Methodological aspects of international environmental accounting of CO2 and water use in input-output models

Topic: Modelling global water issues
Author: Maaike Corinne Bouwmeester
Co-Authors: Jan Oosterhaven

An increasing awareness of embodied emissions and resources in traded products has resulted in attempts to track emissions and natural resource use along the international supply chain. An international input-output (IIO) model is identified to be the appropriate methodological framework to undertake this type of environmental accounting, because direct and indirect, domestic and international environmental impacts can be analyzed in one framework. In this paper, two features of IIO models that influence the results of impact analysis will be studied based on the EXIOPOL database; specification and aggregation errors. Regarding the specification errors, we focus on the deviations in environmental accounting that result from (1) assuming that domestic environmental coefficients can be used to calculate the resources or emissions embodied in international trade and (2) using a single-country framework versus using a multi-country framework to calculate the environmental impacts. The EXIOPOL project offers two dimensions to analyze aggregation errors. In building the database, much work has been devoted to detailing the sectors that are important from an environmental point of view. This additional detail allows us to investigate the size of errors made when environmental analysis is undertaken using more aggregate industries. We will also compare an IIO model, with the countries included individually, to a model where all countries are aggregated to one region, for example, the EU27. Due to the extent of the database we can provide distributions of the deviations instead of point-estimates. This allows us to investigate whether deviations are larger depending on the specific country or sector that is analyzed. We will test the specification and aggregation errors made by focusing on CO2 emissions and water use. Investigating two quite different environmental extensions provides for a generalization of our findings regarding the different kinds of errors.