Chapter 6

Macroeconomic Data

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6.1 Uses of Macroeconomic Data

During the GTAP Data Base construction process, macroeconomic data are used in various stages. The primary use of macroeconomic data is in updating the regional input-output (I-O) tables to a common base year – 2004 for the GTAP 7 Data Base. As a first step, all the coefficients in the regional I-O tables, initially in national currency units, are scaled-up by the ratio of gross domestic product (GDP) calculated from the I-O tables to external GDP data in 2004 US dollars. Then, data on GDP aggregates – private consumption (C), gross capital formation (I), and government consumption (G) – are used in the FIT process to update the values of these aggregates in the regional I-O tables (see Chapter 15.A).

Per capita GDP data are also required in the construction of input-output tables for composite regions, i.e. the aggregate regions for which input-output data are generated based on the I-O tables of the primary regions. Similarity in per capita GDP is used as a criterion for matching a member country in a composite region to one of the primary regions within the same geographic area (see Chapter 8.E). A combination of one or more primary region I-O tables is then used to generate an I-O table for a composite region.

Macroeconomic data are also used in extending various data sets to the standard country coverage and as weights for aggregating data from standard countries to GTAP regions. Macroeconomic data, particularly GDP and GDP shares, are used in extending the trade datasets (Chapter 9) to 226 standard countries in the GTAP 7 Data Base. GDP data are also used as weights for aggregating data on domestic support (Chapter 10.B), factor shares (Chapter 12.A), and labor shares (Chapter 12.B) from standard countries to GTAP regions.

Finally, macroeconomic data, government consumption and GDP are used to check and potentially revise the share of government consumption in each I-O table. This procedure, started in GTAP 6 Data Base, imposes a more uniform treatment of government consumption expenditure across countries and is explained in greater detail in Chapter 8.E.

6.2 Data Sources and Processing

Since macroeconomic data, particularly GDP, are used in extending other datasets to the full set of standard countries, GDP and population data are required for all the 226 standard countries. Our primary source for macroeconomic data is the data base maintained by the Development Economics Prospects Group of the World Bank. The World Bank data base is a suitable source of
macroeconomic data for GTAP since it covers a wide range of countries and includes data that is already reconciled for statistical discrepancies. It is the underlying data base for the *Global Economic Prospects and the Developing Countries*, an annual publication of the World Bank.

The construction of the GTAP Data Base does not directly require data on exchange rates. All the coefficients in the regional I-O tables are simply scaled up to match the GDP data in 2004 US dollars. Since most the 2004 GDP data comes from the World Bank’s data base, the underlying exchange rate is the Atlas conversion factor\(^1\) that is used by the World Bank in its national accounts data.

From the World Bank data base, we obtained data on real GDP, GDP aggregates (private consumption, government consumption, gross domestic fixed investment, stocks, total exports, total imports), and population data for 130 countries, covering the world’s major economies. The GDP and GDP aggregates data are in millions of 2004 US dollars. For the 96 remaining countries, GDP and population data for 2004 or the closest available year, were compiled from other sources such as the *World Development Report* and the *CIA World Factbook*.

Estimates of the GDP aggregates were generated for the 96 countries for which only GDP and population data are available. This was done by first mapping the 226 countries with a smaller number of 19 geographic regions.\(^2\) This is one extra region compared to the GTAP 6 Data Base because Southern Asia has now been separated from South-eastern Asia. For each geographic region, the average share of each GDP aggregate to total GDP was calculated for the countries for which GDP aggregates data are available. Estimates of the GDP aggregates were then generated for the countries with no GDP aggregates data by multiplying GDP of each country with the average share of the GDP aggregate in the geographic region to which the country belongs. The estimates for each GDP aggregate were then summed up for each GTAP region after estimates have been generated for the data gaps. This practice is based on the assumption that a country would have a similar macroeconomic profile to its neighboring countries.

Starting with the GTAP 6 Data Base, we modified the processing of the data on GDP aggregates and we give the same treatment in the GTAP 7 Data Base. Our practice in previous versions of the data base was to use the estimates of C, I, G from the macroeconomic dataset as targets in adjusting the regional I-O tables. However, for exports (X) and imports (I), we use the trade totals from the reconciled merchandise trade data and services trade data (see Chapter 9). Since the trade totals do not match the total exports and imports in the World Bank dataset, the resulting final GDP does not match the World Bank’s GDP totals. In constructing the GTAP 7 Data Base, we revised this practice by scaling the GDP aggregates (C, I, G) so that together with the trade data totals the resulting GDP matches the GDP totals in the macroeconomic dataset.

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\(^1\) The Atlas conversion factor for any year is the average of a country’s exchange rate (or alternative conversion factor) for that year and its exchange rates for the two preceding years, adjusted for the difference between the rate of inflation in the country and, for 2001 onwards, that in countries including the Euro Zone, Japan, the United Kingdom, and the United States. A country’s inflation rate is measured by the change in its GDP deflator (http://www.worldbank.org/data/aboutdata/working-meth.html).

\(^2\) The 19 regions are: Oceania, Eastern Asia, South-eastern Asia, Southern Asia, Central Asia, Western Asia, North America, Caribbean, Central America, South America, Northern Africa, Eastern Africa, Western Africa, Central Africa, Southern Africa, Northern Europe, Eastern Europe, Western Europe, and Southern Europe.
The first four columns of Table 6.1 presents GDP, private consumption, gross capital formation (investment), and government consumption data expressed in 2004 US $ million for the 113 regions in the GTAP 7 Data Base.

6.3 **Capital Stock and Depreciation**

The GTAP Data Base reports data on physical capital stock and depreciation. Like the GDP aggregates data described in the previous section, capital stock data in 2004 US $ million were also obtained from the data base of the Development Economics Prospects Group of the World Bank.

Similar to the procedure for filling data gaps in the GDP aggregates data, data gaps for capital stock were filled by first calculating the average ratio of capital stock to GDP for the countries for which capital stock data are available. Estimates of capital stock were then generated for the countries with no capital stock data by multiplying GDP in each country with the average ratio of capital stock to GDP in the geographic region to which the country belongs. The capital stock estimates were then summed up for each region after estimates have been generated for the data gaps.

Depreciation is estimated at four percent of the 2004 physical capital stock. The last two columns of Table 6.1 present capital stock and depreciation data in millions of 2004 US dollars for the 113 regions of the GTAP 7 Data Base.
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Addendum to Chapter 6
Macroeconomic Data

Angel H. Aguiar and Terrie L. Walmsley

In the GTAP 7.1 Data Base adjustments were made to improve the Macroeconomic data used in the GTAP 7 Data Base. With the inclusion of 27 new EU I-O tables into the GTAP 7.1 Data Base, comparisons were made of the macroeconomic data used in the GTAP 7 Data Base and those used in the compilation of the EU SAMs. Further investigation of the discrepancies led us to revise and update the macroeconomic data used in the GTAP 7 Data Base. The Private Consumption, Gross Capital Formation, and Government Consumption data for Belgium, Bulgaria, Cyprus, Greece, Hungary, Luxembourg, and Malta were modified using OECD NIA and EUROSTAT data.

Table A.1 presents gross domestic product, private consumption, gross capital formation (investment), and government consumption data expressed in 2004 US $ million for the selected countries for which we have modified these macro data and the percentage change with respect to the originally used data.

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<th>GTAP Regions</th>
<th>Gross Domestic Product (2004 US$ million)</th>
<th>Private Consumption</th>
<th>% Change</th>
<th>Gross Capital Formation</th>
<th>% Change</th>
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