

18.A

Macroeconomic Data

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18.A.1 *Uses of Macroeconomic Data*

Macroeconomic data are used in different aspects of the GTAP Data Base construction process. The primary use of macroeconomic data is in updating the regional input-output (I-O) tables to a common base year -- 2001 for the GTAP 6 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 2001 US dollars. Secondly, 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 19).

Data on per capita GDP is used 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 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 14). A combination of the 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. Starting with the GTAP 5 Data Base, an effort was made to collect international datasets for a standard set of countries. However, not all the international datasets cover the entire set of standard countries. Macroeconomic data, particularly GDP and GDP shares, are used in extending the trade datasets (chapter 15) to 226 standard countries in the GTAP 6 Data Base. GDP data are also used as weights for aggregating data on domestic support (chapter 16), factor shares (chapter 18.C), and labor shares (chapter 18.D) from standard countries to GTAP regions.

18.A.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 2001 US dollars. Since most the 2001 GDP data comes from the World Bank's data base, the underlying exchange rate is the Atlas conversion factor¹ 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 134 countries, covering the world's major economies. The GDP and GDP aggregates data are in millions of 2001 US dollars. For the 92 remaining countries, GDP and population data for 2001 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 92 countries for which only GDP and population data are available. This was done by first mapping the 226 countries with a smaller number of 18 geographic regions (see table 14.3 in chapter 14). 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.

We modified the processing of the data on GDP aggregates in the construction of the GTAP 6 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 15). 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 6 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.

The first four columns of table 18.A.1 presents GDP, private consumption, gross capital formation (investment), and government consumption data expressed in 2001 US \$ million for the 87 regions in the GTAP 6 Data Base.

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>).

18.A.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 2001 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 4 percent of the 2001 physical capital stock. The last two columns of table 18.B.1 present capital stock and depreciation data in millions of 2001 US dollars for the 87 regions of the GTAP 6 Data Base.

Table 18.A.1 Macroeconomic Data (2001 US\$ million)

GTAP Regions	Gross Domestic Product	Private Consumption	Gross Capital Formation	Government Consumption	Capital Stock	Depreciation
AUS	357,368	214,866	77,243	64,239	935,617	37,425
NZL	50,569	28,609	10,165	8,571	130,973	5,239
XOC	13,831	9,674	3,473	2,893	39,022	1,561
CHN	1,159,031	495,479	408,777	147,626	2,737,614	109,505
HKG	162,793	106,525	47,220	18,267	449,397	17,976
JPN	4,177,611	2,334,191	1,059,721	718,340	15,068,192	602,728
KOR	427,646	246,227	109,933	42,268	1,266,670	50,667
TWN	281,436	171,851	51,522	35,869	530,953	21,238
XEA	29,248	18,244	8,394	5,272	94,469	3,779
IDN	145,306	88,044	23,359	10,190	309,494	12,380
MYS	88,041	18,180	12,938	5,469	254,688	10,188
PHL	71,438	52,870	14,008	9,502	190,250	7,610
SGP	84,857	50,172	29,968	12,247	247,711	9,908
THA	114,681	62,568	23,146	11,594	382,255	15,290
VNM	32,723	26,774	12,735	2,566	89,826	3,593
XSE	79,054	49,528	19,086	8,449	217,008	8,680
BGD	46,706	36,413	10,601	2,069	107,103	4,284
IND	477,342	309,472	106,147	60,786	1,018,348	40,734
LKA	15,911	11,209	3,312	1,520	44,242	1,770
XSA	84,347	60,459	15,338	9,083	175,764	7,031
CAN	715,020	405,746	144,611	136,495	1,799,510	71,980
USA	10,082,150	6,956,264	1,990,635	1,528,647	22,575,078	903,003
MEX	617,820	411,729	121,753	67,896	1,757,415	70,297
XNA	2,999	3,115	904	694	6,866	275
COL	82,411	53,020	12,458	17,567	128,343	5,134
PER	54,047	38,375	9,823	5,963	146,085	5,843
VEN	124,948	87,912	24,150	10,274	367,363	14,695
XAP	25,952	18,343	5,556	2,952	67,915	2,717
ARG	268,638	198,004	37,765	28,432	640,061	25,602
BRA	502,509	301,804	105,288	100,108	1,444,935	57,797
CHL	66,450	41,628	13,195	7,675	126,970	5,079
URY	18,666	14,433	2,609	2,608	32,469	1,299
XSM	9,836	6,524	1,843	968	26,004	1,040
XCA	70,149	57,753	15,083	8,877	164,132	6,565
XFA	122,030	82,750	28,441	14,784	327,450	13,098
XCB	34,138	26,665	9,164	4,764	91,605	3,664
AUT	189,950	112,269	45,108	37,171	633,451	25,338
BEL	227,547	129,090	48,263	51,375	608,674	24,347
DNK	159,236	75,672	32,341	41,312	415,053	16,602
FIN	121,580	60,960	24,670	25,109	392,324	15,693
FRA	1,321,496	723,856	268,352	318,457	3,729,534	149,181
DEU	1,855,516	1,080,196	368,384	347,284	5,939,225	237,569
GBR	1,429,850	958,843	238,934	278,434	3,564,192	142,568
GRC	116,563	83,207	29,222	17,982	356,394	14,256

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Table 18.A.1 Macroeconomic Data (2001 US\$ million) (Contd)

GTAP Regions	Gross Domestic Product	Private Consumption	Gross Capital Formation	Government Consumption	Capital Stock	Depreciation
IRL	102,545	46,940	24,746	14,332	223,617	8,945
ITA	1,089,457	654,578	217,282	207,578	3,278,999	131,160
LUX	19,249	11,262	5,996	4,600	51,489	2,060
NLD	384,273	204,864	90,553	95,748	1,160,240	46,410
PRT	110,088	64,950	32,935	24,757	303,257	12,130
ESP	583,487	345,461	149,540	102,947	1,638,603	65,544
SWE	218,723	104,917	38,196	58,365	600,782	24,031
CHE	245,954	150,777	47,923	36,442	781,686	31,267
XEF	178,373	84,673	33,380	38,108	556,659	22,266
XER	23,666	20,819	4,683	5,366	83,792	3,352
ALB	4,114	3,859	814	457	12,109	484
BGR	13,553	9,015	2,588	2,049	59,128	2,365
HRV	20,260	11,842	4,845	4,901	59,638	2,386
CYP	9,633	7,169	2,067	1,844	26,824	1,073
CZE	56,733	30,465	17,017	10,885	207,151	8,286
HUN	51,926	32,014	13,663	5,513	171,016	6,841
MLT	3,611	2,911	932	919	10,607	424
POL	176,256	119,233	38,438	28,702	511,479	20,459
ROM	38,718	30,591	8,385	2,430	215,763	8,631
SVK	20,459	11,064	6,318	4,125	70,659	2,826
SVN	18,810	10,160	4,824	4,043	55,370	2,215
EST	5,525	2,853	1,418	1,036	14,379	575
LVA	7,549	4,893	2,308	1,841	19,646	786
LTU	11,992	8,661	2,743	2,020	31,209	1,248
RUS	309,951	159,775	69,662	46,310	1,070,476	42,819
XSU	104,328	61,739	22,831	18,799	295,701	11,828
TUR	147,683	99,501	24,589	21,095	410,869	16,435
XME	644,575	353,053	139,126	141,648	1,534,888	61,396
MAR	34,219	20,796	8,146	5,927	91,835	3,673
TUN	19,990	12,330	5,583	3,194	65,124	2,605
XNF	181,761	121,839	36,094	24,501	588,264	23,531
BWA	5,196	1,729	1,098	1,357	12,551	502
ZAF	113,274	67,024	15,826	20,086	377,966	15,119
XSC	5,151	3,131	1,181	1,193	16,853	674
MWI	1,749	1,275	167	270	4,860	194
MOZ	3,607	2,150	1,272	318	7,981	319
TZA	9,341	7,988	1,590	589	14,133	565
ZMB	3,639	2,446	635	412	9,354	374
ZWE	9,057	6,393	695	1,715	28,334	1,133
XSD	19,729	13,030	4,445	1,590	68,883	2,755
MDG	4,604	3,818	743	385	9,923	397
UGA	5,675	4,542	1,117	697	9,662	386
XSS	140,772	94,869	30,212	23,805	359,186	14,367