

Targeting High-Impact Scope 3 Categories to Accelerate Corporate Net-Zero Strategies

Topic: Input-Output Analysis: Trade and Global Value Chains policies (8)

Author: Mo Li

Co-Authors: Hugo Ernest-Jones, Yohanna Maldonado, Cheng Lin, Steven J. Davis, Sangwon SUH

Research Question

Corporate climate action is a linchpin of global efforts to limit planet warming to 1.5°C. For the vast majority of companies, the largest share of greenhouse gas (GHG) emissions lies not in their direct operations, but in their value chain, specifically Scope 3 emissions. However, measuring and managing these emissions presents a formidable challenge due to the complexity of supplier networks and the lack of primary data. To address this, the Science Based Targets initiative (SBTi), the leading global standard-setter for corporate climate targets, released a draft revision to its Corporate Net-Zero Standard in March 2025. This revision proposes moving away from fixed coverage thresholds (which previously required companies to cover 67–90% of their total emissions) toward a significance-based approach. Specifically, the draft suggests that companies must set targets for any Scope 3 category that represents at least 5% of their total Scope 3 inventory.

The central research question of this study is whether this proposed 5% category-level significance threshold is robust enough to capture the majority of global emissions when applied across the entire economy, rather than just among current high-performing reporters. Furthermore, we investigate whether this threshold is overly conservative, potentially imposing unnecessary administrative burdens, and identify the optimal balance between simplified reporting requirements and rigorous global emissions coverage.

Method

To answer this question, we moved beyond the self-reported data typically used for such analyses (e.g., CDP disclosures), which often suffer from selection bias towards large, transparent companies. Instead, we utilized the Comprehensive Environmental Data Archive (CEDA), a high-resolution multi-regional input–output (MRIO) model. CEDA links economic activities with environmental flows across global supply chains, allowing us to simulate the emission profiles of "average" companies across the global economy.

Our methodology involved modeling 26,400 distinct country-sector combinations across the world's 65 largest economies (representing over 90% of global GDP). We treated each country-sector pair as a representative corporate entity. We then calculated the upstream Scope 3 emissions for each entity, ensuring that global emissions were not double-counted. We also approximated downstream emissions attributable to households (e.g., use of sold products) to create a comprehensive picture of global Scope 3 liability. We then virtually applied the SBTi's proposed exclusion criteria to this synthetic global dataset, testing how different significance thresholds (from 0% to 100%) impacted the aggregate coverage of global GHG emissions.

Data

The primary data source for this analysis is the CEDA model, which integrates harmonized national input–output tables, international trade statistics, and GHG emission inventories. The model covers 400 distinct industrial sectors across 149 countries. For this specific study, we utilized a condensed version focusing on the 65 largest economies to ensure computational efficiency while retaining high sectoral granularity. This dataset provides a "ground truth" of economic linkages and emission intensities that is independent of corporate willingness to report, offering a more neutral testbed for policy criteria than voluntary disclosure databases.

Novelty of the Research

The novelty of this research is threefold. First, it provides an independent, global-coverage test of proposed Scope 3 threshold rules using an MRIO framework. Unlike previous analyses that rely on self-reported corporate disclosure datasets (which can be incomplete and biased toward better reporters), our approach avoids selection bias by modeling the full economic system.

Second, it quantifies how far threshold flexibility can be increased while still achieving high global emissions coverage. We identify a highly nonlinear relationship between threshold stringency and coverage: while the SBTi's proposed 5% threshold captures 96% of global Scope 3 emissions, we find that a threshold of 37% still retains 90% of emissions, and a threshold of 71% retains 80%. This provides a concrete evidence base for reducing implementation burdens without sacrificing aggregate ambition.

Third, this work informs the design of credible, scalable, and adoption-friendly corporate standards. By identifying where simplified rules hold—specifically due to the dominance of "Purchased Goods and Services" in many footprints—and where sectoral heterogeneity creates risk (e.g., in transportation), we offer a pathway to align corporate prioritization with global mitigation needs more effectively.