

11.K

Brazil

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11.K.1 Original Input-Output Table

The initial input-output table of Brazil is the Input-Output Table of Brazil – 1996 (Matriz de Insumo-Produto do Brasil – 1996), from the Instituto Brasileiro de Geografia e Estatística (IBGE). The original I-O table is commodity by industry with 43 industries producing 80 commodities. It is a complete set of I-O table accounts, with separate tables for production, intermediate and final use, value-added, taxes, import tariffs (separate from import values), and margins for both domestic products and imports. The values are given at basic prices in 1996 Reais.

11.K.2 Data Adjustments

Aside from the sectoral definitions, there are no *a priori* inconsistencies between the initial I-O table for Brazil and GTAP specifications. One exception is that the Brazilian I-O table does not include any information about returns to land. Due to the differences in sectoral definition, some data adjustments were done to match GTAP classification.

The first data adjustment was the elimination of the Financial Dummy sector. It is a fictional sector that “uses” a substantial amount of the Financial Sector Services, and has an equivalent Operational Surplus loss. To eliminate the Financial Dummy sector, its Use of Financial Services was distributed to the Use of the same product by other activities, in proportion to each industry’s Use of Financial Services. The corresponding value was subtracted from each activity’s Gross Operational Surplus (GOS). The same adjustment was made to part of the Tax matrix where required (Taxes on Financial Dummy Use of Financial Services).

Another data adjustment was the allocation of part (20 percent) of agricultural activities reported GOS to the wage bill. This was done to raise the wage share in total costs to about 20 percent, otherwise agriculture will be one of the most capital-intensive industries in the economy. This procedure approximates wage shares (wages + payment in products for landless workers) in total factor plus inputs costs of agriculture in the Censo Agropecuário do Brasil de 1996 (Brazilian 1996 Agricultural Census) (31.76 percent).

11.K.3 Sectoral Splits

As previously noted, the original Brazilian 1996 I-O table has 80 commodities produced by 42 industries (excluding the Financial Dummy sector). Several steps were involved in transforming the table into 57 by 57 commodity matrices. The first one was to split the agricultural activities. In the original table, Agriculture is a multi-product sector producing 11 products: coffee, sugarcane, paddy rice, wheat, soybeans, cotton, corn, livestock, raw milk, poultry and other agricultural products. These products were initially further disaggregated. Livestock was split into Livestock, Swine, and Wool. Other Agriculture was split into Other Agriculture, Fisheries, Vegetable and Fruits, and Forestry. The criteria used for this task were the shares in value of production of each new product in the original aggregated product as obtained from the Brazilian 1996 Agricultural Census.

Next, the production of Other Agricultural Products by the Agriculture sector was adjusted, since the definition of this sector in the original Brazilian I-O table differs from the GTAP definition. In the Brazilian I-O table, this aggregate includes many different agricultural products including coffee and agricultural services. Its value then is higher than what can be observed in the Brazilian 1996 Agricultural Census. The value was adjusted so that the share of Other Agricultural Products in total agricultural plus forestry products (excluding animal products) in the I-O table matches the same share value in the Census (0.392). The difference was allocated to the production of Other Services by the Agricultural sector.

The next step was to create a diagonal production matrix product by product, using commodity shares in each industry. All the other matrices were modified accordingly. After this step, some other adjustments were made, mainly regarding the intermediate consumption and labor use of agricultural activities. The own usage of the new agricultural activities (for example, the use of corn by the new corn producing sector) were modified since the product share criteria used for splitting the sectors distorted this intermediate usage. The correction was done sector by each sector, based on cost spreadsheets, author's experience, as well as on advice from experts.

Fertilizer use in the agricultural sectors was also adjusted to match the use share reported in the Anuário Estatístico do Setor de Fertilizantes (Statistics Yearbook of the Fertilizer Sector) by the Associação Nacional para a Difusão de Fertilizantes (ANDA), 1996, by producing sector. The share of fertilizer used in pastures was allocated half to Livestock production, half to Raw Milk production.

Labor use shares in agricultural activities were also adjusted, to match the shares in the 1996 Brazilian Agricultural Census (Table 11 of the Census). After this step, re-balancing was done using the RAS procedure.

The final set of data adjustments involved splitting some remaining sectors in the Brazilian I-O table using information on production shares drawn from an I-O table elaborated by Prof. Joaquim José Martins Guilhoto (unpublished, 2003) for 1999. The original Public Utility Industrial Services activity was split into Electricity (0.8119), Gas (0.0027), and Water Services (0.1854). The

original Transport activity was split into Land Transportation (0.839), Water Transportation (0.031), and Air Transportation (0.130). The original Petroleum and Gas activity was split into Gas Extraction (0.083) and Petroleum Extraction (0.917). Finally, part (50 percent) of the values of the Wood and Furniture sector was moved to the Other Industrial Products sector since the Wood Products sector (lum) in GTAP corresponds only to wood products and not to furniture.

11.K.4 Sectoral Concordance

The resulting 90 x 90 Brazilian I-O table was aggregated to match the 57 x 57 GTAP sectoral classification (GSC2). Appendix Table 11.K.A1 provides the concordance between the Brazilian I-O table, ISIC3, CPC, and GSC2. It is important to note that there is no official correspondence between the Brazilian I-O table and ISIC3. The classification provided is based on symmetry and experience.

References

- Instituto Brasileiro de Geografia e Estatística (IBGE). 2000. “Censo Agropecuário do Brasil de 1996,” Sao Paulo, Brazil: IBGE.
- Instituto Brasileiro de Geografia e Estatística (IBGE). 1999. “Matriz de Insumo-Produto do Brasil – 1996,” Sao Paulo, Brazil: IBGE.
- Associação Nacional para a Difusão de Adubos (ANDA). 1996. “Statistics Yearbook of the Fertilizer Sector,” Sao Paulo, Brazil: ANDA.

Appendix

Table 11.K.A1 Concordance between the Brazilian 1996 I-O Table, ISIC3, CPC, and GSC2

Product	Original name in 1996 I-O Table	ISIC3	CPC	GSC2
Paddy Rice	Arroz em casca		0113	pdr
Wheat	Trigo em grão		0111	wht
Corn	Milho em grão		0112	gro
Vegetables and Fruits	(Absent; Split from Other Agriculture)		012, 013	v_f
Soybean	Soja em grão		014	osd
Sugar Cane	Cana-de-açúcar		018	c_b
Cotton	Algodão em caroço		0192	pfb
Coffee (beans)	Café em coco		016	ocr
Other Agriculture	Outros produtos agropecuários		017, 0191, 0193, 0292, 0293, 0294, 0295, 0298	ocr
Livestock	Bovinos e suínos		0211	ctl
Swine	(Absent; Split from Livestock)		0212	oap
Poultry	Aves vivas		0212	oap
Raw Milk	Leite natural		0291	rmk
Wool	(Absent; Split from Livestock)		0296	wol
Forestry	(Absent; Split from Other Agriculture)		03	frs
Fisheries	(Absent; Split from Other Agriculture)	05		frs
Charcoal and Others	Carvão e outros	10		coa
Petroleum	(Absent; Split from Petroleum and Gas Extraction)	111		oil
Gas	(Absent; Split from Petroleum and Gas Extraction)	112		gas
Ore	Minério de ferro	13.1		omn
Other Minerals	Outros minerais	12.0, 13.2, 14		omn
Bovine Meat	Carne bovina		21111	cmt
Chicken Meat	Carne de aves abatidas		2112	omt
Raw Vegetable Oil	Óleos vegetais em bruto		2163	vol
Processed Vegetable Oil	Óleos vegetais refinados		2165	vol
Processed Milk	Leite beneficiado		22	mil
Other Milk Products	Outros laticínios		Included in 22	mil
Processed Rice	Arroz beneficiado		2316	pcr
Sugar	Açúcar		15.4	sgr
Wheat Flour	Farinha de trigo		2311	ofd
Coffee Products	Produtos do café		239	ofd
Other Processed Vegetal Products	Outros produtos vegetais beneficiados		239	ofd

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Table 11.K.A1 Concordance between the Brazilian 1996 I-O Table, ISIC3, CPC, and GSC2 (Contd)

Product	Original name in 1996 I-O Table	ISIC3	CPC	GSC2
Other Food and Feed Products	Outros produtos alimentares inclusive rações		25, except 2311, 239	ofd
Beverages	Bebidas		24	b_t
Natural Yarn	Fios têxteis naturais	17		tex
Natural Textiles	Tecidos naturais	Included in 17		tex
Artificial Yarn	Fios têxteis artificiais	Included in 17		tex
Artificial Textiles	Tecidos artificiais	Included in 17		tex
Other Textiles	Outros produtos têxteis	Included in 17		tex
Apparel	Artigos do vestuário	18		wap
Leather Products	Produtos de couro e calçados	19		lea
Wood and Furniture	Madeira e mobiliário	20, 36.1		lum
Paper and Cellulose	Papel, celulose, papelão e artefatos	21, 22		ppp
Gasoline	Gasolina pura	included in 23		p_c
Combustible Oil	Óleos combustíveis	included in 23		p_c
Other Refined Products	Outros produtos do refino	included in 23		p_c
Basic Petrochemical Products	Produtos petroquímicos básicos	23		p_c
Gas Alcohol	Gasoálcool	(Not available in ISIC; blend of gasoline + alcohol)		p_c
Non Petroleum Chemicals	Elementos químicos não-petroquímicos	24, except 24.12, 24.13, 24.22, 24.23, 24.29		crp
Alcohol	Álcool de cana e de cereais	15.5		crp
Fertilizers	Aubos	24.12		crp
Resins	Resinas	24.13		crp
Paints	Tintas	24.22		crp
Pharmaceutical Products	Produtos farmacêuticos e de perfumaria	24.23		crp
Other Chemical Products	Outros produtos químicos	24.29		crp
Rubber Products	Produtos derivados da borracha	25.1		crp
Plastics	Artigos de plástico	25.2		crp
Non Metallic Mineral Products	Produtos minerais não-metálicos	26		nmm
Basic Iron Products	Produtos siderúrgicos básicos	27, except 27.10		i_s
Steel Processing	Laminados de aço	27.10		i_s
Non-Ferrous Metal Products	Produtos metalúrgicos não-ferrosos	27.2, 27.3		nfm

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Table 11.K.A1 Concordance between the Brazilian 1996 I-O Table, ISIC3, CPC, and GSC2 (Contd)

Product	Original name in 1996 I-O Table	ISIC3	CPC	GSC2
Other Metal Products	Outros produtos metalúrgicos	27.3, 28		fmp
Automobiles	Automóveis, caminhões e ônibus	34		mvh
Other Vehicles and Spare parts	Outros veículos e peças	35		otn
Electronic Equipment	Equipamentos eletrônicos	30, 32		ele
Equipment and Machinery	Fabricação e manutenção de máquinas e equipamentos	29, except 29.21		ome
Tractors and Related Machinery	Tratores e máquinas de terraplanagem	29.21		ome
Electric Materials	Material elétrico	31		ome
Various Industrial Products	Produtos diversos	36.9, 37		omf
Electricity	(Absent; Split of Industrial Services of Public Utility)	401		ely
Gas Services	(Absent; Split of Industrial Services of Public Utility)	402		gdt
Water Services	(Absent; Split of Industrial Services of Public Utility)	41		wtr
Civil Construction	Produtos da construção civil	45		cns
Trade	Margem de comércio	50, 51, 52		trd
Hotels and Meals	Alojamento e alimentação	55		trd
Land Transportation	(Absent; Split of Transport)	60, 63		otp
Water Transportation	(Absent; Split of Transport)	61		wtp
Air Transportation	(Absent; Split of Transport)	62		atp
Communications	Comunicações	64		cmn
Financial Services	Serviços financeiros	65, 67		ofi
Insurance	Seguros	66, except 6603		isr
Health and Education	Saúde e educação mercantis	6603		isr
Building Rentals	Aluguel de imóveis	70.1		obs
Other Services	Outros serviços	70 except 70.1, 71, 72, 73, 90, 91, 92, 93, 99		obs
Services to Firms	Serviços prestados às empresas	74		obs
Non Mercantile Private Services	Serviços privados não-mercantis	95		ros
Public Administration	Administração pública	75		osg
Public Education	Educação pública	80		osg
Public Health	Saúde pública	85		osg
Imputed Rentals	Aluguel imputado	(No correspondence with ISIC, Dwellings)		dwe

Note: Absent - products not present in the original Brazilian 1996 I-O table; split from other sectors.