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COMPARATIVE REGIONAL ANALYSIS ON THE BASE OF THE SYSTEM OF AGGREGATED INPUT-OUTPUT TABLES

The last basic input-output table of Russia was constructed on the basis of SNA'93 by the State Committee of Russian Federation on Statistics for 1995. The official regional input-output tables in Russia were not constructed after 1987.

The methodology of construction and testing of regional input-output tables on the base of the national IOT and regional accounts data is discussed in the paper.

Interregional analysis of the main indexes is carried out.

1. Introduction

National Input-Output tables (NIOT) for Russia by Material Product System methodology were compiled since 1966 until 1991. The first base NIOT by SNA was constructed for 1995. Presently, National Input-Output tables are produced on an annual basis in current prices with a 2-3 year lag from the reference year.

There is rich experience in compilation of the Regional Input-Output tables (RIOT) for Russia but elaboration of these tables had been carried out in conditions of other economic system and by MPS methodology. Input-Output tables were compiled by 12 economic regions for 1972, 1977, 1982 и 1987 (years of base Input-Output table for USSR). Information base was special survey of production inputs, which were produced for construction of NIOT. Regional tables by 3 Siberian regions had same classification of products as national tables and were carried out at purchasers' prices only. RIOT by other regions was constructed by brief classification.

Regional Input-Output tables by subject of Russian Federation are never produced. However federal and regional institutes have strong requirement in RIOT for forecasting and planning. Some regions try to elaborate Supply and Input-Output tables but these attempts are not finished and unadequate.

In this paper is presented the first endeavour of the compilation and analysis of experimental RIOT 1997 for 79 subjects of Russian Federation by SNA methodology at producers' prices.

2. Statistical base for RIOT

2.1. The National Input-Output Tables of 1997

A time series of Input-Output tables, constructed by SNA'93 methodology, is available spanning for the 1991-1997 period.

Feature of Russian Input-Output system is the compiling of input-output table (product-by-product) passed Use table. Supply table was constructed for 1995 only (Goskomstat of Russia, 1996). However, the Russian Input-Output system includes Input-Output table in both basic and purchasers' prices, and whole complex of matrixes, used for transition from purchasers' prices to basic prices.

National Input-Output table 1997 has "working level of aggregation" 93 x 120 products, including 65 industrial products. Official NIOT 1997 for Russian Federation has 22

products, including 13 industrial goods. There are 11 categories of final demand including import and export. Unfortunately, product classification, used in Russian Input-Output tables, is not correspondence with Central Product Classification (CPC) (UN, 1993) and other international classifications.

The database for NIOT is special sampling survey of production inputs. Last survey was carried out for 1995 and NIOT 1995-1997 are constructed on the base of this information.

Another feature of NIOT that construction of NIOT is finished late than the national accounts and the regional production accounts. Adjustments of the control totals, which were made in NIOT, are not taken into consideration in regional accounts and partly in national accounts. As result, there are differs between control total by NIOT and control total by national accounts conditionality by adjustments, and between control total by NIOT and the regional production accounts – adjustments and undistributed part of production, taxes and final consumption. It is severe handicap for regionalizing of Input-Output table.

That is why for compilation of RIOT we corrected data of the regional production accounts on the amount of adjustments but sum of all RIOT is not equal NIOT on the amount of undistributed part. In the future, we will try to divide undistributed part between region, then National Input-Output table will be formed the control totals for Regional Input-Output tables.

2.2. Scheme of Regional Input-Output table

Experimental Regional Input-Output tables, presented in paper, are constructed for 1997. The methodology of regional accounts in Russia is continuing to improve year by year. By this reason, we use for our estimations last NIOT (for 1997).

In national and regional accounts are used classification has 34 positions, however, industry is presented by only one position, although market and non-market services are presented to a far greater extent. In our case on the final stage we aggregate RIOT on 10 products (simplified scheme of RIOT is shown in Table 1):

(1) Industry,
(2) Construction,
(3) Agriculture and forestry,
(4) Other activity of goods and services productions,

(5) Transport,

(6) Communication services,

(7) Trade, intermediation and restaurant services,

(8) Housing, communal and households services,

(9) Education, healthcare, culture, art,

(10) Science and scientific services,

(11) Administration, finances, credits, insurance, services of membership organization.

Table 1. *Simplified scheme of Input-Output table for the region of Russia (product-by-product, at producers' prices)*

	Products											**Intermediate consumption**	Final consumption		Gross fixed capital formation	Changes on inventories and acquisition less disposals of valuables	**Domestic final demand**	Net export	**Total economy**
Products	1	2	3	4	5	6	7	8	9	10	11		Households	General government and NPISHs					
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
Intermediate inputs																			
Value added																			
Taxes on product																			
Subsidies on product																			
Gross regional product																			
Output, at producers prices																			

- from the regional production account

- from the regional use of income account

2.2. Using of Regional Accounts

Presently, in Russia there are only the production account and some elements of the use of income account on the regional level.

The regional production account (Goskomstat of Russia, 1998). This account has compiled since 1994 and Goskomstat has published the official data of GRP by 79 subject of Russian Federation. Gross regional product is defined as sum of gross value added by industries plus net tax on the product. Gross value added is the difference between output at basic prices and intermediate inputs.

Table 2. *Simplified scheme of the production account for region of Russia (at current prices)*

	Output at basic prices	Intermediate inputs	Value added
Industry Construction Agriculture and forestry Other activity of goods and services productions Market services (20 positions) Non-market services (10 positions)			
Total			
Taxes on products Subsidies on products	X X	X X	
Gross regional product	X	X	

Methodology of estimation of this indexes on the national and regional levels is the same. However, some elements of Russian GDP can't be compiled on the regional level or distributed between regions.

Total GRP of all Russian regions is differ from Russian GDR on the value added of:

- non-market community services, provided by general government to the society as a whole (national defence, governing);
- other non-market community services, budgeted on the account of federal budget and data is absent on the regional level;
- financial intermediation services (particularly banks), which activity is not limited of the regional border;
- services of the foreign trade, in many cases information can be taken on the federal level only.

Besides, GDP and GRP at market prices distinguish on the amount of the export taxes and the import taxes, because their total amount is impossible to distribute between separate regions (there are some specifics of their account). Total GRP composes approximately 90% of Russian GDP (Granberg etc., 1998).

The use of income account. There are two elements of the use of income account, which estimate on the regional level: final consumption of households (FCH) and final consumption of general government and NPISHs (FCG).

The methodology of final regional consumption (FRC) calculation has some simplifications. It is related with incomplete available data.

The final consumption of households is taken into account in borders of region, without separation on residents and non-residents of regional economy. Sum of FCH by regions is not equal national FCH on the amount of humanitarian aid and direct purchasers on foreign market by residents less direct purchasers in domestic market by non-residents. On the regional level final consumption of households is divided between consumption of goods and consumption of services.

The consumption of collective services is evaluated only by production method according to kinds of services. The part of final consumption, connected with activity of federal institutes, is not distributed between regions.

Total FRC composes approximately 70% of final consumption estimated for Russian as a whole (Granberg etc., 1999).

3. Methodology of regionalizing Input-Output Table

3.1. Output and intermediate inputs

We used the top-down method (Eurostat, 1995) for regionalizing of Input-Output tables, especially for estimation of the 1st quadrant. "Working" variant of regional intermediate consumption matrix is constructed by same classification as NIOT. But industrial production is presented by only one position in the regional production account. Therefore, on the first step "industrial" output was divided on 65 products. It was made on the base of enterprise statistical reports and indirect statistical information. For estimation of share of intermediate inputs in output by products was used average national share for proper product. Value added by industrial products is the difference between output at basic prices and intermediate inputs. Control totals by non-industrial products are taken into the regional production account.

After estimation of control totals of output and intermediate inputs by all 120 products for each region we compile intermediate consumption matrix for each region proceed from the supposition, that structure of intermediate inputs by the production of each

product is same for all regions and equal national structure. Finally we aggregate received matrix on 11x11 scheme.

3.2. Final domestic demand

Control totals by final consumption of households and final consumption of general government and NPISHs by regions are taken from the use of income accounts.

Structure of FCH of services by regions is estimated by annual statistical form and structure of FCH of goods by regions conditionally is same the structure of FCH of goods from NIOT.

Gross capital formation was estimated on the regional level by elements. Official statistics is published "investment in fixed capital" (IFC) by regions of Russia, but this index is not comparison with "gross fixed capital formation" (GFCF).

$$GFCF = IFC – STD + CL + IFA + IDB, \quad (1)$$

STD – small inexpensive tools and devices,
CL- changes in livestock and trees,
IFA - improvements to existing fixed assets,
IDB - inputs on database.

Missing elements of gross fixed capital formation, changes in inventories and acquisition less disposals of valuables was estimated with using of direct and indirect information. Unfortunately, in present time is too hard to divide regional gross capital formation between products, it is one of the reasons why we finally aggregated RIOT on 11 x 11 classification.

3.3. Net export and non-competitive import

Unfortunately, in our RIOT we could not estimate export and import by products and regions. At present time such information is either unavailable or unreliable. We evaluate net export by products as difference between output and intermediate consumption plus final domestic demand.

However we try to calculate non-competitive import in intermediate consumption by industrial products. We estimate matrix of non-competitive import for every region by the following methodology: if there is intermediate consumption of some product but there is not production of this product then all amount of intermediate consumption is a non-competitive import. In other cases, intermediate consumption is not defined as non-competitive import regardless of production quantity. Of course, amount of non-

competitive import depends from classification of products. But that is all what we can do using available data.

4. Comparative analysis of aggregated RIOT

Construction of Regional Input-Output tables by explained above methodology is showed extremely high distinguishes between regions – subjects of the Russian Federation.

The comparative characteristics by some regions of Russian Federation for 1997 is led below:

Table 3.1. *Intermediate inputs-output ratios (%)*

	Products											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Total
Chukchi autonomous district	56,4	2,5	3,6	1,2	14,9	2,4	10,2	6,2	0,1	1,8	0,6	100
Ingush Republic	54,0	2,0	11,0	1,2	12,7	1,8	11,3	4,4	0,1	0,9	0,6	100
Krasnodar kraj	52,9	1,8	17,9	0,9	9,5	1,4	11,6	2,3	0,1	1,0	0,6	100
Magadan oblast	57,7	2,2	4,1	1,3	15,2	1,8	11,1	3,8	0,1	2,1	0,6	100
Moscow city	55,6	2,4	4,5	2,0	10,7	3,1	13,4	3,7	0,2	3,3	1,2	100
Omsk oblast	68,7	1,0	8,4	0,7	10,0	0,9	7,5	1,6	0,1	0,6	0,4	100
Perm oblast	64,4	1,6	5,9	0,9	10,8	1,2	10,8	2,1	0,1	1,6	0,6	100
Republic of Altay	45,5	2,0	21,2	1,0	13,1	1,9	9,7	4,3	0,1	0,7	0,5	100
Republic of Bashkortostan	66,5	1,1	9,2	0,8	10,5	0,9	8,2	1,5	0,1	0,9	0,4	100
Samara oblast	68,6	1,5	4,5	1,0	9,0	1,1	10,1	2,2	0,1	1,4	0,6	100

Table 3.2. *Non-competitive import (%)*

Regions of Russia	Share of non-competitive import of industrial goods in intermediate consumption of industrial goods	Product structure of non-competitive import								
		Total	Energy and fuel	Metal-lurgy	Chemical	Machine building and metal-working	Light	Food	Con-struction materials	Other industrial goods
Perm oblast	3,1	100	1,4	33,0	0,0	41,1	0,0	12,1	2,1	10,3
Krasnodar kraj	3,5	100	55,7	22,7	11,0	6,6	0,0	0,0	2,9	1,1
Samara oblast	3,7	100	43,7	25,9	0,0	5,5	14,2	0,0	6,9	3,9
Republic of Bashkortostan	4,0	100	78,1	0,0	0,0	14,7	0,0	1,3	0,0	5,8
Moscow city	4,7	100	57,5	7,2	0,0	0,0	0,0	0,0	27,6	7,7
…										
Magadan oblast	46,1	100	42,3	19,9	11,6	12,6	1,0	4,4	3,2	5,0
Omsk oblast	50,0	100	96,0	1,0	0,3	0,7	0,0	0,6	0,3	1,0
Chukchi autonomous district	59,8	100	32,4	7,6	11,8	26,1	2,7	5,2	8,9	5,4
Republic of Altay	71,6	100	45,0	5,9	11,6	12,6	0,6	10,6	4,6	9,2
Ingush Republic	75,6	100	37,4	9,2	8,9	24,3	0,5	8,5	6,0	5,1

Table 3.3. *Structure of final demand (%)*

Regions of Russia	Final consumption of households	Final consumption of general government and NPISHs	Gross fixed capital formation	Changes in inventories and acquisition less disposals of valuables	Net export	Total
Chukchi autonomous district	22,6	55,7	14,8	5,0	1,8	100
Ingush Republic	62,3	27,8	66,6	0,0	-56,7	100
Krasnodar kraj	66,9	18,7	24,2	3,2	-13,0	100
Magadan oblast	43,8	34,1	24,6	-0,9	-1,6	100
Moscow city	103,7	13,8	23,2	1,7	-42,4	100
Omsk oblast	66,0	18,8	17,3	3,5	-5,6	100
Perm oblast	54,5	15,7	22,2	3,4	4,1	100
Republic of Altay	79,6	37,0	11,1	9,0	-36,6	100
Republic of Bashkortostan	44,2	13,2	25,7	5,3	11,7	100
Samara oblast	63,9	14,8	20,1	3,8	-2,5	100

Table 3.4. *Structure of intermediate inputs (%)*

	Products										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Chukchi autonomous district	51,8	37,1	75,9	28,5	23,4	28,0	39,8	157,7	43,8	15,4	79,7
Ingush Republic	37,3	45,3	42,0	10,8	33,5	25,2	24,9	81,6	24,0	10,5	66,0
Krasnodar kraj	64,5	42,1	58,1	20,5	30,1	20,4	33,3	70,2	34,8	44,4	32,5
Magadan oblast	60,7	18,7	101,8	36,6	44,9	29,2	36,9	47,7	38,2	44,2	54,9
Moscow city	63,1	45,7	13,9	48,6	48,1	28,8	30,6	56,1	52,9	56,0	34,6
Omsk oblast	75,6	50,9	56,0	34,5	33,7	22,7	30,8	56,9	39,1	45,0	35,9
Perm oblast	61,3	41,1	48,7	16,4	52,5	19,7	26,3	62,3	43,6	54,7	33,9
Republic of Altay	63,1	38,0	48,5	40,8	53,6	22,4	29,5	38,1	28,8	38,5	60,3
Republic of Bashkortostan	67,7	42,2	53,3	36,4	28,8	19,1	30,2	54,7	37,7	42,1	53,3
Samara oblast	66,7	48,7	69,8	31,8	29,3	20,8	36,2	80,8	40,6	27,0	38,0

Compiled Regional Input-Output tables are the informational base for regional and interregional models of the short-time forecasting.

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