# ADB Multi-Region Input-Output Database: Sources and Methods

Joseph Mariasingham, ADB

**Overview**

In a global economic environment increasingly characterized by fragmented and internationally distributed production processes and by trade in intermediates, the necessity for pertinent quantitative information of sufficient granularity is more urgent now than ever. The input-output economic analysis framework provides an ideal system for depicting and analyzing productive and trading activities which are so integrated in the globalized world that studying one in isolation from the other would be suboptimal. To address the increasing demand for such information the World Input-Output Database (WIOD) was developed under the auspices of the University of Groningen. It is a very rich source of time series data encompassing the global economy with rather detailed IO tables provided for 40 economies. However, currently in the WIOD disaggregate information is available only for 6 Asian economies. To address certain informational and analytical needs related to the Asian and the Pacific Region, the Asian Development Bank (ADB) has embarked on a project to augment the WIOD with details for more Asian economies. Currently there are 5 additional economies namely Bangladesh, Malaysia, Philippines, Thailand and Viet Nam for 6 years 2000, 2005-2008 and 2011 in the expanded database known as ADB Multi-Region Input-Output Database (ADB MRIO). Work is underway to add more economies and years to the database. It should be noted that the information presented are not official statistics rather estimates methodically produced to assist research and analysis.

**Structure of the ADB MRIO**

In order to preserve the complementarity with the WIOD, the tables in the ADB MRIO database are structured the same as the WIOD. The aim is to facilitate a smooth back-and-forth transition between the two databases with minimal modifications to data preparation and analysis processes employed by users.

**Economies**

45 economies are covered in detail in the database. The rest of the economies are aggregated under the category “Rest of the World” (ROW).

**List of Economies in the ADB MRIO**

| | | | |
|---|---|---|---|
| Australia (AUS) | Austria (AUT) | Belgium (BEL) | Bulgaria (BGR) |
| Brazil (BRA) | Canada (CAN) | People's Republic of China (PRC) | Cyprus (CYP) |
| Chez Republic (CZE) | Germany (DEU) | Denmark (DNK) | Spain (ESP) |
| Estonia (EST) | Finland (FIN) | France (FRA) | Great Britain (GBR) |
| Greece (GRC) | Hungary (HUN) | Indonesia (IDN) | India (IND) |
| Ireland (IRL) | Italy (ITA) | Japan (JPN) | Republic of Korea (KOR) |
| Lithuania (LTU) | Luxemburg (LUX) | Latvia (LVA) | Mexico (MEX) |
| Malta (MLT) | Netherlands (NLD) | Poland (POL) | Portugal (PRT) |
| Romania (ROM) | Russia (RUS) | Slovakia (SVK) | Slovenia (SVN) |
| Switzerland (SWE) | Turkey (TUR) | Taipei,China (TAP) | United Stated of America (USA) |
| Bangladesh (BAN)* | Philippines (PHI)* | Malaysia (MAL)* | Thailand (THA)* |
| Viet Nam (VIE)* | Rest of the World (ROW)* | | |

* Economies added to the database by ADB

**Sectors**

In the database, the industrial aggregations by which the economies are sectored are exactly the same as in the WIOD. Preserving the sector classification enables the seamless integration of the data on the additional five economies into the international input-output tables extracted from WIOD for the relevant years.

**Valuation**

The estimates in the database are in current US dollars.

**Conceptual Framework**

The conceptual framework of the ADB MRIO (and hence the methods used in the construction of the tables) is essentially the same as that of the WIOD outlined in the document *World Input-Output Database (WIOD): Contents, Sources and Methods* (Timmer et. al, 2012) available at

www.wiod.org/publications/source_docs/WIOD_sources.pdf

In addition, the ADB technical document *Understanding the Statistics on Global Value Chains* provides a succinct introductory exploration of the input-output framework in the national and international contexts. The document can be accessed at

www.adb.org/sites/default/files/publication/175162/gvc.pdf

**Data Sources**

The published economy specific official supply and use tables (SUTs) and/or input-output tables (IOTs) were used as benchmark for expanding the international IOTs extracted from the WIOD. The IOTs for non-benchmark years were produced basing the structures provided in the benchmark IOTs updated by relevant survey and other sourced economic data. The methods used to transform SUTs to IOTs and updating the tables are detailed in

http://ec.europa.eu/eurostat/documents/3859598/5902113/KS-RA-07-013-EN.PDF/b0b3d71e-3930-4442-94be-70b36cea9b39?version=1.0

The IOTs thus produced were aggregated or disaggregated, as the case maybe, using established methods, in some cases modeled assumptions, to match the structure of the WIOD tables. The import and export vectors were articulated bilaterally using the relevant patterns discerned through analyzing data extracted from UN COMTRADE, trade statistics published by the economies, and, where necessary, EORA MIRO. The articulation was constrained to preserve, to a large extent, the estimates from the national IOTs. Where there were discrepancies between the estimates provided by two economies for the same trade transaction (if valued correctly, bilateral import and export data for two economies should be consistent) that assessed to be of higher quality was preserved. The determination of the bilateral sector trade was the penultimate step in integrating the five economies into the IOTs from WIOD.

**Supply Demand Equality**

To preserve the integrity and relevance of the information in IOTs from the WIOD, special attention was paid to maintain, as much as possible, the economy-sector specific overall WIOD totals for supply and demand. After integrating the five economies, the relevant segments of the rest of the world (ROW) IO tables were adjusted systematically and manually to maintain the supply demand equality. In instances where the required adjustment exceeded the five economies' proportion in the ROW data related to other economies (including those of the five economies) were adjusted relatively marginally (<2.5%). However segments assessed to be of lower quality, such as the "change in inventories and valuables" of certain economies, were subjected to larger adjustments. In the process of equating supply with demand, the RAZ procedure was sparingly used, that too only locally, in a controlled manner to preserve the original data as much as possible in the non-ROW segments of the tables.

**Assessment of Data Quality**

The data in the balanced international IOTs were compared with the corresponding original data from WIOD and the national IOTs. Steps were taken to ensure that the balancing adjustments were controlled within a narrow range to maintain the economy-sector specific production technology, gross domestic

products (GDPs), demand patterns and trade flows. However, as a last step a limited number of proportionately large cell-specific adjustments were made to maintain the overall economy-sector specific supply and demand controls and equality. Further, the Leontief inverse was calculated for each year and applied as follows to check the relationship between production and final demand

$X = (I - A)^{-1}Y$

Where X and Y are the vectors of total output and final demand given by economy-sector, I is an NxN identity matrix, A is the NxN matrix of input coefficients. The Wang, Wei and Zhu (2014) export decomposition framework was also applied to the ADB MRIO tables for each of the four years: the test was whether a bilateral sector export transaction could be completely decomposed and expressed as the sum of 16 terms defined by Wang et al. The expanded international IOTs met both the additional criteria.

**ADB Initiatives**

Between 2008 and 2013 ADB implemented a project to construct or update SUTs and IOTs for 18 developing economies in the Asia and the Pacific Region. To the extent possible the tables produced are being used as benchmark to expand the IOTs from the WIOD and to create a time series. Another ADB project is currently underway to produce SUTs and IOTs of 19 Asian economies for more current years. As part of this project, the participating national statistical offices are also encouraged to produce the tables (benchmark or non-benchmark) on an annual basis so that a high quality time series could be maintained. The tables will be used to update and expand the IOTs from the WIOD.

**References**

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