

An environmental world linkage behind Japanese household consumption: Global link input-output model

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With the rapid growth of newly emerging countries such as Brazil, Russia, India, and China (BRICs), product supply chains have been growing steadily more complex and globalized. Viewed from an environmental perspective, this change implies that environmental emissions related to a country's activities are increasingly translocated to foreign countries. For analyzing environmental characteristics of goods and services, globalization lends weight to the consideration of their environmental impact overseas.

Particularly, the Japanese economy is maintained through consumption of large amounts of natural resources, most of which are imported. Recently, not only have the imports of natural resources increased; imports of manufactured products have increased as well. For envisioning a future that accommodates sustainable consumption and production in Japan, it is crucial to understand overseas environmental impacts structurally, as they are stimulated by the Japanese economy. An interregional input-output model including multiple nations and multiple sectors presents a powerful framework to achieve that purpose. However, in general, it is difficult to incorporate many nations and their production sectors into data compilation for that model. Considering data availability, it is therefore useful and functional to define sectors in the framework according to research objectives.

This paper presents a global link input-output model to identify a potential network between Japanese economic activities and those of other countries. In this model, Japan, with about 400 sectors used for detailed elucidation of household consumption patterns, is included with each country represented as one sector.

For compiling model data, this study combines the Japanese input-output table with Trade Statistics of Japan and UN trade data. It therefore enables the association of 400 commodities consumed by Japanese households to more than 200 countries. Moreover, by incorporating sectoral CO₂ emission data in Japan and each country's CO₂ emission data into the model, we estimate the embodied CO₂ emissions of each commodity consumed by Japanese households, including CO₂ generated indirectly within other countries.

Keywords: global link, interregional, household, trade, embodied CO₂