AD Kazakhstan

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AD.1 Introduction

This document describes the adaption of the 2017 Kazakhstan Input-Output (I-O) table for contribution into the Global Trade Analysis Project (GTAP). The paper is organized as follows. Section 2 describes the source data. Section 3 discusses strengths and limitations of the contributed input-output (I-O) data. Section 4 discusses the processing of the raw data. Section 5 demonstrates the mapping from Kazakhstan I-O table's 68 sectors into aggregated 46 sectors of contributed table and the GTAP's 65 sectors.

AD.2 Data Sources

The original table was a 68-sector input-output data published by The Statistical Committee of the Republic of Kazakhstan[35]

The 2017 I-O data is provided in industry-by-industry (NACE classification) dimensions. The unit is thousands of Kazakh tenge and is left so until the contributed table stage. The original 68-sector table was checked for the balance and sign conditions and satisfied both. The original data from the Statistical Committee consisted of several readily available tables:

1. Use table in basic prices for 68 sectors. It consists of a matric of inter-industry intermediate use (68 by 68), elements of value added by industries (wages, depreciation, profits and mixed income, production taxes) and the elements of demand by industries(household, government consumption, investment, stocks, export). Basic prices already include the transport and trade margins within the values, but do not include commodity taxes.

2. A MAKE matrix is available (called Supply table) at basic prices. The matrix is symmetric, so each industry produces one commodity.

3. A Domestic use table at basic prices (less commodity taxes) demonstrates the use of domestically produced commodities, including the elements of value-added and sources of demand.

4. An Import use table at basic prices (less tariffs and import taxes) demonstrates the use of imported commodities by 68 industries, including the elements of value-added and sources of demand.

[34]Center for Research and Consulting (CRC), Kazakhstan, www.crcons.com.

[35]National Accounts, Input-Output Table 2017, available at `https://stat.gov.kz/official/industry/11/statistic/5`.

5. Tables of Trade and Transport margins (two separate tables) consisting of intermediate consumption (by industries) and final value-added and demand-side components.

6. A table of commodity taxes (including domestic and import taxes, excise tax, other nonspecified taxes) consisting of an industry-by-industry matrix and the components of valueadded and demand.

AD.3 Strengths and Limitations of the original Input-Output Data

As part of data preparation process, we have conducted a balance and a sign check of the original data. In this section we provide the results of the checks and other strengths and limitations of the raw data.

Strengths

1. The original data provides a detailed coverage of 68 sectors of the economy. The level of specificity of the data is plausible for the use in the data processing stage, i.e. data contains separate table of use in basic prices, domestic use, imported commodity use, transport margins, trade margins.

2. The basic use table is balanced.

Limitations

1. The data lacks separate industry-by-industry tables for domestic commodity taxes and import taxes. Only one aggregate commodity tax table is available, which also includes excise taxes and other non-specified taxes.

2. Almost all sign conditions are met, except for the Natural Gas extraction sector, where export exceeds production slightly.

3. The original table does not separate between the land and capital aggregates within primary factors. The available components are wages, production taxes, depreciation, profits and other mixed income.

AD.4 Data Processing

This section describes the adjustment of the original data table for the plausible processing format.

1. Regarding the aggregate tax table: we have used the domestic, import and basic use matrices (68 by 68) to extract the shares of each component (domestic versus imported) in the basic

use matrix. We have then used these shares to make rough estimations of the distribution of commodity tax matrix between domestic and import tax components. The underlying assumption was that major parts of taxes are domestic commodity taxes and import taxes, i.e. excises and other minor taxes are ignored. Also, in the initial representation of the table (Figure 3 in Horridge et al. 2008) all taxes (without separation into domestic and import) were aggregated in the -Mtax (net import taxes) column, because around 70% of Kazakhstan's taxes were import taxes, according to the previous analyses conducted by CRC.

2. Regarding the re-export possibility in Natural Gas sector: the difference is too small to be manipulated further and the no-re-export condition is still met, because due to sector specificity in Kazakhstan we are sure that the difference is not re-export.

3. Regarding the land/capital separation: due to economic specificity, land and capital is present in both depreciation and profits and mixed income, but the exact shares are not clearly defined by the Statistical Committee. Therefore, as was advised by the instructions, the separation is left to GTAP. It is important to note (for further separations by GTAP team) that agriculture in Kazakhstan is more land-intensive, than capitalintensive, so average world shares might not correspond to Kazakhstan's economy (advised to use less developed country shares in this case).

AD.5 Converting the Kazakhstan's IO table into GTAP Format

This section includes the mapping between Kazakhstan's original I-O table's 68 sectors, a contributed table aggregated 46 sectors and GTAP's 65 sectors. Important comments on the mapping are provided as well.

Table 8.52: Concordance between 68 I-O sectors, contributed 46 sectors and GTAP's 65 sectors

No.	46 sectors	68 I-O sectors	65 GTAP sectors
1	Agr*	Agriculture	pdr wht gro v_f osd c_b pfb ocr ctl oap rmk wol
2	Frs	Forestry	frs
3	Fsh	Fishing	fsh
4	Coa	Coal	coa
5	Oil	Oil MineTechSvcs**	oil
6	Gas	Gas	gas
7	Oxt	FerrousOres NonFerrOres OtherMining	oxt
8	FoodBevCig*	FoodBev Cigarettes	cmt omt vol mil pcr sgr ofd b_t
9	Tex	Textile	tex
10	Wap	Clothing	wap
11	Lea	Leather	lea
12	Lum	WoodAndPulp	lum

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No.	46 sectors	68 I-O sectors	65 GTAP sectors
13	Ppp	Paper Printing	ppp
14	PC	Coke Refining	p_c
15	Chm	Chemical	chm
16	Bph	Pharma	bph
17	Rpp	PlasticRubbr	rpp
18	Nmm	Othnonmtlmin	nmm
19	IS	"BasicFerrous SteelPipes OthSteelProd MetalCasting**"	i_s
20	Nfm	NonFerrPrec	nfm
21	Fmp	MetalPrdNEqp	fmp
22	Ele	ElctrncOptcl	ele
23	Eeq	ElectricEqp	eeq
24	Ome	OtherEquip	ome
25	Mvh	VehiclesPrts	mvh
26	Otn	OthTranspEqp	otn
27	Omf	Furniture OthManufact Repair	omf
28	Ely	Electricity SteamHeat	ely
29	Gdt	GasDistrib	gdt
30	Wtr	WaterWaste	wtr
31	Cns	Construction	cns
32	Trd	"TrdRepairMVP OthWholesale OthRetail"	trd
33	Otp	RoadPipeline	otp
34	Wtp	WaterTransp	wtp
35	Atp	AirTransp	atp
36	Whs	Warehouse	whs
37	Cmn	Post Information Communicatin	cmn
38	Afs	Hotels Restaurant	afs
39	Ofi	Finance FinanceAux**	ofi
40	Ins	Insurance	ins
41	RsaDwe***	RealEstate	rsa dwe
42	Obs	SciTech AdminService	obs
43	Osg	GovDefence	osg
44	Edu	Education	edu
45	Hht	Health SocialSvc	hht
46	Ros	ArtRecCultre OtherService Servants	ros

Important comments:

*No disaggregation is done between Food, beverages and tobacco, as in Kazakhstan's I-O tables food and beverages sector is separated from tobacco. Also, no agriculture disaggregation is done, as advised by the contribution instructions.

**MineTechServices is added to the Oil sector, because majority of it goes to Oil (as opposed to gas and other mining), MetalCasting is added to Iron and Steel, as majority of casting is done on these metals, FinanceAux is added to Financial services (as opposed to Insurance), as majority of auxiliary services relate to Financial sector.

***Majority of Kazakhstan's Real Estate sector consists of Dwellings (around 70%).

AD.6 Checking the sectoral balance and sign conditions

After converting the original I-O table into the 46-sector contribution format the balance and sign checks were conducted again. The new data meets all the balance and sign conditions.

References

Horridge, Mark et al. (2008). *Exercises in Contributing I-O Tables to the GTAP Data Base*. Department of Agricultural Economics, Purdue University, West Lafayette, IN: Global Trade Analysis Project (GTAP). URL: https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=2850.