

The problems of identification of resource-type regions

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Abstract. The article considers approaches to the allocation of qualitative and quantitative criteria for the allocation of resource-type regions. An enclave character of the development trajectory of the Russian regions is shown. The authors' approach to the allocation and classification of resource regions is proposed, the dynamics of the selected groups over the period of 2005–2014 is shown.

1. Introduction

Much attention has been paid to the problems of development of the resource economies and regions over the recent years. This is because most countries which have significant deposits of natural resources, including Russia, lag behind the countries not possessing such natural wealth in the pace and quality of economic growth, social development, political and economic institutions.

Currently, Russia's economy is on the verge of a systemic crisis, whose key cause is the exhaustion of the resource-based model of development based on the extensive exploitation of large deposits of mineral resources (MR), especially in the energy sector, implementation of large-scale mega-projects and the activities of large export-oriented mining companies. The problem of searching for new effective models of the country's development, based on innovation and accelerated development of manufacturing industries, is paramount.

The task of modernizing the mineral resource development model declared by the Government of the Russian Federation and a change in the spatial specialization are expected to solve this problem. In the new model of development, the resource type regions should be the starting point for the formation of the intensive model of the country's development. All this suggests that the analysis of resource regions is a very urgent task.

The article *aims* at justifying the qualitative and quantitative approach to the identification of "resource type" regions and the development of their typology.

2. Methods of research

The research methodology consisted in the methods of analysis, comparison, generalization and expert assessment.

3. Results and discussion

Large deposits of mineral resources (MR) in a region are both a source for growing prosperity and the cause of many problems in its development. Resource orientation provides regions with high growth



and high income levels, while limiting the development of other industries and enhancing the disintegration processes.

The discussion of the problems and features of resource-type countries' and regions' development was started in R. Auty's research [1]. In his later works with E. Gelb, R. Auty tried to explain the causes and mechanisms of the falling living standards in the countries—exporters of oil in the 1970s-1980s [2]. The fact of slower development of resource-rich countries in the 1990s attracted the attention of John Sachs and A. Warner when performing cross-country comparisons [3]. At the same time, large number of vivid metaphors denoting this phenomenon emerged in the scientific literature: the “resource curse”, the “Dutch disease”, the “oil curse”, “enclave development”, etc. [4]. They all reflect a negative influence of the MR factor on the economy of the transitional countries rich in natural resources in three areas: technological, macroeconomic and institutional [4].

The technological and macroeconomic impact is implemented by the following pattern: big revenues from the export of raw materials, with investment mechanisms holding back the development of non-oil sectors of the economy. The labour-intensive, knowledge-intensive, the manufacturing sectors of the economy are particularly affected. The export of resources leads to strengthening of the national currency as a result of increased foreign exchange inflows from exports of raw materials. This, combined with constant growth in wages in capital-intensive extractive industries, leads to a decrease in competitiveness of other sectors, hampers the development of the market, limits the possibilities of intensive growth and the economy development on the innovative basis. The simple dominance of capital-intensive technologies in the resource sector, reduces the need for skilled staff and investments in human capital. Large capital-intensive commodity production has a negative impact on the level of competition and market potential in the country, further worsening the situation. Commodity companies starting acquiring patents not for their implementation, but for limiting other companies' access to new technologies. The country starts investing fewer resources in the development of education, science and new technologies.

High revenues from commodity exports reduce the quality of institutions. The desire to limit competition by means of the state leads to the formation of rent-seeking behavior that contributes to the selection and preservation of the inefficient economic and political resources for maximum profit and its distribution among the representatives of the political elite and big businesses. As noted by M. Ross, the vast majority of resource-rich countries have been unable to avoid reducing the market potential and deterioration of the quality of economic institutions, they have underdeveloped democratic institutions and civil society [5]. In turn, inefficient institutional environment impedes economic growth, reducing its quality indicators and, accordingly, affects the quality of life of the population, leading to increased social stratification, deterioration of the environment, increasing inequalities within and between countries and regions [6].

In the late 1990 – early 2000s, along with the works describing the negative impact of resource wealth on national economies, new works emerged attempting at finding a way out of resource-dependent development. The interest to this problem was fueled by the active search for a new model of development of Russia. V. Polterovich, V. Popov, A. Tonis and other researchers attempted in their works to develop institutional mechanisms creating the conditions to overcome the resource curse and the conversion of revenues from exports of natural resources into a source of growth and development of the Russian economy. The authors expressed disagreement with the fact that there is an inevitable direct relationship between resource wealth and underdevelopment of countries and noted that the vector of the resource wealth influence on the economy is determined by the quality of institutions [7]. The authors emphasized that the “resource curse” is the manifestation of the negative influence of the economic structure on the economic growth (rather than the development) [8].

In general we agree with this approach, but we believe that in addition to the institutional factors, the of countries' and regions' ability to create the industries alternative to the extractive sector based on revenues from hydrocarbon exports is of great importance for overcoming the resource curse.

In addition, we believe that with regard to Russia, the “resource curse” should be studied at the regional level. This is due to the fact that it is a powerful factor in the preservation and deepening of

regional disparities in the levels of socio-economic development. Commodity specialization is the main factor determining the peculiarities of the system of settlement and spatial organization of the Russian Federation. Commodity regions attract investment and skilled and mobile workforce, becoming the leading regions as manifested by cumulative socio-economic indicators. At the same time, the high cost of maintaining the infrastructure and difficult climatic conditions become an obstacle for their sustainable development. Thus, while in 1998 the per capita GRP production in the ten most economically developed regions of Russia exceeded the average level by 2.5 times, in 2000, it was more than 3.2 times. Among the developed regions, the regions of raw material specialization dominated [9].

The concept of “resource region” has not yet received a clear definition, neither in scientific literature nor in practice. In foreign studies, the resource regions are studied within the scope of national economies. Thus, R. Auty defined resource economies (mineral economies) as developing countries where at least 8 % of the GDP and 40 % of exports are produced in the industries related to mining. [1]. In Russian researches, resource economies are analyzed both within national economies [7], and from the standpoint of a particular region [8]. Most often, resource regions are understood as the regions within the borders of a subject of the Russian Federation, which have significant deposits of natural resources and actively explore them [10].

Despite the fact that the features of resource regions development largely determine the trajectory of the country as a whole, in Russia there is no universally accepted approach to the identification and classification of the “resource regions”. For example, according to the classification of A.O. Polynia [11], one of the key factors in identifying resource-type regions is the index of “the level of the region’s MR potential”, defined as the ratio of the regional and national average values of the mineral resource base valuation per capita (at market prices on the valuation date). In M. Grigoriev, Yu. Urozhayeva, and D. Ivanov’s synthetic classification of regions, all regions of Russia are divided into 9 types forming 4 groups, with commodity regions identified within each group [12]. N.N. Mikheeva identifies 21 commodity regions in Russia, focusing on the share of mining in GRP [13]. The same approach was followed by V.P. Orlov who defines the resource region as a region “where more than 5 % of shipped products are mineral resources” [14]. I.N. Ilyina suggests using the share of gross value added from mining in the GRP of more than 30% as the key criterion for identifying resource regions of Russia [8]. N.N. Mikheeva and S.V. Belousova suggest using the same rate, but they justify the index level with a cutoff at 10.5 % and 10.8 % [13, 15]. L.A. Tolstolesova defines a resource region as the subject of the Russian Federation (or several subjects) where mineral complex production make more than 50 % in the structure of industrial production due to its geographical location and the availability of significant natural resources [16]. Some authors attempt giving a quality definition of resource regions [17].

In this article, the resource regions (“resource type” regions) are understood as regions specializing in the extraction and processing of mineral complex products due to their geographical location and the availability of substantial MR potential, where the largest export-oriented vertically-integrated commodity companies, determining the direction and nature of the regional economic development.

To identify the Russian resource regions and suggest their classification depending on the degree of resources dependence, the authors chose the time period of 2005-2014. The year 2005 was taken as a reference point, since it was then that the economy recovery after the recession of the 1990s was over. The periods of rapid growth of the Russian economy in 2006-2007 and the period of sharp recession during the crisis of 2008-2009 were excluded from the analysis. The latest statistical data are available for the year 2014.

To determine the lower boundary of the resource dependence of the Russian regions, the authors took V.P. Orlov’s approach, determining the “resource type” of the Russian regions on the basis of the share of the value added in the section “Resource extraction” in the GRP. [14]. Non-resource “border” regions were included into the group of the analyzed regions to account for the dynamic changes in the level of resource dependence of Russia as a whole (the share of extractive industries in the GRP fluctuated in the range from 8.9 % to 11.4 % during this period) and its regions (some regions crossed

the border several times, moving into to group of resource regions, and then coming out of the group again). The “border” regions were defined as non-resource regions that crossed the border of 5 % at least once in the analyzed period. As a result, the number of selected regions amounted 36 regions.

To ensure the comparability of indicators based on the share of extractive industries in the GRP the K-rate was calculated. This rate represents the ratio of the share of extractive industries in the GRP (K_{reg}) to the share of extractive industries in the Russian Federation’s GDP (K_{Rus}):

$$K = \frac{K_{reg}}{K_{Rus}}$$

The results of the K-rate calculations for the selected 36 regions in 2005-2014 are provided in table 1.

Table 1. Dynamics of resource dependence of the regions (2005-2014).

Region / year	2005	2010	2011	2012	2013	2014
1 Nenets Autonomous Okrug	5.80	7.56	6.60	6.73	7.03	7.01
2 Khanty-Mansiysk Autonomous Okrug - UGRA	5.85	6.06	5.98	6.06	6.07	6.31
3 Sakhalin Region	1.73	5.70	5.41	5.49	5.66	6.20
4 Tyumen Region	4.68	4.80	4.63	4.87	4.86	5.11
5 Yamalo-Nenets Autonomous Okrug	4.80	4.61	4.29	4.64	4.87	4.74
6 The Republic Of Sakha (Yakutia)	3.09	3.86	3.88	3.82	3.98	4.20
7 Chukotsky Autonomous Okrug	0.59	3.67	3.71	3.38	2.90	4.05
8 Orenburg Region	2.89	3.45	3.16	3.30	3.80	3.40
9 Republic Of Komi	2.68	3.22	2.98	2.88	3.00	3.17
10 Tomsk Region	2.77	2.30	2.69	2.79	2.69	2.69
11 Udmurt Republic	2.09	2.25	2.30	2.29	2.33	2.28
12 Kemerovo Region	2.12	3.02	3.09	2.39	2.06	2.04
13 Astrakhan Region	0.21	0.34	1.56	1.74	1.97	2.03
14 Irkutsk Region	0.30	0.72	1.16	1.40	1.56	1.88
15 Republic Of Tatarstan	2.41	2.08	1.98	1.95	1.90	1.87
16 Magadan Region	2.12	1.98	2.24	1.63	1.61	1.62
17 Krasnoyarsk Krai	0.30	1.74	1.48	1.38	1.59	1.59
18 Perm Krai	1.23	1.30	1.39	1.62	1.58	1.46
19 Samara Region	0.84	1.14	1.25	1.31	1.24	1.34
20 Belgorod Region	1.70	1.62	1.87	1.43	1.40	1.17
21 Murmansk Region	0.84	1.46	1.66	1.44	1.67	1.15
22 The Republic Of Karelia	1.51	1.23	1.27	1.21	1.15	1.13
23 Amur Region	0.41	0.98	1.40	1.33	1.07	1.06
24 The Republic Of Khakassia	0.57	1.48	1.40	1.06	1.10	1.03
25 Kursk Region	1.41	1.16	1.33	1.13	1.09	0.88
26 Transbaikal Region	0.59	1.23	0.71	0.81	0.93	0.73
27 Tyva Republic	0.40	0.66	0.55	0.54	0.43	0.61
28 Volgograd Region	0.53	0.54	0.55	0.53	0.55	0.43
29 Khabarovsk Krai	0.37	0.43	0.49	0.58	0.53	0.42
31 Kaliningrad Region	1.15	0.57	0.51	0.43	0.40	0.33
32 The Republic Of Buryatia	0.35	0.47	0.54	0.45	0.38	0.33

33	Republic Of Bashkortostan	0.99	0.85	0.43	0.26	0.26	0.30
34	The Republic Of Ingushetia	0.80	0.18	0.17	0.17	0.19	0.16
35	Chechen Republic	0.79	0.26	0.21	0.17	0.18	0.16
36	Republic Of Kalmykia	0.51	0.33	0.26	0.27	0.27	0.13

*Note: The intensity of shading reflects the degree of the region's resource dependence.

-  - monoregions with maximum resource dependence (monoregions);
-  - resource regions with high resource dependence (high dependence regions)
-  - regions with medium resource dependence (medium dependence regions)
-  - resource regions with low resource dependence (low dependence regions)
-  - non-resource regions

Source: [9], authors' calculations

The table shows the presence of 5 clearly defined groups of regions that have different level of MR dependence have been respectively defined by the authors as monoregions, high dependence regions, medium dependence regions, low dependence regions, and non-resource regions.

The distribution of regions into groups and with the account for years is shown in tables 1 and 2. In table 1, it is reflected in the intensity of shading, while table 2 shows the number of regions in each group in each year.

Table 2. Classification of the regions depending on the share of the extraction industries in the GRP and the K-rate.

Type of a region	K	2005	2010	2011	2012	2013	2014
Monoregions: (> 30%)	>3	5	11	9	8	8	9
High dependence regions (20-30%)	[2-3)	7	3	4	4	4	4
Medium dependence regions (10-20%)	[1-2)	7	10	12	13	13	11
Low dependence regions (5 до 10%)	[0.5-1)	10	6	5	4	3	7
Resource regions, total	>0.5	29	30	30	29	28	31
Non-resource regions, with the share of extracting industries within 1 % – 5 %	[0.1-0.5)	7	6	6	7	8	5

*Source: [9], authors' calculations

It is significant that the number of regions that were included in the resource regions group was quite stable, their number in the considered period was around 30. In general, in 2005 – 2014, there was a slight increase in the number of resource regions – from 29 to 31.

One can also note the increase in the share of monoregions from 5 in 2005 to 9 in 2014; the increase in the number of monoregions was accompanied by the increase in their resource dependence, the upper value of the K-rate increased by almost 2 times. (see table 2). The increase in the number of monoregions occurred due to the increase in the degree of the high dependence regions' dependence (Orenburg Region and the Republic of Komi) and the conversion of medium dependence regions (Sakhalin Region) and previously non-resource regions (Chukotsky Autonomous Okrug) into monoregions. This was due to the rising price of hydrocarbons at the world markets and the overall growth of the resource dependence of the Russian economy.

The high dependence group was reduced due to processes of polarization. Two regions increased their dependence and became monoregions, two more regions contrarily reduced their resource dependence and went to the less resource-dependent groups. One monoregion (Kemerovo Region) moved to the high dependence group (see tables 2 and 3)

The biggest changes occurred in the largest group of medium dependence regions. Over the period of 2005 – 2014, the total number of the regions increased from 7 to 11. It is particularly noticeable in the change of intensity of shading of the regions of this group in table 3. In addition, the regions

constituting this group were constantly changing. Only 2 regions constantly belonged to the group of medium dependence regions: Perm Krai and the Republic of Karelia. The rest moved from high dependence regions (the Republic of Tatarstan and Magadan Region), low dependence regions (Samara and Murmansk Regions) and non-resource regions (Tuva Republic and Amur Region).

The impact of the dominant MR on the status of the regions is also significant. Table 3 shows that the most resource-rich regions, possessing large deposits of hydrocarbons (oil and gas) tended to increase their resource dependence, with the exception of the Republic of Tatarstan, Tomsk Region and the Republic of Bashkortostan. This reduction of resource dependence reflects a positive trend in the structure of the GRP of all the regions, the gradual growth of the share of processing industries and high-tech production. However, these positive trends do not yet have a significant impact on the other resource regions.

Table 3. Classification of Russian resource regions and the dynamics of group transition.

No.	Region	Dominant MR	Resource dependence dynamics	Transition from another group compared to 2005.
<i>Resource monoregions $K > 3$</i>				
1	Nenets Autonomous Okrug	oil and gas	↑	-
2	Khanty-Mansiysk Autonomous Okrug - UGRA	oil and gas	↗	-
3	Sakhalin Region	oil and gas	↑↑	from medium dependence group
4	Tyumen Region	oil and gas	↗	-
5	Yamalo-Nenets Autonomous Okrug	oil and gas	↘	-
6	The Republic Of Sakha (Yakutia)	oil and gas	↗	-
7	Chukotsky Autonomous Okrug	oil and gas	↑↑	from low dependence group
8	Orenburg Region	oil and gas	↑	from high dependence group
9	Republic Of Komi	oil and gas	↑	from high dependence group
<i>High dependence regions $K = 2-2.99$</i>				
10	Tomsk Region	oil and gas	↘	-
11	Udmurt Республика	oil and gas	↗	-
12	Kemerovo Region	coal	↓	from monoregions
13	Astrakhan Region	oil and gas	↑↑	from non-resource regions
<i>Medium dependence regions $K = 1-1.99$</i>				
14	Irkutsk Region	oil and gas	↑↑	from non-resource regions
15	Republic Of Tatarstan	oil and gas	↓	from high dependence group
16	Magadan Region	oil and gas	↓	from high dependence group
17	Krasnoyarsk Krai	oil and gas	↑↑	from non-resource regions
18	Perm Krai	oil and gas	↗	-
19	Samara Region	oil and gas	↑	from low dependence group
20	Belgorod Region	oil and gas	↓	-
21	Murmansk Region	other mineral resources	↑	from low dependence group
22	The Republic Of Karelia	other mineral resources	↘	-
23	Amur Region	coal and other mineral resources	↑↑	from non-resource regions

24	The Republic Of Khakassia	oil and gas	↑	from low dependence group
<i>Low dependence regions $K = 0,5-0,99$</i>				
25	Kursk Region	other mineral resources	↓	from medium dependence group
26	Transbaikal Region	coal	↗	-
27	Tyva Republic	coal	↑	from non-resource regions
<i>Non-resource regions $K = 0,1-0,49$</i>				
28	Volgograd Region	oil and gas	↓	from low dependence group
29	Khabarovsk Krai	coal and other mineral resources	↗	-
31	Kaliningrad Region	other mineral resources	↓↓	from medium dependence group
32	The Republic Of Buryatia	coal	↘	-
33	Republic Of Bashkortostan	oil and gas	↓	from low dependence group
34	The Republic Of Ingushetia	oil and gas	↓	from low dependence group
35	Chechen Republic	oil and gas	↓	from low dependence group
36	Republic Of Kalmykia	oil and gas	↓	from low dependence group

*Source: [9], authors' calculations

The data of table 3 also indicate that the regions rich in coal and other mineral resources (iron ore, nonferrous metal ores, etc.) reduced the level of their resource dependence during the analyzed period. However, these changes did not reflect the positive changes in the sectoral structure of the GRP (growth of the manufacturing industries and knowledge-intensive production), but the decrease in the overall decline of the GRP under the impact of lower raw materials prices in the world markets. Most likely, the real level of resource dependence in these regions remains at a high level. The exception is the Republic of Tyva. It has seen an increase in resource dependence, reflecting the development of new coal deposits.

4. Conclusion

The analysis showed that despite the fact that Russia is a resource economy, only 27 of the 85 Russian regions can be identified as resource-dependent, they have a decisive impact on the character and trajectory of the Russian economy's development. An important indicator of the region's resource dependence may be the share of the mining sector in the GRP structure.

There is a significant differentiation in the level of resource dependence of Russian regions. This allows suggesting a classification of resource regions and to distinguishing among four sustainable groups: monoregions, high dependence regions, medium dependence regions, and low dependence regions. The boundary of the resource dependence of the Russian regions is movable, thus it makes sense to include "border" regions (shifting from resource to non-resource regions). It is important to understand the reason for their "border" position.

Resource regions is not uniform, which is manifested in the major differences in the degree of dependence of the regional economy on the industries engaged in the extraction of resources, trends and mechanisms for the development and implementation of the regions' resource dependence.

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