

Belarus

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The Belarusian input-output (I-O) table in the GTAP 7 p4 Data Base was constructed from input-output tables and some supporting data supplied by the Ministry of Statistics and Analysis of the Republic of Belarus (Minstat). The data provided covers the Belarusian financial year ended 31 December 2004. The data were reclassified and re-balanced to meet GTAP's requirements.

This paper describes the construction of the Belarusian input-output table for the GTAP 7 p4 Data Base. In line with GTAP requirements, as outlined in Huff, McDougall, and Walmsley (2000), the data for Belarus were provided in four matrices:

- the supply and use of the GTAP sectors and two primary factors of production (land, labor and capital) without commodity taxes (GTAP matrix UF);
- the supply and use of the GTAP sectors and two primary factors with commodity taxes (GTAP matrix UP);
- output of the GTAP sectors (GTAP vector OP);
- imports of the GTAP sectors (GTAP vector MF).

Because data definitions and classifications of available I-O tables do not match precisely with the requirements of GTAP, the information was first adjusted or reclassified according to GTAP requirements. The obtained data were assembled according to the structure of the GTAP Data Base as defined by the tables UF, UP, OP and MF.

1. Source Data

The primary data sources used to construct the Belarusian I-O table for GTAP were electronic version of the 2004 I-O tables made available by the Ministry of Statistics and Analysis of Belarus for the financial year ended 31 December 2004. The source data were commodity by commodity and commodity by industry tables reported in basic prices. The units of the source table are Belarusian Rubles. The Minstat's tables contain detailed data on the supply and use of 31 commodities in Belarus and the associated tax payments.

The supplementary source of information was the data on foreign trade of Belarus and on industrial production were used to support the construction of the I-O table for the GTAP Data Base.

2. *Processing of the Source Data*

The Minstat data were different from the format of the GTAP data requirements. The main difference was the compilation of the Minstat's tables based on the Classification of Branches of the Economy (OKONX) that did not meet international practice of sectoral classification (ISIC, NACE). The Minstat intends to fully introduce the new economic activities classification into the accounts only in 2011. In addition, there were no payments to land in Belarusian I-O tables. The main adjustments applied to the Minstat's data were:

- reclassification of the Minstat's sectors to GTAP sectors
- reclassification of imports, from the Minstat's tables to GTAP commodities
- removal of re-exports
- removal of negative value flows
- final balancing of the data base.

3. *Mapping Between Minstat's Sectors and GTAP Counterparts*

The Belarusian I-O tables have 31 sectors (see appendix table 2.) compared to the 57 in the GTAP Data Base. To obtain the I-O on a 57 sector basis, a concordance was established between the two classifications (appendix table 3). The concordance shows that some sectors can be linked directly to one of the GTAP sectors without adjustment, e.g. *communication*, *ferrous metals*, *construction*. Some GTAP sectors linked to more than one Minstat's sectors. For example, GTAP sector *recreation and other services* corresponded to 4 Minstat's sectors, and *public administration and defense, education, health* matched 5 Belarusian I-O table's sectors. In this case GTAP sectors were obtained by simple aggregation of Minstat's sectors. However, there were 37 GTAP sectors that should be adjusted to 8 Minstat's sectors. Taking into consideration that it was difficult to provide a reliable full sectoral detail in agriculture and food processing this sector was just separated from other sectors without further disaggregation (see table 4). To obtain the rest 19 GTAP sectors 7 Minstat's sectors were split by calculation the output shares based on the production in this sectors. In the same way Minstat's imports were reclassified to GTAP commodities using the data on foreign trade of Belarus.¹

4. *Direct and Indirect Taxes*

Direct taxes in Belarus levied on acquisition of transport facilities, on the use of natural resources, or on land, buildings and constructions. Furthermore, there are several state duties as well as other dues, e.g. for the permission to carry out specific activities, or to funds earmarked for special

¹ TNVED RB equivalent to the Harmonised Commodity Description and Coding System for International Trade Statistics

purposes. There aren't direct taxes on imports in Belarus in 2004. Indirect taxes on commodities in Belarus include value added tax (VAT), excises, sales tax, taxes on the use of roads and vehicles, contributions to funds for special purposes related to maintenance and repair costs of housing property, contributions to the fund for supporting agricultural production. In 2004 Belarus used origin principle of VAT taxation, i.e. doesn't collect VAT from imports. There are only two taxes on imports, namely sale tax and excise tax. The sale tax was levied only on imports of consumer goods and its sum is around 2%. The excise tax levied only on tobacco products and alcohol beverage. Therefore indirect taxes on imports were not allocated across sectors.

5. *Removal of Negative Value*

Negative values were found in many sectors. However, these negatives were very small and therefore were removed by adjusting "changes in stocks".

6. *Removal of Re-exports*

As exports should not include the re-export of imported goods it was identified and subtracted from total exports. It mainly related to exports of non-ferrous metals.

7. *I-O Table Supplied to GTAP*

The following tables were supplied to GTAP:

- UF matrix of pre-commodity-tax usage values.
- UP matrix of post-commodity-tax usage values.
- OP vector of outputs non-commodity indirect taxes inclusive.
- MP vector of imports, import duty excluded.

8. *Diagnostics*

The Belarusian I-O table for the GTAP Data Base was checked to ensure that

- there were no negative values
- total sales equal total costs in total and for each sectors
- total sales by commodity equal to sum of intermediate sale and sales to the final demand categories
- total costs by sector equal the sum of purchases of domestic and imported intermediates, value added and industry taxes or OP

References

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Appendix

Table 1. 2004 Input-Output Data Available Electronically

Grouping	Table	Description
Basic tables	1.1	Table of resources of goods and services
	2.1	Table of consumption of goods and services in buyer prices
	3.1	Table of consumption of goods and services in basic prices
	3.2	Table of domestic goods and services consumption
	3.3	Table of imported goods and services consumption
	3.4	Table of transportation markups
	3.5	Table of trade and intermediation markups
	3.6	Table of net taxes on production
	4.1	Input-output symmetric tables in basic prices
	8.1	Coefficients of direct and complete costs

Table 2. Minstat's Input-Output Product Classification, 2004

No.	Description
1	Electricity and heat energy
2	Petrochemical products
3	Gas industry products
4	Coal
5	Shale oils and peat
6	Ferrous metals
7	Non-ferrous metals
8	Products of petrochemical and chemical industry
9	Machines and equipment, products of metal processing
10	Products of timber, wood-processing and pulp-and-paper industry
11	Construction materials (including products of glass and porcelain and faience industry)
12	Products of light industry
13	Food industry products
14	Other industrial products
15	Products of construction
16	Agricultural produce, services to agriculture
17	Forestry products
18	Transportation services
19	Communication services
20	Trade and intermediary service (including public catering services)
21	Services of geology and earth's interior prospecting, geodesic and hydrometeorology services
22	Data processing services
23	Products of other types of activity
24	Housing services, utilities, non-production types of daily services to the population
25	Services of healthcare, physical culture and social provision
26	Education services
27	Services of culture and arts
28	Scientific services
29	Services of financial intermediation and insurance
30	Government and defense services
31	Services of public unions

Table 3. Concordance between Belarusian I-O products and GTAP products

GTAP-Belarus sectors	Belarusian I-O tables (source data)
Agriculture and food processing	Agricultural products, services to agriculture
Food products	Food industry products
Beverages and tobacco products	
Energy	
Coal	Coal
	Shale oils and peat
Oil	Petrochemical products
Gas	Gas industry products
Petroleum, coal products	Products of petrochemical and chemical industry
Electricity	Electricity and heat energy
Gas manufacture, distribution	
Goods and services	
Forestry	Forestry products
Fishing	
Mineral nec	
Textiles	Products of light industry
Wearing apparel	
Leather products	
Wood products	Products of timber, wood-processing and pulp-and-paper industry
Paper products, publishing	
Chemical, rubber, plastic products	Products of petrochemical and chemical industry
	Construction materials (including products of glass and porcelain and faience industry)
Mineral products nec	
Ferrous metals	Ferrous metals
Metals nec	Non-ferrous metals
Metal products	Ferrous metals
Motor vehicles and parts	Machines and equipment, products of metal processing
Transport equipment nec	
Electronic equipment	
Machinery and equipment nec	
Manufactures nec	Other industrial products
Water	
Construction	Products of construction
Trade	Trade and intermediary service (including public catering services)
Transport nec	Transportation services
Water transport	
Air transport	
Communication	Communication services
Financial services nec	Services of financial intermediation and insurance
Insurance	
Business services nec	Data processing services
Recreational and other services	Services of culture and arts
	Products of other types of activity
	Scientific services

GTAP-Belarus sectors	Belarusian I-O tables (source data)
	Services of geology and earth's interior prospecting,
	geodesic and hydrometeorology services
Public Administration and defense, education, health	Government and defense services
	Education services
	Services of healthcare, physical culture and social provision
	Services of public unions
	Housing services, utilities, non-production types of daily services to the population
Dwellings	Housing services, utilities, non-production types of daily services to the population

Table 4. Concordance between GTAP-Belarus 40 and GTAP 57 products

GTAP57		GTAP -Belarus 40	
Agriculture and food processing			
Paddy rice	1	Agriculture and food processing	1
Wheat	2		
Cereal grains nec	3		
Vegetables, fruits, nuts	4		
Oil seeds	5		
Sugar cane, sugar beet	6		
Plant-based fibers	7		
Crops nec	8		
Bovine cattle, sheep and goats, horses	9		
Animal products nec	10		
Raw milk	11		
Wool, silk-worm cocoons	12		
Bovine cattle, sheep and goat, horse meat products	13		
Meat products	14		
Vegetable oils and fats	15		
Dairy products	16		
Processed rice	17		
Sugar	18		
Food products	19	Food products	2
Beverages and tobacco products	20	Beverages and tobacco products	3
Energy		Energy	4
Coal	21	Coal	5
Oil	22	Oil	6
Gas	23	Gas	7
Petroleum, coal products	24	Petroleum, coal products	8
Electricity	25	Electricity	9
Gas manufacture, distribution	26	Gas manufacture, distribution	10
Goods and services		Goods and services	11

GTAP57		GTAP -Belarus 40	
Forestry	27	Forestry	12
Fishing	28	Fishing	13
Mineral nec	29	Mineral nec	14
Textiles	30	Textiles	15
Wearing apparel	31	Wearing apparel	16
Leather products	32	Leather products	17
Wood products	33	Wood products	18
Paper products, publishing	34	Paper products, publishing	19
Chemical, rubber, plastic products	35	Chemical, rubber, plastic products	20
Mineral products nec	36	Mineral products nec	
Ferrous metals	37	Ferrous metals	21
Metals nec	38	Metals nec	22
Metal products	39	Metal products	23
Motor vehicles and parts	40	Motor vehicles and parts	24
Transport equipment nec	41	Transport equipment nec	25
Electronic equipment	42	Electronic equipment	26
GTAP57		GTAP -Belarus 40	
Machinery and equipment nec	43	Machinery and equipment nec	
Manufactures nec	44	Manufactures nec	27
Water	45	Water	28
Construction	46	Construction	29
Trade	47	Trade	30
Transport nec	48	Transport nec	31
Water transport	49	Water transport	32
Air transport	50	Air transport	33
Communication	51	Communication	34
Financial services nec	52	Financial services nec	35
Insurance	53	Insurance	36
Business services nec	54	Business services nec	37
Recreational and other services	55	Recreational and other services	38
Public Administration and defense, education, health	56	Public Administration and defense, education, health	39
Dwellings	57	Dwellings	40