

Downstream emissions and the carbon trade balance between world regions

Topic: Drivers of CO₂ emissions

Author: Alexandra Penedo de Sousa Marques

Co-Authors: Joao Rodrigues, Tiago Domingos

Emissions embodied in a country's final consumption, as a measure of a country's responsibility on climate change, have been suggested as an alternative to direct emissions, based on the premise that processes causing greenhouse gas (GHG) emissions benefit humans by providing consumer goods and services. But, in the economic process, for every buyer there is always a seller. An obvious symmetrical approach to the emissions embodied in a country's final consumption (upstream emissions) is to consider the emissions embodied in its value added (downstream emissions). Here we compute the emissions embodied in the value added of goods internationally traded between world regions, and show the main world fluxes of downstream embodied emissions. For that we built a multi-region input-output model based on GTAP database. We find that Developed Economies and Fossil Fuel Exporters are the regions whose payments to primary factors of production are most dependent on emissions generated elsewhere. Developed Economies receive downstream emissions mainly via the value added of manufactured products' exports. Fossil Fuel Exporters receive downstream emissions mainly from Developed Economies, through the value added of fossil fuels' exports. This sector has a high downstream intensity. The accounting of downstream emissions allows the determination of the extent to which an agent's income depends on carbon emissions. This approach, combined with upstream emissions, allows a fairer sharing of responsibility between consumers and producers that could solve the issue of "common but differentiated responsibilities".