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Are climate risks priced?

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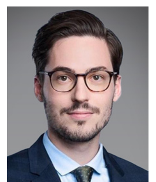

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Are climate risks priced?

- In our previous paper, we documented a consistent outperformance of low-carbon stocks which seemed to indicate that the climate risk had not yet been priced
- In this note, we look at the performance of a broader "climate factor" and find that it is consistent with the positive risk premium in climate-sensitive stocks
- In our view, this observation suggests that the success of low-carbon investing might be only a transitional phenomenon driven by investment flows
- It is therefore time to take the climate factor into account to have a better control on portfolio performance

The "low-carbon puzzle"

Common wisdom tells us that performance comes as a reward for taking risks. The opposite is also true. Stocks that are perceived to be riskier should trade at discount relative to peers. From this point of view, the consistent underperformance of high-carbon stocks seems to be a puzzle as these stocks are clearly most exposed to risks of climate transition.[1]

In a previous paper, we attempted to explain the success of low-carbon investing through the lens of factors or styles in general. Surprisingly, the consistent performance of low-carbon strategies survived controlling for various style exposures. We noted, though, that apart from recent few years, this performance could be largely attributed to the increase in valuations of low-carbon relative to high-carbon stocks. This observation suggests that the success of low-carbon investing might be driven by investment flows. Therefore, this could be only a temporary phenomenon that would disappear after high-carbon stocks become sufficiently cheap to attract performance-seeking investors.

[1] Strictly speaking, the connection between the risk and its market price is not that straightforward. Most academic publications are in favor of a positive risk premium in brown stocks, which results from an implicit assumption that climate risks are associated with adverse economic scenarios (Sustainable investing in equilibrium I Journal of Financial Economics). However, some argue that brown stocks can in fact provide a hedge against recessions, therefore, should have a negative risk premium (How Will Climate Change Affect Asset Prices? The 30,000-Foot Answer I EDHEC Risk Climate Impact Institute).

In this note, we take yet another attempt to resolve the low-carbon puzzle by using a market-based approach to measure stocks' climate exposure. We build a climate factor – a portfolio that mimics the performance of climate-sensitive stocks. While our low-carbon factor was built directly from firms' carbon-related characteristics, the climate factor is derived from stocks price sensitivities to the variation in this low-carbon factor (e.g. climate betas).

This approach is not new in the literature on climate thematic.[2] Our contribution is in that we build upon a novel methodology of dynamically estimating stock betas developed by one of the authors,[3] which is particularly well-suited for the environment when stocks' exposures to the factor are time-varying. As companies are actively transforming in response to challenges of climate transition, and the market is learning about their actions we expect climate exposure to be indeed changing over time.

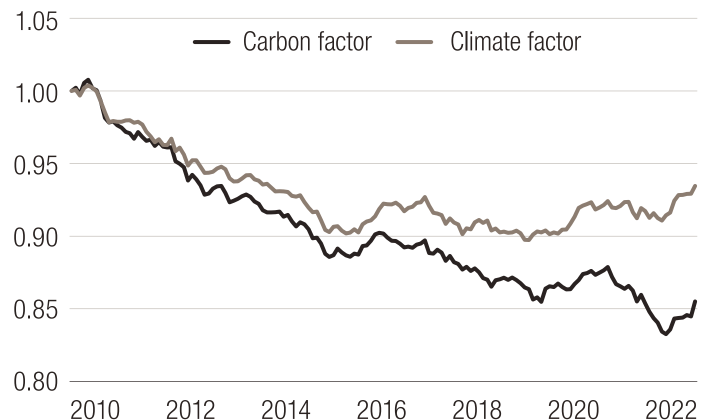
From carbon to climate factor

We start with a high-carbon strategy, which is exactly opposite to the low-carbon one described in our previous paper. It represents a long-short portfolio tilted towards stocks that are more carbon intensive relative to peers.[4] To avoid systematic biases as much as possible we built the high-carbon portfolio on a regional and sector[5] neutral basis, and further "purified" from exposures to traditional factors[6]. In the rest of the note, we will call it the carbon factor.

In a second step, we computed time-varying 'climate betas' from stock returns and returns of the carbon factor. In line with the carbon factor construction, we used pure stock returns that are sector, region, and factor neutral. For each stock, we required at least 10 years of returns for climate betas to be measured with sufficient confidence. Finally, we built the 'climate factor' as a long-short portfolio tilted towards stocks with higher climate betas.

Figure 1 compares the performance of the two factors adjusted to have the same ex-post volatility. The correlation between returns of the two factors is as high as 0.7, while the average historical holdings-based correlation is only 0.2. This means that although the climate factor is quite different from the original carbon factor, it has a similar systematic risk exposure.

FIG 1: THE DISCONNECTION BETWEEN CLIMATE AND CARBON FACTORS



Carbon factor is a long-short portfolio tilted towards stocks that are more carbon-intensive relative peers. Climate factor is a long-short portfolio tilted towards stocks with higher climate betas with respect to the carbon factor. Both portfolios are built on stocks in MSCI World Index. Source: LOIM, Trucost, WorldScope, MSCI.

We cannot help but notice a remarkable divergence between the two factors. The carbon factor consistently underperforms through the full period of observations. While the climate factor follows it closely during the first half of the observation period, it seems to be slowly drifting up afterwards. Clearly, the behavior of the climate factor is consistent with a positive risk premium in climate-sensitive stocks.

One possible explanation for the gap between the two factors is the pressure of investment flows that continue pushing high-carbon stocks down as they are most obvious victims to be penalised by investors seeking to lower climate risk exposures of their portfolios. While this argument is commonly used to justify the outperformance of green stocks over brown ones,[7] our findings confirm a more granular attention of investors across climate-sensitive stocks.
In our view, most of these stocks have been already discounted as investors turned to green assets, while the valuation effect continues impacting only a subset of high-carbon stocks. As climate-exposed stocks begin to yield a positive premium, this might eventually lead low-carbon strategies to lose their steam and underperform due to the bias toward stocks with high valuations.

2 Carbon Beta: A Market-Based Measure of Climate Transition Risk Exposure | SSRN,
Look up! A market measure of the long-term transition risks in equity portfolios | EDHEC Risk Climate Impact Institute.
The Market Measure of Carbon Risk and its Impact on the Minimum Variance Portfolio | SSRN
3 Empirical Asset Pricing with Score-Driven Conditional Betas ISSRN
4 We used carbon intensity computed by Trucost based on scope 1, 2 and direct scope 3 emissions.
5 GICS 3 level.
6 Value, Quality, Momentum, Beta and Size. A portfolio is "purified" from factor exposures by finding the "nearest" portfolio with zero exposure to the five factors.
7 Dissecting Green Returns | SSRN. Investments considered environmentally friendly are often referred to as "green," with "brown" denoting the opposite.

What are the implications?

The existence of positive risk premia in climate-sensitive stocks has much wider applications beyond low-carbon investing. Indeed, any strategy that is implementing the climate transition thematic might prove to be costly in terms of performance over the long run.

Of course, this does not mean that we should not invest in climate transition but rather be prudent about how we are doing it. Our mission as portfolio managers is to ensure that we are finding opportunities not yet priced by the market. The natural way to do so is to introduce the climate factor directly into the risk model used to build portfolios or as a constraint. Whatever the approach is, it will ensure that the portfolio stays away from stocks with little upside opportunities.

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