The new EXIOLab â€" compiling and updating EXIOBASE V.2 in a virtual laboratory

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Author: Rachel C. REYES
Co-Authors: Arne GESCHKE, Arjan de Koning, Richard WOOD, Tatyana Bulavskaya, Konstantin STADLER, Hagen Schulte in den Baeumen, Arnold Tukker

In this work, we explore options to reconstruct the second version of EXIOBASE multi-region input-output (EXIOBASE2 MRIO) database in the EXIOLab collaborative cloud-computing laboratory environment. Whereas EXIOBASE2 uses a multi-process reconciliation procedure with the major steps of (1) detailing and harmonising country tables into high-resolution common classification and (2) linking of these tables via trade, in this paper, we focus on combining these steps and using alternative mathematical reconciliation techniques with the virtual laboratoryâ€™s high-performance computing capability. We use both EXIOBASE2â€™s pre-processed data and final tables in defining an optimisation problem that confronts the compiled MRIO table with conflicting data sources, tagged with user-defined standard deviation estimates, giving the researcher some degree of influence over the adherence of the compiled table to its sources. Visualisation tools, distance measures and detailed diagnostic tests are made available in the lab for increased transparency on reliability and uncertainty information, useful for interpreting MRIO-based studies. For illustration, global carbon, water, land and materials footprints are calculated with EXIOLab and are shown to vary slightly from previously reported resource footprints. The simplification and flexibility offered by the new EXIOLab present opportunities in IO-based research to be more timely, topical and relevant especially for swaying environmental and socio-economic policy decisions towards promotion of wellbeing and sustainability.