

Bufetova, Anna

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TRENDS TOWARD THE CONCENTRATION OF ECONOMIC ACTIVITY AND UNEVEN SPATIAL DEVELOPMENT OF RUSSIA

Anna Bufetova

*Novosibirsk State University
Institute of Economics and Industrial Engineering Siberian Branch of Russian Academy of
Sciences
Russia*

Using Markov chains the paper studies peculiarities of the process of spatial concentration of economic activity in Russia in the period of 2001-2014 as well as the role of spatial external effects in it. We conclude about the predominance of the processes of concentration of economic activity over the processes of its dissemination, the formation of the pole of relative backwardness and a significant concentration of economic activity in a small number of regions in prospect. Analysis of spatial effects showed that their character depends on relative levels and degree of differences in the development of regions and their nearest neighbors, and that high differentiation of regions in terms of economic activity prevents the development of backward regions and contributes to further polarization. In such circumstances, a policy aimed at containing the growth of regional inequalities and the emergence of competitive cooperation of regions seems to be more appropriate to the situation.

Keywords: Regions of Russia, economic activity, spatial concentration, spatial effects, Markov chains, transition probability matrix, final distribution.

I. Introduction

Uneven development of regions remains a serious problem in Russia. It causes large budgetary spending and interbudgetary redistributions aimed at mitigating regional disparities.

Permanent interest to the problem of uneven development of Russian regions resulted in formation of several areas of research in the academic literature. In one of them analysis of scale and dynamics of regional disparities is based on calculation of statistical measures of heterogeneity – Gini and Theil indices (Postnikova and Shiltsin 2009, Prokapalo 2010, Yemtsov 2005). The other group of works is devoted to the testing of σ - and β -convergence hypothesis (see for example Kolomak 2010a; Lavrovskiy and Shiltsin 2009; Carluer and Sharipova 2004).

E. Kolomak (2013, 2014) investigated the process of spatial concentration of economic activities in Russia and analyzing Theil indices dynamics concluded about its quite high rates. Using spatial econometrics methods she found out the main determinants of the process.

The studies devoted to the role of spatial externalities in regional growth confirm the relevance of the spatial external effects for the regional dynamics. Lugovoy et al. (2007) investigate the role of geographic factor in regional economic growth in the RF and show spatial autocorrelations of Russian regions by means of Moran's tests. The WB report (2009) pointed out that spatial effects in regional economic growth are stronger in European part of the country.

Kholodilin et al. (2009) examine the impact of spatial effects on the convergence process of Russian regions. They find a strong regional convergence among high-income regions located near other high-income regions.

Kolomak (2010b) tests a model where the spatial externalities generated by regional growths are considered as a source for development of neighboring territories. Such externalities do affect the other regions' growth rates. She finds that the character of such influence depends on location of the region: in the European part of the RF prevail positive spatial externalities in Asian part – negative.

The use of growth regressions to study convergence is not free of criticism however. For example, these growth regressions may be plagued by Galton's fallacy of regression to the mean (Quah 1993b). In addition the regression framework is focused on the representative regional economy only. This method is unable to say something about the dynamics of the entire cross-sectional distribution, the relative movements of individual regional economies within it and reveals nothing about the relative behavior of rich and poor parts of the cross section distribution. To cope with these problems a number of researchers adopted Markov chain as an alternative approach for the study of region's distribution dynamics (Quah 1993a, 1996, Fingleton 1997, 1999).

This method quantifies the evolution of both the shape and internal dynamics of the region's distribution in terms of transitional probability matrix. It gives predictions about the long-run steady state of the cross-sectional distribution, at the same time quantifying the intradistributional dynamics. As it was mentioned earlier a number of researches revealed the importance of spatial interdependence between regions for the performance of the region and for the evolution of region's distribution. In some works spatial dependence was directly incorporated into a Markov chain analysis (Rey 2001, Quah 1996, Le Gallo 2004).

The number of works which study regional inequality in the RF using Markov chain is not large (Carlier 2005, Dolinskaya 2002, Yemtsov 2005). All of them consider regional inequality in terms of per capita GRP in the transitional period, that is in 90-th of XX century. And this approach has not been applied to the issues of spatial dependence of regional development in the RF.

This article attempts to contribute to the literature devoted to the problem of concentration of economic activity in Russian regions by obtaining additional new information about the specific features of this process using alternative research method.

As a starting point we formulate the following research questions.

What are the rates of concentration of economic activity in the RF and what is the perspective of this process if current trends continue?

Are there any distinctions in the relative movements of regional economics of different levels of development within the economic activity distribution?

Is the process of regional concentration of economic activity geographically dependent? What is the impact of neighboring regions on the process of concentration of economic activity in the region? Does the character of this influence depend on the economic development of the region and its distinction with the nearby regions?

II. Data and methodology

We rely on official data from the Federal State Statistics Service of the Russian Federation¹ and choose a gross regional product (GRP) as a main indicator of economic activity. To eliminate the influence of differences in regional prices we consider the ratio of GRP to the cost of a fixed basket of consumer goods and services.

But due to the calculation procedure the value of GRP depends on geography of registration of the outcomes of economic activity. So we also include into analysis an indicator which has direct relation to the spatial structure of economic activity location – the number of employed in the economy of the region.

The study covers 77 regions of the RF for the period of 2001-2014. The Chechen Republic was excluded from the consideration owing to omitted values for some years of the period. We also exclude Moscow and Tyumen Oblast because their GRP exceed average level by 13 and 9 times in 2001 and by 17 and 8.5 times in 2014 respectively. The existence of such specific elements in the aggregate of regions decrease the validity of comparison of regional indicators with the mean value.

To study the evolution of regional economic activity distribution we use the Markov chain techniques proposed by Quah (1993a). As this approach requires the discretization of the distribution each region was assigned to one of a predetermined number of groups based on its relative GRP or number of employed in economy. The number of groups is chosen to be five. Following the recommendation in Quah (1993a) the boundaries of groups are chosen such that each group initially contains the same number of regions.

Let f_t denote the vector of the resulting discretized distribution at a period t . The dynamics of evolution of regional economic activity distribution are represented by the probability matrix with elements p_{ij} which specify the probability that the regional economy that was in group i in the period $(t-1)$ ends up in the group j in the next time period:

¹ *Federal State Statistics Service of the Russian Federation*. Available at: www.gks.ru. (accessed 25 April 2016). (In Russian).

$$P_{ij} = \frac{\sum_{t=1}^T n_{ij}(t)}{\sum_{t=1}^T n_i(t-1)}, \quad \sum_{j=1}^N P_{ij} = 1.$$

where $n_{ij}(t)$ denotes the number of regions moving from group i to group j in period t ;

$n_i(t-1) = \sum_{j=1}^N n_{ij}(t)$ is the number of regions in income group i in year $(t-1)$,

N – number of groups.

In the basic Markov model the transition probabilities are assumed to be time invariant so the vector of the regional distribution from period t can be mapped into the vector for period $t+n$ as $f_{t+n} = f_t P^n$, where P – is the transition probability matrix.

If we assume that the distribution continues to evolve according to the estimated transitional matrix, the resulted limiting distribution α can be calculated. If such a stable limiting distribution exist, multiplying it by transitional matrix will give the exact same limiting distribution back: $\alpha = P\alpha$. The limiting distribution corresponds to the normalized eigenvector of the transition matrix P associated with the eigenvalue equal to one.

In this paper, unlike works mentioned above, we perform a test of time homogeneity (time stationarity) and a test of Markov property. The first test is necessary for deciding whether the transition probabilities of Markov chain can be assumed constant over time. The Markov property requires the transition probabilities to be independent of states at the beginning of previous period. If it is not so the transitional matrix will contain only part of the information necessary to describe the true evolution of the economic activity distribution (Bickenbach and Bode, 2003).

To obtain additional characteristics of the transitional process we calculate several mobility indices (Bosker 2009). Two of them give information about intradistributional mobility of regions during the transition period towards steady state. The Shorrocks' index (SI) gives an indication of the mobility across income classes over time: $SI = \frac{k - \text{trace}P}{k - 1}$, where k is a number of groups. It takes values on the interval $[0, k/(k - 1)]$ with lower values indicating less mobility.

The second index is called the half-life (HL), it indicates the speed of transition towards the steady state by denoting the number of periods it takes for the distribution to move halfway towards the steady state: $HL = -\frac{\ln(2)}{\ln(|\lambda_2|)}$, where λ_2 is the second largest eigenvalue of the transition matrix P .

The other two indices give information on the degree of intradistributional mobility once the steady state is reached. The Bartholemew index (BI) denotes the expected number of group

boundaries crossed from one period to the next once in the steady state:

$$BI = \sum_{i=1}^N \alpha_i \sum_{j=1}^N p_{ij} |i - j|, \text{ where } \alpha_i \text{ - } i\text{-th component of the vector of limited distribution } \alpha.$$

Index of unconditional probability of leaving current group (UPLCG) denotes the unconditional probability of leaving one's current income group once in the steady state:

$$UPLCG = \frac{k}{k-1} \sum_{i=1}^N \alpha_i (1 - p_{ii})$$

To study how the economic performance of a region can be explained by its geographical environment, the extent to which this environment influence the regions' relative position inside the cross-section distribution we use regional conditioning (Quah 1996) and spatial Markov chains (Rey 2001).

The general idea of regional conditioning is to study how closely the evolution of each region's economic activity follows that of some group of regions, which are expected to behave similarly. In this purpose a new regional distribution is constructed. This is a distribution by neighbor-relative GRP (or number of employed in the economy) where each regions' GRP (number of employed) is normalized by the average GRP (number of employed) of the neighboring regions. On the base of neighbor-relative and national-related distributions a conditional probability matrix is constructed. This matrix established transition between these two different distributions. Every element of this matrix specifies the probability that the regional economy that belongs to the group i in the national-related distribution at the same time belongs to the group j in the regional-related distribution.

If the locational aspect of the regions explained nothing about their relative economic indicator (GDP or number of employed in the economy), this matrix should be close to the identity matrix indicating that the distributions are very much the same. On the other hand if regional conditioning explained everything, the matrix should contain only ones in the column corresponding to the middle income group.

The way of simultaneously considering spatial and temporal dynamics has been proposed by Rey (2001). He modified the traditional Markov matrix by conditioning a region's transition probabilities on the initial class of its spatial lag. This results in a Spatial Markov matrix. This matrix decomposes the traditional $N \times N$ transition matrix into N condition matrices of dimension $N \times N$. An element $p_{ij|k}$ of the k -th conditional matrices shows the probability that a region in class i at the time period t goes in class j at the end of the period, given that the spatial lag was in class k at the time period t . In this study we, like Bosker (2009), estimate the dynamics of the region's distribution conditional on a region's indicator (GRP or number of employed) relative to the average of its neighboring regions. To estimate these conditional

probabilities the regions are first grouped based on their regionally conditioned indicator for each year. Next for each of the (five) resulting regionally conditioned groups a transition matrix based on national-relative indicator is estimated. The result is five 5x5 transition matrices, one for each regionally conditioned group.

Comparing the estimated conditional transition probabilities with each other and with the unconditional probabilities shows the role of geographical environment in the economic performance of the region. The spatial Markov chain gives the probability for a region to experience upward or downward moves in the distribution, conditional to the past or present movements of its neighbors and therefore it allows studying the possible correlation between the direction and probability of the transition of a region and the regional context faced by each region.

III. Results and discussion

III.1. GRP distribution

The test of transition probability matrix for Markov property (both for GRP and number of employed in the economy) indicated that the process under consideration is of a higher order than 1. The main reason for this is the sufficient number of reversals: a region that has just moved up or down one or more classes has a significant probability of moving back to the previous class in the next transition period. Obviously, the process under consideration is not a Markov chain of order 1: history matters quite a lot.

One possible way of retaining Markovity of order 1 in the presence of reversals of this kind is to use averages over several years for the considered economic indicator (two years for the present sample data set). The transition probability matrix for GRP distribution constructed on the basis of this approach satisfies the Markov property and homogeneity in time (table 1).

The estimated transition matrix indicates a high degree of stability in the relative ranking of regions in the total distribution: its diagonal elements are relatively high, and the non-zero elements of the matrix are all located directly around the diagonal.

Downward mobility is typical for most classes of distribution: the probability of moving down exceeds the probability of moving up in all classes except the second. As a result ergodic distribution has pronounced positive skew. The share of backward regions increases during the period from 20.8% to 28.3% and in the ergodic distribution arrives at 55.7%. That means that while maintaining the current trends 55.7% of all regions in the steady state will produce less than 20.6% of the total added value.

Table 1. Transition probability matrix for GRP distribution

boundaries of groups (% of the average GRP)	group	1	2	3	4	5
0 – 37,1 (<i>backward regions</i>)	1	0,991	0,009	0	0	0
37,1 – 54,6 (<i>regions with low level of economic indicator</i>)	2	0,044	0,887	0,069	0	0
54,6 – 96,3 (<i>regions with level of economic indicator below average</i>)	3	0	0,048	0,912	0,040	0
96,3 – 137,8 (<i>regions with average and higher level of economic indicator</i>)	4	0	0	0,148	0,787	0,065
More than 137,8 (<i>regions with high level of economic indicator</i>)	5	0	0	0	0,024	0,976
Initial distribution of regions, 2001 (%)		20,8	19,5	19,5	19,5	20,8
Distribution in 2014 (%)		28,3	11,5	26,9	11,5	21,8
Limiting (ergodic) distribution (%)		55,7	11,6	16,5	4,4	11,8
Mobility indices						
Transitional period			Steady state			
SI	0,012	BI	0,045			
HL	62,7	UPLCG	0,56			

Source: author's elaborations on FSSS data

The share of regions which have GRP below average i.e. belonging to the groups 1, 2 and 3, increased during the period from 59.8% to 66.7% and in ergodic distribution reaches 83.8% , concentrating the production of less than 42.8% of the total value added. Consequently 16.2% of regions which have GRP above average will concentrate more than 57.2% of the total added value in the steady state. All these obviously mean the increasing concentration of economic activity in the relatively small number of regions.

The groups of backward regions (group 1) and regions with high level of GRP (group 5) are the most stable. The probability of remaining in these groups is very high, considerably exceeds 90%.

The probability of leaving the group of backward regions (group 1) is less than 1%. So we can conclude about existence of “backwardness trap” which effectively hold regions that are caught in it.

Throughout the whole period this group includes underdeveloped Caucasus republics (Adygea, Ingushetia, Kabardino-Balkar Republic, Karachay-Cherkess Republic, Republic of North Ossetia-Alania), Mari El Republic, Republic of Kalmykia, Altai Republic, Tyva Republic, Republic of Khakassia, Kamchatka Krai, Magadan Oblast, Ivanovo Oblast, Kostroma Oblast, Jewish Autonomous Oblast, Chukotka Autonomous Okrug. Four more regions enter this group during the period: Republic of Karelia, Republic of Mordovia, Kurgan Oblast, Republic of Buryatia.

The second and fourth groups are less stable and their shares in ergodic distribution decreases. The share of the fourth group i.e. regions with average and higher level of GRP reduces most of all and go down to 4.4%. It means that in steady state the set of regions breaks down into two groups: regions that have GRP below average and regions in which GRP exceeds the average by more than 37.8%.

The fifth group of regions is in a high degree stable. The probability of leaving it is only 2.4%. In 2001-2014 it permanently includes Moscow oblast, Rostov oblast, Nizhny Novgorod Oblast, Orenburg oblast, Samara oblast, Sverdlovsk Oblast, Chelyabinsk oblast, Irkutsk oblast, Kemerovo oblast, Novosibirsk oblast, Krasnodar Krai, Perm Krai, Krasnoyarsk Krai, Republic of Bashkortostan, Republic of Tatarstan, St. Petersburg.

Consequently the evolution of distribution demonstrates the divergence trend and polarization of regional economic activity: on the one hand the production of significant share of added value is concentrating in the small number of regions and on the other one can observe the formation of vast pole of backwardness.

All mobility indices show very low mobility of regions both during transitional period and in the steady state (see Table 1). It means that the system is moving to the steady state with a low speed so that the concentration of economic activity is taking place at a moderate pace, and regions that currently have low level of GRP, is likely to remain lagging behind. And on the contrary, leading regions with high indicators of GRP will preserve their leading positions.

Conditional probability matrix which established transition between neighbor-relative and national-related distributions is presented in table 2.

Table 2 Conditional probability matrix

		the neighbor-relative distribution				
		group	1	2	3	4
national- relative distribution	1	0,72	0,16	0,12	0	0
	2	0,13	0,33	0,46	0,05	0,03
	3	0,14	0,32	0,28	0,15	0,11
	4	0,07	0,17	0,16	0,37	0,25
	5	0,01	0,02	0,05	0,45	0,47

In case of both the national-relative and the neighbor-relative distribution the different GRP groups are defined as (1) less than 37,1%, (2) between 37,1 and 54,6%, (3) between 54,6 and 96,3%, (4) between 96,3 and 137,8%, (5) more than 137,8% of the national average GRP or regionally conditioned average GRP respectively.

Source: author's elaborations on FSSS data

The estimated matrix is not identity matrix and it doesn't contain ones in the column corresponding to the group with middle values. On the contrary all diagonal elements are less than 0.5 except (1;1) element which corresponded to backward regions. This particular character

of the conditional matrix implies existence of spatial external effects that influence the performance of regions.

To find out peculiarities of these spatial external effects we consider Spatial Markov matrix (table 3).

Attention is drawn to the fact, that backward regions do not demonstrate positive modifications in their trajectories of development when the lag in GRP with their neighbors is large (GRP of a region is less than 37% of average GRP of its neighbor regions). In contrast the probability of leaving the first group diminishes from 0.9 to 0.6%. The obvious explanation of the fact is that too significant differences and low level of economic development complicate the interaction of regions, impede the absorption of development impulses generated by mature centers. Bridging the gap in the level of GRP with the nearest neighbors to 37-54,6% of their average GRP slightly improves the trajectory of development of backward regions: the probability of transition to the second group increased to 2.8%.

Regions with low level of GRP (group 2) also lose from the neighborhood with more developed regions. The probability of downward transition (to group 1) increased from 4.4 to 12.5% and the probability of upward transition decreases from 6.9 to 4.2%. The possible explanation is proposed by agglomeration theories: more developed centers absorb the resources of periphery and retard its development.

Diminishing the gap in GRP with their neighbors leads to gradual improvement of regions' trajectories within the distribution: the probability of downward transition decreases and of upward transition increases. In other words the reduction of gap in the level of development facilitates interaction of regions and help to diffuse innovations and positive impulses generated by more developed regions. The behavior of regions with GRP below average (group 3) is very much the same.

The most favorable situation for regional performance is when GRP of a region equals or exceeds that of their neighbors (group 4). In this case the region becomes a center and in accordance to agglomeration theories begin to absorb resources from nearby periphery. In this case the probability of upward movement within the distribution increases and of downward movement decreases or even becomes zero. At the same time these regions demonstrate significant deterioration of their trajectories within the distribution when they are in the position of periphery towards their nearest neighbors: probability of downward transition greatly grows as compared with transition probability matrix without spatial effects.

Table 3. Spatial Markov matrix for GRP distribution

Group number	Group number				
	1	2	3	4	5
<i>Regionally conditioned group 1</i>					
1	0.994	0.006	0	0	0
2	0.125	0.833	0.042	0	0
3	0	0	1	0	0
4	0	0	0.167	0.667	0.166
5	0	0	0	0.5	0.5
<i>Regionally conditioned group 2</i>					
1	0.972	0.028	0	0	0
2	0.091	0.818	0.091	0	0
3	0	0.095	0.878	0.027	0
4	0	0	0.222	0.722	0.056
5	0	0	0	0.25	0.75
<i>Regionally conditioned group 3</i>					
1	1	0	0	0	0
2	0	0.930	0.070	0	0
3	0	0.053	0.911	0.036	0
4	0	0	0.222	0.778	0
5	0	0	0	0	1
<i>Regionally conditioned group 4</i>					
1	0	0	0	0	0
2	0	0.857	0.143	0	0
3	0	0	0.929	0.071	0
4	0	0	0.05	0.85	0.1
5	0	0	0	0.033	0.967
<i>Regionally conditioned group 5</i>					
1	0	0	0	0	0
2	0	1	0	0	0
3	0	0.042	0.875	0.083	0
4	0	0	0.115	0.846	0.039
5	0	0	0	0.011	0.989

In case of both the national-relative and the regionally conditioned distribution the different GRP groups are defined as (1) less than 37,1%, (2) between 37,1 and 54,6%, (3) between 54,6 and 96,3%, (4) between 96,3 and 137,8%, (5) more than 137,8% of the national average GRP or regionally conditioned average GRP respectively.

Source: author's elaborations on FSSS data

III.2. Distribution of regions by number of employed in the economy

The same calculations for the indicator of number of employed on the economy of region confirm the conclusions obtained in the analysis of GRP. The distribution by number of employed is even more stable than GRP distribution, all diagonal elements of transitional matrix exceed 0.9, and the values of indices of mobility evidenced in favor of even lower mobility of

regions within the distribution. Downward transitions prevail in all groups. As a result, ergodic distribution reveals the same but more delicate tendencies of polarization of regions in the level of economic activity accompanied by significant diminishing of group of regions with level of economic activity around average (Table 4). Spatial Markov matrix also doesn't disprove the obtained conclusions (Table 5). Diminishing the gap in the level of region's indicator with their neighbors leads to gradual improvement of its trajectory within the distribution: the probability of downward transition decreases and of upward transition increases. The role of «center» in regard to neighboring regions has a positive influence to region's trajectory within the distribution.

Table 4. Transition probability matrix for distribution of regions by number of employed in the economy

boundaries of groups (% of the average number of employed)	group	1	2	3	4	5
0 – 42,8 (<i>backward regions</i>)	1	0,985	0,015	0	0	0
42,8 – 63 (<i>regions with low level of economic indicator</i>)	2	0,034	0,938	0,028	0	0
63 – 89,1 (<i>regions with low level of economic indicator</i>)	3	0	0,032	0,952	0,016	0
89,1 – 152,9 (<i>regions with average and higher level of economic indicator</i>)	4	0	0	0,030	0,952	0,018
More than 152,9 (<i>regions with high level of economic indicator</i>)	5	0	0	0	0,016	0,984
Initial distribution of regions, 2001 (%)		20,8	19,5	19,5	19,5	20,8
Distribution in 2014 (%)		24,4	17,9	20,5	16,7	20,5
Limited (ergodic) distribution (%)		44,4	19,4	17	9	10,2
<i>Mobility indices</i>						
Transitional period			Steady state			
SI	0,047	BI		0,033		
HL	86,3	UPLCG		0,041		

Source: author's elaborations on FSSS data

Table 5. Spatial Markov matrix for distribution of regions by number of employed in the economy

Group number	Group number				
	1	2	3	4	5
<i>Regionally conditioned group 1</i>					
1	0.982	0.018	0	0	0
2	0.042	0.937	0.021	0	0
3	0	0	1	0	0
4	0	0	0	0	0
5	0	0	0	0	0
<i>Regionally conditioned group 2</i>					
1	0.964	0.036	0	0	0
2	0.073	0.829	0.098	0	0
3	0.015	0.076	0.894	0.015	0
4	0	0	0.029	0.971	0
5	0	0	0	0	0
<i>Regionally conditioned group 3</i>					
1	1	0	0	0	0
2	0	0.982	0.018	0	0
3	0	0.021	0.958	0.021	0
4	0	0	0.091	0.909	0
5	0	0	0	0	0
<i>Regionally conditioned group 4</i>					
1	1	0	0	0	0
2	0	1	0	0	0
3	0	0	1	0	0
4	0	0	0	0.96	0.04
5	0	0	0	0.037	0.963
<i>Regionally conditioned group 5</i>					
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0.875	0.125	0
4	0	0	0.045	0.955	0
5	0	0	0	0	1

In case of both the national-relative and the regionally conditioned distribution the different groups are defined as (1) less than 42,8%, (2) between 42,8 and 63%, (3) between 63 and 89,1%, (4) between 89,1 and 152,9%, (5) more than 152,9% of the national average number of employed in the economy or regionally conditioned average number of employed respectively.

Source: author's elaborations on FSSS data

IV. Conclusion

The observed increase in inequality of Russian regions in terms of economic activity leads to their polarization – economic activity measured by indicators of the real GRP and number of employed in the economy is concentrated in a small number of regions, although the pace of this process is very mild.

Polarization of regions is reflected by overwhelming downward mobility of regions within the distribution: the probability of downward transition exceeds the probability of upward transition of regions within the distribution. There is no doubt about the existence of backwardness traps that capture more and more regions even during considered period. The ergodic distribution demonstrates the formation of sizeable pole of backwardness and concentration of production of more than a half of total added value in a small number of regions. Simultaneously the number of regions which are characterized by average level of economic activity considerably decreases.

The influence of spatial factor to the regions' trajectories within the distribution is determined by the level of economic activity in the region, the gap in the level of economic activity in the region and its neighbors and region' relation to its geographic neighbors as a center or periphery.

Low level of economic activity in the region and too significant differences in the level of development with neighboring regions complicates the interaction of regions, impede diffusion of innovation and development impulses generated by mature centers. All these even more worsen region' transition trajectories and contribute to further increase of inequality. Consequently high degree of regional differentiation in economic activity impedes the development of backward regions and may be considered as a factor that condition the existence of «backwardness trap». At the same time, cutting back of gap in the level of economic activity improve regions' transition trajectories within the distribution. This fact suggests a positive effect of neighborhood with mature regions as a result of diffusion and absorption of impulses generated by them.

However concentration of economic activity in the developed regions dominates in this period which is confirmed by significant improvement of regions' transition trajectories in the case when they are more economically developed in comparison with their neighbors.

All said above cast doubts on the relevance of policies aimed at stimulating the territories of advanced development. Speeding up the process of concentration may reinforce growing inequality in the level of economic development of regions. But as the study has shown, significant differences in the regional development may complicate regional interaction and thus counteract diffusion of innovations and development impulses. This makes lagging behind regions resistant to positive spatial effects and fixed their backwardness.

In such a situation policy aimed at restraining the growth of regional disparities in levels of economic activity seems more adequate. The most effective direction of this policy seems to be the establishment of conditions for and stimulating collaboration between regions. Along with decrease of inequality in economic, social and political performance this policy implies

development of the institutional environment of interregional cooperation, elevation of the level of trust in society and the economy, increase in economic autonomy of regions etc. All these can help to diffuse impulses from centers to periphery and prevent high level of polarization in economic activity of regions.

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