

E *Bolivia*

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E.1 Introduction

This document describes the adaptation of the 2014 Bolivian input-output (I-O) table for input to the Global Trade Analysis Project (GTAP). The paper is organised as follows. Section 2 briefly describes the source data. Section 3 discusses strengths and limitations of the published input-output (I-O) data. Section 4 discusses the processing to correct anomalies in the raw data. Section 5 presents the mapping between the 35 Bolivian I-O sectors, 65 GTAP sectors, and the more aggregated 31 sectors of the submitted table.

E.2 Data Sources

The primary raw input was 35-sector input-output data published by the Bolivian National Statistical Office (NSO).¹³

The 2014 I-O data was measured in thousands of 1990 Bolivianos. The 2014 original I-O data satisfies the sectoral balance condition, and contain most of the data ready for conversion to the GTAP format. These data include Supply and Use tables at purchasers' prices for 35 sectors. The Supply table shows the total outputs of 35 domestic commodities, total imports, transport and trade margins, and taxes on domestic and imported goods, by commodity. The Use table shows the demand for those commodities by industries, private households, government, investment, changes in inventories, and exports.

E.3 Strengths and Limitations of the Original Input- Output Data

We have conducted a number of checks on the data. They include checks of the non-negativity condition and the balancing conditions of the tables. We also check the plausibility of tax rates, margin rates implied in the data, and the structure of industries' costs and sales. This section discusses the strengths and limitations of the data. The procedures that we used to address these limitations are discussed in the next section.

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¹³Input-output tables Bolivia 2014, National Statistics, Bolivia, March 2020. Accessed from: <https://www.ine.gob.bo/index.php/estadisticas-economicas/pib-y-cuentas-nacionales/matrices/matrices-de-insumo-producto/>

Strengths

1. As can be seen from the previous section, the original data contain detailed supply and use data for 35 commodities and activities. They provide separate trade and transport margins and separate tax data for domestic and imported commodities.
2. The tables are balanced.

Limitations

1. There are re-exports of basic metals.
2. Need to address imputed banking charges.

E.4 Data Processing

In this section we discuss the adjustments procedures, the additional data sources, and the assumptions that we adopted to address the data issues described in the previous section.

1. To remove re-exports we follow the recommendations of the GTAP's contribution website: <https://www.gtap.agecon.purdue.edu/databases/contribute/reexports.asp>.
2. Similarly, to address imputed bank charges, we follow the recommendations of the GTAP's contribution website: <https://www.gtap.agecon.purdue.edu/databases/contribute/bankingsect.asp>
3. We proceed to obtain an I-O table, commodity by commodity, following UN's Handbook of Supply and Use tables, model B.
4. An import matrix is constructed using proportions of the total use matrix. Then the domestic matrix is computed as a residual.
5. A matrix of commodity taxes is constructed for domestic and imported inputs assuming proportions.

E.5 Converting the Bolivian IO table into GTAP Format

Converting the IO Table From COM x IND to COM x COM

GTAP prefers commodity by commodity input-output tables. Our initial I-O table is commodity by industry. To convert it to a commodity by commodity table, we use the technology assumption

and the procedure described in Horridge et al. (2008).¹⁴

Mapping Between Bolivian I-O Sectors and GTAP Sectors

The 35 sectors of the Bolivia I-O table were aggregated to a set of 31 sectors that best correspond to elements of GTAP's standard 65 commodities. The mappings from 35 and 65 sectors to these 31 sectors are reported in Table 8.19.

E.6 Checking Sectoral Balance and Non-negativity Conditions

After converting the Bolivian I-O tables to the format required by GTAP Data Base, we conducted the sectoral balance and non-negativity checks. The new data base passed the sectoral balance check and non-negativity conditions.

¹⁴Horridge, M., McDougall R., Narayanan, B. and Walmsley, T. (2008) Exercises in Contributing I-O Tables to the GTAP Data Base. Available from https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=2850

Table 8.19: Concordance between 35 Bolivia I-O sectors, GTAP 65 sectors and 31 sectors in the Contributed table

No.	31 sectors	65 GTAP sectors	35 I-O sectors
1	ProdAgrN	1 pdr, 2 wht, 3 gro, 4 v_f	1. PRODUCTOS AGRÍCOLAS NO INDUSTRIALES
2	ProdAgrI	5 osd, 6 c_b, 7 pfb	2. PRODUCTOS AGRÍCOLAS INDUSTRIALES
3	Coca	8 ocr	3. COCA
4	Pecuario	9 ctl, 10 oap, 11 rmk, 12 wol	4. PRODUCTOS PECUARIOS
5	SilvCzPe	13 frs, 14 fsh	5. SILVICULTURA, CAZA Y PESCA
6	Petroleo	15 coa, 16 oil, 17 gas	6. PETRÓLEO CRUDO Y GAS NATURAL
7	Minerale	18 omn	7. MINERALES METÁLICOS Y NO METÁLICOS
8	CarnesFr	19 cmt, 20 omt	8. CARNES FRESCAS Y ELABORADAS
9	Lacteos	22 mil	9. PRODUCTOS LÁCTEOS
10	ofd	21 vol, 23 pcr, 25 ofd	10. PRODUCTOS DE MOLINERÍA Y PANADERÍA, 12. PRODUCTOS ALIMENTICIOS DIVERSOS
11	AzucarCo	24 sgr	11. AZÚCAR Y CONFITERÍA
12	b.t	26 b.t	13. BEBIDAS, 14. TABACO ELABORADO
13	tex	27 tex, 28 wap, 29 lea	15. TEXTILES, PRENDAS DE VESTIR Y PRODUCTOS DEL CUERO
14	Madera	30 lum	16. MADERA Y PRODUCTOS DE MADERA
15	Papel	31 ppp	17. PAPEL Y PRODUCTOS DE PAPEL
16	ProdQuim	33 chm, 34 bph, 35 rpp	18. SUBSTANCIAS Y PRODUCTOS QUÍMICOS
17	Refineri	32 p.c	19. PRODUCTOS DE REFINACIÓN DEL PETRÓLEO
18	MineralN	36 nmm	20. PRODUCTOS DE MINERALES NO METÁLICOS
19	ProdMeta	37 i_s, 38 nfm	21. PRODUCTOS BÁSICOS DE METALES
20	MaqyEqui	39 fmp, 40 ele, 41 eeq, 42 ome, 43 mvh, 44 otn	22. PRODUCTOS METÁLICOS, MAQUINARIA Y EQUIPO
21	ProdManu	45 omf	23. PRODUCTOS MANUFACTURADOS DIVERSOS
22	ElectGas	46 ely, 47 gdt, 48 wtr	24. ELECTRICIDAD, GAS Y AGUA
23	Construc	49 cns	25. CONSTRUCCIÓN
24	trd	50 trd, 51 afs	26. COMERCIO, 33. RESTAURANTES Y HOTELES
25	Trsnport	52 otp, 53 wtp, 54 atp, 55 whs	27. TRANSPORTE Y ALMACENAMIENTO
26	Comunica	56 cmn	28. COMUNICACIONES
27	ServFina	57 ofi, 58 isr	29. SERVICIOS FINANCIEROS
28	ServEmp	59 rsa, 60 obs	30. SERVICIOS A LAS EMPRESAS
29	Vivienda	65 dwe	31. PROPIEDAD DE VIVIENDA
30	ServDom	61 ros	32. SERVICIOS COMUNALES, SOCIALES Y PERSONALES, 34. SERVICIOS DOMÉSTICOS
31	osg	62 osg, 63 edu, 64 hht	35. SERVICIOS DE LA ADMINISTRACIÓN PÚBLICA