

Scientific Portfolio Market Review

November 2025



SciX
An EDHEC Venture

Mainstream Climate Metrics Don't Fully Reveal 'Transition Risk'

Introduction

Many institutional investors are now required to calculate portfolio-related carbon emissions and produce assessments of climate-related risks. Yet, while national pension regulators and other oversight bodies understandably emphasize emissions-related metrics, there is increasingly widespread awareness that these provide only an indirect indication of the portfolio's potential **resilience to transition risk**.

This Market Review briefly illustrates the complexity of this challenge by looking at a universe of more than 1200 equity funds through the dual lenses of Carbon Intensity (CI) and Conditional Transition Loss (CTL). In addition, we look at a white paper from the Scientific Portfolio team¹, which presented a methodology for CTL calculation.

- **Carbon metrics should not be treated as the sole proxy for transition resilience.** Although analysis of 1,255 U.S. and European equity funds illustrates a broadly positive correlation between CI and CTL, there is substantial variance: funds with similar carbon intensities are predicted to have very different losses in various transitions scenarios.
- **Both costs and revenues should be considered when modelling CTL.** Fund-level analysis demonstrates the lack of relationship between losses attributable to carbon taxes and projected revenue changes, underlining the importance of looking at both aspects rather than taking a cost-centric approach. We adopt a company-level methodology that allows for both negative and positive revenue impact, facilitating the identification of potential winners and losers of transition.

The subject of 'transition loss' modelling will be the subject of an in-depth **webinar** on December 4th, 2025. To register to attend the webinar or obtain the replay, [Click Here](#).

View climate, performance and risk data for your equity portfolio and a wide range of equity strategies on the Scientific Portfolio platform.

What Gets Measured, Gets Managed: the Problem of 'Transition Risk'

Many pension and insurance regulators around the globe have now introduced climate-related reporting requirements. These bodies have often taken their cue from the Taskforce for Climate-related Financial Disclosures in terms of the details that investors are expected to provide on *governance, strategy, risk management and metrics/targets*.

The question of resilience to 'transition' is implicitly woven into such frameworks. Instructions such as "perform climate scenario analysis" (*strategy*) and "identify and manage climate-related risks" (*risk management*) implicitly convey a need to understand how an investment portfolio may withstand a shift toward green energy usage and tighter constraints on emissions. Yet, when it comes to the **metrics and targets** that investors are required to report, the spotlight remains firmly focused on emissions – even though the relationship between emissions and transition sensitivity is far from clear-cut.

¹ -Lorans, T., Priol, J., & Bouchet, V. (2025), Beyond carbon price: a scenario-based quantification of portfolio financial loss from climate transition risks, *Journal of Sustainable Finance & Investment*, 1-25.

Carbon intensity and absolute emissions must often be provided in numerical terms, while ‘alignment’ (where used) tends to be based on forward-looking estimates of carbon intensity. Transition risk, on the other hand, is left open to interpretation.

Although there is a natural association between the emissions relating to companies within an investment portfolio and that portfolio’s resilience to transition risk, there are many sources of disconnection. For example, a company’s direct exposure to potential carbon taxes is typically determined by Scope 1 emissions, while carbon intensity tends to be calculated using Scope 1 and 2 (or even 3). Even more complex is the question of how scenarios may affect company revenues; firms that are well placed to benefit from green-energy-related revenues may themselves have high carbon intensity.

The Emergence of Transition Loss Frameworks

With such challenges in mind, we have witnessed the evolution of ‘transition loss’ modelling – a diverse and complex field. Many ESG analytics firms and other service providers have CTL models, although there is often a lack of transparency regarding the details, making it hard to compare or contrast them independently. Various academics have also presented CTL assessments, reaching diverse conclusions (see Appendix A).²

Transition loss models often consider **operational costs**, such as carbon taxes and carbon quotas (e.g. Emissions Trading Schemes). A cost-focused approach may be particularly relevant in the context of short-term stress testing. Some go further and include **revenue** changes, driven by evolving demand across segments, but do so in different ways. Some take a sector-based rather than company-based view: the 2022 climate stress test for occupational retirement provision conducted by the European Insurance and Occupational Pensions Authority (EIOPA), for example, used a sector-based approach. Furthermore, the model might only address the potential for revenue losses, overlooking (‘green’) revenue **gains**. To add to the variety, **scenario choices**—such as the length of time horizon applied and the specific transition scenario (Appendix B)—affect conclusions. The aforementioned paper sets out the CTL methodology used by Scientific Portfolio. It establishes the importance of considering revenues as well as costs, advocates a company-specific versus a sector-based approach, and shows that assessments are highly sensitive to the choice of timeframe and scenario.

Conditional Transition Loss (CTL) – Scientific Portfolio

The CTL is the potential change in a portfolio’s value under adverse climate transition scenarios. It reflects how investors might reassess company valuations if expectations around climate policy, technology or consumer preferences shift abruptly. Scientific Portfolio CTL metrics are constructed by aggregating the conditional transition losses of all companies held in the portfolio. Each company’s transition loss is estimated using a discounted cash flow model that captures the financial consequences of a disruptive climate transition. Estimates require linking firm-level revenues to scenario-based projections of sectoral activity, and matching firm-specific greenhouse gas emissions to future carbon price trajectories. The model uses a green revenue classification from Moody’s. Emissions data are sourced from company disclosures or estimated by ISS where necessary. The model estimates losses under multiple long-term scenarios developed by the Network of Central Banks and Supervisors for Greening the Financial System (NGFS).

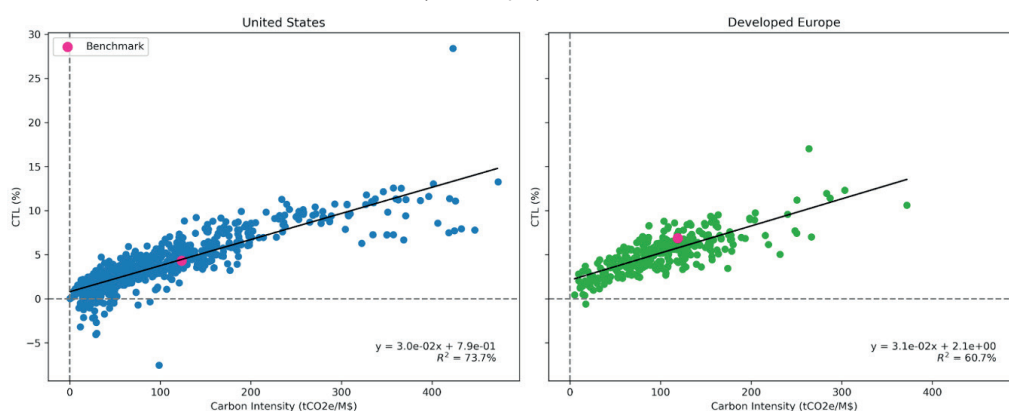
2 - A detailed discussion of the academic literature is available in Lorans et al. (2025). An illustrative chart is shown in the Appendix here.

Equity Fund Snapshots: Carbon Intensity Versus Conditional Transition Loss

For this Market Review, we looked at a large sample of equity funds in the U.S. (863) and Europe (387)³, calculating both Carbon Intensity (CI)—the value-weighted average of portfolio constituents' Scope 1+2 carbon emissions per million USD of corporate revenue—and Conditional Transition loss (CTL) for each one. The CTL numbers are necessarily narrow, in that they reflect only one model, one time horizon (2050) and one scenario (Net Zero).

As we can see in Exhibit 1, there is (as one would hope!) a loose positive correlation between CI and CTL. In other words, funds with higher carbon intensity do tend to be more exposed to potential losses in transition scenarios. The fit, however, is unlikely to be satisfactory from the perspective of an investor seeking to understand their own resilience: in the U.S., the R-squared value is rather modest (74%), while the figure in Europe is even weaker (61%).

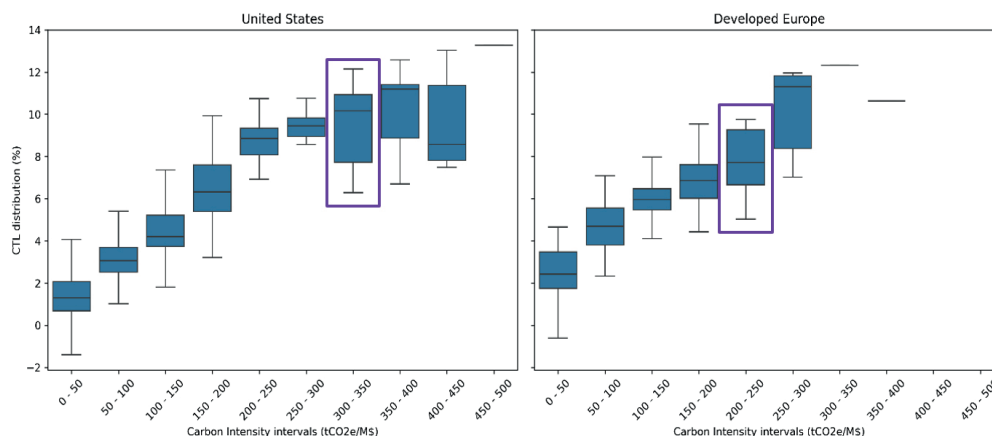
Exhibit 1: Conditional Transition Loss (CTL) versus Carbon Intensity (CI) of equity funds



Source: Scientific Portfolio, October 2025. 863 U.S. funds and 387 European funds. CTL methodology as defined in Lorans et al. (2025), with model MESSAGEix-GLOBIOM 1.1-M-R12, scenario Net Zero 2050 (others available), time horizon 2050 (others available).

The insufficiency of carbon intensity as an indicator of prospective transition loss is further clarified in Exhibit 2, which translates the data from Exhibit 1 into an alternate form. Here, we see funds grouped into particular carbon intensity intervals, showcasing the very broad dispersion of CTL totals within those bands. For example, European funds in the 200-250 tCO₂ e/\$M band have conditional transition losses ranging from barely 5% to above 10% (twice as severe!), while U.S. funds in the 300-350 tCO₂ e/\$M band have CTL ranging from less than 7% to above 12%.

Exhibit 2: Equity fund Conditional Transition Loss distribution by Carbon Intensity interval



Source: Scientific Portfolio, October 2025. 840 U.S. funds and 491 European funds shown (five funds with carbon intensity >500 tCO₂ e/\$M are excluded). Conditional transition loss methodology as defined in Lorans, Priol & Bouchet (2025), with model MESSAGEix-GLOBIOM 1.1-M-R12, scenario Net Zero 2050, time horizon 2050.

3 - Five thematic fund outliers with carbon intensity exceeding >500 tCO₂ e/\$M were excluded from the sample. A version of Exhibit 1 including these omitted funds can be found in Appendix C.

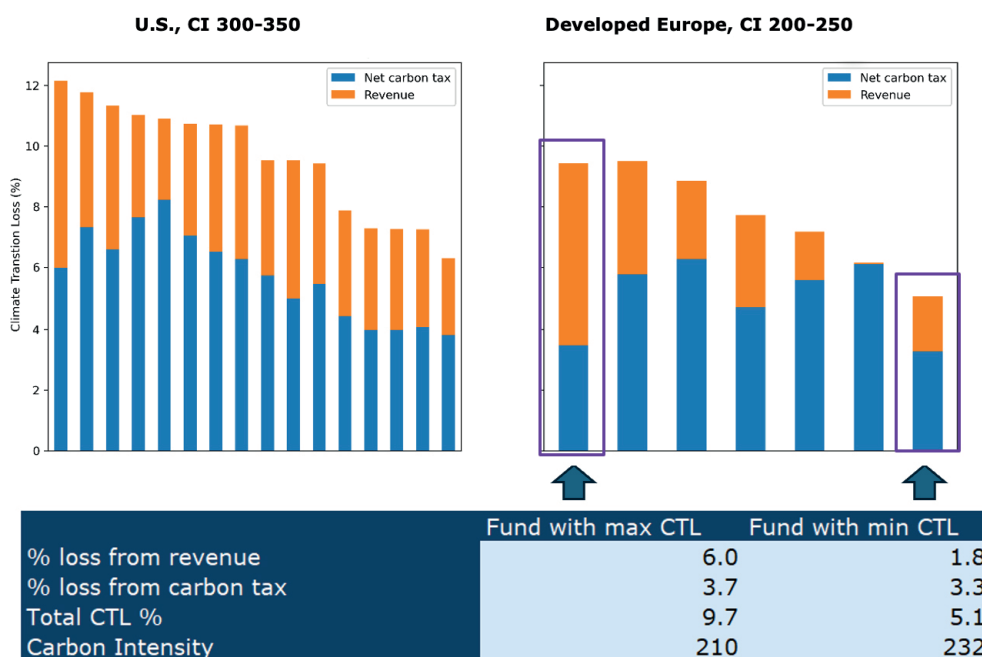
A Closer Look: ‘Cost’ Versus ‘Revenue’ as Drivers of CTL

The erratic relationship between carbon intensity and conditional transition loss becomes even more visible when we seek to disentangle the relative contributions of **operational cost** (carbon price) and **revenue** to each fund’s CTL numbers. Upon further examination, we find not only that CTL numbers are highly varied at any given level of intensity but, additionally, that there is also no clear relationship between prospective losses attributable to carbon taxes and losses (or gains) attributable to revenues – underlining the importance of looking at both and avoiding a purely cost-centric approach.

Exhibit 3 showcases this point by providing a closer look at funds within the two intervals highlighted in Exhibit 2. As an illustrative example, the right-hand chart draws attention to two funds with similar losses attributable to *cost* (carbon taxes) but very different prospective losses attributable to net *revenue* changes, resulting in a CTL that is virtually twice as large.

Upon digging into these two specific funds, for the sake of understanding the disparity, we find that the largest contributor lies in their positions in the Utilities sector: the potential carbon tax-related losses for the Utilities stocks in the two funds are actually rather similar (contributing 1.4% and 1.1% to the respective CTLs of the low-CTL and high-CTL fund), but the *revenue-related* losses for the Utility positions differ hugely (0.5% versus 3.1%). Exhibit 4 provides screenshots from the Scientific Portfolio platform, illustrating the sector attribution of the CTL.

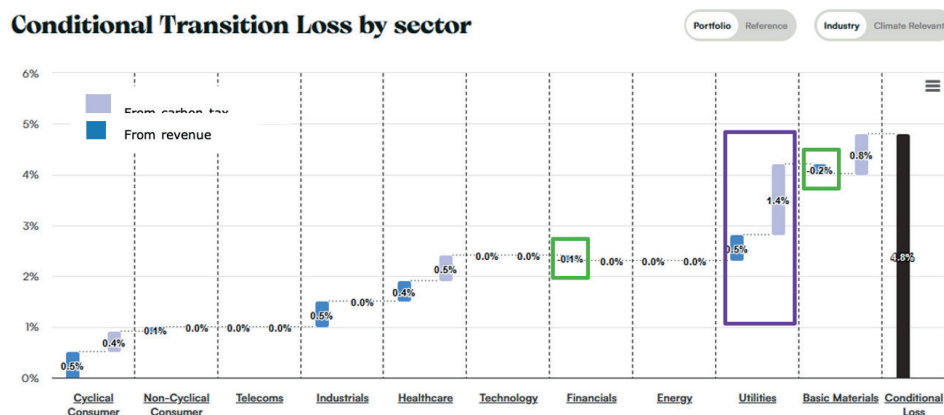
Exhibit 3: CTL decomposition: net loss from revenue vs. net loss from carbon tax



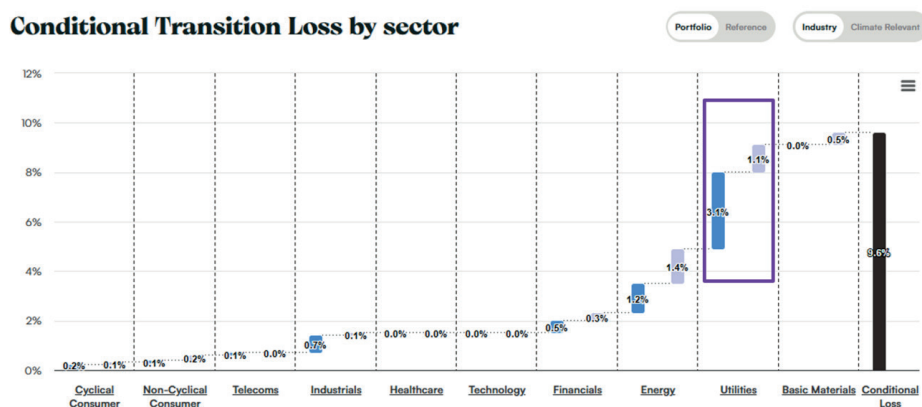
Source: Scientific Portfolio. Each column represents one fund. Top left shows funds in the 300-350 CI band of U.S. funds in Exhibit 2, top right shows funds in the 200-250 band of European funds in Exhibit 2.

Exhibit 4: Screenshots from Scientific Portfolio platform, CTL by sector for two funds

Fund with minimum CTL in 200-250 Carbon Intensity band, Europe



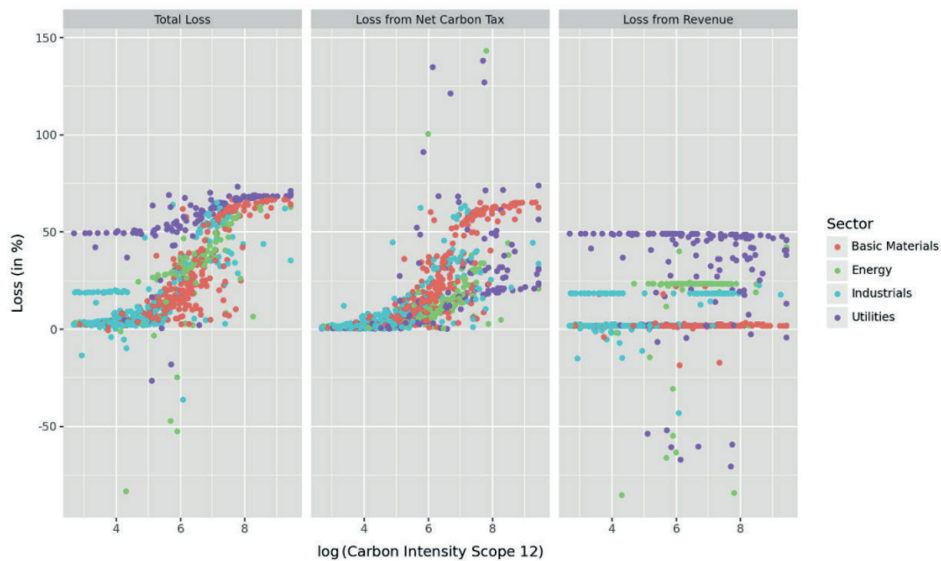
Fund with maximum CTL in 200-250 Carbon Intensity band, Europe



Source: Scientific Portfolio platform. Positive figures represent potential losses, while negative figures—boxed in green—represent potential gains (driven by revenue-related contributions).

More specifically (as can be found when clicking through to understand contributors at stock level), the 'low-CTL' fund has a substantial position in RWE Aktiengesellschaft – a firm that could incur considerable tax-related losses in the relevant transition scenario (and, indeed, has relatively high carbon intensity) but is near-neutral from a revenue perspective due to its 'green' electricity generation (currently 23.4% of company revenues and predicted to increase in the scenario). This brief case study highlights the importance of modelling transition-related losses using a framework that provides granularity on individual companies rather than estimating either taxation or revenue impact at sector level. The aforementioned paper provides further insights on this point. One interesting snapshot from that article is reproduced below.

Exhibit 5: Relationship between CI and CTL for stocks in 'high-sensitivity' sectors



Source: Lorans et al. (2025)

Exhibit 5 shows firms in 'high-sensitivity' sectors. While there is a loose positive correlation between carbon intensity and the estimated loss relating to carbon taxes, there is almost no relationship at all between carbon intensity and the estimated (net) loss relating to revenues. Moreover, while there is some sector clustering in the revenue loss/gain projections, there are still very considerable differences between firms in the same industry.

Takeaway: the Need for Multiple Lenses

There is no 'silver bullet' that investors can employ in order to paint a robust picture of climate risk exposure, including how the portfolio may perform in transition scenarios. It is important to ensure analytical breadth when considering these subjects and *avoid tunnel vision* driven by a narrow selection of metrics. Employing different analytical tools—particularly when monitoring (or selecting) strategies in an equity portfolio—can both improve rigor and help investors to achieve non-synonymous objectives, ranging from fulfilling climate-related commitments to managing diverse investment risks.

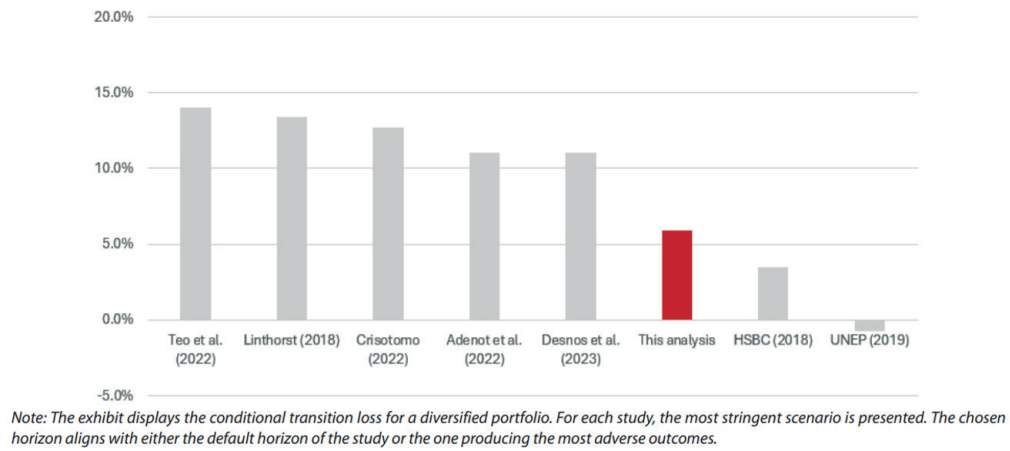
A webinar exploring the subject of Conditional Transition Loss will take place on December 4th, 2025. To register to attend or watch the replay, [Click Here](#).

*This article contains data from the **Scientific Portfolio** platform. Users can access analytics to conduct analyses of available funds and upload their own equity portfolios to examine performance and exposures. Entry-level access is free of charge, via self-registration.*

Access the Scientific Portfolio Platform

Appendix A

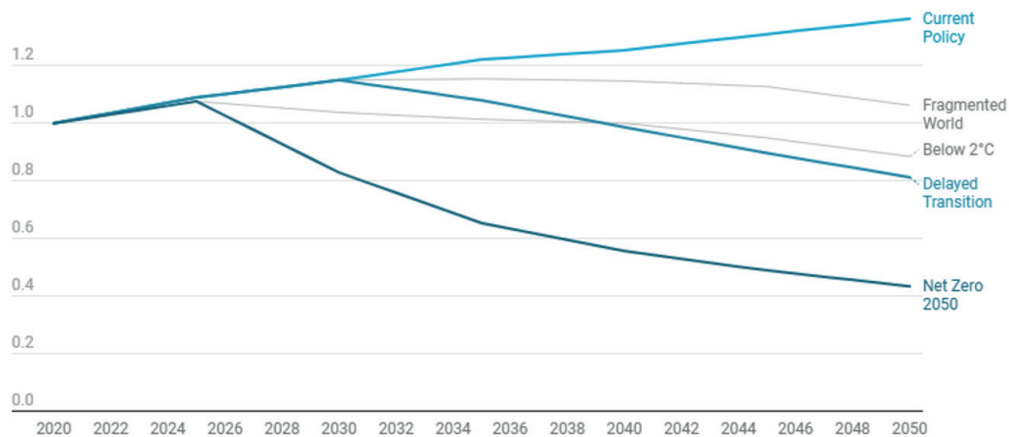
Comparison of aggregate transition loss in the literature with Bouchet et al., 2025



Source: Bouchet, V., Lorans, T., Priol, J., *Beyond Carbon Price: A Scenario-based Quantification of Portfolio Financial Loss from Climate Transition Risk*, January 2025, Scientific Portfolio.

Appendix B

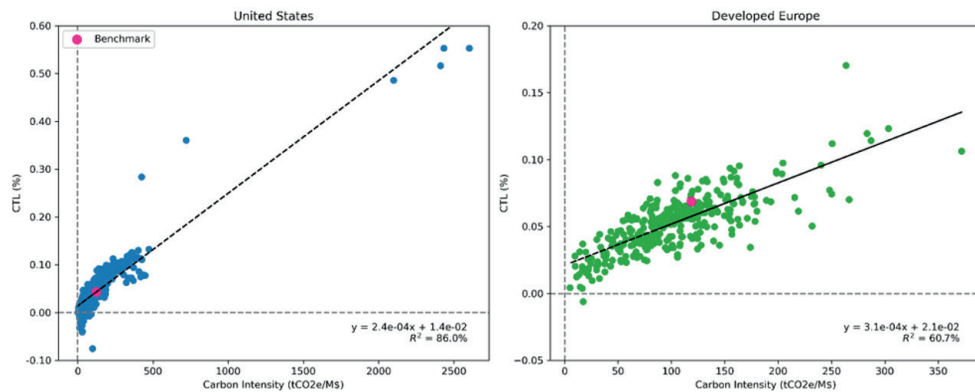
Fossil fuel usage: potential scenarios that may be used for CTL modelling



Source: Chart from Scientific Portfolio, data from NGFS – MESSAGEix-GLOBIOM, created with Datawrapper

Appendix C

Equity fund conditional transition loss versus carbon intensity, including six outlying funds omitted in Exhibit 1



Source: Scientific Portfolio. Data from 845 U.S. strategies and 492 European strategies. Carbon intensity in tCO₂e/\$M. Conditional transition loss methodology as defined in Bouchet, Lorans & Priol (2025), with model MESSAGEix-GLOBIOM 1.1-M-R12, scenario Net Zero 2050, time horizon 2050.

About Scientific Portfolio

Scientific Portfolio is the latest commercial venture incubated within the research ecosystem of EDHEC Business School (EDHEC), one of the world's leading business schools.

Scientific Portfolio has assembled a team with a broad range of expertise and backgrounds, including financial engineering, computer science, sustainable and climate finance, and institutional portfolio and risk management. It proudly carries EDHEC's impactful academic heritage and aspires to provide investors with the technology they need to independently analyse and construct equity portfolios from both a financial and extra-financial perspective.

To achieve this, it offers investors three sources of value through its portfolio analysis & construction platform:

- Helping investors to analyse their equity portfolios, identify actionable insights and enhance portfolios with allocation functionalities. Indeed, Scientific Portfolio likes to promote portfolio analysis as a means to the concrete goal of building portfolios that are both more efficient and better aligned with their investment objectives.
- Providing investors with an integrated framework where financial and extra-financial (ESG) considerations are jointly captured in analysis and portfolio construction. The ability to incorporate ESG-related insights in the portfolio allocation process is now a common requirement among many investors.
- Giving investors access to a Knowledge Centre catering to all types of learners and providing guidance through the portfolio analysis and construction process. This aligns with Scientific Portfolio's commitment to remaining connected with its academic roots and bridging the gap between investors and academia.

<https://scientificportfolio.com/>

