

International material resource dependency in an input-output framework

Topic: Modelling resource dependency

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Besides sustainability concerns, strategic resource interests coupled with increasing resource depletion have contributed to a rising concern with resource security. Governments issue reports to identify strategic material resources and actively design strategies to ensure the supply of natural resources and re-use of materials already in the economy. We assess natural resource use, trade linkages and dependence among the 43 countries present in the EXIOPOL database. Material resource requirements along the international supply chain are quantified using an environmentally extended international input-output model, which allows considering direct and indirect, domestic and international resource use. We focus specifically on fossil fuel carriers, metals and mineral resource use. Dependency on foreign resource suppliers is examined by looking at the natural resources required directly and indirectly in satisfying final demand by country. Key is the extent to which these resources are imported and whether the majority of the imports is sourced from a small or large set of trade partners. Three measures of resource dependency are analyzed. Resource dependency is measured as total material requirements (direct and indirect) per unit output. International material dependency is defined as the percentage of the material requirements that is sourced abroad. Finally, the concentration of international material dependency is measured by the Herfindahl index calculated over the international resource multipliers. When resources are mainly imported from one or a few trade partners, countries may want to reconsider whether strategic interests should be factored into their procurement strategies.