

A micro-founded Hybrid Input-Output framework

Topic: Climate policy issues: tools

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Input-Output Table (IOT) is a very common tool used both for accounting and for analytical purposes. Actually many monetary and physical IOTs have been built in several countries but there are still some limits and discrepancies between the two as stated by Weisz and Duchin (Ecological Economics 2006 57, 534-541). To overcome these problems an IOT is built starting from Supply and Use tables in a hybrid framework, i.e. a micro founded Hybrid Input-Output Table (mHIOT). Here, a hybrid framework means that each commodity is accounted for using its own characteristic unit – kg, kWh, m², m³, km, hours etc. Moreover the mHIOT has an asymmetric structure, i.e. commodity by activity, and relies just on by-product technology hypothesis. These assumptions simplify the transformation of SUTs to IOT and, at the same time, the IO modelling has a higher consistency with real processes. For example processes of recycling and uses of packaging can be easily introduced. Furthermore, in this framework, by introducing characteristic vectors and matrix of prices, an analyst may easily move from physically-accounted levels, including for example natural resources and emissions, to monetary one, where values added are displayed, and vice versa.

The paper analyzes the demand-driven model upon a micro-founded hybrid framework. It is showed that the (physical) demand might be not equal to the (physical) production because an overproduction can occur. That is a logical consequence of an approach based on by-product technology hypothesis.

In addition to this, the hybrid framework allows the determination of environmental pressures of human activities and, at the same time, offers information about the value-added chain. The latter, due to the presence of the matrix of prices, is calculated in a more general way compared to the usual method where just a vector of prices is considered. Indeed, value-added ratios are determined by the real transactions generated to satisfy the demand hence, because a price might differ per purchaser, they are not calculated a priori.

To conclude, a numerical example resuming most of the concepts showed in the paper is included. Starting from a very polluting situation, two alternative green scenarios are discussed: the first one consists in increasing of recycling activities and the second one in a shift to renewable energy production. Environmental and economic effects of both scenarios are discussed.