Chapter 1

Introduction

This brief note describes the new content of the GTAP Data Base, which is being provided in GDX format for GAMS-based GTAP models. The new content, initially using GEMPACK's HAR formatted files, was developed for Version 7 of the GTAP model (Corong et al. (2017)). It incorporates some key changes to the GTAP model, notably the introduction of a make matrix that allows for explicit differentiation between production activities and the supply of commodities. The new format has been tested with versions 9 (Aguiar et al. (2016)) and 10 (Aguiar et al. (2019)) and will be made available for past versions of the Data Base. It has also been coupled with the standard GTAP Model in GAMS, Version 7 (van der Mensbrugghe (2018)).

The Annex provides the standard dimensions (i.e. set definitions) for V10 of the GTAP Data Base.

Chapter 2

Standard GTAP datasets

This chapter describes the contents of the four standard datasets of the GTAP Data Base: (1) the core data (DAT); (2) the key parameters used by the standard GTAP model (PAR); (3) the energy balance data (VOLE); and (4) The energy combustion related CO_2 emissions (EMISS).

2.1 GSDFDAT

Table 2.1 provides the full list of sets and value-flows contained in the main GTAP database. The major changes in the new database format include:

- The letter 'M' has replaced the letter 'I' for import matrices/vectors. The letter 'I' is now used for the investment vectors.
- The accounting framework has been converted from 'market/agent' (M/A) prices to 'basic/purchaser' (B/P) prices. This implies that all tax rates (subsidy rates) are positive (negative). This impacts in particular production and export taxes that were negative in the former accounting system.
- The former '`CGDS`' *activity* has been extracted from firms' expenditures on goods and services and a new set of vectors have been created for investment expenditures that mirrors the vectors used for private and government expenditures.
- Income taxes on factor revenues have been made activity-specific. This currently has no impact as the 'build' procedure continues to assume uniformity across income source activity.
- The database includes a new set of matrices that represent the make matrix that describes the supply of commodities by source activity. The standard database continues to assume diagonality, i.e. a 1-to-1 correspondence between activities and commodities, but future releases may allow for non-diagonality (for example biofuels, vegetable oils, power, etc.). The production tax is applied to the make matrix, i.e. it can be activity- and commodity-specific.

Unless indicated otherwise, all values are in millions of U.S. dollars using prices and market exchange rates for the relevant reference year.

2.2 GSDFPAR

Table 2.2 provides the full list parameters that are included in the standard GTAP release. All files include any set definitions embedded in the parameters—this makes the files self-contained even

Table 2.1: **Main GTAP Database**

Name	Former name	Description	Note
REG	REG	Set of regions	
ACTS	PROD_COMM	Set of activities	This used to include CGDS—investment expenditures are now represented by their own vectors
COMM	TRAD_COMM	Set of commodities	This used to contain to be a subset of PROD_COMM, excluding CGDS.
ENDW	ENDW_COMM	Set of endowments	
MARG	MARG_COMM	Set of margin commodities (a subset of COMM)	
VDFB(COMM,ACTS,REG)	VDFM	Purchases of domestic commodities by firms at basic prices	
VDFP(COMM,ACTS,REG)	VDFA	Purchases of domestic commodities by firms at purchasers' prices	
VMFB(COMM,ACTS,REG)	VIFM	Purchases of imported commodities by firms at basic prices	
VMFP(COMM,ACTS,REG)	VIFA	Purchases of imported commodities by firms at purchasers' prices	
VDPB(COMM,REG)	VDPM	Purchases of domestic commodities by private agents at basic prices	
VDPP(COMM,REG)	VDPA	Purchases of domestic commodities by private agents at purchasers' prices	
VMPB(COMM,REG)	VIPM	Purchases of imported commodities by private agents at basic prices	
VMPP(COMM,REG)	VIPA	Purchases of imported commodities by private agents at purchasers' prices	
VDGB(COMM,REG)	VDGM	Purchases of domestic commodities by government agents at basic prices	
VDGP(COMM,REG)	VDGA	Purchases of domestic commodities by government agents at purchasers' prices	
VMGB(COMM,REG)	VIGM	Purchases of imported commodities by government agents at basic prices	
VMGP(COMM,REG)	VIGA	Purchases of imported commodities by government agents at purchasers' prices	
VDIB(COMM,REG)	VDFM	Purchases of domestic commodities by investment agents at basic prices	The investment vectors are new. They have been extracted from the 'CGDS' activity from the former database format.
VDIP(COMM,REG)	VDFA	Purchases of domestic commodities by investment agents at purchasers' prices	
VMIB(COMM,REG)	VIFM	Purchases of imported commodities by investment agents at basic prices	
VMIP(COMM,REG)	VIFA	Purchases of imported commodities by investment agents at purchasers' prices	
EVFB(ENDW,ACTS,REG)	VFM	Purchases of endowments by firms at basic prices	
EVFP(ENDW,ACTS,REG)	EVFA	Purchases of endowments by firms at purchasers' prices	
EVOS(ENDW,ACTS,REG)	EVOA	Post income tax factor income	In the former database, the income tax on factor income was assumed uniform across source activities.

Table 2.1 Main GTAP Database, ctd.

Name	Former name	Description	Note
VXSV(COMM,REG,REG)	VXMD	The value of bilateral trade at producers' prices	
VFOB(COMM,ACTS,REG)	VXWD	The value of bilateral trade at FOB prices	
VCIF(COMM,ACTS,REG)	VIWS	The value of bilateral trade at CIF prices	
VMSB(COMM,ACTS,REG)	VIMS	The value of bilateral trade at tariff-inclusive prices	
VST(MARG,REG)	VST	The value of regional exports of international trade & transport services	
VTWR(MARG,COMM,REG,REG)	VTWR	Modal distribution of international trade & transport services	
SAVE(REG)	SAVE	Domestic savings	
VDEP(REG)	VDEP	Value of depreciation	
VKB(REG)	VKB	Value of capital stock	
POP(REG)	POP	Population in millions	
MAKS(COMM,ACTS,REG)		Make matrix at production prices	The new database allows for non-diagonal make matrices, though the default database assumes diagonality.
MAKB(COMM,ACTS,REG)		Make matrix at basic prices	The former production tax is implemented at this stage and is assumed to be activity and commodity specific.
PTAX(COMM,ACTS,REG)		Production tax revenues	
VOSB(COMM,REG)		The value of commodity supply pre-production tax.	

if it duplicates information from other files. Users are of course free to ignore the sets if already defined in the code. The major changes in the parameter database include:

- The new GTAP model has added a new CES nest in the production structure—intermediate goods are combined together in a composite bundle. This allows for substitution across intermediate goods.
- A number of former parameters have been given additional dimensionality, which allows for greater heterogeneity—for example, the Armington elasticities are now indexed by region as well as by commodity.
- The new make matrix requires additional parameters. A CET specification is allowed to allocate domestic output across commodities (e.g. vegetable oils). A CES specification is used to bundle 'similar' output from various activities (e.g. electricity).
- Government and investment expenditures are specified using a generic CES expenditure function. The same for the bundling of margin services across source regions.
- In the case of perfect transformation, a value of infinity ('+INF') is used rather than using subsets.

2.3 GSDFVOLE

Table 2.3 provides the full list parameters that are included in the energy volumes database. The values are in millions of tonnes of oil equivalent (MTOE). There are two differences with respect to the previous format: (1) energy used in investment expenditures has been extracted from the firms' matrices; and (2) The 'I' identifier for imports has been replaced by 'M'.

Table 2.2: **Main GTAP Parameter Database**

Name	Former name	Description	Note
REG	REG	Set of regions	
ACTS	PROD_COMM	Set of activities	This used to include CGDS—investment expenditures are now represented by their own vectors
COMM	TRAD_COMM	Set of commodities	This used to contain to be a subset of PROD_COMM, excluding CGDS.
ENDW	ENDW_COMM	Set of endowments	
MARG	MARG_COMM	Set of margin commodities (a subset of COMM)	
ESUBT(ACTS,REG)	ESUBT	Elasticity of substitution between intermediate inputs and value added bundle	There was no separate aggregate intermediate demand bundle in the previous version. The elasticity has also been made region specific. It defaults to zero.
ESUBC(ACTS,REG)		This is a new elasticity that allows for substitution across intermediate inputs within the intermediate demand bundle. It defaults to zero.	
ESUBVA(ACTS,REG)	ESUBVA	Substitution across endowments in value added bundle.	It is now region and activity specific.
ETRAQ(ACTS,REG)		Transformation elasticity across commodities for output allocation	This is new to allow for non-diagonal make matrices. It defaults to 5 but is irrelevant in the case of diagonality.
ESUBQ(ACTS,REG)		Substitution across activities in commodity bundle	This is new to allow for non-diagonal make matrices. It defaults to infinity but is irrelevant in the case of diagonality.
INCPAR(COMM,REG)	INCPAR	Expansion parameter for CDE utility function	
SUBPAR(COMM,REG)	SUBPAR	Substitution parameter for CDE utility function	
ESUBG(REG)		Government expenditure substitution elasticity	In the former database/model, government expenditures were by default allocated using a Cobb-Douglas specification. The new model allows for a generic CES function, though defaults to a value of 1.
ESUBI(REG)	ESUBT	Investment expenditure substitution elasticity	In the former database/model, the investment expenditure elasticity was governed by ESUBT and was 0 by default. A generic CES expenditure function is implemented with a default elasticity of 0.
ESUBD(COMM,REG)	ESUBD	Top level Armington elasticity, substitution between domestic goods and import bundle	It is now region-specific as well as commodity-specific. N.B. It could also be made agent-specific as this choice is done at the agent level.
ESUBM(COMM,REG)	ESUBM	Second level Armington elasticity, substitution of imports across source regions	It is now region-specific as well as commodity-specific.
ESUBS(MARG)		Substitution across source regions for trade & transport services	This is new and allows for a generic CES specification. The default elasticity is 1 as in the past implementation.
ETRAE(ENDW,REG)	ETRAE	Transformation (or mobility) elasticity of factors across activities.	The GAMS implementation replaces perfect mobility with a transformation elasticity of infinity. This precludes the need for the ENDWS_COMM that was a subset for the 'sluggish' factors.
RORFLEX(REG)	RORFLEX	Flexibility of expected net rate of return with respect to investment	

Table 2.3: **Energy Balance Database**

Name	Former name	Description	Note
REG	REG	Set of regions	
ACTS	PROD_COMM	Set of activities	This used to include CGDS—investment expenditures are now represented by their own vectors
COMM	TRAD_COMM	Set of commodities	This used to contain to be a subset of PROD_COMM, excluding CGDS.
ERG	ERG_COMM	Set of energy commodities (a subset of COMM)	
EDF(ERG,ACTS,REG)	EDF	Use of domestic energy by firms	
EMF(ERG,ACTS,REG)	EIF	Use of imported energy by firms	
EDP(ERG,REG)	EDP	Use of domestic energy by private agents	
EMP(ERG,REG)	EIP	Use of imported energy by private agents	
EDG(ERG,REG)	EDG	Use of domestic energy by government agents	
EMG(ERG,REG)	EIG	Use of imported energy by government agents	
EDI(ERG,REG)		Use of domestic energy by investment agents	These flows used to be incorporated in energy use by firms.
EMI(ERG,REG)		Use of imported energy by investment agents	These flows used to be incorporated in energy use by firms.
EXIDAG(ERG,REG,REG)	EXIDAG	Energy exports	

2.4 GSDFEMISS

Table 2.4 provides the full list parameters that are included in the CO_2 database. The values are in millions of of metric tonnes of CO_2.[1] There are two differences with respect to the previous format: (1) emissions from investment expenditures have been extracted from the firms' matrices; and (2) The 'I' identifier for imports has been replaced by 'M'.

[1] To convert to millions of metric tons of carbon, multiply by 12/44.

Table 2.4: **CO_2 Emissions Database**

Name	Former name	Description	Note
REG	REG	Set of regions	
ACTS	PROD_COMM	Set of activities	This used to include CGDS—investment expenditures are now represented by their own vectors
COMM	TRAD_COMM	Set of commodities	This used to contain to be a subset of PROD_COMM, excluding CGDS.
ERG	ERG_COMM	Set of energy commodities (a subset of COMM)	
FUEL	FUEL_COMM	Set of fuel commodities (a subset of ERG)	
MDF(FUEL,ACTS,REG)	MDF	CO_2 emissions from combustion of domestic energy by firms	
MMF(FUEL,ACTS,REG)	MIF	CO_2 emissions from combustion of imported energy by firms	
MDP(FUEL,REG)	MDP	CO_2 emissions from combustion of domestic energy by private agents	
MMP(FUEL,REG)	MIP	CO_2 emissions from combustion of imported energy by private agents	
MDG(FUEL,REG)	MDG	CO_2 emissions from combustion of domestic energy by government agents	
MMG(FUEL,REG)	MIG	CO_2 emissions from combustion of imported energy by government agents	
MDI(FUEL,REG)		CO_2 emissions from combustion of domestic energy by investment agents	These flows used to be incorporated in energy-based emissions by firms.
MMI(FUEL,REG)		CO_2 emissions from combustion of domestic energy by investment agents	These flows used to be incorporated in energy-based emissions by firms.

Chapter 3

Auxiliary GTAP datasets

This chapter describes the contents of the auxiliary GTAP datasets:

- GMIG. Remittances, labor remuneration and volumes by source country.
- GDYN. Cross-border profit flows, miscellaneous parameters for the GDYN model.
- NCO2. Non-CO_2 air emissions.
- LU. Remuneration of land by AEZ.
- MRIO. Imports by source by agent at CIF and tariff inclusive prices.

[TO BE FINISHED]

3.1 GSDFGMIG

3.2 GSDFGDYN

3.3 GSDFNCO2

Table 3.1 provides the full list of matrices in the non-CO_2 auxiliary data set. The GAMS version of the file merges, when available, the non-CO_2 greenhouse gases and the non-greenhouse gas air emissions.[1] The two sets of air emissions have largely the same functionality from the point of view of the geometry of the datasets and thus it is practical to merge them. Differences in functionality are noted below.

The set of non-CO_2 greenhouse gases include:[2]

- Methane (CH_4 or `CH4`): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices (e.g. rice cultivation) and by the decay of organic waste in municipal solid waste landfills.

[1] Chepeliev (2020b) describes the construction of the non-CO_2 greenhouse gas database for V10A of the GTAP Data Base and Chepeliev (2020a) describes the construction of the non-greenhouse gas air emissions data set. N.B. The latter has had different content across versions.

[2] Adapted from https://www.epa.gov/ghgemissions/overview-greenhouse-gases.

- Nitrous oxide (N_2O or `N2O`): Nitrous oxide is emitted during agricultural and industrial activities, combustion of fossil fuels and solid waste, as well as during treatment of wastewater.
- Fluorinated gases (`FGAS`): Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

The set of non-greenhouse gas air emissions include:

- Black carbon (`BC`): Black carbon is the sooty black material emitted from gas and diesel engines, coal-fired power plants, and other sources. It comprises a significant portion of particulate matter or PM, which is an air pollutant.
- Carbon monoxide (`CO`): Carbon monoxide is a colorless, practically odorless, and tasteless gas or liquid. It results from incomplete oxidation of carbon in combustion.
- Ammonia (NH_3 or `NH3`): About 80% of the ammonia produced in industry is used in agriculture as fertilizer. Ammonia is also used as a refrigerant gas, to purify water supplies, and in the manufacture of plastics, explosives, fabrics, pesticides, dyes and other chemicals.
- Non-methane volatile organic compounds (`NMVOC`): Non-methane volatile organic compounds are a large variety of chemically different compounds, such as benzene, ethanol, formaldehyde, cyclohexane, 1,1,1-trichloroethane or acetone. Essentially, NMVOCs are identical to volatile organic compounds (VOCs), but with methane excluded.
- Nitrogen oxides (NO_x or `NOX`): In atmospheric chemistry, NO_x is a generic term for the nitrogen oxides that are most relevant for air pollution, namely nitric oxide (NO) and nitrogen dioxide (NO_2). These gases contribute to the formation of smog and acid rain, as well as affecting tropospheric ozone.
- Organic carbon (`OC`): Organic carbon aerosols are particulate aerosols formed by incomplete combustion of typically biomass.
- Particulate matter 10 (`PM10`): PM10 is particulate matter 10 micrometers or less in diameter. PM10 and PM2.5 are produced from a wide range of industrial processes through bulk material handling, combustion and minerals processing. The industries using these processes include brickworks, refineries, cement works, iron and steel making, quarrying, and fossil fuel power plants. Particulates are released from a wide range of diffuse sources. Examples include lawn mowing, wood stoves, fires, and wind generated dust, though this tends to be coarser. Vehicles will generate particulates either from direct emissions from the burning of fuels (especially diesel powered vehicles) or from wear of tires.
- Particulate matter 2.5 (`PM2_5`): PM2_5 is particulate matter 2.5 micrometers or less in diameter.
- Sulfur dioxide (SO_2 or `SO2`): The largest source of SO_2 in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities. Short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to these effects of SO_2.

Table 3.1: **Non-CO_2 Emissions Database**

Name	Former name	Description	Note
REG	REG	Set of regions	
ACTS	PROD_COMM	Set of activities	This used to include CGDS—investment expenditures are now represented by their own vectors
COMM	TRAD_COMM	Set of commodities	This used to contain to be a subset of PROD_COMM, excluding CGDS.
ENDW	ENDW_COMM	Set of endowments	
EM		Full set of air emissions	This is not part of the GTAP Data Base but has been added for convenience.
EMN		Full set of air emissions excluding CO_2	This is not part of the GTAP Data Base but has been added for convenience.
GHG		Greenhouse gas emissions, a subset of EM	This is not part of the GTAP Data Base but has been added for convenience.
NCO2		Subset of greenhouse gas emissions excluding CO_2	
NGHG		Set of non-greenhouse gases, a subset of EM	This is not part of the GTAP Data Base but has been added for convenience.
NC_TRAD(EMN,COMM,ACTS,REG)	NC_TRAD	Non-CO_2 emissions linked to intermediate demand in MMT	
NC_ENDW(EMN,ENDW,ACTS,REG)	NC_ENDW	Non-CO_2 emissions linked to factor use in MMT	
NC_QO(EMN,ACTS,REG)	NC_QO	Non-CO_2 emissions linked to level of output in MMT	
NC_HH(EMN,COMM,REG)	NC_HH	Non-CO_2 emissions linked to household commodity consumption in MMT	
NC_TRAD_CEQ(NCO2,COMM,ACTS,REG)	NC_TRAD_CEQ	Non-CO_2 emissions linked to intermediate demand in MMTCE	
NC_ENDW_CEQ(NCO2,ENDW,ACTS,REG)	NC_ENDW_CEQ	Non-CO_2 emissions linked to factor use in MMTCE	
NC_QO_CEQ(NCO2,ACTS,REG)	NC_QO_CEQ	Non-CO_2 emissions linked to level of output in MMTCE	
NC_HH_CEQ(NCO2,COMM,REG)	NC_HH_CEQ	Non-CO_2 emissions linked to household commodity consumption in MMTCE	

Unlike CO_2 emissions, which currently in the GTAP Data Base only result from the combustion of fossil fuels, the non-CO_2 greenhouse gas emissions are driven by consumption (intermediate and final), factor use (e.g. methane emissions from livestock capital use or rice land use), and/or output (process-based emissions such as methane from landfills). N.B. The commodity-driven non-CO_2 greenhouse gas emissions are linked to the level of aggregate absorption and not differentiated by source (domestic vs. imported).

Non-CO_2 greenhouse gas emissions are provided in both standard physical units (millions of metric tons, or MMT), and their so-called carbon equivalent (CE) units (MMTCE), which incorporate estimates of their global warming potential (GWP).[3] Emissions of non-greenhouse gas emissions are only provided in MMT.

[3] For Version 10, the GTAP Data Base uses the global warming potential from the 4th Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC), see Forster et al. (2007), as required by the United Nations Framework Convention on Climate Change (UNFCCC).

3.4 GSDFLU

3.5 GSDFMRIO

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Appendix A

Annex: Dimensions of the GTAP database, release 10.0

Table A.1: **Regional dimension of the GTAP database (V10)**

1	AUS	**Australia**
2	NZL	**New Zealand**
3	XOC	**Rest of Oceania**
		American Samoa (asm), Cook Islands (cok), Fiji (fji), French Polynesia (pyf), Guam (gum), Kiribati (kir), Marshall Islands (mhl), Federated States of Micronesia (fsm), Nauru (nau), New Caledonia (ncl), Norfolk Island (nfk), Northern Mariana Islands (mnp), Niue (niu), Palau (plw), Papua New Guinea (png), Samoa (wsm), Solomon Islands (slb), Tokelau (tkl), Tonga (ton), Tuvalu (tuv), Vanuatu (vut), Wallis and Futura Islands (wlf)
4	CHN	**China**
5	HKG	**Hong Kong (China)**
6	JPN	**Japan**
7	KOR	**Republic of Korea**
8	MNG	**Mongolia**
9	TWN	**Taiwan (China)**
10	XEA	**Rest of East Asia**
		Macao (mac), North Korea (prk)
12	KHM	**Cambodia**
13	IDN	**Indonesia**
13	IDN	**Indonesia**
14	LAO	**Lao, PDR**
15	MYS	**Malaysia**
16	PHL	**Philippines**
17	SGP	**Singapore**
18	THA	**Thailand**
19	VNM	**Vietnam**
20	XSE	**Rest of Southeast Asia**
		Myanmar (mmr), Timor-Leste (tmp)

Table A.1: **Regional dimension of the GTAP database (cont.)**

21	BGD	**Bangladesh**
22	IND	**India**
23	LKA	**Sri Lanka**
24	NPL	**Nepal**
25	PAK	**Pakistan**
26	XSA	**Rest of South Asia**
		Afghanistan (afg), Bhutan (btn), Maldives (mdv)
27	CAN	**Canada**
28	USA	**United States**
29	MEX	**Mexico**
30	XNA	**Rest of North America**
		Bermuda (bmu), Greenland (grl), Saint Pierre & Miquelon (spm)
31	ARG	**Argentina**
32	BOL	**Bolivia**
33	BRA	**Brazil**
34	CHL	**Chile**
35	COL	**Colombia**
36	ECU	**Ecuador**
37	PRY	**Paraguay**
38	PER	**Peru**
39	URY	**Uruguay**
40	VEN	**Venezuela, Republica Bolivariana de**
41	XSM	**Rest of South America**
		Falkland Islands (flk), French Guiana (guf), Guyana (guy), Suriname (sur)
42	CRI	**Costa Rica**
43	GTM	**Guatemala**
44	HND	**Honduras**
45	NIC	**Nicaragua**
46	PAN	**Panama**
47	SLV	**El Salvador**
48	XCA	**Rest of Central America**
		Belize (blz)
49	DOM	**Dominican Republic**
50	JAM	**Jamaica**
51	PRI	**Puerto Rico**
52	TTO	**Trinidad & Tobago**
53	XCB	**Caribbean**
		Anguilla (aia), Antigua & Barbuda (atg), Aruba (abw), Bahamas (bhs), Barbados (brb), Cayman Islands (cym), Cuba (cub), Dominica (dma), Grenada (grd), Guadeloupe (glp), Haiti (hti), Martinique (mtq), Montserrat (msr), Netherlands Antilles (ant), Saint Kitts & Nevis (kna), Saint Lucia (lca), Saint Vincent & the Grenadines (vct), Turks and Caicos Islands (tca), British Virgin Islands (vgb), United States Virgin Islands (vir)

Table A.1: **Regional dimension of the GTAP database (cont.)**

54	AUT	**Austria**
55	BEL	**Belgium**
56	BGR	**Bulgaria**
57	CYP	**Cyprus**
58	CZE	**Czech Republic**
59	DNK	**Denmark**
60	EST	**Estonia**
61	FIN	**Finland**
62	FRA	**France**
63	DEU	**Germany**
64	GRC	**Greece**
65	HUN	**Hungary**
66	IRL	**Ireland**
67	ITA	**Italy**
68	LVA	**Latvia**
69	LTU	**Lithuania**
70	LUX	**Luxembourg**
71	MLT	**Malta**
72	NLD	**Netherlands**
73	POL	**Poland**
74	PRT	**Portugal**
75	ROU	**Romania**
76	SVK	**Slovakia**
77	SVN	**Slovenia**
78	ESP	**Spain**
79	SWE	**Sweden**
80	GBR	**United Kingdom**
81	NOR	**Norway**
82	CHE	**Switzerland**
83	XEF	**Rest of European Free Trade Area (EFTA)**
		Iceland (isl), Liechtenstein (lie)
84	ALB	**Albania**
85	BLR	**Belarus**
86	HRV	**Croatia**
87	RUS	**Russian Federation**
88	UKR	**Ukraine**
89	XEE	**Rest of Eastern Europe**
		Moldova (mda)
90	XER	**Rest of Europe**
		Andorra (and), Bosnia and Herzegovina (bih), Faroe Islands (fro), Gibraltar (gib), Macedonia (mkd, former Yugoslav Republic of), Monaco (mco), San Marino (smr), Serbia and Montenegro (scg)

Table A.1: **Regional dimension of the GTAP database (cont.)**

91	KAZ	**Kazakhstan**
92	KGZ	**Kyrgyz Republic**
93	TJK	**Tajikistan**
94	XSU	**Rest of Former Soviet Union**
		Turkmenistan (tkm), Uzbekistan (uzb)
95	ARM	**Armenia**
96	AZE	**Azerbaijan**
97	GEO	**Georgia**
98	BHR	**Bahrain**
99	IRN	**Iran**
100	ISR	**Israel**
101	JOR	**Jordan**
102	KWT	**Kuwait**
103	OMN	**Oman**
104	QAT	**Qatar**
105	SAU	**Saudi Arabia**
106	TUR	**Turkey**
107	ARE	**United Arab Emirates**
108	XWS	**Rest of Western Asia**
		Iraq (irq), Lebanon (lbn), West Bank and Gaza (pse), Syrian Arab Republic (syr), Republic of Yemen (yem)
109	EGY	**Egypt**
110	MAR	**Morocco**
111	TUN	**Tunisia**
112	XNF	**Rest of North Africa**
		Algeria (dza), Libya (lby)

Table A.1: **Regional dimension of the GTAP database (cont.)**

113	BEN	**Benin**
114	BFA	**Burkina Faso**
115	CMR	**Cameroon**
116	CIV	**Côte d'Ivoire**
117	GHA	**Ghana**
118	GIN	**Guinea**
119	NGA	**Nigeria**
120	SEN	**Senegal**
121	TGO	**Togo**
122	XWF	**Rest of Western Africa**
		Cape Verde (cpv), Gambia, The (gmb), Guinea-Bissau (gnb), Liberia (lbr), Mali (mli), Mauritania (mrt), Niger (ner), Saint Helena (shn), Sierra Leone (sle)
123	XCF	**Central Africa**
		Central African Republic (caf), Chad (tcd), Congo (cog), Equatorial Guinea (gnq), Gabon (gab), Sao Tome & Principe (stp)
124	XAC	**South-Central Africa**
		Angola (ago), Democratic Republic of the Congo (cod)
125	ETH	**Ethiopia**
126	KEN	**Kenya**
127	MDG	**Madagascar**
128	MWI	**Malawi**
129	MUS	**Mauritius**
130	MOZ	**Mozambique**
131	RWA	**Rwanda**
132	TZA	**Tanzania**
133	UGA	**Uganda**
134	ZMB	**Zambia**
135	ZWE	**Zimbabwe**
136	XEC	**Rest of Eastern Africa**
		Burundi (bdi), Comoros (com), Djibouti (dji), Eritrea (eri), Mayotte (myt), Réunion (reu), Seychelles Islands (syc), Somalia (som), Sudan (sdn)
137	BWA	**Botswana**
138	NAM	**Namibia**
139	ZAF	**South Africa**
140	XSC	**Rest of South African Customs Union**
		Lesotho (lso), Swaziland (swz)
141	XTW	**Rest of the World**
		Antarctica (ata), Bouvet Island (bvt), British Indian Ocean Territory (iot), French Southern Territories (atf)

Table A.2 provides the standard set of commodities in the GTAP Data Base. In the standard database, these are the same as the set of activities. The standard commodity subsets are:

- MARG: OTP, WTP, ATP
- ERG : COA, OIL, GAS, P_C, ELY, GDT
- FUEL: COA, OIL, GAS, P_C, GDT

Table A.2: **Commodity dimension of the GTAP database (V10)**

1	PDR	**Paddy rice**
2	WHT	**Wheat**
3	GRO	**Cereal grains nec**
4	V_F	**Vegetables, fruit, nuts**
5	OSD	**Oil seeds**
6	C_B	**Sugar cane, sugar beet**
7	PFB	**Plant-based fibers**
8	OCR	**Crops nec**
9	CTL	**Bovine cattle, sheep and goats, horses**
10	OAP	**Animal products nec**
11	RMK	**Raw milk**
12	WOL	**Wool, silk-worm cocoons**
13	FRS	**Forestry**
14	FSH	**Fishing**
15	COA	**Coal**
16	OIL	**Oil**
17	GAS	**Gas**
18	OXT	**Other Extraction (formerly omn Minerals nec)**
19	CMT	**Bovine meat products**
20	OMT	**Meat products nec**
21	VOL	**Vegetable oils and fats**
22	MIL	**Dairy products**
23	PCR	**Processed rice**
24	SGR	**Sugar**
25	OFD	**Food products nec**
26	B_T	**Beverages and tobacco products**
27	TEX	**Textiles**
28	WAP	**Wearing apparel**
29	LEA	**Leather products**
30	LUM	**Wood products**
31	PPP	**Paper products, publishing**
32	P_C	**Petroleum, coal products**
33	CHM	**Chemical products**
34	BPH	**Basic pharmaceutical products**
35	RPP	**Rubber and plastic products**

Table A.2: **Commodity dimension of the GTAP database (cont.)**

36	NMM	**Mineral products nec**
37	I_S	**Ferrous metals**
38	NFM	**Metals nec**
39	FMP	**Metal products**
40	ELE	**Computer, electronic and optical products**
41	EEQ	**Electrical equipment**
42	OME	**Machinery and equipment nec**
43	MVH	**Motor vehicles and parts**
44	OTN	**Transport equipment nec**
45	OMF	**Manufactures nec**
46	ELY	**Electricity**
47	GDT	**Gas manufacture, distribution**
48	WTR	**Water**
49	CNS	**Construction**
50	TRD	**Trade**
51	AFS	**Accommodation, Food and service activities**
52	OTP	**Transport nec**
53	WTP	**Water transport**
54	ATP	**Air transport**
55	WHS	**Warehousing and support activities**
56	CMN	**Communication**
57	OFI	**Financial services nec**
58	INS	**Insurance (formerly isr)**
59	RSA	**Real estate activities**
60	OBS	**Business services nec**
61	ROS	**Recreational and other services**
62	OSG	**Public Administration and defense**
63	EDU	**Education**
64	HHT	**Human health and social work activities**
65	DWE	**Dwellings**

The power-version of the GTAP database splits the standard electricity sector (`'ELY'`) into 12 electricity-based activities—11 of which are different power technologies with differentiated cost structures and 1 activity for transmission and distribution. The database assumes full diagonality of the power structure 'make' matrix. A typical model implementation is likely to keep the differentiated cost structures but collapse demand to a single electricity commodity.[1]

Table A.3: **Additional dimensions of the power database (V10)**

1	TND	**Electricity transmission and distribution**
2	NUCLEARBL	**Nuclear power**
3	COALBL	**Coal power baseload**
4	GASBL	**Gas power baseload**
5	WINDBL	**Wind power**
6	HYDROBL	**Hydro power baseload**
7	OILBL	**Oil power baseload**
8	OTHERBL	**Other baseload**
9	GASP	**Gas power peakload**
10	HYDROP	**Hydro power peakload**
11	OILP	**Oil power peakload**
12	SOLARP	**Solar power**

The standard version of GTAP has 8 endowments or factors of production—of which 5 are labor types. The first three labor types in Table A.4 are typically associated with *unskilled* labor and the remaining two would therefore be designated *skilled* labor.[2] It should be noted that in the default configuration, land payments are only attributed in the agricultural sectors—both crops and livestock—but not forestry. Natural resource payments are available for forestry (`frs`), fisheries (`fsh`), coal mining (`coa`), oil and gas extraction (`oil` and `gas`) and other mining extraction (`oxt`).

Table A.4: **GTAP endowments (V10)**

1	TECH_ASPROS	**Technical and professional workers**
2	CLERKS	**Clerical workers**
3	SERVICE_SHOP	**Service shop**
4	OFF_MGR_PROS	**Management**
5	AG_OTHLOWSK	**Agriculture and other low-skill workers**
6	CAPITAL	**Capital**
7	LAND	**Land**
8	NATLRES	**Natural resources**

Table A.5 provides the definitions for the greenhouse (GHG) and non-greenhouse gases. The set `EM` incorporates all air emissions. The set `EMN` incorporates all air emissions with the exception of CO_2. The set `GHG` includes the four greenhouse gases (CO_2, CH_4, N_2O and `FGAS`). The set `NCO2` represents the greenhouse gases except CO_2. The set `NGHG` includes all non-greenhouse gases.

The land-use version of the GTAP database, also known as the AEZ database, divides land-use into 18 categories that are a cross of six growing length periods, from less than 60 days to over 300

[1] The 12 power activities are added to the `ERG` subset.

[2] Walmsley and Carrico (2016).

Table A.5: **Air emissions**

1	CO2	**Carbon dioxide**
2	CH4	**Methane**
3	N2O	**Nitrous oxide**
4	FGAS	**Fluorinated gases**
5	BC	**Black carbon**
6	CO	**Carbon monoxide**
7	NH3	**Ammonia**
8	NMVOC	**Non-methane volatile organic compounds**
9	NOX	**Nitrogen oxides**
10	OC	**Organic carbon**
11	PM10	**Particulate matter 10**
12	PM2_5	**Particulate matter 2.5**
13	SO2	**Sulfur dioxide**

days, and three broad types of climate—tropical, temperate and boreal.[3]

Table A.6: **GTAP land-use database (V10)**

1	AEZ1	**Tropical and arid LGP000_060**
2	AEZ2	**Tropical and dry semi-arid LGP060_119**
3	AEZ3	**Tropical and moist semi-arid LGP120_179**
4	AEZ4	**Tropical and sub-humid LGP180_239**
5	AEZ5	**Tropical and humid LGP240_299**
6	AEZ6	**Tropical and humid; year round growing season LGP300PLUS**
7	AEZ7	**Temperate and arid LGP000_060**
8	AEZ8	**Temperate and dry semi-arid LGP060_119**
9	AEZ9	**Temperate and moist semi-arid LGP120_179**
10	AEZ10	**Temperate and sub-humid LGP180_239**
11	AEZ11	**Temperate and humid LGP240_299**
12	AEZ12	**Temperate and humid; year round growing season LGP300PLUS**
13	AEZ13	**Boreal and arid LGP000_060**
14	AEZ14	**Boreal and dry semi-arid LGP060_119**
15	AEZ15	**Boreal and moist semi-arid LGP120_179**
16	AEZ16	**Boreal and sub-humid LGP180_239**
17	AEZ17	**Boreal and humid LGP240_299**
18	AEZ18	**Boreal and humid; year round growing season LGP300PLUS**

[3] See Lee et al. (2009) and Baldos (2017).