IMF Multi-Analytical Regional Input-Output (IMF-MARIO) Database

Topic: Input-Output Analysis: Trade and Global Value Chains Policies - VIII
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Input-output tables represent a unique source of information to understand the sale and purchase relationships between producers and consumers within an economy and their interconnection with: a) environment - emissions of CO_2 and other pollutants, use of land, natural resources, energy, etc.; b) employment - by gender, age, income group, qualification, green activities, etc.; c) tax gaps and income distribution; d) Trade in Value Added (TiVA), and so on. Given the IMF's new priority areas for surveillance, including climate change and gender, as well as its traditional surveillance and policy formulation, extending domestic input-output tables to an IMF Multi-Regional Input-Output (MRIO) model would constitute a powerful analytical tool, and source of harmonized granular data, for many IMF Departments, member economies, academia, and researches institutes, to better understand the inter-relationships between economies; their role in global value chains; the implications of their production, consumption, and investment activities for climate change; and their economic and social development. It would also help improve the data and conceptual consistency across individual economies' input-output tables and could also be used to develop or improve Supply-Use Tables (SUTs) for those economies with limited use of the SUT framework in estimation of GDP by the production approach. To fulfill this goal, the IMF is developing the Multi-Analytical Regional Input-Output (IMF-MARIO) database, a new database which will take advantage of already available data from different global input-output tables initiatives; statistical offices; international organizations, including official source data collected by the IMF from its member countries, giving the IMF the advantage of early, and sometimes exclusive, access to a broader set of official statistics, which will reduce the amount of missing data faced in the estimation of MRIOs.

Over the past decade or so, different initiatives were conducted to estimate global MRIOs, with the main ones being the OECD Inter-Country Input-Output Tables (ICIO), the University of Groningen World Input-Output Database (WIOD), the IDE-JETRO's international input-output tables, the University of Sydney EORA and GLORIA databases, the Eurostat FIGARO database, the EXIOBASE database, the University of Purdue GTAP-MRIO, the Asian Development Bank (ADB) MRIO, the ECLAC MRIO, and the recently launched EMERGING.

Some of these MRIO databases use information from previous databases in their estimation. In this way, the different databases are sharing data among themselves in a way to improve estimation and to decrease costs and time of their estimation; this process may also lead to a better convergence of results from these different databases in the future. Following this observed trend, the initial estimation of the IMF-MARIO also draws from information already available in selected MRIOs.

Given the estimation complexity, it is proposed a methodological solution to allow flexibility and speed, it consists in breaking down the IMF-MARIO estimation process into 5 major blocks: 1) SNA constraints for the economy as a whole; 2) Output, value added, tax, subsidies, and final demand components broken down by commodities and industries; 3) Technical coefficients for intermediate consumption and final demand; 4) International trade; and 5) Estimation of the IMF-MARIO components based on data from the 4 previous blocks. Despite the blocks interdependence, the blocks work is organized in such a way to allow that the data gathering and the work in each block can take place in parallel.

Moreover, the new proposed framework for the IMF-MARIO estimation will be flexible enough to make it possible to: a) replace the initial databases used in the estimation process by other better

databases or source data; b) add new databases; c) nowcast and forecast the estimation based on IMF macroeconomic projections; and d) obtain yearly and quarterly estimation of this database.

Regarding the IMF-MARIO scope, an important step in the estimation is the definition of countries, commodities, and industries, as this choice will impact the estimation, the results, and the future use of the model. Despite being possible to change the number of components of these 3 key variables, experience shows that changing their definition usually is not so straightforward, and it is highly demanding in time and resources. As such, the estimation considers a more granular definition of economies, to include all IMF member economies and the main commodities and industries associated with trade, consumption, emissions, and energy.

The resulting IMF-MARIO database consists of: a) harmonized national SUTs at purchasers' and basic prices; b) tables for trade and transportation margins, taxes and subsidies; c) IMF-MARUT (Multi-Analytical Regional Use Table) at basic prices; and d) IMF-MARIO at basic prices.