fund managers only consider backward-looking climate metrics by avoiding or excluding firms with higher carbon emissions, for example a firm with one standard deviation higher Scope 1 carbon emissions compared to the average firm in the sample with -1.49% lower mutual fund ownership.

Is there right data or wrong data?

Our research shows that there are many ways to look at climate data. Therefore, the choice of specific metrics related to a company's CO₂ emissions is not a question of right or wrong.

Rather, it depends on the investors' intentions. Our research also shows that historical emissions (backward-looking data) and reduction targets (forward-looking data) lead to seemingly contradictory conclusions about the 'climate friendliness' of companies. Investors who exclude companies with the currently highest absolute CO₂ emissions from their portfolios today may be missing out on investments in those companies that could be responsible for the most significant CO₂ reductions in the coming years. If an investor wants to drive progress towards net zero, incorporating forward-looking data into the portfolio construction process may contribute to real world reduction.

An investor who expects the price of CO₂ emissions to rise significantly in the short term may prefer to exclude companies with high current CO₂ emissions from a risk perspective. Conversely, an investor who believes that the market is not currently correctly pricing in future changes in emissions may wish to invest in companies with high current CO₂ emissions that are expected to fall sharply.

Finally, investors should be aware that identifying climate-friendly stocks is not a one-off process. Rather, it is important to continuously monitor the development of companies and to regularly review and adjust the chosen metrics to stay up-to-date and make informed investment decisions. ■



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SUMMARY

Investors are increasingly committed to making progress towards net zero emissions while delivering performance for their stakeholders.

Understanding the data is key to identifying risks and opportunities.

Our research shows that companies with a high potential and willingness to reduce carbon emissions are associated with lower future rates of change in carbon emission than similar companies without climate targets.

This insight can help investors select companies that are likely to successfully transform their businesses to reduce carbon emissions.