

# *Venezuela*

*Roberto Ferrer P., Jorge Hernandez, Francesco Leone, and Agustin Velazquez<sup>1</sup>*

## **1. Introduction**

This chapter documents the process by which the Venezuelan Input-Output Table (VIOT) was put together for the purpose of updating the database available to the Global Trade Analysis Project (GTAP).<sup>2</sup> The previous Venezuelan table available to GTAP was the 1997 database assembled by members of Central Bank of Venezuela (CBV). This new table built for the year 2007 is the third of such efforts.

The CBV as the leading institution in charge of compiling economic statistics in Venezuela, has assumed this task as its own. More specifically, this is an initiative of the Bureau of Economic Research (of the Vice-presidency of Studies) supported by the Macroeconomic Accounts Division<sup>3</sup> (of the Statistical Office<sup>4</sup>), both at CBV.

This chapter is divided in five sections. The next section gives reference information and a description of the source tables that constitute the basis of this update. Section three describes the different treatments that were applied to the source tables in order to comply with GTAP requirements. Section four comments on the sectoral classification of the data sources and its mapping to the GTAP classification. Finally, we end with some remarks in section five.

## **2. The Source Data**

The basis for the VIOT are a series of detailed statistical tables available for Venezuela in the year 2007. These tables were constructed by the CBV within the II Program for Macroeconomic Data Update<sup>5</sup> whose goals were updating the base year of economic statistics and adapting Venezuela's

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<sup>1</sup> Roberto Ferrer P. and Francesco Leone are Economic Analysts at the Central Bank of Venezuela, Jorge Hernandez and Agustin Velazquez are Senior and former Senior Research Economists at the Central Bank of Venezuela, respectively.

<sup>2</sup> This document is heavily based on Ferrer et al. (2012). Special thanks to Luis Vargas and the team at the Macroeconomic Accounts Division for their support. Please address questions regarding the content of this document to Roberto Ferrer at [rferrer@bcv.org.ve](mailto:rferrer@bcv.org.ve) or Francesco Leone at [frleone@bcv.org.ve](mailto:frleone@bcv.org.ve). The views expressed here are the authors' and do not involve the Central Bank of Venezuela. Any errors are solely the authors' responsibility.

<sup>3</sup> Translated from "Departamento de Cuentas Macroeconomicas".

<sup>4</sup> Translated from "Gerencia de Estadísticas Economicas".

<sup>5</sup> Officially known as Programa de Actualización de las Estimaciones Macroeconomicas II (PRACEM II).

national accounts methodology to those prescribed by the 2008 revision of the United Nations System of National Accounts (UN-SNA).

Below, we mention the tables that are concerned with VIOT updating:

- domestic use table valued at basic prices
- imported use table valued at CIF prices
- import duties table
- domestic and imported value-added tax tables
- domestic and imported other taxes on products tables
- domestic and imported subsidies on products tables<sup>6</sup>

The general structure of the source tables is that of the UN-SNA and each of them has a sectoral detail of 266 commodities and 118 activities. All the tables are originally expressed in thousands of Bolivares Fuertes (Bs.F.) and have an industry by commodity format.

Given the similarities between the present procedure and the one followed in the construction of the base-1997 VIOT, we should highlight the main differences: 1) Taxes and subsidies decomposed in their domestic and imported parts are now available; therefore, any estimation procedure with regard to these figures were deemed unnecessary. 2) The financial intermediation services indirectly measured (FISIM) were allocated as intermediate and final consumption to users, in concordance with the methodology of the System of National Accounts.

Other necessary treatments similar to those employed in the construction of the base-year 1997 VIOT will be detailed in the upcoming sections.

Table 1 shows a simplified version of our original domestic use table. The features we would like to point out are the activity-product format, the presence of mixed income as a component of the value added and the disaggregation of the different demand components (i.e. exports, final consumption and gross capital formation). Even though distribution margins are not visible due to aggregation of commodities, they are assigned to the categories of transport, wholesale and retail services. This procedure differs from the allocation of margins to the commodities to which they could be associated with. (Keep in mind that our original use table is valued at basic prices.)

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<sup>6</sup> Because GTAP requires only taxes on products net of subsidies (on products); the *value-added tax*, *other taxes on products* and *subsidies on products* tables were all consolidated to a *net taxes on products* table.

### **3. *Applied Treatments***

A number of adaptations were made in order to comply to GTAP requirements. We shall proceed to list them and present a detailed explanation of every one of them:

1. source table re-arrangements
2. direct purchases
3. negative surpluses
4. re-exports
5. transform the industry by commodity format to the commodity by commodity one

Improvements in the source tables for this new base-year 2007, allow us to bypass a couple of treatments that were necessary in our previous, base-year 1997, contribution. Namely: domestic-imported decomposition for the net taxes on products table and financial intermediation services indirectly measured adjustments

#### **3.1 *Source Table Re-arrangements***

The first treatment deals with re-ordering the *domestic use table* considering that we are to submit the VIOT following the new unified format. To fulfill this task it results useful to take a look at how the new format relates to the old format (see Chapter 3 of Huff et al. (2000) and it's corresponding Appendix B).

On one hand, to comply with the GTAP requirement we have to add up and subtract the different columns that are necessary to get the six demand components; namely, intermediate consumption, investment, household consumption, government consumption, change in stocks, and exports. This is straightforward: intermediate consumption remains the same, investment is equal to gross fixed capital formation, household consumption is equal to final consumption of households plus final consumption of non-private institutions serving households (NPISH), government consumption is equal to collective consumption of public administration and individual consumption of public administration, change in stocks must be added with acquisition less disposals of valuables, and exports consist in exports of commodities and services.

On the other hand, we must also get rid of the gross mixed income category. This we do by adding it to the salaries of the economy. Table 2 shows the re-arranged matrix.

All other source tables must be treated in this way. The resulting tables look just like the one in Table 2, but have only commodities as rows.

Once the previous treatment is made we are ready to compile a table very similar to the GTAP Matrix of pre-commodity-tax usage values (UF), the first of the two tables GTAP requires (again, see Appendix B, *ibid.*). This table format can be seen in Table 3. Note, however, that the data in the table does not correspond exactly to this step of the process. It includes other treatments that

we have not talked about as yet. Neither the domestically produced commodities nor imports include commodity taxes, but imported commodities do include import duties. The latter is not clear from Huff et al. (2000) but it can be inferred from GTAP's table formats shown in Figure 1 and available at their webpage.

### **3.2 *Direct Purchases***

According to the UN-SNA 1993 direct purchases are appending accounts because originally, they are not integrated to the industry/commodity framework (in table 1 they are considered as adjustments). To maintain the overall consistency of the framework, the value of direct purchases has been reallocated to the household demand section of the VIOT. The changes are:

Direct purchases by non-residents in the domestic market have been subtracted from household consumption and they have been added to exports.

Foreign direct purchases by residents have been added to households' imported consumption.

Unlike our previous contribution where we used only one product to do these adjustments (i.e. non-regular land transport services for passengers), thanks to improvements in data collection, we now have a vector of 61 commodities that correspond to direct purchases. Table 3 has this treatment.

### **3.3 *Negative Values for Capital Usage***

Even though negative values for capital usage can be valid, reflecting operating losses, GTAP requires they be eliminated. We have adjusted these values upwards to reflect a reasonable positive return on capital and adjusting production taxes downward to simulate an explicit or implicit subsidy. This is done following GTAP recommendations found in Huff et al. (2000).

To estimate the reasonable positive return on capital we observe the temporal (1997-2006) cost structure (labor + capital + production taxes + intermediate consumption) of each of the problematic industries. We take the geometric mean of the three positive capital usage proportions closest to the reference year 2007, assuming these should be the most representative of the 2007 economy. Then, the negative value of capital usage is adjusted so it represents this reasonable proportion within the total cost structure (production taxes are adjusted by this same amount). Table 4 shows relevant information.

The procedure was applied only to those industries that would persist with negative values, even after some appropriate aggregation. Two sets of industries were treated by simple aggregation; see Table 5.

### **3.4 *Re-exports***

Re-exports are imported commodities that do not constitute intermediate consumption, final consumption, nor gross capital formation. Rather, they are destined to the exports' category. GTAP prohibits these registers in their input-output matrices.

Venezuela presents a small amount of re-exports for the product 053 Chemical and fertilizer minerals<sup>5</sup>. They are eliminated from the database, along with the import duties they generate, and no further adjustment to the database is made. Total re-exports only make up for approximately 0.00014% of total imports.

### **3.5 *Commodity by Commodity Format Transformation***

Given the preference GTAP has for commodity by commodity tables we must find a way to transform our commodity by activity tables to the desired format. We opted for the widely known mathematical method presented in Chapter IV, Section E of UN (1999), based on the industry technology assumption.

Briefly, this method assumes that a given industry (activity) produces principal and secondary products using the same technology. For example, an industry A produces its principal product A and a secondary product B. It produces both products using exactly the same combination of inputs, no matter how different these products turn out to be. Product B of course is also produced elsewhere (as a principal product, maybe) with another technology (input combination). This in turn means that we can build some kind of average production function for each product. Based on the shares of production that all industries have over a particular commodity, a weighed production function can be built for each product. This production function in essence tells us how much of *other commodities* is needed (aside from value added and taxes) to produce a particular commodity. Combine this commodity by commodity technical coefficient matrix with the economy's make matrix and we get the symmetric input-output table we were looking for.

As we shall see in the next section, this method is not free of practical problems. Details and reasons for using it can be reviewed in the reference provided.

## **4. *Mapping to the GTAP Classification***

The original source tables have a sectoral classification of 266 commodities and 118 activities. We applied a mathematical treatment to go from commodity by activity tables to commodity by commodity tables, resulting input-output tables that are 266 commodities by 266 commodities. The next step consisted in creating a mapping from those 266 products to the 57 products of the GTAP sectoral classification. The mapping can be found in Table 6 in Appendix A.

We should highlight that source tables contain many commodities relative to the number of activities, which means there are activities that produce multiple products. If one of such activities is the sole producer of those products then the resulting commodities in the symmetric table will all

have the same exact production function. Consequently, given the same industry- technology assumption, going from a commodity by activity arrangement to a commodity by commodity structure can give rise to unusual production functions.

Although this new contribution doesn't suffer from extremely unusual production functions, it is important to keep this in mind. The gist is that multiple products produced almost entirely by the same activity, which are not later aggregated within the GTAP classification, are potentially problematic. A clear example can be examined in Ferrer et al. (2012).

Here too, we have a similar situation, and because no extra information is available to adjust the data, we decided to aggregate these potentially problematic sectors. Considering the relationship between activities and commodities in the original source tables, the corresponding production shares and expert opinions, we derive a concordance table which was employed to aggregate our 57-sector commodity by commodity matrices to 49 final sectors. Table 7 in Appendix B, presents this mapping.

## **5. *Final Remarks***

This work represents the third (known) effort to update Venezuela's Input-Output table for GTAP, in a 30-year span. With respect to the 1997 base-year contribution, the process of assembling the 2007 base-year GTAP matrix was straightforward. Data collection and processing was improved for this new base-year, allowing us to derive a final matrix that relies much less on ad-hoc assumptions. Specifically, we were able to avoid: decomposition of taxes and subsidies into domestic and imported parts; arbitrary allocation of FISIM among its users; and adjusting direct purchases with only one product.

Hopefully, further improvements can be made in the future as the Macroeconomic Accounts Division at CBV advances towards more comprehensive and reliable estimates of our national accounts. This work should not be of interest only to future modelers, but also to CBV's Statistical Office staff for the purpose of statistical compilation.

## ***References***

- Huff et al., *Contributing Input-Output Tables to the GTAP Data Base*. GTAP Technical Paper No.1, Release 4.2, January 2000.
- Ferrer et al. *Regional Input-Output Data: Venezuela* (Chapter 7.L) in Narayanan, G., Badri, Angel Aguiar and Robert McDougall, Eds. 2012. *Global Trade, Assistance, and Production: The GTAP 8 Data Base*. Center for Global Trade Analysis, Purdue University.
- United Nations, *Handbook of Input-Output Table Compilation and Analysis*, Studies in Methods, Handbook of National Accounting, Series F, No.74. New York, 1999.

Figure 1: GTAP I-O Table Format

		<b>No Tax UF</b>			<b>WithTax UP</b>		
		production			production		
domestic	Value of domestic commodities by source and use (intermediate)	Final			domestic	Value of domestic commodities by source and use (intermediate)	Final
imported	Value of imported commodities by source and use (intermediate)	Final	- Import duties	MF	imported	Value of imported commodities by source and use (intermediate)	Final
primary	Value added				primary	Value added	
						+ Indirect taxes	
						OP	

Source: <https://www.gtap.agecon.purdue.edu/databases/contribute/altviewformat.asp>

**Table 1: Simplified Initial Domestic Use Table, 2007 (Thousands of MM of (current) Bs.F.)**

	Act			Exp				FC					GCF			Aq LDV	Tot D (p)	
	IC (b)	A1	A2	A3	XC	XS	X	Dom FD	IC (p)	C HH	C NPISH	C ColP	C IndP	CP	GFCF			Ch Inv
C1	15.3	2.4	11.8	1	0.1	-	0.1	26.4	15.3	7.5	-	-	0.1	0.1	3.1	0.5	-	26.6
C2	33.2	4.1	26.7	2.5	107.1	-	107.1	32.7	33.2	0	-	-	-	-	-	-0.5	-	139.8
C3	97.3	8.2	44.9	44.1	43.7	0.1	43.7	174.1	97.3	49.8	0	-	2.5	2.5	10.9	13.7	-	217.8
C4	125	11.4	25.3	88.4	0	2.7	2.7	419.6	125	146.7	2.6	41.2	32.9	74.1	68.3	2.9	-	422.3
Uses NP (b)	270.7	26.1	108.7	136	150.9	2.7	153.6	652.8	270.7	203.9	2.6	41.2	35.5	76.7	82.3	16.7	-	806.5
Adj	-	-	-	-	-	1.4	1.4	1.2	-	1.2	-	-	-	-	-	-	-	2.6
DPA Res	-	-	-	-	-	-	-	2.6	-	2.6	-	-	-	-	-	-	-	2.6
DPA Nres	-	-	-	-	-	1.4	1.4	-1.4	-	-1.4	-	-	-	-	-	-	-	-
<b>Sub-tot</b>	270.7	26.1	108.7	136	150.9	4.1	155	654	270.7	205.1	2.6	41.2	35.5	76.7	82.3	16.7	-	809
M (CIF)	60.3	4.6	34.7	20.9	0	-	0	146.2	60.3	27.8	-	-	6.4	6.4	37.7	14	-	146.2
<b>Tot U (b)</b>	331	30.7	143.4	156.9	150.9	4.1	155	800.3	331	232.9	2.6	41.2	41.9	83.1	120	30.6	-	955.3
M dut	3	0.2	1.8	1	-	-	-	8.5	3	2.9	-	-	-	-	2.6	0	-	8.5
C tx	1.4	0.1	0.3	1	0.1	-	0.1	3.6	1.4	2.2	-	-	-	-	-	-	-	3.7
C sub	-8.5	-1	-2.3	-5.3	0	-	0	-12.4	-8.5	-3.9	-	-	-	-	-	-	-	-12.4
VAT	8.3	1.5	1.7	5.1	-	-	-	19.9	8.3	6.2	0	-	0.1	0.1	4.7	0.7	-	19.9
<b>Tot U (p)</b>	335.2	31.5	144.9	158.8	151	4.1	155.1	819.8	335.2	240.2	2.6	41.2	42	83.2	127.3	31.3	-	974.9
<b>GVA (b)</b>	471.4	135.1	67.9	268.3														
<b>Comp E</b>	174.6	12.3	24.5	137.9														
Wag Sal	144.1	9.3	20.1	114.7														
Soc C Emp	30.5	3	4.4	23.1														
<b>O Tx Pr</b>	7.1	1	1.8	4.3														
<b>O Sub Pr (-)</b>	-1.9	-0.6	-0.3	-1.1														
<b>Op Sur G</b>	246.4	113.9	39.7	92.8														
<b>MI G</b>	45.2	8.4	2.3	34.5														
<b>Occup</b>	99.9	9.9	9.8	80.2														
Emp	95.4	8.4	9.6	77.4														
Self Emp	1.6	1.3	0.1	0.2														
Vol + Int + Oth W	2.8	0.2	0.1	2.5														
<b>Prod (b)</b>	806.6	166.6	212.8	427.1														

Source: Central Bank of Venezuela. **Row acronyms.** C1-C4: Commodities 1-4, Uses NP (b): Uses of national production at basic prices, Adj: Adjustments, DPA Res: Direct purchases abroad by residents, DPA Nres: Direct purchases abroad by non-residents, Sub-tot: Sub-totals, M (CIF): CIF imports, Tot U (b): Total uses at basic prices, M dut: Taxes on imports, C tx: Other taxes on products, C sub: Subsidies on products, VAT: Value added tax (vat), Tot U (p): Total uses at purchaser's prices, GVA (b): Gross value added at basic prices, Comp E: Compensation of employees, Wag Sal: Wages and salaries, Soc C Emp: Social contributions of employers, O Tx Pr: Other taxes on production, O Sub Pr (-): Other subsidies on production, Op Sur G: Operating surplus, gross, MI G: Mixed income, gross, Occup: Occupancy, Emp: Employees, Self Emp: Self employed, Vol: Volunteers, Int: Interns, Oth W: Other workers, Prod (b): Production at basic prices. **Column acronyms.** IC (b): Intermediate consumption at basic prices, A1-A3: Activities 1-3, XC: Exports goods, XS: Exports services, X: Exports total, Dom FD: Domestic final demand, IC (p): Intermediate consumption at purchaser's prices, C HH: Consumption households, C NPISH: Consumption non-private institutions serving households, C ColP: Public adm. collective consumption, C IndP: Public adm. individual consumption, CP: Public adm. total consumption, GFCF: Gross fixed capital formation, Ch Inv: Changes in inventories, Aq LDV: Acquisition less disposals of valuables, Tot D (p): Total demand at purchaser's prices.



**Table 2:** Simplified Re-arranged Domestic Use Table, 2007 (Thousands of MM of (current) Bs.F.)

	AI01		AI03	AI05	AI07	AI09	AI11	
	A1	A2	A3	FGCF	C HH + C NPISH	CP	Ch Inv + Aq LDV	X
C1	2.4	11.8	1	3.1	7.5	0.1	0.5	0.1
C2	4.1	26.7	2.5	-	0	-	-0.5	107
C3	8.2	44.9	44.1	10.9	49.8	2.5	13.7	43.7
C4	11.4	25.3	88.4	68.3	149.3	74.1	2.9	2.7
Uses NP (b)	26.1	109	136	82.3	206.5	76.7	16.7	154
Adj	-	-	-	-	1.2	-	-	1.4
DPA Res	-	-	-	-	2.6	-	-	-
DPA Nres	-	-	-	-	-1.4	-	-	1.4
Sub-tot	26.1	109	136	82.3	207.7	76.7	16.7	155
M (CIF)	4.6	34.7	20.9	37.7	27.8	6.4	14	0
Tot U (b)	30.7	143	156.9	120	235.5	83.1	30.6	155
M dut	0.2	1.8	1	2.6	2.9	-	0	-
C tx	0.1	0.3	1	-	2.2	-	-	0.1
C sub	-1	-2.3	-5.3	-	-3.9	-	-	0
VAT	1.5	1.7	5.1	4.7	6.2	0.1	0.7	-
Tot U (p)	31.5	145	158.8	127.3	242.8	83.2	31.3	155
GVA (b)	135	67.9	268.3					
<b>AI13</b>	<b>Comp E + MI G</b>	20.7	26.7	172.4				
	<b>N O Tx Pr</b>	0.4	1.5	3.2				
<b>AI14</b>	<b>Op Sur G</b>	114	39.7	92.8				
	Prod (b)	167	213	427.1				

Source: Central Bank of Venezuela.

**Row acronyms.** C1-C4: Commodities 1-4, Uses NP (b): Uses of national production at basic prices, Adj: Adjustments, DPA Res: Direct purchases abroad by residents, DPA Nres: Direct purchases abroad by non-residents, Sub-tot: Sub-totals, M (CIF): CIF imports, Tot U (b): Total uses at basic prices, M dut: Import duties, C tx: Other taxes on products, C sub: Subsidies on products, VAT: Value added tax (vat), Tot U (p): Total uses at purchaser's prices, GVA (b): Gross value added at basic prices, Comp E + MI G: Compensation of employees + mixed income, gross, N O Tx Pr: Net (of subsidies) Other taxes on production, Op Sur G: Operating surplus, gross, Prod (b): Production at basic prices.

**Column acronyms.** A1-A3: Activities 1-3, FGCF: Fixed gross capital formation, C HH + C NPISH: Consumption households + Consumption NPISH, CP: Public adm. total consumption, Ch Inv + Aq LDV: Changes in inventories + Acquisition less disposals of valuables, X: Exports total

**Table 3:** Preliminary Table similar to GTAP Matrix of Pre-commodity-tax Usage Values (UF), 2007 (Thousands of MM of (current) Bs.F.)

	A1	A2	A3	FGCF	C HH + C NPISH	CP	Ch Inv + Aq LDV	X
<b>Domestic</b>	<b>AI01</b>			<b>AI03</b>	<b>AI05</b>	<b>AI07</b>	<b>AI09</b>	<b>AI11</b>
C1	2.4	11.8	1	3.1	7.5	0.1	0.5	0.1
C2	4.1	26.7	2.5	-	0	-	-0.5	106.8
C3	8.2	44.9	44.1	10.9	49.1	2.5	13.7	43.8
C4	11.4	25.3	88.4	68.3	148.8	74.1	2.9	4.1
<b>Imported</b>	<b>AI02</b>			<b>AI04</b>	<b>AI06</b>	<b>AI08</b>	<b>AI10</b>	<b>Re-exp</b>
C1	0.3	2.2	0	0.2	0.7	-	-0.1	
C2	0.2	0.5	0.3	-	-	-	0	
C3	3.5	32.8	16.4	39.5	27.2	1	14	
C4	0.8	0.9	5.2	0.7	2.9	5.4	0	
<b>AI13</b>	<b>Comp E + MI G</b>			21.0	32.9	137		
<b>AI14</b>	<b>Op Sur G</b>			61.0	51.9	74.6		
	<b>N O Tx Pr</b>			0.2	0.7	2.8		
<b>AI15</b>	<b>Nat R</b>							
M dut (*)								
C tx	0.1	0.3	1	-	2.2	-	-	0.1
C sub	-1.0	-2.3	-5.3	-	-3.9	-	-	0
VAT 1.5	1.5	1.7	5.1	4.7	14.2	0.1	0.7	-
Adj	-	-	-	-	-	-	-	-
DPA Res	-	-	-	-	-	-	-	-
DPA Nres	-	-	-	-	-	-	-	-
Tot U (b)	30.9	145	158	127.3	248.5	83.2	30.6	154.9
Tot U (p)	31.5	145	159	127.3	248.5	83.2	31.3	155

Source: Central Bank of Venezuela

(\*) Import duties (M dut) are blank because they are assigned to the different imported commodities.

**Row acronyms.** C1-C4: Commodities 1-4, Comp E + MI G: Compensation of employees + mixed income, gross, Op Sur G: Operating surplus, gross, N O Tx Pr: Net (of subsidies) Other taxes on production, Nat R: Natural resources, M dut: Import duties, C tx: Other taxes on products, C sub: Subsidies on products, VAT: Value added tax (vat), Adj: Adjustments, DPA Res: Direct purchases abroad by residents, DPA Nres: Direct purchases abroad by non-residents, Tot U (b): Total uses at basic prices, Tot U (p): Total uses at purchaser's prices.

**Column acronyms.** A1-A3: Activities 1-3, FGCF: Fixed gross capital formation, C HH + C NPISH: Consumption households + Consumption NPISH, CP: Public adm. total consumption, Ch Inv + Aq LDV: Changes in inventories + Acquisition less disposals of valuables, X: Exports total

**Table 4:** Adjustments made to negative capital usage with Reasonable Proportions (MM of 2007 Bs.F.)

	<b>Industries</b>		
	A59	A74	A75
<b>Total costs</b>	8161	7685	933
<b>Reasonable weight of capital usage in cost structure</b>	18%	25%	2%
<b>New capital usage(1*2)</b>	1481	1948	21
<b>Old capital usage</b>	-166	-251	-7
<b>Net taxes on production (6-7)</b>	-1620	-2328	-28
<b>Old taxes on production</b>	27	-130	1
<b>Adjustments (3-4)</b>	1647	2199	29

Source: Central Bank of Venezuela and own calculations. (Rounding errors may be present.) A59: Manufacture of basic precious and other non-ferrous metals, A74: Electric power generation, transmission and distribution; and Manufacture of gas; distribution of gaseous fuels through mains, A75: Water supply.

**Table 5:** Adjustments Made to Negative Capital Usage by Simple Aggregation (MM of 2007 Bs.F.)

<b>Industries</b>	<b>Capital usage</b>
<b>A42 Manufacture of coke oven products</b>	-15
<b>A43 Manufacture of refined petroleum products</b>	13,262
<b>(A42 + A43)</b>	<b>13,248</b>
<b>A96 Other financial intermediation</b>	-197
<b>A95 Monetary intermediation</b>	5,266
<b>(A96 + A95)</b>	<b>5,069</b>

Source: Central Bank of Venezuela and own calculations. (Rounding errors may be present.)

## *Appendix A*

**Table 6: Source to GTAP Sectoral Classification Mapping (57 products)**

<b>Code</b>	<b>Description</b>	<b>GTAP Num. Code</b>	<b>GTAP Sec. Code</b>
1	Maize	3	gro
2	Sorghum	3	gro
3	Other cereals	3	gro
4	Black beans	3	gro
5	Other dried leguminous and oleaginous fruit	3	gro
6	Rice, not husked	1	pd
7	Sugar cane	6	c b
8	Unmanufactured tobacco	8	ocr
9	Cotton Seeds	7	pfb
10	Other crops	8	ocr
11	Tomatoes	4	v f
12	Onions	4	v f
13	Sweet pepper	4	v f
14	Other vegetables	4	v f
15	Potatoes	4	v f
16	Yucca	4	v f
17	Other edible roots and tubers	4	v f
18	Banana	4	v f
19	Plantain	4	v f
20	Oranges	4	v f
21	Pineapples	4	v f
22	Papayas	4	v f
23	Other fruits	4	v f
24	Coffee, not roasted, not decaffeinated	8	ocr
25	Cocoa beans, raw or roasted	8	ocr
26	Other beverage and spice crops	8	ocr
27	Live bovine animals	9	ctl
28	Raw milk	11	rmk
29	Other live animals	9	ctl
30	Swine	10	oap
31	Poultry	10	oap
32	Eggs of hens or other birds	10	oap
33	Other animal products	10	oap
34	Agricultural service activities	8	ocr
35	Animal husbandry service activities, except veterinary activities	8	ocr
36	Non-wood forest products	13	for
37	Forestry products	13	for
38	Tuna and Sardines	14	fsh
39	Other fishes	14	fsh
40	Shrimp	14	fsh
41	Other crustaceans and seafood	14	fsh
42	Coal and Lignite	15	col
43	Crude petroleum	16	oil
44	Natural gas	17	gas
45	Iron ores	18	omn
46	Aluminium ores	18	omn
47	Gold	18	omn
48	Other non-ferrous metal ores	18	omn
49	Granite and other construction stones	18	omn
50	Limestone and gypsum	18	omn

<b>Code</b>	<b>Description</b>	<b>GTAP Num. Code</b>	<b>GTAP Sec. Code</b>
51	Sands, gravel, broken or crushed stone	18	omn
52	Clays	18	omn
53	Chemical and fertilizer minerals	18	omn
54	Salt	18	omn
55	Other minerals	18	omn
56	Support activities for petroleum extraction and Natural gas	16	oil
57	Support and operation services to mining	18	omn
58	Meat of bovine animals	19	cmt
59	Meat of swine	20	omt
60	Meat n.e.c.	20	omt
61	Meat of poultry, fresh, chilled or frozen	20	omt
62	Preserves and preparations of meat, and meat products	20	omt
63	Canned fish and crustaceans, smoked, in brine	25	ofd
64	Prepared and preserved vegetables and fruits	25	ofd
65	Animal and vegetable oils and fats	21	vol
66	Butters and cheese	22	mil
67	Pasteurized milk	22	mil
68	Powdered milk	22	mil
69	Other dairy products	22	mil
70	Wheat flour	25	ofd
71	Corn flour	25	ofd
72	Husked rice	23	pcr
73	Other cereal products	25	ofd
74	Corn oil	25	ofd
75	Other grain mill products	25	ofd
76	Bakery products	25	ofd
77	Bakery products, n.e.c.	25	ofd
78	Sugar	24	sgr
79	Sugar products	24	sgr
80	Cocoa, chocolate and sugar confectionery	25	ofd
81	Macaroni, noodles, couscous and similar farinaceous product	25	ofd
82	Prepared meals and dishes manufacturing services	25	ofd
83	Coffee and tea	25	ofd
84	Food products n.e.c.	25	ofd
85	Preparations used in animal feeding	25	ofd
86	Whisky	26	b t
87	Beer	26	b t
88	Other alcoholic beverages	26	b t
89	Soft drinks	26	b t
90	Other non-alcoholic beverages	26	b t
91	Cigars and tobacco	26	b t
92	Yarn and thread; woven and tufted textile fabrics	27	tex
93	Knitted or crocheted fabrics	27	tex
94	Textile articles other than apparel	27	tex
95	Wearing apparel, except fur and leather apparel	28	wap
96	articles thereof	28	wap
97	Knitted or crocheted fabrics	27	tex
98	Hides and skins	29	lea
99	Leather and leather products	29	lea
100	Footwear	29	lea
101	Sawn wood	30	lum
102	Products of wood, cork, straw and plaiting materials	30	lum

<b>Code</b>	<b>Description</b>	<b>GTAP Num. Code</b>	<b>GTAP Sec. Code</b>
103	Pulp, paper and paperboard	31	ppp
104	Other articles of paper and paperboard articles	31	ppp
105	Recording and other editing products	31	ppp
106	Printing services	31	ppp
107	Reproduction of recorded media	31	ppp
108	Coke oven products	32	p c
109	Gasoline	32	p c
110	Distillate fuel oil and Residue fuel oil	32	p c
111	Lubricants	32	p c
112	Refinery gases such as ethane, propane, butane etc.	44	gdt
113	Other refined petroleum products	32	p c
114	Basic chemicals, except fertilizers and nitrogen compounds	33	crp
115	Fertilizers and nitrogen compounds	33	crp
116	Plastics in primary forms and of synthetic rubber	33	crp
117	Pesticides and other agrochemical products	33	crp
118	Paints, varnishes and similar coatings	33	crp
119	Soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	33	crp
120	Man-made fibres	27	tex
121	Other chemical products n.e.c.	33	crp
122	Pharmaceuticals, medicinal chemicals and botanical products	33	crp
123	Rubber tyres and tubes	33	crp
124	Other rubber products	33	crp
125	Plastic tubes, pipes and hoses	33	crp
126	Other plastic products	33	crp
127	Glass and glass fibres	34	nmm
128	Refractory ceramic products	34	nmm
129	Structural non-refractory clay and ceramic products	34	nmm
130	Other ceramics and porcelain	34	nmm
131	Cement, Lime and plaster	34	nmm
132	Articles of concrete, cement and plaster	34	nmm
133	Stone cutting, shaping and finishing services	34	nmm
134	Asphalt products	34	nmm
135	Semi-elaborate iron and steel products	35	i s
136	Slate iron and steel products	35	i s
137	Semi-finished products of aluminium or aluminium alloys	36	nfm
138	Slate aluminium products	36	nfm
139	Alumina	36	nfm
140	Basic precious and non-ferrous metals	36	nfm
141	Casting of iron and steel	35	i s
142	Casting of non-ferrous metals	36	nfm
143	Structural metal products	37	fmp
144	Tanks, reservoirs and containers of metal	37	fmp
145	Other fabricated metal products n.e.c.	37	fmp
146	Electronic valves and tubes; electronic components	40	ele
147	Automatic data processing machines and Printing machines	41	ome
148	Television and radio transmitters and apparatus for line telephony or telegraphy	40	ele
149	Radio broadcast and television receivers; apparatus for sound and video recording and reproducing	40	ele
150	Instruments and appliances for measuring, checking, testing, navigating and other purposes, except optical instrument	41	ome
151	Medical and surgical equipment and orthopaedic appliances	41	ome

<b>Code</b>	<b>Description</b>	<b>GTAP Num. Code</b>	<b>GTAP Sec. Code</b>
152	Electric motors, generators and transformers	41	ome
153	Batteries and Accumulators	41	ome
154	Insulated wire and cable	41	ome
155	Electric filament or discharge lamps; lighting equipment	41	ome
156	Domestic appliances	41	ome
157	Other electrical equipment	41	ome
158	Engines, turbines, pumps, compressors	41	ome
159	Office, accounting and computing machinery, n.e.c.	41	ome
160	Other general-purpose machinery	41	ome
161	Agricultural and forestry machinery manufacturing services	41	ome
162	Metal-forming machinery and machine tools manufacturing services	41	ome
163	Machinery for mining, quarrying and construction	41	ome
164	Other special-purpose machinery and parts thereof	41	ome
165	Passenger cars	38	mvh
166	Other motor vehicles	38	mvh
167	Bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	38	mvh
168	Parts and accessories for motor vehicles	38	mvh
169	Ships and boats	39	otn
170	Other transport equipment	39	otn
171	Furniture	42	omf
172	Manufacturing n.e.c.	42	omf
173	Manufacturing services on physical inputs owned by others	39	otn
174	Maintenance and repair services of other machinery and equipment	39	otn
175	Electricity supply	43	ely
176	Gas supply	17	gas
177	Water supply	45	wtr
178	Sewage and refuse disposal,	56	osg
179	Wastes or scraps	56	osg
180	aterials recovery (recycling) services, on a fee or contract basis	42	omf
181	Sanitation and other environmental protection services	56	osg
182	General construction services of one- and two-dwelling buildings	46	cns
183	General construction services of multi-dwelling buildings	46	cns
184	General construction services of industrial buildings	46	cns
185	General construction services of commercial buildings	46	cns
186	Construction services of hotels, motels, inns, hostels, restaurants and similar buildings	46	cns
187	Construction services of indoor sports or recreation installations	46	cns
188	Construction services of educational buildings	46	cns
189	Construction services of health buildings	46	cns
190	General construction services of waterworks	46	cns
191	General construction services of communication and power lines	46	cns
192	Construction services of the oil industry	46	cns
193	General construction services of highways (except elevated highways), streets, roads, railways and airfield runways	46	cns
194	Other construction services, n.e.c.	46	cns
195	Renting of construction or demolition equipment with operator	46	cns
196	Wholesale trade services	47	trd
197	Retail trade service	47	trd
198	Maintenance and repair of motor vehicles and motorcycles	47	trd
199	Railway transport services of passengers	48	otp
200	Railway transport services of freight	48	otp
201	Subway and subway-bus transport services	48	otp
202	Non-scheduled road transport services of passengers	48	otp



<b>Code</b>	<b>Description</b>	<b>GTAP Num. Code</b>	<b>GTAP Sec. Code</b>
203	Scheduled road transport services of freight	48	otp
204	Non-scheduled road transport services of freight	48	otp
205	Pipeline transport	48	otp
206	Water transport services of passengers	49	wtp
207	Water transport services of freight	49	wtp
208	Air transport services of passengers	50	atp
209	Air transport services of freight	50	atp
210	Storage and warehousing services	48	otp
211	Supporting services for transport	48	otp
212	Auxiliary and other supporting transport services	48	otp
213	Postal and courier services	51	cmn
214	Lodging services	47	trd
215	Food and beverage serving services for consumption on the premises	47	trd
216	Books, newspapers and other publications	31	ppp
217	Motion picture and video production, distribution and projection	31	ppp
218	Fixed telephony services	51	cmn
219	Mobile telephony services	51	cmn
220	Other telecommunications services	51	cmn
221	Information technology consulting, support, services, design and development services	54	obs
222	Central banking services	52	ofi
223	Other monetary intermediation services	52	ofi
224	Financial intermediation services indirectly measured	52	ofi
225	Financial leasing services	52	ofi
226	Other financial service activities, except insurance and pension funding activities, n.e.c.	52	ofi
227	Other credit granting services	52	ofi
228	Other financial services, except investment banking, insurance services and pension services	52	ofi
229	Life insurance services	53	isr
230	Non-life insurance	53	isr
231	Life insurance services	53	isr
232	Pension funding	53	isr
233	Administration of financial markets	52	ofi
234	Security and commodity contracts brokerage	52	ofi
235	Other activities auxiliary to financial service activities	52	ofi
236	Financial advisory services	52	ofi
237	Pension fund management services	52	ofi
238	Insurance agents and brokers services	53	isr
239	Other services auxiliary to insurance and pension funding	53	isr
240	Leasing services involving residential property	54	obs
241	Dwellings	57	dwe
242	Renting services involving non-residential property	54	obs
243	Real estate services on a fee or contract basis; including buying and selling of property	54	obs
244	Legal services, accounting, bookkeeping and auditing services; tax consultancy	54	obs
245	Research and development services	54	obs
246	Advertising	54	obs
247	Other professional services, scientific, technical and veterinary services	54	obs
248	Renting of transport equipment and Renting of other machinery and equipment	54	obs
249	Renting of personal and household goods n.e.c.	54	obs
250	Travel agency, tour operator and tourist guide services	55	ros
251	Other information and support services n.e.c	54	obs
252	Public administration and defence services	56	osg
253	Compulsory social security services	56	osg

<b>Code</b>	<b>Description</b>	<b>GTAP Num. Code</b>	<b>GTAP Sec. Code</b>
254	Primary and secondary education	56	osg
255	Higher education	56	osg
256	Other education	56	osg
257	Hospital services	56	osg
258	Private medical and dental practice services	56	osg
259	Other health and social services	56	osg
260	Other entertainment activities and Other Recreational, cultural and sporting services n.e.c	55	ros
261	Activities of business, employers and professional organizations	56	osg
262	Activities of trade unions, services of other membership organizations	56	osg
263	Software publishing, consultancy and supply	47	trd
264	Hairdressing and other beauty treatment	55	ros
265	Other services n.e.c	55	ros
266	Domestic services	55	ros

## *Appendix B*

**Table 7: Aggregate GTAP Sectoral Classification for Venezuelan Database**

GSEC			New		
No.	Long name	Short	No.	Long name	Short name
1	Paddy rice	pdr	1	Paddy rice, wheat, [see rest in footnote]	pdr, wht, gro, osd, c b, pfb
2	Wheat	wht	1	Paddy rice, wheat, [see rest in footnote]	pdr, wht, gro, osd, c b, pfb
3	Cereal grains nec	gro	1	Paddy rice, wheat, [see rest in footnote]	pdr, wht, gro, osd, c b, pfb
4	Vegetables, fruit, nuts	v f	2	Vegetables, fruit, nuts	v f
5	Oil seeds	osd	1	Paddy rice, wheat, [see rest in footnote]	pdr, wht, gro, osd, c b, pfb
6	Sugar cane, sugar beet	c b	1	Paddy rice, wheat, [see rest in footnote]	pdr, wht, gro, osd, c b, pfb
7	Plant-based fibers	pfb	1	Paddy rice, wheat, [see rest in footnote]	pdr, wht, gro, osd, c b, pfb
8	Crops nec	ocr	3	Crops nec	ocr
9	Bovine cattle, sheep and goats, horses	ctl	4	Bovine cattle, sheep and goats, horses	ctl
10	Animal products nec	oap	5	Animal products nec	oap
11	Raw milk	rmk	6	Raw milk	rmk
12	Wool, silk-worm cocoons	wol	7	Wool, silk-worm cocoons	wol
13	Forestry	for	8	Forestry	for
14	Fishing	fish	9	Fishing	fish
15	Coal	col	10	Coal	col
16	Oil	oil	11	Oil	oil
17	Gas	gas	12	Gas, Gas manufacture, distribution	gas, gdt
18	Minerals nec	omn	13	Minerals nec	omn
19	Bovine cattle, sheep and goat, horse meat prod.	cmt	14	Meat prod.	cmt omt
20	Meat products nec	omt	14	Meat products	cmt omt
21	Vegetable oils and fats	vol	15	Vegetable oils and fats	vol
22	Dairy products	mil	16	Dairy products	mil
23	Processed rice	pcr	17	Processed rice and food products nec	pcr
24	Sugar	sgr	18	Sugar	sgr
25	Food products nec	ofd	17	Processed rice and food products nec	ofd
26	Beverages and tobacco products	b t	19	Beverages and tobacco products	b t
27	Textiles	tex	20	Textiles	tex
28	Wearing apparel	wap	21	Wearing apparel	wap
29	Leather products	lea	22	Leather products	lea
30	Wood products	lum	23	Wood products	lum
31	Paper products, publishing	ppp	24	Paper products, publishing	ppp
32	Petroleum, coal products	p c	25	Petroleum, coal products	p c
33	Chemical, rubber, plastic products	crp	26	Chemical, rubber, plastic products	crp
34	Mineral products nec	nmm	27	Mineral products nec	nmm
35	Ferrous metals	i s	28	Ferrous metals	i s
36	Metals nec	nfm	29	Metals nec	nfm

GSEC			New		
No.	Long name	Short	No.	Long name	Short name
37	Metal products	fmp	30	Metal products	fmp
38	Motor vehicles and parts	mvh	31	Motor vehicles and parts	mvh
39	Transport equipment nec	otn	32	Transport equipment nec	otn
40	Electronic equipment	ele	33	Electronic equipment	ele
41	Machinery and equipment nec	ome	34	Machinery and equipment nec	ome
42	Manufactures nec	omf	35	Manufactures nec	omf
43	Electricity	ely	36	Electricity	ely
44	Gas manufacture, distribution	gdt	12	Gas, Gas manufacture, distribution	gas, gdt
45	Water	wtr	37	Water	wtr
46	Construction	cns	38	Construction	cns
47	Trade	trd	39	Trade	trd
48	Transport nec	otp	40	Transport nec	otp
49	Water transport	wtp	41	Water transport	wtp
50	Air transport	atp	42	Air transport	atp
51	Communication	cmn	43	Communication	cmn
52	Financial services nec	ofi	44	Financial services nec	ofi
53	Insurance	isr	45	Insurance	isr
54	Business services nec	obs	46	Business services nec	obs
55	Recreational and other services	ros	47	Recreational and other services	ros
56	Public admin. and defense, educ., health	osg	48	Public admin. and defense, educ., health	osg
57	Dwellings	dwe	49	Dwellings	dwe

Footnote: New No.1: Paddy rice, wheat, cereal grains nec, plant-based fibers, oilseeds, sugar cane