

L Chile

Alonso González Marentis, Jonas Luckmann, Khalid Siddig

L.1 Introduction

This document describes the procedures followed to develop the 2016's Input-Output Table (IOT) for Chile. We use data for provided by the Central Bank of Chile including tables of supply, intermediate and final use as well as value added in billions of 2016 Chilean Pesos. The original data, which are provided in commodity by industry structure, provides information on 181 commodities and 111 industries. The resulting IOT for Chile, which is converted into a commodity by commodity structure, includes 56 sectors. This contribution aims to update the IOT for Chile in the GTAP database, which dates back to 1996.

L.2 Source Data

The data used to develop the 2016's Input-Output Table (IOT) for Chile is extracted from the input-output data provided by the Central Bank of Chile (Banco Central de Chile, 2020a) for the year 2016 published in 2019. The input-output data provided by the Chilean Central Bank include tables for supply, intermediate use and final use (both segregated into domestic, imported and total use) and value added. The units are billions of 2016 Chilean Pesos (CLP), expressed at consumer, producer and basic prices, of which the valuation at basic and producer prices is used for this contribution. The source tables provide data on 181 commodities and 111 industries. Due to different sector classifications, the source data were transformed to match the GTAP GSC3 commodity by commodity classification as described in the following section. The source data do not provide any information regarding land.

L.3 Data Transformation

Transformation of the IO-tables into the GSC3 GTAP Classification

The first step in transforming the IOT data into the GTAP classification is to develop a mapping between the two classifications. This implies that the 181 commodity/sectors are to be aggregated to match the GTAP 65 sectors. As the two classifications are different, the resulting aggregation includes 56 “new” sectors (Table 8.25 in the Appendix).

To match each sector we follow the GTAP concordance, which is based on CPC v.2.1 and ISIC Rev.4. The latter two classifications are also followed in the original Chilean IOT data. Note that one of these original sectors “Support services for agriculture, livestock and forestry” was included in sector “Business services nec.”, thus moving it from the agricultural category to services to match better the GTAP criteria, as there is no GTAP sector in the first category exactly

encompassing this Chilean sector. The real estate sector, which is an aggregation of the original sectors Real estate services and Housing services, includes the item Dwellings.

The UF and UP arrays are developed in the second step. The UF corresponds to usage of input i in use u , commodity tax excluded; while the UP array corresponds to usage of input i by use u , commodity tax included. For each array, we aggregate the source data from the “original” Chilean sectors to the “new” sectors referred to in Table 8.25 of the Appendix and build the new intermediate use matrices. This is done for domestic and imported production using the respective source-tables.

After obtaining the new intermediate use matrices, we add the final demand per commodity using the respective final use-table from the source data. This includes information on use by household, government, exports, investment and changes in stocks.

The next step involves adding the value added per industry. The source data provided information on labor, capital and production taxes but no information on land. Additionally net taxes on products are included in the “UP” worksheet.

Next, we develop the OP array, which includes the vector of output including non-commodity indirect tax and the MF worksheet containing the imports of commodities excluding import duties. For the OP, we first created a worksheet AI12 according to GTAP guidelines that contains information on other net taxes of production. The information for other net taxes of production is taken from the value added table of the source data. Finally the OP vector is created by adding other net taxes on production to UP.

For the MF array, we first create an array AI27 containing information on import duties and UF total usage. Import duties are taken from source data, total supply table. Then we create the MF array by subtracting import duties to UF total usage. This is only done for imports.

Moving the Tables from Commodity by Industry to Commodity by Commodity Structures

As required by GTAP database, the original data, which is provided in a commodity $\times$ industry structure, should be transformed into a commodity $\times$ commodity structure. To do this, in a first step a make matrix is generated by transposing the supply matrix. From the make matrix we derive a transformation matrix by dividing column entries by commodity outputs. From the intermediate use table we obtain a coefficient matrix by dividing input values of each industry group by the column output. Then we multiply the coefficient matrix by the transformation matrix to obtain the desired squared structure. Once we obtain the coefficients, we multiply them by the respective intermediate use commodity totals.

For more details on the transformation procedure and different alternatives, refer to Eurostat, (2008) and Venkatesh & Pal (2018). The model described above follows the Model B: Product-by-product input-output table based on industry technology assumption, model with transformation coefficients as described in Eurostat (2008).

Checks and adjustments

The balance condition was not satisfied for some sectors. However, in most cases the imbalances were very small except for the trade sector, which showed large imbalances and hence, required further processing. Regarding the latter and for the domestic use, we used the trade margins for the original subsectors 132-134 (see mapping in Table 8.25) while maintaining the final use data for the original subsectors 135-136. For the imported use, we do the same and set the import values for sector 132-134 to zero, as the current values given in the source data are actually payments to domestic traders for handling imports. This is shown in tables 3 and 4 of the source data (national and imported supply) as well as by table 8 and 10 (final national and imported use at consumer-prices), which all show that all market margins received by subsectors 132-134 are going to the domestic trade sector and none to imported trade services.

Other adjustments include a small negative value of investments (3% of the total use-value) in the new transport sector (36), which we set to zero. The row total is kept constant by reducing stock changes by the same value. Furthermore, capital use by oil and gas sectors was negative. Following the GTAP guidelines reported in Huff et al. (2000), we compared the data from previous IOTs of the years 2008 and 2013 (Banco Central de Chile, 2020b) and found in these years that there were positive capital returns, confirming that the negative values in 2016 were an unusual case. We determine the historical level of capital earnings using the ratio of capital earnings to all other costs from previous years. With this ratio, we obtain our imputed value, which then we divide proportionally between the oil and gas sectors, since they were aggregated in one industry in the original data. To keep the total sales consistent with the total costs, we adjusted stock-changes accordingly.

Furthermore, there was a large tax rate related to the domestic petroleum, coal products sector used in water transport at 135.1%. We believe this is an artefact caused by the data-transformation, as the values are pretty small. In this case, we reduced the UP value considering a more realistic tax-value (29.02%, which corresponds to the average rate other sectors pay) while keeping the balance by adjusting stock-changes.

Lastly, re-exports were taken out directly of the imports of commodities as this information was available on the sectors re-exporting commodities. As final check we calculated the difference between UP and UF to get a matrix of commodity taxes, which we used to confirm the balance condition holds.

References

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Appendix

Table 8.25: Mapping from Chilean sectors to GTAP

Chile 2016 IOT Original Sectors		GTAP 10 Data Base Sectors		Chile 2016 IOT New Sectors	
No.	Description	No.	Code Description	No.	Code Description
2	Corn	1	pdr Paddy rice	1	pdr_gro Paddy rice and
3	Other cereals	3	gro Cereal grains nec		Cereal grains nec
1	Wheat	2	wht Wheat	2	wht Wheat
4	Tubers and legumes	4	v_f Vegetables, fruit, nuts	3	v_f_osd Vegetables, fruit, nuts and
6	Vegetables and mushrooms				Oil seeds
7	Wine grape and pisquera				
8	Table grapes				
9	Apples				
10	Peaches and other carozos				
11	Avocado				
12	Kiwis and other tropical fruits				
13	Blueberries and other berries				
14	Other fruits				
		5	osd Oil seeds		
		6	c_b Sugar cane, sugar beet	4	c_b_sgr Sugar cane, sugar beet and
57	Sugar	24	sgr Sugar		Sugar
		7	pfb Plant-based fibers	5	pfb_ocr Plant-based fibers and
5	Forage and other crops for industrial use	8	ocr Crops nec		Crops nec
15	Cattle	9	ctl Bovine cattle, sheep and goats, horses	6	ctl_oap_wol Bovine cattle, sheep and goats, horses and
		10	oap Animal products nec		Animal products nec and
16	Pigs				Wool, silk-worm cocoons
17	Poultry				
19	Eggs				
20	Other animals and livestock products				
		12	wol Wool, silk-worm cocoons		
18	Raw milk	11	rmk Raw milk	7	rmk Raw milk
22	Conifers	13	frs Forestry	8	frs Forestry
23	Eucalyptus				
24	Firewood and other forestry products				

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Chile 2016 IOT Original Sectors			GTAP 10 Data Base Sectors			Chile 2016 IOT New Sectors		
No.	Description	No.	Code	Description	No.	Code	Description	
25	Salmon and trout farming	14	fish	Fishing	9	fish	Fishing	
26	Other fish, shellfish and seaweed							
27	Coal	15	coa	Coal	10	coa	Coal	
28	Raw oil	16	oil	Oil	11	oil	Oil	
29	Natural gas	17	gas	Gas	12	gas	Gas	
31	Molybdenum minerals and concentrates	18	omt	Other Extraction (formerly omn Minerals nec)	13	omt_nfm	Other Extraction and Metals nec	
32	Iron							
35	Non-metallic minerals							
36	Mining Exploration Services							
30	Copper	38	nfm	Metals nec				
33	Gold							
34	Silver and other non-ferrous metalifers							
37	Beef	19	cmt	Bovine meat products	14	cmt	Bovine meat products	
38	Pig meat	20	omt	Meat products nec	15	omt	Meat products nec	
39	Bird meat							
40	Cecinas and other meats							
47	Other oils and fats	21	vol	Vegetable oils and fats	16	vol	Vegetable oils and fats	
48	Processed milk	22	mil	Dairy products	17	mil	Dairy products	
49	Other dairy products							
51	Rice and other milling products	23	pcr	Processed rice	18	pcr_ofd	Processed rice and	
41	Fish flour	25	ofd	Food products nec			Food products nec	
42	Fish oil							
43	Chilled and frozen salmon and trout							
44	Other chilled or frozen fish							
45	Canned fish and seafood							
46	Canned fruits and vegetables							
50	Flour and wheat by-products							
52	Food for fishes							
53	Bird food							
54	Other animal feed							
55	Bread and other bakery products							

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Chile 2016 IOT Original Sectors			GTAP 10 Data Base Sectors			Chile 2016 IOT New Sectors		
No.	Description	No.	Code	Description	No.	Code	Description	
56	Noodles and pasta							
58	Other food products							
59	Piscos and other liquors	26	b_t	Beverages and tobacco products	19	b_t	Beverages and tobacco products	
60	Wines							
61	Beers							
62	Non-alcoholic beverages							
63	Tobacco products							
64	Textile products	27	tex	Textiles	20	tex	Textiles	
65	Clothing	28	wap	Wearing apparel	21	wap	Wearing apparel	
66	Leather and leather products	29	lea	Leather products	22	lea	Leather products	
67	Footwear							
68	Sawn, brushed and splintered wood	30	lum	Wood products	23	lum	Wood products	
69	Boards and pressed wood							
70	Other wood products							
71	Cellulose							
72	News paper	31	ppp	Paper products, publishing	24	ppp	Paper products, publishing	
73	Paper and cardboard containers							
74	Tissue products							
75	Other papers and cartons							
76	Books, newspapers, magazines and other print							
77	Diesel	32	p_c	Petroleum, coal products	25	p_c	Petroleum, coal products	
78	Gasoline							
79	Kerosene							
80	Combustible oils							
81	Liquefied gas and other fuels							
82	Fertilizers and pesticides	33	chm	Chemical products	26	chm	Chemical products	
83	Molybdenum oxide							
84	Other basic chemicals							
85	Paints and varnishes							
88	Explosives and detonators							
89	Other chemical products							
86	Pharmaceutical products	34	bph	Basic pharmaceutical products	27	bph	Basic pharmaceutical products	
87	Toiletries and cosmetics							

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Chile 2016 IOT Original Sectors			GTAP 10 Data Base Sectors			Chile 2016 IOT New Sectors		
No.	Description	No.	Code	Description	No.	Code	Description	
90	Rubber products	35	rrp	Rubber and plastic products	28	rrp	Rubber and plastic products	
91	Plastic products							
92	Glass bottles	36	mmm	Mineral products nec	29	mmm	Mineral products nec	
93	Other glass products							
94	Cement, lime and plaster							
95	Ready-mixed concrete							
96	Asphalt mixes							
97	Other non-metallic mineral products							
99	Iron and steel products	37	i_s	Ferrous metals	30	i_s	Ferrous metals	
98	Ferromolibdene and other basic steel products	39	fmp	Metal products	31	fmp	Metal products	
100	Commodities of non-ferrous metals							
101	Metallic products for structural use							
102	Other metal products							
104	Computers and their components	40	ele	Computer, electronic and optical products	32	ele	Computer, electronic and optical products	
105	Other office machinery							
106	TVs							
107	Mobile phones							
108	Machines and appliances for domestic use	41	eeq	Electrical equipment	33	eeq	Electrical equipment	
103	Machinery for industrial use	42	ome	Machinery and equipment nec	34	ome	Machinery and equipment nec	
109	Other machinery and electrical equipment							
110	Cars	43	mvh	Motor vehicles and parts	35	mvh	Motor vehicles and parts	
111	Buses							
112	Other motor vehicles							
113	Maritime and air transport equipment	44	otn	Transport equipment nec	36	otn	Transport equipment nec	
114	Other land transport equipment and its parts and pieces							
115	Furniture	45	omf	Manufactures nec	37	omf	Manufactures nec	

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Chile 2016 IOT Original Sectors			GTAP 10 Data Base Sectors			Chile 2016 IOT New Sectors		
No.	Description	No.	Code	Description	No.	Code	Description	
116	Other manufactured products and waste							
117	Repair and installation of machinery and equipment, except transport							
118	Maintenance and repair services of transport equipment							
119	Energy and electrical power	46	ely	Electricity	38	ely	Electricity	
120	Electricity transmission services							
121	Electricity distribution services							
122	Gas distributed by pipelines	47	gdt	Gas manufacture, distribution	39	gdt	Gas manufacture, distribution	
123	Water	48	wtr	Water	40	wtr	Water	
124	Waste disposal and recycling services							
125	Residential buildings	49	cns	Construction	41	cns	Construction	
126	Non-residential buildings							
127	Roadworks							
128	Works of electric power projects							
129	Mining works							
130	Other engineering works							
131	Construction services							
132	Commercial automotive brokerage services	50	trd	Trade	42	trd	Trade	
133	Commercial Wholesale Brokerage Services							
134	Commercial retail intermediation services							
135	Commercial services in exchange for a fee or contract							
136	Maintenance and repair services of motor vehicles							
137	Hotel services	51	afs	Accommodation, Food and service activities	43	afs	Accommodation, Food and service activities	
138	Restaurant services							
139	Railway transport services	52	otp	Transport nec	44	otp	Transport nec	Continued ...

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Chile 2016 IOT Original Sectors			GTAP 10 Data Base Sectors			Chile 2016 IOT New Sectors		
No.	Description	No.	Code	Description	No.	Code	Description	
140	Passenger road transport services							
141	Freight road transport services							
142	Pipeline transportation (gas pipelines and pipelines)							
143	Maritime transport services	53	wtp	Water transport	45	wtp	Water transport	
144	Embarkation rental services							
145	Passenger air transport services	54	atp	Air transport	46	atp	Air transport	
146	Air transport services of cargo and rental of aircrafts							
147	Warehousing and storage	55	whs	Warehousing and support activities	47	whs	Warehousing and support activities	
148	Road, parking and bus station services							
149	Port and airport services							
150	Other transport related							
151	Mail and courier service	56	cmn	Communication	48	cmn	Communication	
152	Mobile phone services							
153	Landline and long distance telephone services							
154	Other telephone services							
155	Computer Services							
156	Editing, production and dissemination services							
157	Financial intermediation services	57	ofi	Financial services nec	49	ofi	Financial services nec	
158	Financial intermediation services indirectly measured (SIFMI)							
161	Auxiliary financial intermediation services							
159	Life insurance services	58	ins	Insurance (formerly isr)	50	ins	Insurance (formerly isr)	
160	General Insurance Services							
162	Real estate services	59	rsa	Real estate activities	51	rsa.dwe	Real estate activities and dwellings	

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Chile 2016 IOT Original Sectors			GTAP 10 Data Base Sectors			Chile 2016 IOT New Sectors		
No.	Description	No.	Code	Description	No.	Code	Description	
163	Housing services	65	dwe	Dwellings				
164	Legal and accounting services	60	obs	Business services nec	52	obs	Business services nec	
165	Architecture and engineering services							
166	Advertising and market research services							
167	Investigation and development							
168	Other professional, technical and business services							
21	Support services for agriculture, livestock and forestry							
169	Rental services without operators							
170	Personnel supply, cleaning, security and other support services							
177	Recreation Services	61	ros	Recreational and other services	53	ros	Recreational and other services	
178	Repair of household items							
179	Domestic service							
180	Other personal services							
181	Other goods and services							
171	Public Administration Services	62	osg	Public Administration and defense	54	osg	Public Administration and defense	
172	Public education services	63	edu	Education	55	edu	Education	
173	Private education services							
174	Public health services	64	hht	Human health and social work activities	56	hht	Human health and social work activities	
175	Private health services							
176	Social and association services							