

G Brazil

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G.1 Introduction

In GTAP 11, two tables for Brazil were contributed, for reference years 2010 and 2015. This document describes the procedures used to update the Brazilian databases in GTAP, departing from the original I-O tables of Brazilian National Accounts System. The format in both reference year tables are very much alike due to the standard format and nomenclature used by the Instituto Brasileiro de Geografia e Estatística (IBGE) starting in 2010, e.g., the mappings are identical.

G.2 The 2015 Brazilian I-O tables

The Brazilian database departs from the official Brazilian I-O tables for year 2015, published by the IBGE in year 2018. All the original values are in million reais (R\$) of year 2015. The following matrices were made available by IBGE:

- A production (MAKE) matrix with 67 sectors and 127 products.
- An absorption (USE) matrix at basic prices for both domestic and imported products, with 73 users. The users correspond to 67 sectors and 6 final demanders, namely Investment, Exports, Stocks, Government Consumption, Household Consumption, and Non-profit Institutions Serving Households Consumption.
- An absorption (USE) matrix at purchaser's prices, with the same dimensions as the one at basic prices;
- Commodity taxes matrices, by commodity and sectors, for domestic and imported goods and services, with one aggregated indirect tax type for each matrix, for domestic and imported commodities.
- Commodity taxes vectors, by commodity, for four different groups of taxes: three indirect taxes on both domestic and imported goods (IPI, ICMS, and Other taxes); and one vector of import tariffs.
- Margins matrices (trade and transport), product by user, for both domestic and imported products.

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- A value-added matrix (primary factors), by sector. This matrix distinguishes payments to labor (both employed workers and autonomous workers, and social security payments), capital (Operational Surplus), and taxes and subsidies on production.

Some corrections were required in the database preparation from the beginning. They are:

- Small negative values which appears in the MAKE matrix for the production of Trade margins by two sectors. Those values are negligible, and were just eliminated.
- Small values for taxes over zero use flows. Those values are negligible, and were just eliminated. As already mentioned, the TAXES matrices in the Brazilian IO tables show all indirect taxes aggregated, including the import tariffs. Import tariffs were separated from the other indirect taxes using the following information:
- The total value of import tariffs, by commodity;
- The share of each user (sector and final demand) in total use of each imported commodity, at basic prices.

With this procedure tax matrices are generated by commodity, sector, source (domestic and imported) and type of indirect tax: a domestic tax on both domestic and imported goods, and the import tariffs. No other further adjustments are required.

G.3 Preparing the 2015 GTAP database

As described above, the original Brazilian 2015 I-O tables are multi-product, and must be converted in product by product tables to match GTAP convention. This is made through the diagonalization of the MAKE matrix using commodities shares, and performing the same procedure in all the other matrices, using the production commodities shares information. A previous step involved aggregating the commodity dimension further to 122 commodities, to better approximate the GTAP sectoral definition. This stage involved basically two types of aggregation:

- First, different transport services (Land transportation, Passenger transportation, Water transportation, Air transportation, Storage and other services on transportation, and Mail) to just one sector, Transport. This was done because the transport margins matrices do not specify the type of transportation.
- Second, “Non-profit institutions serving households consumption”, which is an element of final demand, was aggregated to “Households consumption”.

The diagonalization procedure was performed, which generated commodity by commodity matrices, with dimensions 122 x 122. This type of adjustment, however, generates unusual intermediate use structures, mainly in those industries that produce many products in the original

tables, as is the case of agriculture and the food industry. In this case, further adjustments were made in intermediate use part of the USE matrix, to fix this problem. These adjustments were made mostly on the agriculture and the food industry sectors, which are relatively more disaggregated in the GTAP database, based on extra information, like sectoral cost spreadsheets shares, as well as in experience. A rebalancing step using a RAS type method is required after those adjustments, in order to restore the usual balance conditions.

Finally, the original sectors were mapped to the GTAP sectors, resulting in 56 mapped sectors. The mapping and sectors' description can be seen in the Appendix.

G.4 References

Instituto Brasileiro de Geografia e Estatística. 2018. Matriz de Insumo-Produto do Brasil 2015. Contas Nacionais no. 62. 62 p. Available at: <https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9085-matriz-de-insumo-produto.html?=&t=downloads>

Appendix

Table 8.20: Concordance between the Brazilian 2015 IO table, GSC3 code and CPC/ISIC4 nomenclature.

No	Brazilian IO	DESCRIPTION	GSC3 code	CPC/ISIC4
1	ArrozTrigOut	Rice, wheat, other grains	pdr_wht	111; 113 - 119
2	MilhoGrao	Corn	gro	112
3	AlgodHerb	Cotton	pfb	192
4	CanaDeAcucar	Sugar cane	c_b	18
5	SojaGrao	Soybeans	osd	14
6	OutPrLavTemp	Other agricultural products	ocr	199
7	Laranja	Citric fruits	ocr	12, 13, 15, 17
8	CafeGrao	Coffee	ocr	16
9	OutPrLavPerm	Other permanent crops	ocr	199
10	BovOutrAnim	Livestock and other animals	ctl_wol	211, 212, 214, 299, 294
11	LeitVacOuAni	Raw milk	rmk	22
12	Suinos	Pigs	oap	214
13	AvesOvos	Poultry and eggs	oap	215; 23
14	ExplFlorSilv	Natural forests and Forestry	frs	3
15	PescaAcq	Fishing and aquiculture	fsh	3
16	CarvMiner	Coal	coa	5
17	MinNaoMetal	Non-metallic minerals	omn	8
18	PetroGasNat	Oil and natural gas	oil_gas	61; 62
19	MinFerro	Iron ore	omn	7
20	MinMetNaoFer	Non-ferrous metallic minerals	omn	7
21	AbateCarne	Meat production	cmt	21111, 21112, 21115, 21118, 21119

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No	Brazilian IO	DESCRIPTION	GSC3 code	CPC/ISIC4
22	CarneSuino	Pork	omt	21113
23	CarneAves	Chicken meat	omt	2112
24	PescadoInd	Fish preparations	ofd	212
25	LeiteResfr	Processed milk	mil	22
26	OutLaticinio	Dairy	mil	22
27	Acucar	Sugar	sgr	235
28	ConservFrut	Fruit products	ofd	214
29	OleoGordura	Oils and fat	vol	216
30	Cafe	Processed coffee	b_t	24
31	ArrozBenef	Rice, unhusked	pcr	2316
32	PrTrigManMil	Processed products from wheat, cassava or corn	pcr	2311, 2312
33	Racao	Feedstuffs	ofd	2333
34	OutProdAlim	Other processed food	ofd	239
35	Bebidas	Beverages	b_t	24
36	ProdFumo	Tobacco products	b_t	25
37	FioFibraText	Textile yarns and fibers	tex	13
38	Tecelagem	Fabrics	tex	13
39	FabOutPText	Other textiles	tex	13
40	ArtVestAc	Apparel	wap	14
41	CalcadArtCou	Leather products and shoes	lea	15
42	ProdMadeira	Wood products	lum	16
43	Celulose	Cellulose	ppp	17
44	PapPapel	Paper	ppp	17
45	SevImpreRep	Printing services	ppp	18
46	CombAviacao	Aviation fuel	p_c	19
47	Gasoolcool	Gasoline C	p_c	19
48	Nafta	Petroleum Naphtha	p_c	19
49	OleoComb	Combustible oil	p_c	19
50	DieselBiodis	Diesel and biodiesel	p_c	19
51	OutProRefPet	Other oil refined products	p_c	19
52	EtanolCombus	Ethanol	chm	20
53	ProdQuimInor	Inorganic chemicals	chm	20
54	AduboFert	Fertilizers	chm	20
55	ProdQuimOrg	Organic chemicals	chm	20
56	FabResina	Resins products	chm	20
57	DefAgricol	Agricultural pesticides	chm	20
58	ProdQuimDiv	Other chemical products	chm	20
59	TintasVerniz	Paints and varnish	chm	20
60	PerfSabLimp	Perfumes, soap and other cleaning products	chm	20
61	ProdFarmac	Pharmaceutical products	bph	21
62	ArtBorrac	Rubber products	rpp	22
63	ArtPlastico	Plastic products	rpp	22
64	Cimento	Cement	nmm	23
65	ArtCimGesso	Cement and plaster products	nmm	23
66	VidroCerOut	Glass, ceramics and other non-metallic mineral products	nmm	23
67	GusaFerLig	Pig iron and iron alloys	i_s	19
68	Laminados	Laminated iron	i_s	19
69	ProdMetMNF	Metallurgy of non-ferrous metals	nfm	2432
70	FundidosAco	Steel products	i_s	19

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No	Brazilian IO	DESCRIPTION	GSC3 code	CPC/ISIC4
71	ProduMetal	Metal products	fmp	25
72	CompEletron	Electronic compounds	ele	26
73	MaqEscEquInf	Office equipment	ome	28
74	MatEletrCom	Electronic equipment	ele	26
75	EqMedContOpt	Medical equipment	ome	28
76	MaqApaEquEle	Electric machinery and equipment	eeq	27
77	Eletrodome	Home appliances	eeq	27
78	TratMaqAgric	Tractors and agricultural equipment	ome	28
79	MaqExtConst	Equipment for mining and construction	ome	28
80	OutMaqEquip	Other equipment and machinery	ome	28
81	Automoveis	Automobiles	mvh	29
82	CaminhOnib	Trucks and buses	mvh	29
83	PecasVeicAut	Vehicles spare parts	mvh	29
84	OutrEquTran	Other transport equipment	otn	30
85	Moveis	Furniture	omf	31
86	OutAtivIndst	Other industries	omf	32
87	ManRepMaqEqp	Equipment maintenance and repairs	omf	33
88	EletricidGas	Electricity and gas	ely_gdt	351; 352
89	AguaEsgRes	Water, sewerage, recycling and residues management	wtr	36 - 39
90	ConstEdif	Building construction	cns	41
91	ConstInfra	Infrastructure construction	cns	43
92	SevEspConst	Special construction services	cns	43
93	Comercio	Trade	trd	45
94	Transporte	Transport	otpwtpatpwhs	49 - 53
95	SevAlojament	Lodging services	afs	55
96	SevAliment	Food services	afs	56
97	LivroJornRev	Books, newspapers and magazines	ppp	18
98	CineMusRadTV	Cinemas, Music, Radio and TV	cmn	59
99	TelecomOuts	Telecommunications, cable TV and other services	cmn	61
100	DesenSistOut	Information services development	cmn	62
101	IntFinancSeg	Financial institutions and insurance	ofi_isr	64 - 66
102	AlugEftSvImb	Real state rentals	rsa	68
103	AluguelImput	Dwellings	dwe	n.a.
104	SevJurCont	Consulting, accounting and juridical services	obs	M,N
105	SevPesqDesn	Research and development services	obs	M,N
106	SevArquiEng	Engineering and architecture services	obs	M,N
107	PublicidOut	Publicity, marketing and others	obs	M,N
108	AluguelNimb	Rentals except real estate and intellectual property management	rsa	68
109	CondomSevEdf	Condominiums and services for buildings	rsa	68
110	OutServAdm	Other administrative services	obs	M,N
111	VigilSegInv	Surveillance	obs	M,N
112	ServAdmPub	Public administration services	osg	84
113	PrevAssisSoc	Social security and assistance	osg	84
114	EducPublica	Public education	edu	85
115	EducPrivada	Private education	edu	85
116	SaudePublica	Public health	hht	Q
117	SaudePrivada	Private health	hht	Q
118	ArteCultEsp	Arts, culture and religious services	ros	R, S, T

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No	Brazilian IO	DESCRIPTION	GSC3 code	CPC/ISIC4
119	OrgPatrSind	Labor unions, syndicates, and patronal organizations	ros	R, S, T
120	ManutRepPC	Maintenance of computers, phones and other domestic appliances	omf	33
121	ServPessoais	Personal services	ros	R, S, T
122	ServDomest	Domestic services	ros	R, S, T