Monetary input-output tables and physical balances

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Input-Output tables are widely used in several types of analyses. Indeed, although born in an economic context, IOTs are more and more used for environmental impact assessment of specific scenarios, e.g. for the assessment of greenhouse gas emissions due to determined changes in the consumption pattern. But, in order to perform as a multidisciplinary modeling tool, IOTs have to be robust and coherent with some defined requirements in many different levels, e.g. economic, mass, energy and so on.

The paper states that IOTs should reduce as much as possible the loss of information in order to achieve a more reliable analysis of physical variables and to behave as a proper multidisciplinary tool. Yet the use of a monetary framework may even increase the loss of information, which already occurs when a common aggregation process is carried out to construct IOTs. The further loss of information is a consequence of the fixed prices assumption adopted implicitly when a monetary framework is chosen for the Leontief demand-driven model. So this assumption can affect the calculated environmental impact assessment wrongly.

In order to demonstrate such statement the paper focuses on the variability of behaviors within homogenous activity groups and the changeability of average prices. The latter are indeed dependent variables of final demand vectors hence a simple scenario analysis may jeopardize the proportionality between the predicted monetary and physical levels of production, which is strongly required in order to perform multidisciplinary analyses. Thus monetary IOTs, including also the mixed-units (hybrid) framework, may turn out to be inconsistent with fundamental physical laws, e.g. the Mass Conservation Law. In terms of environmental impact assessment this can cause either over or underestimation of pollutants emission or natural resources extraction.

The paper concludes with some remarks and recommendations to avoid such drawback and to carry out any desired balance coherently. A numerical example is shown.