Calculation of the carbon content for border tax adjustment: An application of a re-constructed Japan-China multi-regional input-output model

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Carbon adjustment at the border to the imports from countries which do not implement comparable domestic mitigation policies has been considered as an effective measure to compensate competitiveness loss for countries which implement strict mitigation policies. One of the practical and complicated issues in the implementation of border tax adjustment is how to determine the carbon content of imported products. Whether to use the nation-wide average levels in the country of origin or the average levels in the destination country? Whether to use direct emissions from the production of the products or emissions embodied in the finished products which include all emissions from upstream production.
In this paper, we calculate the carbon content of products based on a re-constructed two-country input-output model for Japan and China. Recently the government of Japan announced a plan to impose a carbon tax of JPY289/t-CO2 on fossil fuels from 2011. A border tax adjustment policy is also discussed to address the competitiveness issue associated with the imposition of the carbon tax. China is selected because it is one of the most important trade partners to Japan and the largest emitter of GHGs which has yet implemented a binding target.
To reflect distinguished regional disparity in terms of economic growth, industrial structure and trade in China, we link China's multi-region input-output table with a Japan-China two-country input-output table and re-construct a new model with the disaggregation of China into thirty provinces. To our best knowledge, it is the first time to link a subnational multi-region input-output table with a multi-country input-output table for the calculation of embodied emissions.
The calculation results indicate that "like" products imported to Japan from different provinces in China have very different carbon contents in particular for carbon-intensive products, such as steel and iron and cement, etc. This demonstrates that using national average levels in the country of origin as a metric for the determination of carbon content is not appropriate.