

Land footprints and the use of high product and country resolution in multi-regional input-output modelling

Topic: Global databases

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Multiregional input-output (MRIO) databases are becoming available with increasingly more detailed data. However, there is still no MRIO databases with high harmonized sector detail and high country detail. Minor countries are often aggregated into so called rest of the world (RoW) regions in IO databases such as WIOD and EXIOBASE (Stadler et al., 2014). However, as better data are becoming available in the source databases, and computational methods are improving, so do the possibilities of including detailed country data in MRIOs, replacing the RoW regions. In this work we aim to develop new methods that expand the 49 regions in EXIOBASE to 214 countries (representing the countries with macroeconomic data such as trade, GDP and industry output) and show the relevance for environmental footprint accounting. We apply novel methods to allow for the simultaneous modelling of data at both high (harmonized) sectorial and country resolution in MRIO data using desktop computational capacity for the first time.

Product and service level trade data is provided by Comtrade database, energy trade data is provided by the IEA and UN services databases, while the industry and product output values are provided by the national accounts databases, FAOSTAT and IEA energy balances. We use this data to make an initial estimate of the supply-use tables (SUTs) as per Stadler et al. (2014), but at the individual country level.

A mathematical optimization approach is employed here to ensure internal consistency within the SUTs (balances are held), consistency with country-level macro-economic data, and detailed bilateral trade data.

We assess the sensitivity of results of land footprints using the aggregated and disaggregated databases, and do a further sensitivity analysis against an aggregated product database to show the quantitative benefits of including both country and product level detail.