

B Azerbaijan

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B.1 Introduction

This document describes the adaptation of the 2021 Azerbaijanian input-output (I-O) table for input to the Global Trade Analysis Project (GTAP). The paper is organized 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 81 Azerbaijanian I-O sectors, 65 GTAP sectors, and the more aggregated 42 sectors of the submitted table. Section 6 is about the final check for non-negativity and balance.

B.2 Data sources

The primary raw input was 81-sector input-output data published by the State Statistical Committee of the Republic of Azerbaijan (SSC).¹⁶ The 2021 I-O data was measured in thousands of 2021 Azerbaijanian manat. At first sight, the 2021 raw input-output data satisfy the sectoral balance condition, and contain most of the data ready for conversion to the GTAP format. These data include: The Supply table shows the total outputs of 81 domestic commodities, imports, CIF/FOB, trade and transport margins and net taxes on product, by commodity, at basic prices.

1. The Use table shows the demand for those commodities by industries (intermediate consumption), private households, government, non-profit organizations serving households, investment (gross fixed capital formation), changes in inventories, and exports, by commodity, at basic prices.
2. The IO table shows the intermediate consumption of 81 domestic commodities by 81 industries, final consumption expenditure by households, final consumption expenditure by government, final consumption expenditure by non-profit organizations serving households (NPISH), gross fixed capital formation, changes in inventories, export, import and CIF/FOB on its row accounts. The column accounts show the spending by 81 industries on 81 domestic commodities, as well as, net taxes, CIF/FOB, compensation of employees, social contributions, net income, taxes on production and consumption of fixed capital.

In addition, we have the following data from the SSC:

1. Gross national income aggregates, current prices, million manats for the year 2021. This table was used for calculating taxes on imports for each commodity.

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¹⁶Input-output tables Azerbaijan 2021, The State Statistical Committee, Azerbaijan, March 2024.

2. Foreign Trade of Azerbaijan for the year 2021. This table was used for cross-checking the values of imports and exports.

B.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.

Strengths

As can be seen from the previous section, the original data contain detailed supply and use data for 81 commodities and activities. Moreover, there are two separate tables for calculating additional indicators, as well as cross-checking trade data.

Limitations

1. There are some small negative flows in six sectors.
2. The "Coal and lignite" column account consists of only zeros.
3. The "Sewerage services; sewage sludge", "Waste collection, treatment and disposal services; materials recovery services" and "Remediation services and other waste management services" sectors have negative capital returns.
4. We have data regarding the aggregate imports across commodities. However, there is a requirement for disaggregated data delineating the proportion of imports within each respective sector.
5. In case of taxes, again, we have aggregated data, which need to be disaggregated.

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. With regard to some negative values in the tables: because they are very small, we replaced them with zeros.

2. In order to solve the problem regarding zeros in the “Coal and lignite” column account we aggregated it to the “Crude petroleum and natural gas” column account.
3. To eliminate negative capital returns from the aforementioned sectors we used positive returns from IO table for 2016.
4. The summation of the “Compensation of employees” and “Social contributions” row accounts from the original IO table was conducted to derive the consolidated “Compensation of employees” row account for the GTAP IO table.
5. The “Net taxes on production and imports” GTAP row account is derived by aggregating the “Net taxes” and “Taxes on production” row accounts from the original IO table.
6. The “Consumption of fixed capital” GTAP row account is derived by aggregating the “Net income” and “Consumption of fixed capital” row accounts from the original IO table.
7. The allocation of the total value of taxes on imports, derived from the “Gross National Income Aggregates” table, among row accounts was determined based on the proportional distribution of industries’ imports relative to total imports.
8. It has been clarified from the “Gross National Income Aggregates” table that no subsidies are allocated to imports.
9. To derive the “Government consumption” column account within the GTAP framework, the aggregate of the “Final consumption expenditure by government” and “Final consumption expenditure by non-profit organizations serving households (NPISH)” column accounts from the original Input-Output (IO) table was computed.
10. The “Investment” GTAP column account is derived by aggregating the “Gross fixed capital formation” and “Changes in inventories” column accounts from the original IO table.
11. We derived disaggregated import data by transforming the import vector into an import matrix, utilizing the proportional representation of each sector within the total intermediate consumption. It was assumed that the sectoral shares in the total intermediate consumption mirrored their respective shares in the importation of the given commodity.
12. We used the same approach to disaggregate tax data, resulting in the transformation of the tax vector into a tax matrix.

Table 8.6 reports some summary data from our final input-output table.

Mapping Between Azerbaijanian I-O Sectors and GTAP Sectors

The 81 sectors of the Azerbaijan I-O table were aggregated to a set of 42 sectors that best correspond to elements of GTAP’s standard 65 commodities. The mappings from 81 and 65 sectors to these 42 sectors are reported in Table 8.7.

Table 8.6: Macro Aggregates from the 2021 Azerbaijan IO table

Income method		thousand manat
A	Compensation of Employees	22,740,900
B	Gross Profits	56,781,389
C	Net taxes + Taxes on Production	7,922,475
D	Consumption of fixed capital	5,758,520
GDP = A + B + C + D		93,203,285

Expenditure method		thousand manat
A	Consumption	48,507,368
B	Investment	15,917,800
C	Government Spending	13,221,900
D	Net exports (Exports - Imports)	15,556,216
GDP = A + B + C + D		93,203,285

Value added method		thousand manat
A	Value of Output	139,316,353
B	Value of Intermediate Consumption	46,113,069
GDP = A - B		93,203,285

Table 8.7: Concordance between 81 Azerbaijanian I-O sectors, GTAP 65 sectors and 42 sectors in the Contributed table

42 sectors	65 GTAP sectors	81 Azerbaijanian IO sectors
Agro	pdr, wht, gro, v.f, osd, c.b, pfb, ocr, ctl, oap, rmk, wol	1.Products of agriculture, hunting and related services
Frs	frs	2.Products of forestry, logging and related services
Fsh	fsh	3.Fish and other fishing products; aquaculture products; support services to fishing
CoOilGas	coa	4.Coal and lignite
	oil, gas	5.Crude petroleum and natural gas
Oxt	oxt	6.Metal ores, 7.Other mining and quarrying products, 8.Mining support services
Food	cmt, omt, vol, mil, pcr, sgr, ofd	9.Food products
B_T	b_t	10.Beverages, 11.Tobacco products
Tex	tex	12.Textiles
Wap	wap	13.Wearing apparel
Lea	lea	14.Leather and related products
Lum	lum	15.Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials
Ppp	ppp	16.Paper and paper products, 17.Printing and recording services
P_C	p_c	18.Coke and refined petroleum products
Chm	chm	19.Chemicals and chemical products
Bph	bph	20.Basic pharmaceutical products and pharmaceutical preparations
Rpp	rpp	21.Rubber and plastics products
Nmm	nmm	22.Other non-metallic mineral products

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42 sectors	65 GTAP sectors	81 Azerbaijanian IO sectors
Metals	i_s, nfm	23.Basic metals
Fmp	fmp	24.Fabricated metal products, except machinery and equipment
Ele	ele	25.Computer, electronic and optical products
Eeq	eeq	26.Electrical equipment
Ome	ome	27.Machinery and equipment not elsewhere classified
Mvh	mvh	28.Motor vehicles, trailers and semi-trailers
Otn	otn	29.Other transport equipment
Omf	omf	30.Furniture, 31.Other manufactured goods
Electr	ely, gdt	33.Electricity, gas, steam and air conditioning
Wtr	wtr	34.Natural water; water treatment and supply services, 35.Sewerage services; sewage sludge, 36.Waste collection, treatment and disposal services; materials recovery services, 37.Remediation services and other waste management services
Cns	cns	38.Constructions and construction works
Trd	trd	32.Repair and installation services of machinery and equipment, 39.Wholesale and retail trade services; repair services of motor vehicles and motorcycles
Afs	afs	45.Accommodation services, 46.Food and beverage serving services
Otp	otp	40.Land transport services and transport services via pipelines
Wtp	wtp	41.Water transport services
Atp	atp	42.Air transport services
Whs	whs	43.Warehousing and support services for transportation
Cmn	cmn	47.Publishing services, 48.Motion picture, video and television programme production services, sound recording and music publishing, 49.Programming and broadcasting services, 50.Telecommunications services, 51.Computer programming, consultancy and related services, 52.Information services
Fin_ins	ofi, ins	53.Financial services, except insurance and pension funding, 54.Insurance, reinsurance and pension funding services, except compulsory social security, 55.Services auxiliary to financial services and insurance services
Dwe_rsa	rsa, dwe	56.Real estate services
Obs	obs	44.Postal and courier services, 57.Legal and accounting services, 58.Services of head offices; management consulting services, 59.Architectural and engineering services; technical testing and analysis services, 60.Scientific research and development services, 61.Advertising and market research services, 62.Other professional, scientific and technical services, 63.Veterinary services, 64.Rental and leasing services, 65.Employment services, 66.Travel agency, tour operator and other reservation services and related services, 67.Security and investigation services, 68.Services to buildings and landscape, 69.Office administrative, office support and other business support services
Ros	ros	75.Creative, arts and entertainment services, 76.Library, archive, museum and other cultural services, 77.Gambling and betting services, 78.Sporting services and amusement and recreation services, 79.Services furnished by membership organizations, 80.Repair services of computers and personal and household goods, 81.Other personal services
Osg	osg	70.Public administration and defense services; compulsory social security services
Edu	edu	71.Education services
Hht	hht	72.Human health services, 73.Residential care services, 74.Social work services without accommodation