

Brazil

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1. Introduction

This document describes the procedures used to update the Brazilian data base in GTAP, departing from the original I-O tables of Brazilian National Accounts System. In this document the terms “sector” means production sector, and is sometimes referred also as “industry.”

2. The 2005 Brazilian I-O Tables

The Brazilian data base departs from the official Brazilian I-O tables for year 2005, published by the Instituto Brasileiro de Geografia e Estatística – IBGE in year 2008. All the original values are in million reais (R\$) of year 2005. The following matrices were made available by IBGE:

- A production (MAKE) matrix with 55 sectors and 110 products.
- An USE matrix at basic prices for both domestic and imported products, with 61 users. The users correspond to 55 sectors and 6 final demanders, namely Investment, Exports, Stocks, Government Consumption, Household Consumption, and Non-profit Institutions Serving Households Consumption.
- An USE matrix at purchasers prices, with the same dimensions as the one at basic prices;
- Taxes matrices by products, for four different indirect taxes, including tariffs. These matrices are not disaggregated by sectors.
- Margins matrices (trade and transport), by product.
- A value added matrix (factors), by sector.
- Production taxes and subsidies, by sector.

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

- Small negative value which appears in the MAKE matrix for the production of Trade margins by the Information Services sectors.
- Negative Operational Surplus for the Livestock and Automobile sectors in 2005. These values were changed to “typical” operational surpluses in those sectors for the period 2000 to 2005.

As noted before, the MARGINS and the TAXES matrices in the set of Brazilian I-O tables are not supplied by industry, but only by commodity. Those values were initially split across industries using the commodity shares in each industry, by type of tax and margin. This creates a first approach for creating commodities by industries matrices for taxes and margins, which are, of course, unbalanced. The balance is then restored using a balancing method and the original USE table at purchasers prices as the control. With this procedure we get the tax matrices by commodity, industry, source (domestic and imported) and type of indirect tax (four types), as well as the margins matrices by commodity, industry, source and margin type (trade and transport).

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3. Processing of the I-O Data for GTAP Data Base

As described above, the original Brazilian 2005 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. This will generate commodity by commodity matrices, with dimensions 110 x 110.

This type of adjustment, however, generates an unusual intermediate use structure, mainly in those industries that produce many products in the original tables, as is the case of the food industry. In this case, further adjustments were made in the USE matrix, to avoid this problem. These adjustments were made mostly on the agriculture and food industry, which are relatively more disaggregated in the GTAP Data Base, and were based on extra information, like cost spreadsheets shares, as well as in experience. A further rebalancing step is required after those adjustments are done.

Further adjustments used in the preparation stage were:

- The disaggregation of “electricity” and “water” from an aggregated sector in the original Brazilian I-O tables, where electricity, water, sewerage and urban cleaning are aggregated. This was done using shares from the GTAP representative table values.
- The aggregation of different transport products (passengers and mail) to just one, transport.
- The aggregation of “Non-profit institutions serving households consumption,” which is an element of final demand, to “Households consumption.”

After the abovementioned adjustments the Brazilian data base had its dimension reduced to 108 sectors x 108 commodities. And, finally, the original sectors were mapped to the GTAP sectors. The mapping and sectors’ description can be seen in the Appendix.

References

Instituto Brasileiro de Geografia e Estatística. 2008. Matriz de Insumo-Produto do Brasil 2000/2005. Contas Nacionais no. 23. 57 p.

Appendix

Concordance between the Brazilian 2005 I-O table, GSC2 code and CPC/ISIC3 nomenclature.

DESCRIPTION			MAPPING	
No.	Brazilian IO		GSC2 code	CPC/ISIC3
1	ArrozCasca	Rice	pdr	0113;
2	MilhoGrao	Corn	gro	0112;
3	TrigoOutCere	Wheat	wht	0111;
4	CanaDeAcucar	Sugar cane	c_b	018;
5	SojaGrao	Soybeans	osd	014;
6	OutPrServLav	Other agricultural products	ocr	0199;
7	Mandioca	Cassava	ocr	0199;
8	FumoFolha	Tobacco	ocr	017;
9	AlgodHerb	Cotton	pfb	0192;
10	FrutasCitric	Citric fruits	v_f	013;
11	CafeGrao	Coffee	ocr	016;
12	ExplFlorSilv	Forestry	for	03;
13	BovOutrAnim	Livestock	ctl_wool	0211;0296;
14	LeitVacOuAni	Raw milk	rmk	0291;
15	SuinosV	Pigs	oap	0212;
16	AvesV	Poultry	oap	0212;
17	Ovos	Eggs	oap	0292;
18	PescaAcq	Fisheries	fsh	05;
19	PetroGasNat	Oil	oil_gas	111; 112;
20	MinFerro	Iron ore	omn	13;
21	CarvMiner	Charcoal	col	101;
22	MinMetNaoFer	Non Ferrous Metallic minerals	omn	14;
23	MinNaoMetal	Non-metallic minerals	omn	14;
24	AbateCarne	Slaughtering	cmt	21111;
25	CarneSuino	Pork	omt	21113;
26	CarneAves	Chicken meat	omt	2112;
27	PescadoInd	Fish preparations	ofd	212;
28	ConsFrut	Fruit products	ofd	215;
29	OleoSoja	Soybean oil	vol	2163;
30	OutOleExcMil	Other oils, except corn	vol	2164;
31	OleoSojaRefi	Refined soybean oil	vol	2165;
32	LeiteResfr	Processed milk	mil	22;
33	ProdLatiSorv	Dairy	mil	22;
34	ArrozBenef	Rice, unhusked	pcr	2316;
35	FarinhaTrigo	Wheat flour	ofd	2311;
36	FarinhaMandi	Cassava flour	ofd	2312;
37	OleosMilRac	Corn oil and feedstock	ofd	2166; 233;
38	UsiRefAcucar	Refined sugar	sgr	235;

39	CafeTorrMoid	Processed coffee	ofd	239;
40	CafeSoluv	Soluble coffee	ofd	239;
41	OutProdAlim	Other food	ofd	239;
42	Bebidas	Beverages	b_t	24;
43	ProdFumo	Tobacco products	b_t	25;
44	BenAlgOutTex	Cotton textiles	tex	17;
45	Tecelagem	Fabrics	tex	17;
46	FabOutPText	Other textiles	tex	17;
47	ArtVestAc	Apparel	wap	18;
48	CouroFabArt	Leather products	lea	19;
49	Calcados	Shoes	lea	19;
50	ProdMadeira	Lumber products	lum	20;
51	Celulose	Cellulose	ppp	21;
52	PapPapel	Paper	ppp	21;
53	JornRevDisc	Printed paper	ppp	22;
54	GasLiqPet	Gas	gdt	402;
55	GasAutomo	Automotive gas	gdt	402;
56	Gasoalcool	Gasoline	p_c	232;
57	OleoComb	Combustible oil	p_c	232;
58	OleoDies	Diesel oil	p_c	232;
59	OutProRefPet	Other refined petroleum	p_c	232;
60	Alcool	Ethanol	crp	242;
61	ProdQuimInor	Inorganic chemicals	crp	241;
62	ProdQuimOrg	Organic chemicals	crp	241;
63	FabResina	Resin products	crp	242;
64	ProdFarmac	Pharmaceuticals	crp	242;
65	DefAgricol	Pesticides	crp	242;
66	PerfSabLimp	Perfume, soap, cleaning products	crp	242;
67	TintasVerniz	Paints	crp	242;
68	ProdQuimDiv	Other chemicals	crp	242;
69	ArtBorrac	Rubber products	crp	25;
70	ArtPlastico	Plastic products	crp	25;
71	Cimento	Cement	nmm	26;
72	OutMinNMet	Other non-metallic minerals	nmm	26;
73	GusaFerLig	Gusa iron	i_s	271;
74	Laminados	Laminated iron	i_s	2731;
75	ProdMetMNF	Non-metallic metallurgy	nfm	272;
76	FundidosAco	Steel products	i_s	2731;
77	ProduMetal	Metal products	fmp	28;
78	MaquEquip	Machinery and equipment	ome	29;
79	Eletrodome	Home appliances	ele	32;
80	MaqEscEquInf	Office equipment	ele	30;
81	MaqApaEquEle	Electric equipment	ele	32;
82	MatEletron	Electronic equipment	ele	32;

83	IntMedHosp	Medical equipment	ome	33;
84	Automoveis	Automobiles	mvh	34;
85	CaminhOnib	Trucks	mvh	34;
86	PecasVeicAut	Spare parts	mvh	34;
87	OutrEquTran	Other transport equipment	otn	35;
88	Moveis	Furniture	omf	36;
89	SucatasRec	Scrap materials	omf	37;
90	ElGasAgEsLPu	Electricity and water	ely_wtr	401;41;90; part of 402;
91	Construcao	Construction	cns	45;
92	Comercio	Trade	trd	521;
93	Transporte	Transport	otp_wtp_atp	60; 61; 62; 63;
94	ServInforma	Information services	cmn	64;
95	IntFinancSeg	Financial institutions and insurance	ofi_isr	65; 66; 67;
96	ServImobAlug	Real state rentals	obs	K
97	AluguelImput	Dwellings	dwe	n.a.
98	ManutReparos	Repairs	trd	526;
99	AlojamAlim	Hotels and food	trd	55;
100	PrestSeEmpre	Services to enterprises	obs	K
101	EducaMercant	Mercantile education	osg	80;
102	SaudeMercant	Health	osg	85;
103	ServPFamil	Services to households	ros	95;
104	ServAssociat	Associative services	osg	91;
105	ServDomest	Domestic services	ros	95;
106	EducPublica	Public education	osg	80;
107	SaudePublic	Public health	osg	85;
108	SerPubSegSoc	Public service and social security	osg	75;