18.B
Government Consumption

Robert A. McDougall and Vitaly Kharitonov

For the GTAP 6 Data Base, we have added a new procedure to impose a more uniform treatment of government consumption expenditure.

Under standard national accounting conventions (U.N. 1993), government consumption includes the outputs of "non-market processes of production" and excludes their inputs, these being accounted as intermediate usage by various industries, notably, public administration and defence. Most I-O tables contributed to GTAP apply this convention, but some do not. The non-compliant tables differ from the compliant in presenting much lower totals for government consumption expenditure, and, within those totals, much lower expenditure shares for public administration and defence (more precisely, for the GTAP commodity *osg* in which public administration and defence are included). This has been a major source of variation in I-O structure across regions in past releases.

The objects of the new procedure are to identify the non-compliant tables, and to revise them so as to approximate a more compliant treatment. We apply the procedure after initial cleaning (chapter 11.A), but before any sectoral disaggregation (chapter 13). So the I-O tables are not uniform in sectoral classification: some use the GTAP sectoral classification, others various aggregations thereof.

To identify non-compliant tables, we calculate the ratio of government consumption to GDP in each table, and compare it with external macroeconomic data. Since the contributed tables have various reference years, we use time series data for the comparison. We deem a table non-compliant if its ratio of government consumption to GDP is less than half the corresponding ratio in the external data.

Our time series data source is the International Monetary Fund's *International Financial Statistics* (IMF, 2003). This distinguishes 186 countries corresponding to GTAP standard countries, plus a few other items such as "Euro Area". We extract estimates for GDP and government consumption in local currency units, and exchange rate estimates for 140 countries, for years from 1983 to 2003. For some countries, some observations are missing; we treat zero observations as miscoded missing values; a few wild-seeming observations, we consider likely miscodes and discard. These last include some observations for GDP in Surinam, government consumption in Kuwait, and exchange rates in Angola and Brazil.

After discarding all observations for which we lack matching GDP, government consumption, and exchange rate data, our data set contains 140 countries. For these countries overall, about two thirds of the possible observations are present and one thirds are absent. We fill in the

missing observations, using an entropy-based method. The method identifies and exploits both country-specific and year-specific characteristics of the data set. It has however this weakness, that it does not capture country-specific time trends; if observations are missing for a given country for the years 2000 to 2003, say, in filling in those data it gives as much weight to that country's observation for 1983 as for 1999. We find therefore that this method is not well suited to filling in long time series; finding a more suitable filling-in method remains a task for future versions.

That first filling-in step fills in just the missing observations for those countries for which some IFS observations are available. The next filling-in step supplies estimates for the 66 standard GTAP countries for which no observations are available, again for the years 1983-2003. For this we use the GDP and government consumption estimates from the GTAP macroeconomic data set (chapter 18.A), together with year-specific factors extracted from the time-series data. This gives us our final multi-year macroeconomic data set.

We identify the reference year for each contributed I-O table. Some contributed tables are a hybrid of original I-O data for an earlier year and macroeconomic data for a later year; for such tables, we take the reference year for the macroeconomic data. For some tables, the reference year is not a calendar year but a financial year; for those, we use the simple average of the data for the calendar years that overlap the financial year.

We find that in almost all contributed tables, we have original macroeconomic data for the required reference year. For one country, Argentina, we have data for years from 1993 on but not for the reference year 1984, so there we rely on the first filling-in procedure. For five countries, Albania, Russia, Taiwan, Tanzania, and the United States, we have no original macroeconomic data, so there we rely on the second filling-in procedure.

We now compare the ratio of government consumption to GDP in each contributed table with the corresponding ratio for that table's reference year in the time-series macroeconomic data set. We reject the government consumption data for those tables in which the ratios differ by a factor of more than 2. We find four such tables; Table 18.B.1 shows them, and also the tables for which ratios compare relatively poorly, but for which we did not reject the government consumption data.

The tables for which we reject the I-O data are Argentina, Uruguay, Morocco, and Canada. We note that the I-O tables present not only sizable apparent underestimates of government consumption, but also some sizable apparent overestimates. We note also that for three of the four rejected tables, we have macroeconomic data for the I-O table reference year. For the fourth, Argentina, we fill in the required observation using observations for other years in the first filling-in procedure. Finally, we note that two of the countries only narrowly accepted, Russia and Albania, are absent on our time-series macroeconomic data set, so that in accepting them we rely on the GTAP macroeconomic data set and the second filling-in procedure.

Table 18.B.1 Government Consumption Data, Selected Countries

Country	Government Consumption/ GDP Ratio		Accept/Reject	Government Services Share in Government Consumption
	I-O Data	Macro Data		
Bulgaria	0.19	0.12	accept	0.96
Sri Lanka	0.15	0.10	accept	0.89
Cyprus	0.21	0.14	accept	1.00
Peru	0.10	0.07	accept	0.95
Russia	0.24	0.17	accept	0.91
Viet Nam	0.05	0.08	accept	0.77
Albania	0.10	0.17	accept	0.92
Canada	0.10	0.20	reject	0.25
Morocco	0.05	0.15	reject	0.15
Uruguay	0.04	0.15	reject	0.05
Argentina	0.03	0.13	reject	0.00

As noted above, one feature of tables using non-standard treatments of government consumption is a low share of government services (GTAP commodity *osg*) in government consumption expenditure. In the last column of table 18.B.1, we report the share from the contributed table. The share is above 90 per cent for all but one of the narrowly accepted tables; the exception is Viet Nam, with a share of 0.77. For the rejected tables, the share is much lower, 25 per cent or less. This raises our confidence that our criterion has rightly distinguished the compliant from the non-compliant tables.

For the four countries for which we reject the I-O table government consumption data, we proceed as follows. We aggregate the representative table (see chapter 14) to the same sectoral classification as the contributed table, and calculate the sectoral composition of government consumption at that aggregation. We then adjust the contributed table, so that the ratio of government consumption to GDP is as in the macroeconomic time-series data set, and the sectoral composition of government consumption as in the representative table. In the adjusted tables therefore the *osg* share is the same as in the representative table, 96 per cent.

References

International Monetary Fund (IMF). 2003. International Financial Statistics—Database and Browser. Washington, D.C.

United Nations (UN). 1993. *System of National Accounts 1993.* Series F, No. 2. United Nations. New York.