rwiot: An R package for Input-Output analysis on the World Input Output Database (WIOD)

Dong Guo1* Valentin Todorov1

1. United Nations Industrial Development Organization (UNIDO)
*Contact author: d.guo@unido.org

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International trade is becoming increasingly globalized and the products traded today are not produced in a single country but are the end-result of a series of steps carried out in many countries throughout the world. A basic method of quantitative economics which considers the macroeconomic activity as a system of interrelated goods and services is the Input-Output analysis [1]. It observes various economic sectors as a series of inputs (raw materials, supplies and services) and outputs (finished or semi-finished goods and services). In particular, it provides the tools to assess structural changes in the economy, in terms of linkages between economic sectors. The World Input-Output Database (WIOD) [3] is a new public data source which provides time-series of world input-output tables for the period from 1995 to 2009. National input-output tables of forty major countries in the world (covering about 90% of world GDP) are linked through international trade statistics.

Given the availability of this valuable statistical information, the analysts will need readily available and easy to use software for accessing and analyzing the data. The R package rwiot developed at UNIDO provides analytical tools for exploration of the various dimensions of the internationalization of production WIOD through time and across countries using input-output analysis. The package contains functions for basic (Leontief and Goshian inverse, backward and forward linkage, impact analysis) as well as advanced (vertical specialization) input-output analysis. Compositional data analysis techniques can be applied to study the interregional intermediate flows by sector and by region. The flexible R packaging mechanism is used to extend the functions with data, complete documentation and a large number of examples. In order to include the huge world input-output table (more than 250 MB) into the package a two-tear approach is used. The package rwiot includes the data for only one year (less than 15 MB) and thus can be downloaded from the CRAN repository and installed. After that a second package, rwiotData containing the complete table can be downloaded from an alternative web site. Special attention is given to the visualization of the analysis. The results can be presented in publication quality graphics as dot plots, radial plots or time series plots. The object oriented structure of the package allows for easy extension of the package functionality.

The presentation is illustrated with an example studying the manufacturing sectors and linking the world input-output tables to the UNIDO statistical database INSTAT.

References

