An Inhomogeneous Approximation-and-Update Approach to Refine Multi-Regional Input-Output Tables

Topic: Input-Output analysis of disasters I
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The potentially increasing intensity of extreme weather events may lead to severe damages on global infrastructure. In order to use multi-regional input-output tables (MRIOT) for an analysis of these damages including the downstream effects of production and transport failure, the tables need to be more detailed both regionally and sectorally than most currently available global matrices.

Here we present a simple approximation-and-update practice to refine existing multi-regional input-output tables. Our basic idea for enlarging an MRIOT by certain subsectors or sub-regions is to find suitable weights that reflect their economic importance within the superordinate sector or region. These ratios can then be used to deduce their inputs and outputs. Particularly, the apportioning of economic flows does not need to be homogeneous. We argue that for many purposes a heterogeneous MRIOT allowing for uneven sectoral and regional detail is more convenient than aggregated data. The down-scaling procedure is complemented by an update algorithm. Once more information on an estimated flow is available, all associated flows are updated accordingly. The enlarged MRIOT thus becomes asymptotically accurate.

Embedded in the community data project Zeean (www.zeean.net) we apply this method to the refinement of the EORA World MRIO database.

Naturally, our algorithm just approaches an exact MRIO dataset and any investigation based on it has to be supplemented by an error analysis revealing potential misinterpretations. However, the refinement procedure will enable a more precise analysis of damages on global supply chains and their economic, environmental and social implications.