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Interregional Inequality and Federal Expenditures and Transfers in Russia

Alexander M. Torbenko

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Abstract

The paper considers the influence of federal government expenditures and transfers on interregional convergence in gross regional product (GRP) per capita and wages in Russia over 2005–2011. Such an influence is not found. The federal government’s policy was reactive and was not focused on decreasing interregional inequality during this period. Wages growth depended more on GRP per capita growth than on federal government spendings and transfers per capita growth. The dependence between GRP per capita growth and federal government spendings and transfers per capita growth was very weak. Moreover, the paper shows that in this period inequality of Russian regions in GRP per capita and wages was diminishing. In the given period in Russian regions there existed unconditional β -convergence, poor regions grew faster than rich ones. This result confirms the prediction of neoclassical theory of regional growth and challenges a new economic geography prediction. Comparing our results to the results of previous research the process of interregional convergence in Russia can be seen. In the 1990s, with the state pressure having been eliminated, the differentiation between Russian regions began, while in the 2000s a natural process of (conditional or unconditional) convergence started.

Keywords: convergence, federal expenditures and transfers, wages, Russia, regions, gross regional product.

JEL classification: C13, R11, R12, R58.

1 Introduction

There are two approaches to regional development: a neoclassical approach and a new economic geography (NEG). According to the neoclassical view decreasing return from capital leads to regional convergence, because underdeveloped regions with low capital stock grow quickly compared to developed regions with high capital stock. As for NEG increasing return and circular causation lead to divergence, because more developed regions with high capital stock grow faster than underdeveloped ones.

There are a few papers which consider convergence or divergence of Russian regions in the post-Soviet period. Yemtsov finds that in 1990 years Russian regions were diverged in per capita income [7]. Kolomak also proves that in 1995–2005 interregional divergence was rising [4]. Guriev and Vakulenko [2] show that in 2000–2010 Russian regions converged in wages and income per

capita, but diverged in GRP per capita ¹. Guriev and Vakulenko following Zubarevich [8] assume that this is a result of fiscal redistribution by the federal government.

The main purpose of our paper is to answer how the federal government expenditures and transfers influence wages and GRP per capita in Russian regions in 2005–2011. The following assumptions need to be tested:

1. There was a convergence in GRP per capita and wages in Russian regions in 2005–2011.
2. The federal government policy did not focus on the decrease interregional inequality.
3. Federal expenditures and transfers (FET) did not influence the convergence in wages in regions.
4. FET per capita had a weak influence on GRP per capita growth.
5. The cause of convergence is a fast growth of poor regions (β -convergence).

Milanovic distinguishes three concepts of regional inequality [5]. Concept 1 measures differences in GDP or GRP per capita between regions. Concept 2 takes GDP or GRP but weighs them by regions' populations. Concept 3 measures inequality between all individuals. Concept 1 is used to find out influence of economic policy on inequality and regional convergence. Concept 2 is used to research the actual feeling of spatial inequality as experienced by the people in the country. In this paper we use Concept 1.

Russia is a federation with four-level budget system, where the federal budget is the first level, regional budgets are the second level, budgets of city districts and municipal counties are the third level, and budgets of urban and rural settlements are the fourth level. Each budget level is relatively independent from the others.

The federal government may pass transfers to a region or may spend funds directly in a region. The data on transfers from the federal budget to regional budgets is transparent and available for study. The data on direct federal government regional spendings is less available. We were able to collect data about federal expenditures divided according to regional treasury administration².

We summarised that data and data about federal budget transfers to get the volume of cash flow from the federal budget to a region, which is referred to as FET. In addition, we used Rosstat's data about GRP, wages and population in Russian regions for 2005–2011 [6].

We studied data on 79 regions and excluded the data on some "matroshka" regions because we could not decide which region, "mother" or "daughter", to include. So we excluded Arkhangelskaya oblast, Nenetskiy avtonomnyi okrug, Tyumenskaya oblast as well as Republic Chechnya. However, we left the data about Khanty-Mansiyskiy avtonomnyi okrug and Yamalo-Nenetskiy avtonomnyi okrug.

¹GRP is the same as GDP, but calculated by Russian Statistical Service (Rosstat) on a regional level

²So called UFK

2 Convergence of Russian regions

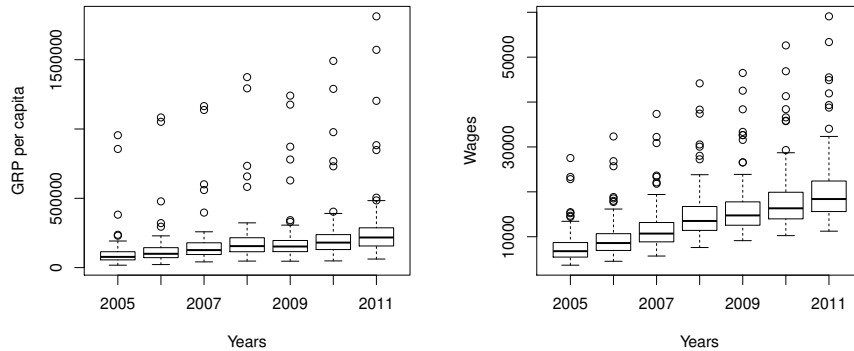


Figure 1: Changes of distributions GRP per capita and wages in 2005–2011

Figure 1 illustrates changes in distribution of GRP per capita and wages in 2005–2011. A horizontal bold line stands for median, a box — for interquartile range, ”whiskers” — for one-half interquartile range, and circles — for ”outliers” behind one-half interquartile range. It is obvious that the range of distribution of GRP per capita as well as of wages is growing, while the median value is growing too.

For more exact evaluation of the convergence in Russian regions we considered changes of inequality indicators in time. We used two types of such indicators: unweighted Theil entropy index and unweighted coefficient of variance.

The unweighted Theil entropy index T is calculated as

$$T = \sum_{n=1}^N \left(\frac{Y_n}{Y} \ln \frac{Y_n}{Y/N} \right), \quad (1)$$

where

$$Y = \sum_{n=1}^N Y_n, \quad (2)$$

N is number of regions, n is a region’s number, Y_n is GRP per capita in n -th region, Y is a sum of all region GRPs per capita [4]. We calculated Theil entropy index for wages analogously.

The coefficient of variance ν is calculated as

$$\nu = \frac{\sigma}{\bar{x}}, \quad (3)$$

where σ is standard deviation of variable and \bar{x} is mean of variable. We calculated coefficients of variance for GRP per capita and wages.

The results are presented in table 1.

There is a trend to a fall of inequality in all indicators. It is clear that in 2005–2011 the inequality of Russian regions in GRP per capita and wages was diminishing.

Table 1: Changes of inequality in Russian regions

Year	2005	2006	2007	2008	2009	2010	2011
<i>Coefficients of variance</i>							
GRP per capita	1.246	1.189	1.078	1.041	1.010	0.985	0.998
Wages	0.524	0.492	0.464	0.445	0.439	0.438	0.443
<i>Theil entropy indices</i>							
GRP per capita	0.381	0.358	0.320	0.306	0.299	0.289	0.295
Wages	0.105	0.094	0.0865	0.080	0.078	0.079	0.080

3 Dependence incomes and federal expenditures and transfers

Active government's policy for decreasing inequality is to send more money to poor regions. Then FET could be inversely proportional to GRP. We calculated correlations between FET per capita and GRP per capita for each year of a given period (table 2).

Table 2: Spearman's rank correlation with FET per capita

	2005	2006	2007	2008	2009	2010	2011
GRP per capita	0.481	0.542	0.505	0.513	0.444	0.484	0.504
Wages	0.616	0.699	0.646	0.659	0.598	0.607	0.639

We found that FET per capita is directly proportional to GRP per capita and wages. The correlation between FET per capita and wages is more than between FET per capita and GRP per capita. It is evident that federal government's policy is reactive and does not focus on decreasing of interregional inequality. Furthermore, FET per capita influence wages in regions more significantly than GRP per capita.

4 Influence federal expenditures and transfers growth on wages growth

As shown above, FET influences wages level in regions, but how do FET influence wages convergence? If this influence exists FET per capita growth must be directly proportional to wages growth. Figure 2 shows this assumed dependence.

In figure 2 dependence is likely to exist, although the coefficients of correlation show a very weak dependence (table 3).

For drawing more founded conclusions we build a regression model of wages growth dependence from FET per capita growth and GRP per capita growth:

$$\hat{w} = \alpha_0 + \alpha_1 \hat{F} + \alpha_2 \hat{Y} + \varepsilon, \quad (4)$$

where \hat{w} is wages growth in 2005–2011, \hat{F} is FET per capita growth over the same period, \hat{Y} is GRP per capita growth over the same period, α_k are coefficients, ε is error.

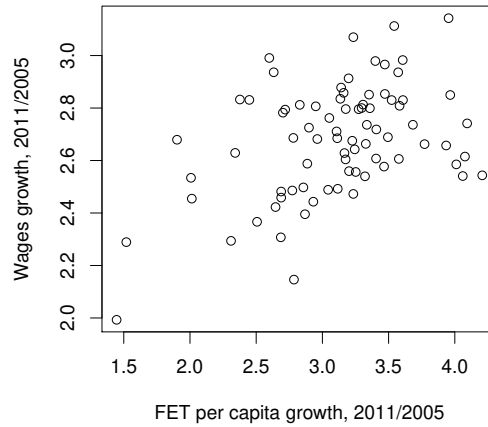


Figure 2: Dependence between wages growth and FET per capita growth

Table 3: Correlation between wages growth and FET per capita growth

	Spearman's rank correlation	Pearson's correlation
Value	0.231	0.299
<i>p</i> -value	0.040	0.007
0.95 confidence interval		0.084
		0.488

In the model with GRP per capita growth we exclude outliers with an extra fast GRP per capita growth (Sakhalinskaya oblast and Chukotskiy avtonomnyi okrug) and a very big GRP per capita (Moscow, Khanty-Mansiyskiy avtonomnyi okrug and Yamalo-Nenetskiy avtonomnyi okrug).

The results are presented in table 4.

So, in the models with GRP per capita growth FET per capita growth is not significant. Thus, wages growth depends on GRP per capita growth more than on FET per capita growth. Furthermore, Spearman's coefficient of rank correlation between wages growth and GRP per capita growth confirms this (coefficient value is 0.412, *p*-value is 0.000).

Based on these results FET do not influence interregional convergence in wages.

5 Influence federal expenditures and transfers growth on GRP growth

It could be assumed that FET growth influence wages growth indirectly through GRP growth. In figure 3 a) showed the dependence of GRP per capita growth

Table 4: Models for wages growth

Independent variable	Dependent variable <i>Wages growth, 2011/2005</i>			
		Model 1	Model 2	Model 3
<i>FET per capita growth, 2011/2005</i>	Coeff.	0.021	0.123	
	<i>p</i> -value	0.593	0.007	
<i>GRP per capita growth, 2011/2005</i>	Coeff.	0.241		0.248
	<i>p</i> -value	0.000		0.000
<i>Intercept</i>	Coeff.	1.974	2.289	2.022
	<i>p</i> -value	0.000	0.000	0.000
<i>N</i>		74	79	74
<i>R</i> ²		0.254	0.090	0.251
Adj. <i>R</i> ²		0.233	0.078	0.241
<i>p</i> -value of <i>F</i> -statistic		0.000	0.007	0.000

Method: OLS

from FET per capita growth and in figure 3 b) the same dependence is presented without outliers.

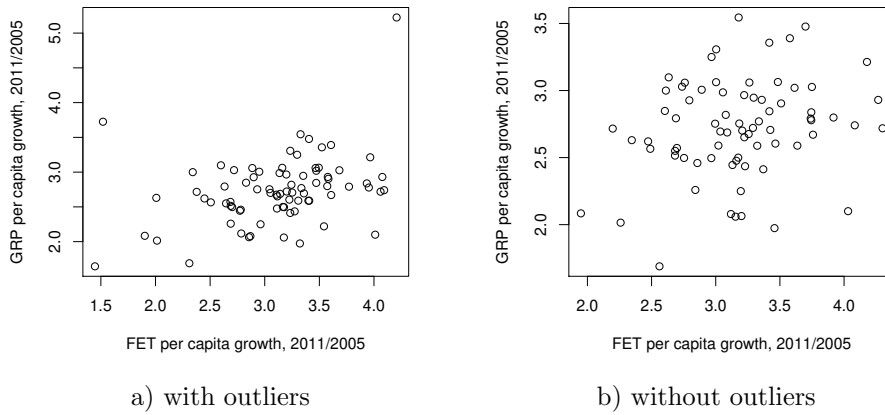


Figure 3: Dependence between GRP per capita growth and FET per capita growth

The coefficient of Spearman's rank correlation between GRP per capita growth and FET per capita growth is equal to 0.223 (*p*-value is 0.048) that indicates a weak dependence.

The summary of the regression model of dependence between GRP per capita growth and FET per capita growth is presented in table 5. This model also demonstrates a very weak influence.

Table 5: Model of dependence GRP per capita growth from FET per capita growth

Independent variable	Dependent variable <i>GRP per capita growth, 2011/2005</i>	
<i>FET per capita growth, 2011/2005</i>	Coeff.	0.186
	<i>p</i> -value	0.034
<i>Intercept</i>	Coeff.	2.128
	<i>p</i> -value	0.000
<i>N</i>		74
<i>R</i> ²		0.061
Adj. <i>R</i> ²		0.048
<i>p</i> -value of <i>F</i> -statistic		0.034
Method: OLS		

6 Convergence and quickly growth of poor regions

We assume that the cause of convergence is a fast growth of poor regions. This approach is called β -convergence and presupposes the dependence between the initial level of GRP per capita and its growth. The theoretical foundation of this is presented in Barro and Sala-i-Martin [1].

The dependence between GRP per capita in 2005 and GRP per capita growth in 2005–2011 is shown in figure 4 a).

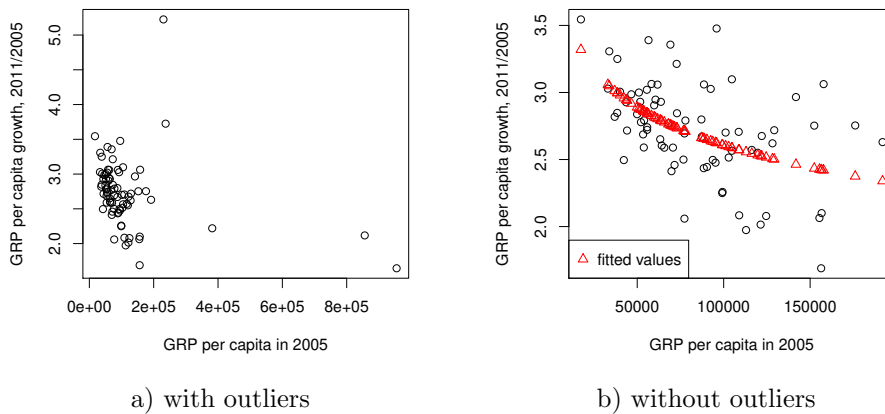


Figure 4: Dependence between GRP per capita in 2005 and GRP per capita growth in 2005-2011 years

To test our assumption we built the following regression model:

$$\hat{Y} = \alpha_0 + \alpha_1 \ln(Y_{2005}) + \varepsilon, \quad (5)$$

where Y_{2005} is GRP per capita in 2005, α_k are coefficients, ε is error. We used data without outliers as in model 4. The summary of this model is presented in table 6.

Table 6: Model of dependence GRP per capita growth from GRP per capita in 2005

Independent variable	Dependent variable <i>GRP per capita growth, 2011/2005</i>	
$\ln(\text{GRP per capita in 2005})$	Coeff.	-0.408
	<i>p</i> -value	0.000
<i>Intercept</i>	Coeff.	7.308
	<i>p</i> -value	0.000
<i>N</i>		74
R^2		0.267
Adj. R^2		0.257
<i>p</i> -value of <i>F</i> -statistic		0.000
Method: OLS		

Table 6 and figure 4 b) show that unconditional β -convergence existed in Russian regions in 2005–2011. Moreover, we see that poor regions grew faster than rich regions. This corresponds to the neoclassical theory of regional growth prediction.

Note that [3] illustrates the absence of unconditional β -convergence between Russian regions in 1998–2004, but conditional β -convergence existed in that period. The value of coefficient R^2 in model 5 also shows that GRP per capita growth depends from other causes.

7 Conclusion

The results illustrates two main points. First, in 2005–2011 interregional convergence in GRP per capita existed in Russia. Second, federal expenditures and transfers did not influence the convergence of GRP per capita nor wages. So this convergence happened by natural way effected by faster growth of poor regions.

Comparing our results to the results of previous research the process of interregional convergence in Russia can be seen. In the 1990s, with the state pressure having been eliminated, the differentiation between Russian regions began, while in the 2000s a natural process of (conditional or unconditional) convergence started.

A more theoretically significant result is verifying the neoclassical growth theory prediction rather than the NEG prediction. This demonstrates that such a sophisticated theory as NEG is not true in some points, but a straightforward neoclassical theory is more realistic. Perhaps, some synthesis of the both theories will be productive for following research.

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