

Interregional balance based on rail transport data

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- Official I-O tables for Russia 2011-2015
- Regional data of SNA

but

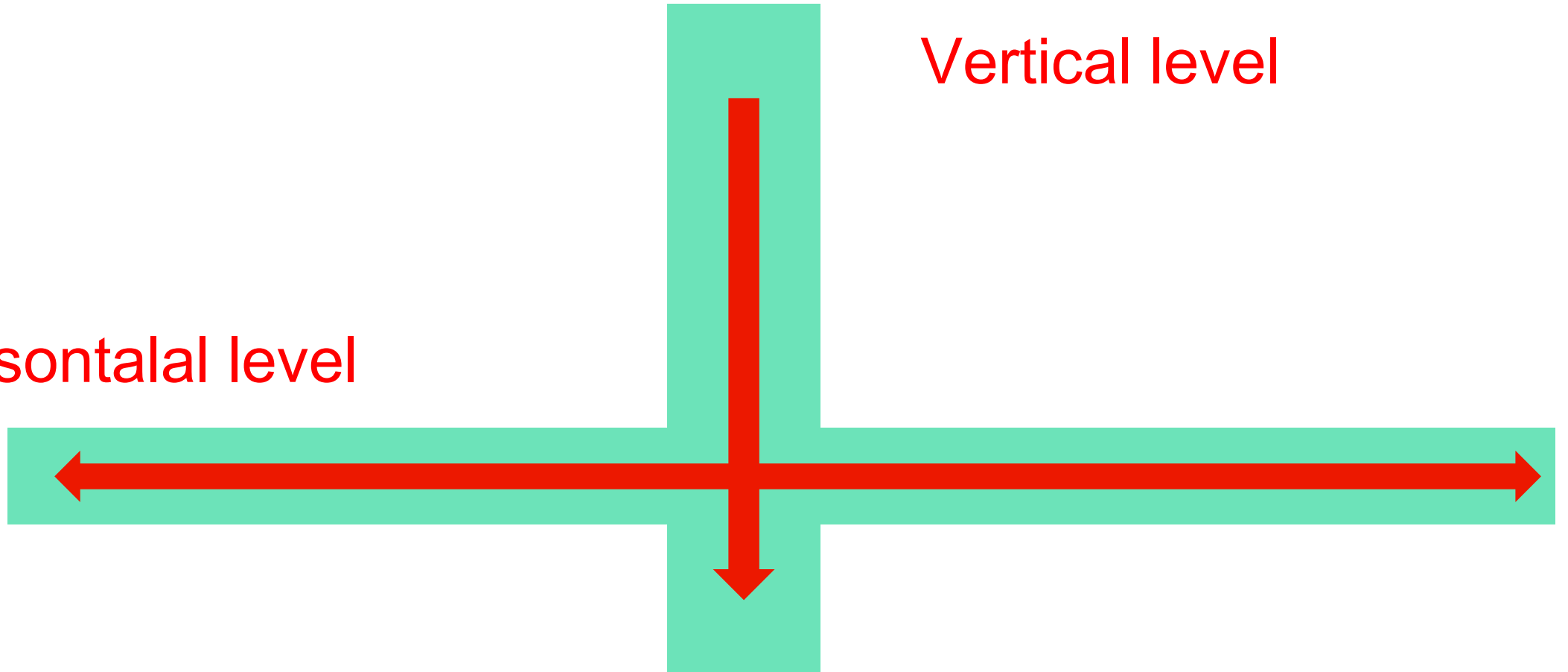
Rosstat believes that it is impossible to develop and publish regional Input-Output tables

Reason:

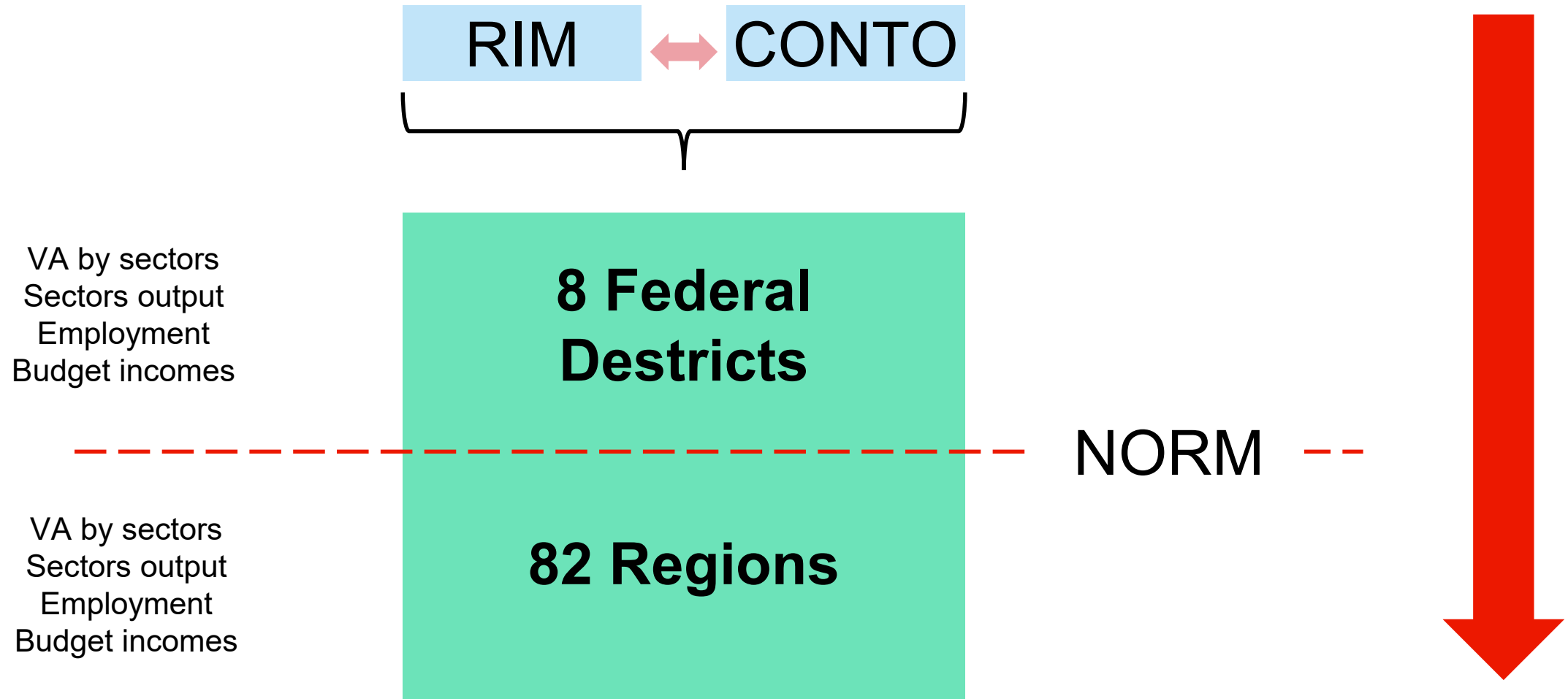
A large amount of technical work and the inability to identify the production of large corporations

Vertical level

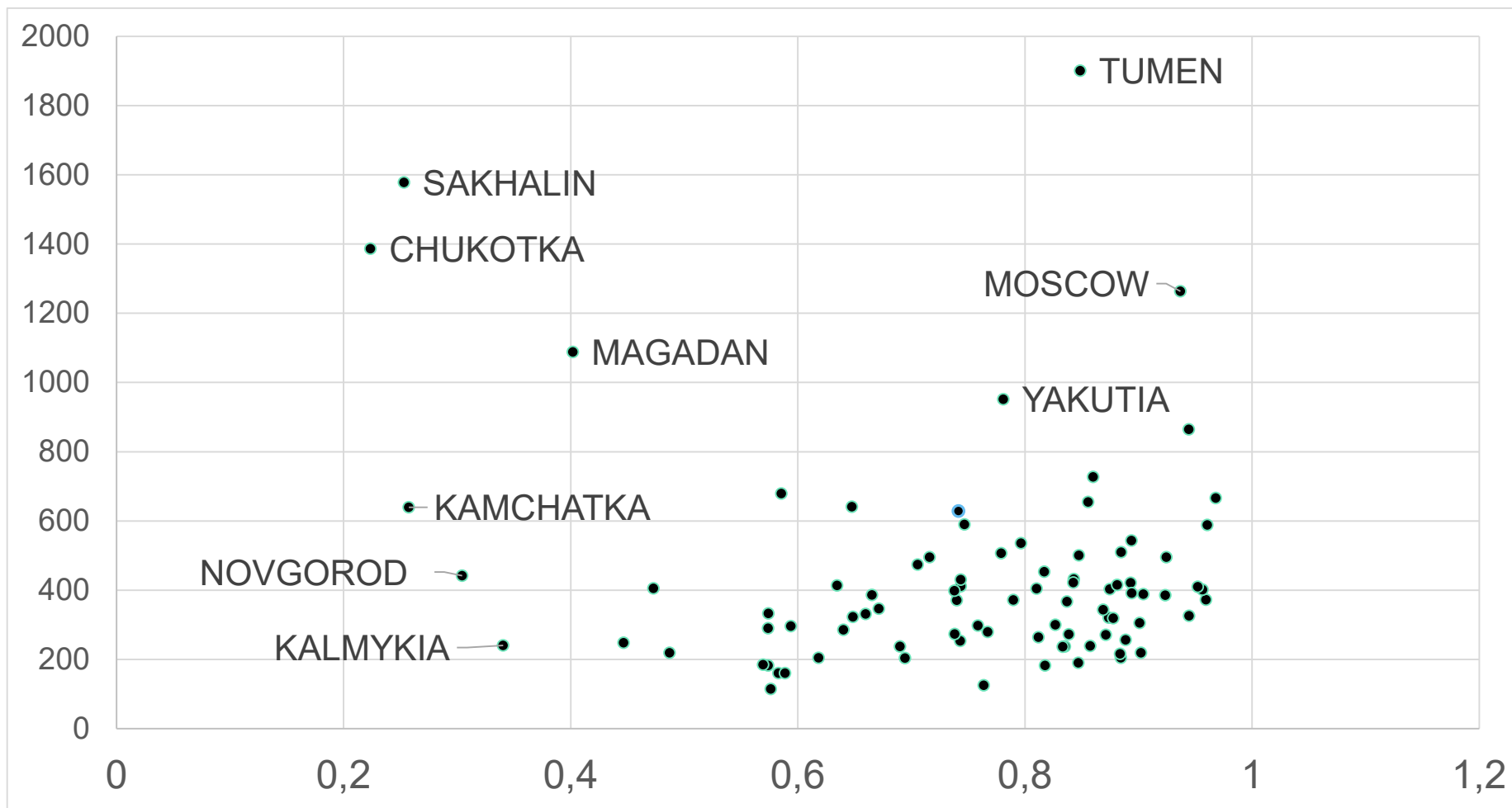
Horizontal level



Model problems



Correlations of GDP dynamics in Russia and certain regions in 2004-2017 (x-axis) and the level of GRP per capita (in thousand rubles 2017, y-axis)

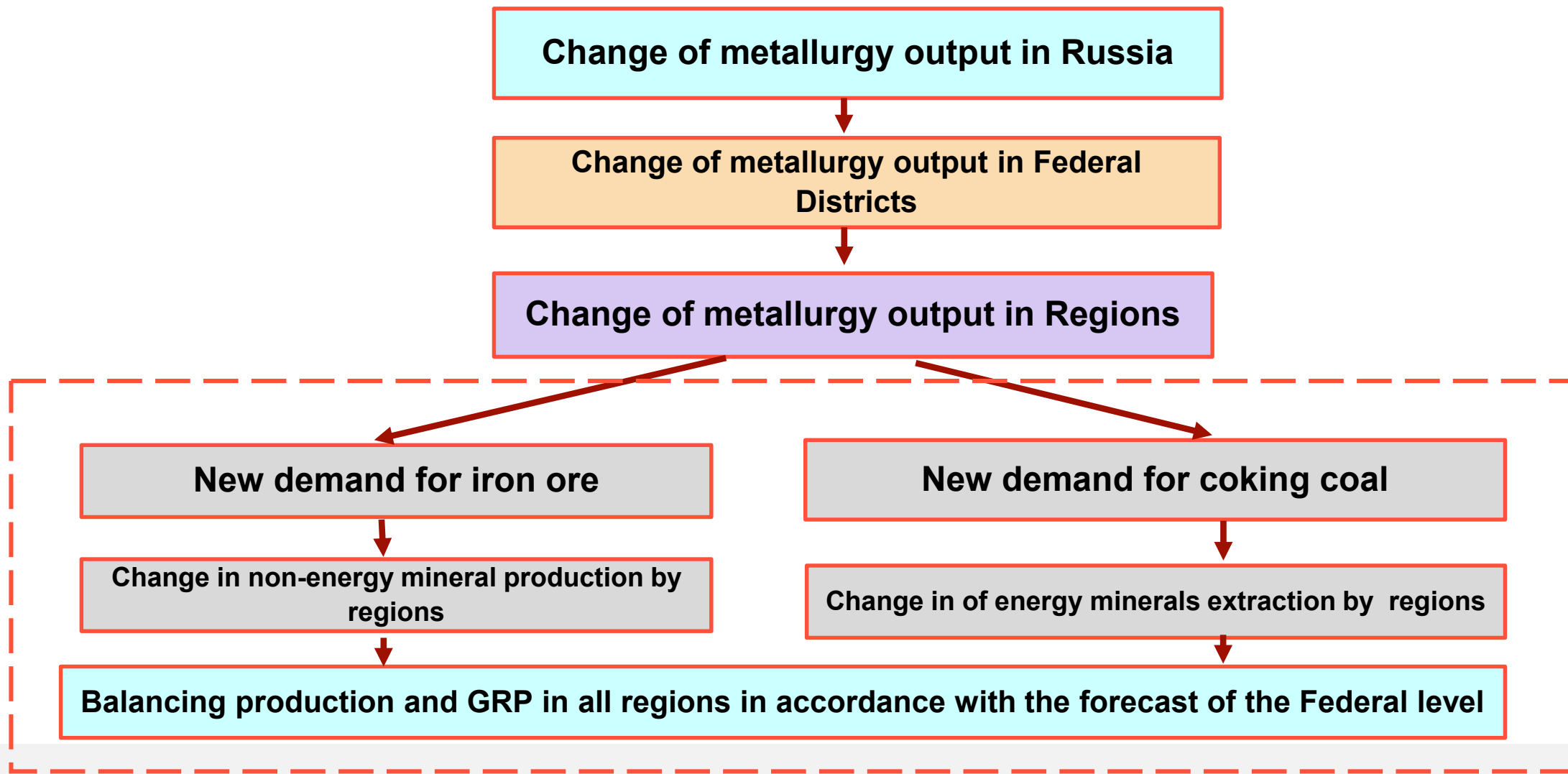


Matrixes of interregional goods transportation (domestic, import, export, transit) 79 X 79 regions

1. Coking coal
2. Steam coal
3. Coke
4. Ferrous metals
5. Nonferrous metal
6. Ores of ferrous metals
7. Nonferrous metal ores
8. Oil
9. Energy Gases
10. Petroleum products
11. Roundwood
12. Carving wood
13. Cement
14. Other construction materials
15. Bread goods
16. Fertilizers
17. Other chemicals
18. Other goods

Based on transport matrices, the regional model has been modernized, which now takes into account the system of horizontal interregional relations

Impact of horizontal economic relations on the regional forecast of output and GRP (on the example of metallurgy)



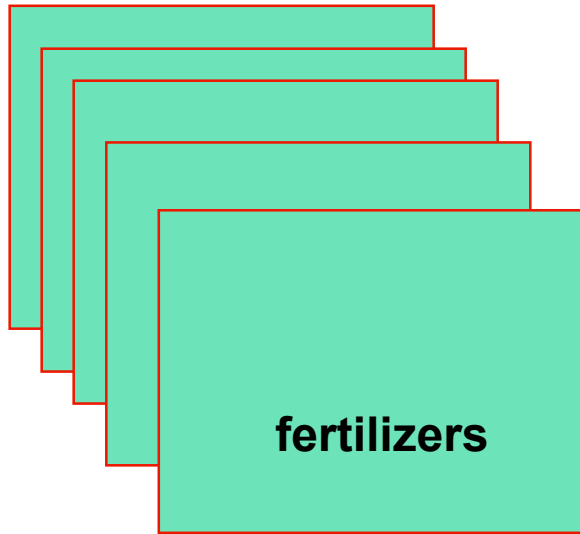
The cost of goods transported by Russian rail in internal transportation

	2014	2015	2016	2017
Coking coal	73	89	128	213
Steam coal	159	200	211	180
Coke	51	72	82	123
pipes of ferrous metal	373	474	428	445
rolled ferrous metal	885	948	1025	1290
semi-finished products of ferrous metals	126	135	147	146
aluminum	31	53	49	62
other non-ferrous metals	148	156	149	173
ores of ferrous metals	109	119	106	152
oil	329	311	251	319
energy gases	209	323	364	436
petroleum products	2196	2189	1917	2165
roundwood	30	33	37	40
carving wood	41	38	42	52
cement	85	78	81	87
other building materials	548	517	595	639
wheat	29	41	47	39
flour	13	15	17	16
nitrogen fertilizers	45	65	66	63
potash fertilizers	4	5	4	3
other fertilizers	32	44	54	48
sulfur	5	10	5	4
ammonia	4	5	6	6
TOTAL	5523	5921	5812	6700

20% of agriculture,
mining and
manufacturing output

60% of agriculture,
mining and
manufacturing output
using in intermediate
consumption

Formation of a single transport matrix



AVERAGE PRICES FOR GOODS

$$c_{rk} = d_{rk} * p$$

где: c_{rk} – value of cargo transported from region r to region k ;

d_{rk} – physical volume of cargo transported from region r to region k ;

p – average price per unit of cargo transported

$$X = (E - A)^{-1} * Y$$



$$X' = (E - C)^{-1} * Y'$$

**output in real
sector**

**final
demand in
real sector**

**matrix of coefficients of
interregional exchange of
intermediate products**

Interregional Input-Output symmetric table for Russia (2017)

	CFD	NWFD	SFD	WFD	NKFD	UFD	SIBFD	FEFD	OTHERS	FINAL DEMAND OF REAL SECTOR PRODUCTION (WITHOUT IOF FOREIGN TRADE)	OUTPUT OF REAL SECTOR
CFD	427,5	129,1	57,7	83,7	9,8	47,0	16,7	10,7	0,1	8900,0	9682,3
NWFD	133,9	289,7	29,7	64,2	4,3	28,8	16,2	5,3	0,0	4085,7	4657,8
SFD	54,8	15,1	188,3	34,9	45,5	38,4	12,2	4,6	0,4	2580,5	2974,7
WFD	227,8	169,7	215,5	446,1	39,7	164,1	54,4	15,3	2,0	5944,2	7278,7
SKFD	16,1	2,1	31,3	1,9	4,7	2,7	0,4	0,1	0,0	910,6	970,0
UFD	95,2	228,1	67,9	282,2	9,9	394,6	128,1	18,0	1,9	6035,3	7261,2
SIBFD	93,1	47,3	36,4	58,8	3,7	119,4	626,9	265,8	0,9	3778,6	5030,9
FEFD	10,1	1,0	0,5	3,7	0,1	11,5	9,4	262,1	0,0	2338,7	2637,1
OTHERS	0,0	0,1	0,3	0,1	0,0	0,9	0,3	0,0	0,4	390,7	392,9
VA of REAL SECTOR	8623,7	3775,7	2347,2	6303,0	852,3	6453,6	4166,4	2055,2	387,2		
OUTPUT OF REAL SECTOR	9682,3	4657,8	2974,7	7278,7	970,0	7261,2	5030,9	2637,1	392,9		

Connectivity in Russian regions

Dependence of output by Federal districts with the growth of final demand by 10%

	CFD	NWFD	SFD	WFD	NKFD	UFD	SIBFD	FEFD	Impact on regional output
CFD		0,30	0,20	0,34	0,17	0,16	0,22	0,04	1,44
NWFD	0,14		0,06	0,25	0,03	0,33	0,12	0,01	0,78
SFD	0,06	0,07		0,30	0,30	0,11	0,09	0,00	0,87
WFD	0,08	0,13	0,12		0,02	0,37	0,13	0,02	0,79
NKFD	0,01	0,01	0,16	0,06		0,02	0,01	0,00	0,26
UFD	0,05	0,06	0,13	0,22	0,03		0,25	0,04	0,73
SIBFD	0,02	0,03	0,04	0,08	0,01	0,17		0,04	0,36
FEFD	0,01	0,02	0,02	0,03	0,00	0,04	0,60		0,70
Dependence on regional demand	0,37	0,64	0,73	1,28	0,56	1,19	1,41	0,15	

- The greatest impact on the development of regional output has (due to scale) the development of the CFO
- The DFO and SIBFO remain loosely linked to other regions of the country
- The greatest dependence on domestic demand in the "old industrial" regions: PFD, UFO, SIBFO

The most important interregional links in the consumption of intermediate products in 2017



Rank	SUPPLY	USE	Inverse Matrix Coefficients	Input coefficients
1	Khabarovsk	Primorsky Krai	0,224	0,198
2	Krasnoyarsk	Khabarovsk	0,169	0,145
3	Khabarovsk	Jewish Autonomous region	0,096	0,077
4	Irkutsk	Transbaikalia	0,086	0,069
5	Kemerovo	Altai	0,073	0,060
6	Irkutsk	Transbaikalia	0,072	0,049
7	Kemerovo	Primorsky Krai	0,071	0,053
8	Krasnoyarsk	Republic Of Khakassia	0,070	0,067
9	Altai	Lipetsk	0,066	0,064
10	Тюменская область	St. Petersburg	0,062	0,062
11	Kemerovo	Novosibirsk	0,058	0,047
12	Vologda	Kostroma	0,057	0,054
13	Chelyabinsk	Volgograd	0,057	0,050
14	Omsk	Novosibirsk	0,051	0,046
15	Belgorod	Lipetsk	0,050	0,048
16	Chelyabinsk	Sverdlovsk district	0,049	0,049
17	Leningrad district	Novgorod	0,048	0,046
18	Vologda	Ivanovo	0,047	0,045
19	Yaroslavl	Karelia	0,047	0,043
20	Amur	Khabarovsk	0,047	0,040

Main conclusions



- 1. Economic dynamics in Russia is formed in the conditions of structural and regional imbalance, which is one of the significant limitations of growth in the medium and long term.**
- 2. The formation of an effective economic policy requires a comprehensive analysis of the effectiveness of measures at the level of the country's economy, sectors and regions.**
- 3. The tools of intersectoral and interregional forecasting should take into account both the impact of macroeconomic dynamics on the regional development and the interregional level of interactions.**
- 4. In current state of statistics, the most qualitative information on the structure of interregional economic relations can be obtained from the analysis of data on traffic on the railways.**
- 5. Analysis of the system of interregional interactions at the level of FD shows significant constraints to economic development associated with high significance of the CFD at formation of economic dynamics insufficient use of the potential of old industrial regions of the country, isolation from major production chains of Siberia and the Far East.**
- 6. The task of analyzing the system of interregional relations requires the expansion of spatial analysis and forecasting tools. In this regard, it is necessary at the methodological and practical level to resolve the issue of expanding the regional part of the national accounts and the formation of official input-output tables, at least at the level of the FD.**

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