

C Government Consumption

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C.1 Background

Under standard national accounting conventions, government consumption includes the outputs of non-market processes of production and excludes their inputs, these being accounted as intermediate usage by various industries, mainly public administration and defense (UN 2009). Most IOTs contributed to GTAP follow this convention, but some do not. The non-compliant tables differ from the compliant in presenting much lower totals for government consumption expenditure. This used to be a major source of variation in I-O structure across regions in previous releases. This chapter explains the procedure used to improve government consumption representation in the non-compliant tables.

C.2 Methodology

The objectives of this procedure are to identify the non-compliant tables, and to revise them so as to approximate a more compliant treatment. The procedure is applied after initial cleaning (chapter 8), but before any sectoral disaggregation (chapter 9B). Therefore, the IOTs are not yet uniform in sectoral classification: some use the GTAP sectoral classification, others use various different aggregations thereof.

To identify non-compliant tables, the ratio of government consumption to GDP is calculated for each table, and compared to external macroeconomic data. Since the contributed tables have various reference years, time series data are used for the comparison. A table is deemed non-compliant if its ratio of government consumption to GDP is less than half the corresponding ratio in the external data.

The time series data source used is same to the chapter 7, which combines the WDI data (primary), UN data, and IMF. This distinguishes 187 countries corresponding to GTAP standard countries. We extract estimates for GDP and government consumption in current US dollars, for the years 1984 to 2023. For some countries, some observations are missing; we treat zero observations as mis-coded missing values.

After discarding all observations for which we lack matching GDP and government consumption, our data set contains 187 countries. All contributed tables have original macroeconomic data for the required reference year. 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 eight such tables; Table 9.6 shows them, and also selected tables for which ratios compare relatively poorly, but for which we did not reject the government consumption data.

Table 9.6: Government Consumption Data, Selected Countries Government Consumption to GDP Ratio

Country	I-O Data	Macro Data	Accept / Reject	Government services share in Government Consumption
Estonia	0.21	0.17	accept	0.86
Malta	0.27	0.19	accept	0.89
Norway	0.25	0.24	accept	0.91
Laos	0.22	0.09	reject	0.97
Hungary	0.10	0.21	reject	0.98
Luxembourg	0.42	0.16	reject	0.98
Ukraine	0.06	0.21	reject	0.98
DR Congo	0.17	0.07	reject	0.99
Algeria	0.04	0.19	reject	0.95
Mozambique	0.12	0.26	reject	0.98
Burundi	0.10	0.23	reject	0.98

The IOTs for which we reject the I-O data are Laos, Hungary, Luxembourg, Ukraine, DR Congo, Algeria, Mozambique, and Burundi. We note that the IOTs present not only sizable apparent underestimates of government consumption, but also some sizable apparent overestimates.

In the last column of Table 9.6, we report the share from the contributed table. As noted above, it used to be the case that tables using non-standard treatments of government, consumption is a low share of government services (GTAP commodity osg, edu and hht) in government consumption expenditure. This is no longer the case in the countries we reject, for these countries, the share of osg in government consumption expenditure appears reasonable.

References

UN (2009). *System of National Accounts*. United Nations. URL: <http://unstats.un.org/unsd/nationalaccount/docs/SNA2008.pdf>.

D Representative Table and Composite Regions

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This chapter describes three sets of regional groupings that are used in the construction of the GTAP Data Base, namely: the representative region, geographic regions, and composite regions. Input-Output (I-O) tables are constructed for the representative region and for composite regions. A classification of the global economy into a few large geographic regions is used to construct IOTs for composite regions and in filling in missing macroeconomic data (see chapter 7).

D.1 Representative Table

The representative table is an I-O table created as a linear combination of the set of IOTs which have full sectoral disaggregation. Ideally, the regions comprising the representative table should represent the broad spectrum of economic development and geographic location of the regions in the data base. Table 9.7 8.E.1 provides the list of 48 countries whose IOTs form the representative I-O table used in GTAP 11.

Table 9.7: Countries Included in the Representative I-O Table

ISO3	Country	ISO3	Country	ISO3	Country
aus	Australia	hrv	Croatia	nld	Netherlands
nzl	New Zealand	cyp	Cyprus	pol	Poland
jpn	Japan	cze	Czech Republic	prt	Portugal
kor	Korea	dnk	Denmark	rou	Romania
twn	Taiwan	est	Estonia	svk	Slovakia
khm	Cambodia	fin	Finland	svn	Slovenia
sgp	Singapore	fra	France	esp	Spain
bgd	Bangladesh	deu	Germany	swe	Sweden
usa	United States of America	grc	Greece	gbr	United Kingdom
mex	Mexico	hun	Hungary	mdg	Madagascar
bra	Brazil	irl	Ireland	mwi	Malawi
col	Colombia	ita	Italy	moz	Mozambique
ury	Uruguay	lva	Latvia	tza	Tanzania
aut	Austria	ltu	Lithuania	zmb	Zambia
bel	Belgium	lux	Luxembourg	bwa	Botswana
bgr	Bulgaria	mlt	Malta	zaf	South Africa

The representative I-O table is used in several stages in the data base construction process. In the initial stage of checking contributed I-O tables, cost and use shares calculated from an I-O table submitted to GTAP are compared to those from the representative table to identify highly unusual shares and possible errors in the contributed I-O table. Once an I-O table is found to be

acceptable and is included in the GTAP data construction process, the I-O table undergoes an initial cleaning procedure where the representative table is used as the source of scaling factors which are then used in revising abnormal or infeasible values in the initial I-O table.

The representative table is also used in the I-O table disaggregation procedure (chapter B). For sectors that are not split in the original I-O table, the structure of production, intermediate usage, and consumption are adapted from the representative table. This is true for the non-agricultural sectors. We use agricultural I-O data for disaggregating agriculture (see chapter B.2).

D.2 Geographic Regions

In the GTAP 11 Data Base, the global economy is represented by 160 regions, 141 of which are countries for which national I-O data are available (referred to as primary regions) and 19 are composite regions.

Dividing the global economy into a fewer number of geographic regions is useful in certain aspects of the data base construction. In generating a complete macroeconomic dataset, for each geographic region, averages of the shares of GDP aggregates to total GDP for countries with available data are used for filling in estimates of the GDP aggregates for countries with missing data (see chapter 7). As discussed in the next section, geographic regions are also used in the construction of IOTs for composite regions.

The set of 19 geographic regions given in table 9.8 are used in constructing the macroeconomic dataset. Table 9.9 provides a mapping between the 19 geographic groups and the 251 standard countries.

Table 9.8: Geographic Regions used in GTAP Data Construction

Region code	Description	Region code	Description
OCEN	Oceania	NEUR	Northern Europe
EAAS	Eastern Asia	WEUR	Western Europe
SEAS	South-eastern Asia	EEUR	Eastern Europe
STAS	Southern Asia	SEUR	Southern Europe
CEAS	Central Asia	NAFR	Northern Africa
WEAS	Western Asia	WAFR	Western Africa
NAMR	North America	CAFR	Central Africa
CARB	Caribbean	EAFR	Eastern Africa
CAMR	Central America	SAFR	Southern Africa
SAMR	South America		

Because of the constraint imposed by the unavailability of a single I-O table for any of the countries included in a geographic region such as the Caribbean, a smaller set of 15 geographic regions is used in constructing the composite regions. This was done by classifying the Caribbean, Central America, and South America together as the larger Latin America region and defining the

larger Sub-Saharan Africa region as composed of Eastern Africa, Central Africa, Western Africa, and Southern Africa.

D.3 Composite Regions

The GTAP 11 Data Base includes 141 contributed IOTs out of 160 regions. The I-O data for these primary regions are used to construct IOTs for the 19 composite regions which account for the rest of the economies in the world—i.e., including the Rest of the World (XTW) region which represents remote territories such as Antarctica, Bouvet Islands, British Indian Ocean Territory and French Southern Territories.

It should be noted that although we continue to use the same names as some composite regions in the GTAP 10 Data Base, the composition of some of these regions have changed due to new IOTs we received, thereby lowering the number of countries remaining in composite regions.

Further we assume here that the average patterns of production, consumption, and savings in any individual country in the 19 composite regions can be approximated by patterns observed in one of its neighboring primary regions.

In constructing an I-O table for a composite region, we start by associating a primary region to each of the member countries in a composite region. The steps involved in the procedure are:

- all the 251 standard countries are matched on the basis of similarity in GDP per capita with a primary region within the same geographic region
- the target total GDP is generated for each composite region; this is the sum of GDP for the individual countries comprising the composite region
- the primary regions matching the countries in the composite region in terms of similarity in GDP per capita are noted and GDP weights (ratio of country GDP to total target GDP) are assigned to each primary region
- the I-O table for each composite region is constructed by combining the I-O data from the primary region tables summed according to the GDP share weights.

The IOTs for the composite regions are then updated and adjusted to match aggregated regional data on macroeconomic aggregates, trade, protection, and energy in the FIT procedure documented in chapter 15.A.

Table 9.9: Geographic Regions and Mapping

Code	Region	Country	ISO3
OCEN	Oceania	American Samoa	asm

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Code	Region	Country	ISO3
		Australia	aus
		Bouvet Island	bvt
		Cocos (Keeling) Islands	cck
		Cook Islands	cok
		Christmas Island	cxr
		Fiji	fji
		Micronesia (Federated States of)	fsm
		Guam	gum
		Heard Island and McDonald Islands	hmd
		British Indian Ocean Territory	iot
		Kiribati	kir
		Marshall Islands	mhl
		Northern Mariana Islands	mnp
		New Caledonia	ncl
		Norfolk Island	nfk
		Niue	niu
		Nauru	nru
		New Zealand	nzl
		Pitcairn	pcn
		Palau	plw
		Papua New Guinea	png
		French Polynesia	pyf
		Solomon Islands	slb
		Tokelau	tkl
		Tonga	ton
		Tuvalu	tuv
		United States Minor Outlying Islands	umi
		Vanuatu	vut
		Wallis and Futuna Islands	wlf
		Samoa	wsm
EAAS	Eastern Asia	China	chn
		Hong Kong, China's Special Administrative Region	hkg
		Japan	jpn
		Republic of Korea	kor
		China, Macao Special Administrative Region	mac
		Mongolia	mng
		Democratic People's Republic of Korea	prk
		Chinese Taipei	twm
SEAS	South-eastern Asia	Brunei Darussalam	brn
		Indonesia	idn
		Cambodia	khm
		Lao People's Democratic Republic	lao
		Myanmar	mmr
		Malaysia	mys
		Philippines	phl
		Singapore	sgp
		Thailand	tha
		Timor-Leste	tls
		Viet Nam	vnm
STAS	Southern Asia	Afghanistan	afg
		Bangladesh	bgd

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Code	Region	Country	ISO3
		Bhutan	btn
		India	ind
		Iran (Islamic Republic of)	irn
		Sri Lanka	lka
		Maldives	mdv
		Nepal	npl
		Pakistan	pak
CEAS	Central Asia	Kazakhstan	kaz
		Kyrgyzstan	kgz
		Tajikistan	tjk
		Turkmenistan	tkm
		Uzbekistan	uzb
WEAS	Western Asia	United Arab Emirates	are
		Armenia	arm
		Azerbaijan	aze
		Bahrain	bhr
		Cyprus	cyp
		Georgia	geo
		Iraq	irq
		Israel	isr
		Jordan	jor
		Kuwait	kwt
		Lebanon	lbn
		Oman	omn
		State of Palestine	pse
		Qatar	qat
		Saudi Arabia	sau
		Syrian Arab Republic	syr
		Turkey	tur
		Yemen	yem
NAMR	North America	Bermuda	bmu
		Canada	can
		Greenland	grl
		Mexico	mex
		Saint Pierre and Miquelon	spm
		United States of America	usa
LMAR	Latin America		
CARB	Caribbean	Aruba	abw
		Anguilla	aia
		Antigua and Barbuda	atg
		Bonaire, Sint Eustatius and Saba	bes
		Bahamas	bhs
		Saint Barthélemy	blm
		Barbados	brb
		Cuba	cub
		Curaçao	cuw
		Cayman Islands	cym
		Dominica	dma
		Dominican Republic	dom
		Guadeloupe	glp
		Grenada	grd

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Code	Region	Country	ISO3
		Haiti	hti
		Jamaica	jam
		Saint Kitts and Nevis	kna
		Saint Lucia	lca
		Saint Martin (French Part)	maf
		Montserrat	msr
		Martinique	mtq
		Puerto Rico	pri
		South Georgia and the South Sandwich Islands	sgs
		Sint Maarten (Dutch part)	sxm
		Turks and Caicos Islands	tca
		Trinidad and Tobago	tto
		Saint Vincent and the Grenadines	vct
		British Virgin Islands	vgb
		United States Virgin Islands	vir
CAMR	Central America	Belize	blz
		Costa Rica	cri
		Guatemala	gtm
		Honduras	hnd
		Nicaragua	nic
		Panama	pan
		El Salvador	slv
SAMR	South America	Argentina	arg
		Antarctica	ata
		Bolivia (Plurinational State of)	bol
		Brazil	bra
		Chile	chl
		Colombia	col
		Ecuador	ecu
		Falkland Islands (Malvinas)	flk
		French Guiana	guf
		Guyana	guy
		Peru	per
		Paraguay	pry
		Suriname	sur
		Uruguay	ury
		Venezuela (Bolivarian Republic of)	ven
WEUR	Western Europe	French Southern Territories	atf
		Austria	aut
		Belgium	bel
		Switzerland	che
		Germany	deu
		France	fra
		Guernsey	ggy
		Isle of Man	imn
		Jersey	jey
		Liechtenstein	lie
		Luxembourg	lux
		Monaco	mco
		Netherlands	nld
		Sark	sark

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Code	Region	Country	ISO3
NEUR	Northern Europe	Holy See	vat
		Albania	alb
		Denmark	dnk
		Estonia	est
		Finland	fin
		Faroe Islands	fro
		United Kingdom of Great Britain and Northern Irela	gbr
		Ireland	irl
		Iceland	isl
		Lithuania	ltu
		Latvia	lva
		Norway	nor
		Svalbard and Jan Mayen Islands	sjm
		Sweden	swe
		Åland Islands	ala
SEUR	Southern Europe	Andorra	and
		Bosnia and Herzegovina	bih
		Spain	esp
		Gibraltar	gib
		Greece	grc
		Croatia	hrv
		Italy	ita
		North Macedonia	mkd
		Malta	mlt
		Portugal	prt
		San Marino	smr
		Serbia	srb
		Slovenia	svn
		Kosovo	xkx
		Bulgaria	bgr
EEUR	Eastern Europe	Belarus	blr
		Czechia	cze
		Hungary	hun
		Republic of Moldova	mda
		Montenegro	mne
		Poland	pol
		Romania	rou
		Russian Federation	rus
		Slovakia	svk
		Ukraine	ukr
		Algeria	dza
NAFR	Northern Africa	Egypt	egy
		Western Sahara	esh
		Libya	lby
		Morocco	mar
		Tunisia	tun
SSAF	Sub-Saharan Africa		
WAFR	Western Africa	Benin	ben
		Burkina Faso	bfa
		Côte d'Ivoire	civ
		Cabo Verde	cpv

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Code	Region	Country	ISO3
		Ghana	gha
		Guinea	gin
		Gambia	gmb
		Guinea-Bissau	gnb
		Liberia	lbr
		Mali	mli
		Mauritania	mrt
		Niger	ner
		Nigeria	nga
		Senegal	sen
		Saint Helena	shn
		Sierra Leone	sle
		Togo	tgo
SAFR	Southern Africa	Botswana	bwa
		Lesotho	lso
		Namibia	nam
		Eswatini	swz
		South Africa	zaf
CAFR	Central Africa	Angola	ago
		Central African Republic	caf
		Cameroon	cmr
		Democratic Republic of the Congo	cod
		Congo	cog
		Gabon	gab
		Equatorial Guinea	gnq
		São Tomé and Príncipe	stp
		Chad	tcd
EAFR	Eastern Africa	Burundi	bdi
		Comoros	com
		Djibouti	dji
		Eritrea	eri
		Ethiopia	eth
		Kenya	ken
		Madagascar	mdg
		Mozambique	moz
		Mauritius	mus
		Malawi	mwj
		Mayotte	myt
		Réunion	reu
		Rwanda	rwa
		Sudan	sdn
		Somalia	som
		South Sudan	ssd
		Seychelles	syc
		United Republic of Tanzania	tza
		Uganda	uga
		Zambia	zmb
		Zimbabwe	zwe