TOOLKIT: CARBON BETA

Carbon beta is a tool designed to measure transition risk in individual stocks and portfolios of stocks. It is a forward-looking measure that determines the extent to which an asset's price correlates with a carbon risk factor.

The beta of a stock is a traditional finance indicator of risk with a long academic history, and is a concept well understood in the finance world. It simply measures how the value of a stock or portfolio of stocks moves in relation to the market. For the purpose of computing carbon beta, the "market" is redefined as a group of high emitting stocks believed to possess high climate risk and face potential high costs for abating emissions. The carbon beta of an individual stock or portfolio is its valuation in relationship to the carbon risk portfolio. Huij et al. developed a methodology to estimate asset-level climate risk exposure by regressing stock returns on a pollutive-minus-clean portfolio. The authors find that, not surprisingly, climate risk is highest in energy and utility sectors, and lowest in healthcare and financials.

The methodology is relatively simple and straightforward, and investors can readily replicate it using existing historical market data and emissions and transition risk disclosures. Investors can even develop their own methodologies on how climate risk is defined in the "market" portfolio. For example, the pollutive-minus-clean portfolio assumes that all emissions are the same, while investors might assign greater weight to some emissions over others. For firms whose emissions occur in the production of goods that reduce emissions elsewhere (e.g. solar panels), or that operate in sectors for which abatement is expected to be easier, investors might perceive lower risk exposures. Interestingly, Huij et al. find that returns to stocks with high carbon betas are lower during months in which climate change is more frequently discussed in the news, during months in which temperatures are abnormally high, and during exceptionally dry months.

Carbon beta can also be a tool to identify firms that are investing in green technologies. Green innovation is largely driven by firms in the energy sector, yet paradoxically these firms are generally amongst the worst performers on environmental issues. Using green patents as an indicator, Huij et al. test the association of carbon beta with green innovation and find that green innovators are less exposed to climate risk, including firms in the energy sector.

Carbon beta is but one factor to analyze amongst many. It is an indicator that can be used in concert with other factors while recognizing how factors can interact.