

Russian Regions in the Global Economic Space

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Abstract. The article is devoted to analysis and assessment of the place of Russian regions in terms of labor productivity in context of the global economic space. Its main goal is to identify (empirical) patterns of acceleration or deceleration of the growth rate of above mentioned indicator on the basis of large international and Russian statistical data sets, to elicit the similarity (analogies) between countries of the world and Russian regions that are close to each other in terms of technological development. Preliminary results indicate that a group of regions rapidly developing (against the background of not only Russia as a whole, but also the world) appeared in Russia. It comes into particular prominence after 2008-2009. It is important that achievements of many of them are not connected with metropolitan position or rent-seeking. The idea of the article and its novelty is to identify specific successful regions behind general trends and to understand the origins of success. Among specific issues the article considers ones related to the ratio of labor productivity indicators among countries of the world and regions of Russia. It is shown that the measure of differentiation of the considered indicators in the world is higher than in Russia.

1. Statement of purpose

World economy of about last quarter-century and Russian economy of last 10-12 years are characterized by structural changes having fundamental meaning but it seems as if still do not fully understood. The old world and Russian centers of economic power are steadily losing their power, the new economies dormant before are gradually increasing their influence and their weight. As an example of "wilting" Japan's GDP accounting for 12.6% of the global indicator in 1991 fell to 7.7% in 2017, approaching close to the level of 1960 (GDP constant 2010 US \$), the GRP of Moscow amounted to 23.5% in comparison with the all-Russian indicator in 2006 and 20.7% in 2016 (GRP constant 2005).

In connection with above mentioned structural processes the configuration of the world and Russian economic space is transforming, the values of the parameters characterizing their inherent properties - compression and expansion (sparseness and condensation) – are changing. More specifically we are talking about the change in time of spatial (intercountry, interregional) ratios of the resulting economic indicators presented by labor productivity indicators in this case.

Convergence-divergence processes in the world and Russian economic space are studied quite deeply [1-18]. Another thing is that researches are often limited to generalized estimates, the dominant

tendency (convergency or stratification with such a speed, intensity), without identifying sufficiently specifically the "carriers" of this trend - leaders and outsiders.

There are several reasons why the issues under consideration are important and relevant. Firstly, it is connected to the recently posed political and economic task of Russia joining the top five largest economies in the world in the medium term (GDP based on PPP). Further, as is known, the priority of the spatial development of the Russian Federation until 2025 is declared "the development of promising centers of economic growth with an increase in their number ..." [19]. One of the aspects of this work are the identification of the regions of Russia which can be called such centers and their comparison with successful countries of approximately the same technological level (in terms of labor productivity). Finally, an additional impetus to the writing of the article is the fidelity assessment of the famous thesis: "lagging subjects of the Russian Federation will need not even tens, but hundreds of years to reach the level of modern developed Russian regions, that indicates the presence of contrasts of intercontinental scope within one country" [20]. Apparently, this statement was first made by A.G. Granberg: "In terms of the degree of interregional socio-economic differentiation, Russia ranks first in the world, and the differentiation of Russian regions exceeds the differentiation among the countries of golden billion and the most backward countries of the world" [21]. This paper is an attempt to verify the validity of this statement applying to labor productivity indicators.

2. Russian realities

It is advisable to make an assessment of the processes of interregional development in Russia from the beginning of the 2000s, when more or less normal development conditions were recreated, mostly spontaneous chaotic processes were overcome and natural procedures of fixed capital reproduction started to be carried out in the country [22,23].

Figure 1 represents the distribution of Russian regions³ depending on the approximation of the value of labor productivity to the consolidated indicator for Russia at the beginning and end of the period under review. All the values of relative indicators of labor productivity in the regions in 2000 and 2016 were divided on 5 (unequal) intervals for this purpose: [0, 0,5]; (0,5, 0,67]; (0,67, 1]; (1, 1,67]; (1,67, ∞).

There was a noticeable positive skew in the distribution in the base year 2000: values of labor productivity in 63 from 78 (80.8%) regions are less than in Russia as a whole (in 19 cases are less the ½ of consolidated indicator for Russia). Positive skew was also observed at the end of the period but not so noticeable: values of labor productivity in 57 (73.1%) regions are less than in Russia as a whole (in 10 cases are less the ½ of consolidated indicator for Russia).

The highlight of interregional development during the period under the review was the predominant dynamics of the regions located on the lower levels of productivity in the base year and the relatively low growth rates of the leading regions at the same time.

By 2016 it is observed the movement upward relative to the average Russian indicator (the differentiation of labor productivity is reducing) in 43 cases and the increase of the gap in 20 cases out of 63 outsider regions (with the level of labor productivity below the average Russian indicator at the beginning of the period). As for the 15 leading regions (with the level of labor productivity higher than the average Russian indicator at the beginning of the period) the gap from the average indicator decreased in 11 cases and increase in only 4 cases.

³ 78 regions are represented here out of 79 Russian regions which are usually studied in a long retrospective. The exclusion of the Republic of Ingushetia is associated with the phenomenon of employment statistics. According to the Federal State Statistics Service the average annual number of employees in the republic increased from 77.4 thousand people in 2014 people to 153.2 thousand people in 2015.

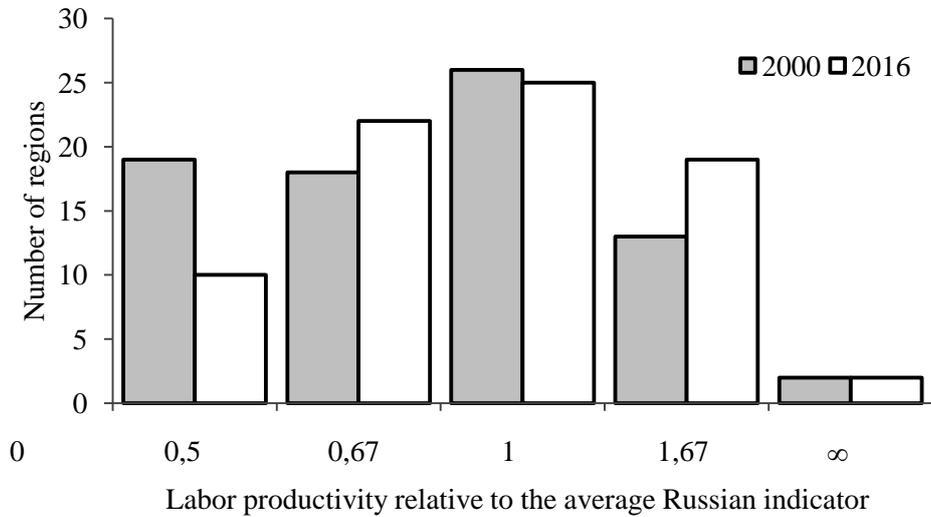


Figure 1. Histogram of the distribution of regions in 2000 and 2016 as for proximity of their labor productivity to the consolidated indicator for Russia, GRP constant 2005. Source: [24].

The result of interregional structural changes in 2000-2016 was the reducing (not losing) of relative advantage by the leaders in most cases and decreasing mostly a labor productivity gap by many outsiders.

The natural consequence is a noticeable reduction in scatter observed over the period: coefficient of variation was 77.6% in 2000 and 57.4% in 2016.

3. Global aspects

The average annual growth rate of labor productivity in the world amounted to 2.24% (GDP constant 2011 international \$ in PPP) and 1.39% (GDP constant 2010 US \$) during 2001-2016. The histogram shows the distribution of countries⁴ depending on the dynamics of labor productivity (Figure 2).

Myanmar and China demonstrate phenomenal average annual productivity growth rates (nine or more percent). Another ten countries (Azerbaijan, Armenia, Georgia, Turkmenistan, India, Mongolia, Romania, Mozambique, Ethiopia, and the Republic of Moldova), which were also not leaders in terms of labor productivity in the base year 2000, have more than five percent of average annual productivity growth rate. At the same time the average annual rates of many giants of the world economy (Sweden, USA, Australia, the United Kingdom, the Netherlands, Finland, Japan, Norway, Denmark, New Zealand, Luxembourg, Belgium, Canada, Austria, France, Switzerland, Germany) amounted to no more than 1.5% (significantly lower than the global average rate). About 30 countries at different levels of labor productivity in 2000 lowered their levels by the end of the period.

A generalizing consequence of various trends is the decrease of the polarization degree: the coefficient of variation of labor productivity indicators amounted to 113.8% in 2000 (49 countries) and 71.0% in 2016 (93 countries).

⁴ The World Bank database of labor productivity since 2000 contains 189 countries.

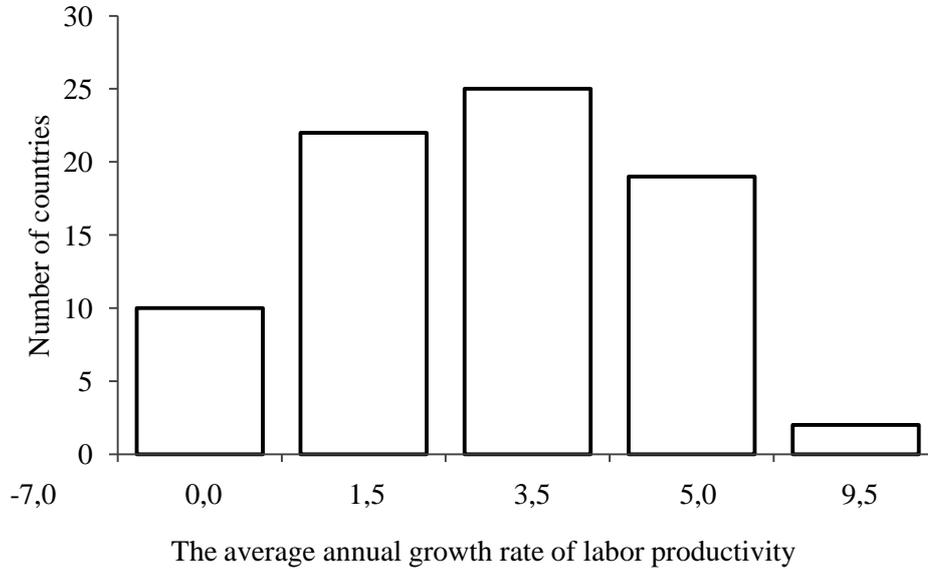


Figure 2. Distribution of countries depending on the average annual growth rate of labor productivity in 2001-2016 (GDP constant 2011 international \$ in PPP). Source: [25].

4. Russian regions in the global economic space

The questions are posed as follows:

- the scatter of indicators greater among countries of the world or regions of Russia?
- does the presentation of Russia by its regions (instead of one common position) make the global labor productivity more or less differentiated?

To answer these questions appropriate economic and statistical scatter indicators for 2016 were calculated (table 1).

Table 1. Scatter indicators of labor productivity in 2016 (GDP constant 2011 international \$ in PPP).

	Russia (78 regions)	World (93 countries, including Russia)*	World (92 countries and Russia represented by 78 regions) ^a
Max-Min Ratio, times	12,5	37,0	-
Variation coefficient, %	57,4	71,0	77,7
Theil index	0,129	0,245	0,250
Gini index	0,266	0,376	0,378

^a The World Bank database contains information about number of employees of 91 countries for 2016. Estimates of employment in China (829 511 thousand people) and India (534 864.6 thousand people), made according to retrospective data from the University of Groningen for 1970-2014, are added [26].

The calculation results show that:

- the difference of values of extreme labor productivity indicators among the regions of Russia is much smaller than among the countries of the world;
- systemic indicators of variation also show less polarization in Russia; however, all of them are unanimous that the presentation of Russia by its regions (instead of one common position) in the global economic space practically does not affect the characteristics of its scattering and does not make it more or less differentiated.

It seems that the statement that differentiation of Russian regions exceeds the differentiation among the countries of golden billion and the most backward countries of the world forms beautiful, but not entirely accurate image.

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References

- [1] Durlauf S N and Quah D T 1999 The New Empirics of Economic Growth *Handbook of Macroeconomics* **1** ed J B Taylor and M Woodford (Elsevier) pp 235-308
- [2] Heshmati A 2006 The world Distribution of Income and Income Inequality: A Review of the Economics Literature *Journal of world-systems research* **1** (July) pp 61-107
- [3] Dunford M 1993 Regional disparities in the European Community: Evidence from the REGIO databank *Regional Studies* **27** (8) pp 727-43
- [4] Petrakos G, Rodriguez-Pose A and Rovolis A 2003 Growth, Integration and Regional Inequality in Europe *ERSA conference papers* (www.ersa.org/ersaconfs/ersa03/cdrom/papers/46.pdf)
- [5] Petrakos G and Saratsis Y 2000 Regional inequalities in Greece *Papers in Regional Science* **79** pp 57-74
- [6] Barro R J and Sala-i-Martin X 1992 Convergence *Journal of Political Economy* **100** (2) pp 223-51
- [7] Sala-i-Martin X 1996 The Classical Approach to Convergence Analysis *The Economic Journal* **106** (July) pp 1019-36
- [8] Quah D 1993 Empirical cross-section dynamics in economic growth *European Economic Review* **37** (2/3) pp 426-34
- [9] Mankiw N, Romer D and Weil D 1992 A contribution to the empirics of economic growth *Quarterly Journal of Economics* **107** pp 407-38
- [10] Giorgi G M, Pittau M G and Zelli R 2003 Regional empirics for economic disparities in Italy: 1951-2001 *Estadistica* **55** pp 261-81
- [11] Goffe N and Monusova G 2017 Labour productivity: social and economic prerequisites for growth *World Economy and International Relations* **4** pp 37-49
- [12] Zaytsev A 2016 International differences in labor productivity: role of capital, technological level and resource rent *Voprosy ekonomiki* **9** pp 67-93
- [13] Voskoboinikov I and Gimpelson V 2015 Productivity Growth, Structural Change and Informality: the Case of Russia *Working paper WP3/2015/04* (Moscow: Higher School of Economics Publ. House) p 47 www.hse.ru/data/2015/07/17/1085497876/WP3_2015_04_FFF.pdf
- [14] Battisti M, Del Gatto M and Parmeter C F Labor productivity growth: disentangling technology and capital accumulation www.bus.miami.edu/_assets/files/repec/WP2014-02.pdf
- [15] Jorgenson D W and Nishimizu M 1978 US and Japanese Economic Growth 1952-1974: an international comparison *The Economic Journal* **88**(352) pp 707-26
- [16] Bernard A B and Jones C I 1996 Comparing apples to oranges: productivity convergence and measurement across industries and countries *American Economic Review* **86**(5) pp 1216-38
- [17] Hall R E and Jones C I 1999 Why do some countries produce so much more output per worker than others? *The Quarterly Journal of Economics* **114**(1) pp 83-116
- [18] Kumar S and Russell R 2002 Technological Change, Technological Catch-up, and Capital Deepening: Relative Contributions to Growth and Convergence *American Economic Review* **92**(3) pp 527-48
- [19] The spatial development strategy of the Russian Federation for the period until 2025 www.static.government.ru/media/files/UVAIqUtT08o60RktoOXI22JjAe7irNxc.pdf

- [20] The concept of the Spatial Development Strategy of the Russian Federation for the period until 2030 www.карьеры-евразии.рф/uploadedFiles/files/Kontseptsiya_SPR.pdf
- [21] Granberg A G 2004 The economic space of Russia: eternal problems, transformation processes, search for strategies *The Economic Revival of Russia: periodical scientific publication* **1** pp 16-22 www.lib.usue.ru/resource/free/12/s54.pdf
- [22] Lavrovskiy B L 2015 The state policy of regional development: questions of the theory *Federalism* **4(80)** pp 121-30
- [23] Lavrovsky B L, Goryushkina E A and Shiltsin E A 2010 *Regional imbalances: Russia and Siberia* (Novosibirsk State Technical University)
- [24] Federal State Statistics Service (www.gks.ru)
- [25] Data of World Bank and International Labour Organization May 2018 Output per worker (GDP constant 2011 international \$ in PPP) - ILO modelled estimates (www.ilo.org/ilostat/faces/oracle/webcenter/portalapp/pagehierarchy/Page27.jsp?indicator=GDP_211P_NOC_NB&subject=LPY&collection=A&locale=en)
- [26] University of Groningen Penn World Table, version 9.0 www.rug.nl/ggdc/productivity/pwt/pwt-releases/pwt9.0