Available Online at http://www.journalajst.com

ISSN: 0976-3376

ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Asian Journal of Science and Technology
Vol. 07, Issue, 11, pp.3700-3706, November, 2016

RESEARCH ARTICLE

THE YOUTH UNEMPLOYMENT IN RUSSIA AND GERMANY: A SPATIAL PANEL DATA ANALYSIS

***Evgeny Inozemtsev**

Saratov Socio-Economic Institute of Plekhanov Russian University of Economics, Saratov, Russia

ARTICLE INFO

Article History:
Received 17th August, 2016
Received in revised form
21st September, 2016
Accepted 22nd October, 2016
Published online 30th November, 2016

Key words:
Youth unemployment,
Spatial panel models,
RUSSIA, Germany.
JEL Classification: C23,
R23, E24.

ABSTRACT

The purpose of this article is the comparative analysis of spatial effects and development of small business on the level of youth unemployment in the European part of Russia and Germany. The research was carried out usingthe panel analysis on 55 regions of Russia and 38 regions of Germany with use of various options of spatial weight matrixes. The special attention is given to influence of the distance to the capital on an unemployment rate.

INTRODUCTION

The problem of youth unemployment doesn't have only purely economic, but also political aspect. The youth, as the most active part of the population, is the engine of social development and the youth unemployment rate(YUR)and also its dynamics is the most important indicator of social wellbeing (or trouble) of a country and its separate regions. General tendencies, such as excess of YUR over the general unemployment rate in 2-3 times, are characteristic both for Russia and for the European countries (see, e.g., Berlingieri et. al., 2014). The comparative analysis of Russia and Germany is used to reveal general regularities and peculiarities of the space factor influence on the unemployment rate in these countries. This article has the following structure: in the second section the literature review is presented, in the third - the used matrixes of spaceweights are described. In the fourth section the empirical spatial models and the results of their estimation are given. In the last section the conclusion on the work done is offered.

Literature Review

The question of spatial effects' influence on the unemployment rate is studied quite actively in the recent years, first of all in relation to the European countries.

****Corresponding author: Evgeny Inozemtsev***
Saratov Socio-Economic Institute of Plekhanov Russian University of Economics, Saratov, Russia

It is proved that ignoring of spatial effects leads to the displaced and inefficient estimates (see, e.g., Anselin, Bera, 1998). With regard to the unemployment the spatial analysis was used for Great Britain (Molho, 1995), United States (Partridge, Rickman, 1997), Spain (Lopez-Bazo *et al*., 2002), Italy (Cracolici *et al*., 2009) and eleven countries of Western Europe (Niebuhr, 2003). In the work (Fuchs-Schundeln*et al*., 2012) clear distinction of the unemployment rates in the western and eastern states of Germany (not in favor of the last ones) is statistically proved. In the article (Fuchs-Schundeln, Izem, 2012) accurate distinction of unemployment rates in the western and eastern lands of Germany (not in favor of the last) is statistically proved. Regional distinctions of the general unemployment levels in Germany on the basis of 412 small districts (*Landkreiseundkreisfreie Städte*) were investigated in the work (Lottmann, 2012) by methods of the space panel analysis. From the point of view of the subject of our research the articles (Demidova *et al*., 2013, 2014) are especially important. In particular, in the work (Demidova *et al*. 2013) existence of the spatial autocorrelation for YUR was statistically proved and the spatial panel analysis with selection of two clusters (eastern and western) was carried out. There also were obtained significant (p <0.01) values of Moran's I for 2000-2009, however, for the group of "eastern" regions (21 of 75 regions) Moran's indices proved to be insignificant. It makes it possible to assume that influence of the spatial effects sharply weakens to the East from the Urals. Thus, it is important to divide the territory of Russia into the western and eastern parts, investigating them separately. A similar approach was used also in other researches of unemployment in Europe, e.g. (Schioppa, Basile, 2002; Basile, 2010; Fuchs-Schundeln, Izer, 2012; Lottmann, 2012; Basile *et al*., 2012).

MATERIALS AND METHODS

As the basic data we used official published information of Federal services of statistics of Russia (*Rosstat*[1]) and Germany *(Statistisches Bundesamt*[2]*)*. With a glance of given above reasons we limited ourselves to 55 regions located in the European part of Russia, with some objective exceptions, such as Chechnya or Kaliningrad region. At the same time for Germany a deeper geographical differentiation was carried out: there were considered not 16 federal lands *(Länder)* but 38 statistical regions. As YUR the unemployment rate at the age of 20-29 years (Russia) and at the age of 15-24 years (Germany) was used. This coercive measure caused by incomparability of statistical methodology of the two countries is not a serious obstacle as a whole. Really, the middle age of the beginningof the professional activity in the European countries is higher than in Russia (Guriev, Vakulenko, 2015)and the levels of youth unemployment are approximately comparable. For accounting of spatial effects weight matrixes of two types were used. The first one is the Inverse Distance Weights, IDW:

$$w_{ij} = \begin{cases} 0, if i = j; \\ d_{ij}^{-\gamma}, if d_{ij} \le D(q); \\ 0, if d_{ij} > D(q), \end{cases} \quad \ldots\ldots\ldots\ldots\ldots(1)$$

whered_{ij}- distance between centers of the regions, d_{ij}- quartiles of distances,q = 1, …, 4.

The second matrix is the gravity economic weights, GEW:

$$w_{ij} = \begin{matrix} 0, if i = j; \\ \frac{\sqrt{E_i E_j}}{d_{ij}}, if d_{ij} \le D(q); \\ 0, if d_{ij} > D(q), \end{matrix} \quad \ldots\ldots\ldots\ldots\ldots(2)$$

Where E_i and $E_j$are values of some economic indicator for *i* and *j* regions. Thus, the GEW matrix strengthens influence of relations not only between two large (with great value *E*) regions, but also between a large and small region as in the numerator geometric middling for two regions is calculated (see, e.g., Martin *et al*., 1999; Anselin, 2002). As$d_{ij}$the shortest distance on highways between the centers of the regions, as *E* - values of a gross regional product (GRP) were taken. q-value was taken equal to 4, i.e. all distances between the objects were considered. For the purpose of a more detailed analysis matrixes (1) with γ = 1 and γ = 2 were compared, as in the latter case relations with near regions intensify and on the contrary (see, e.g., Anselin, 1988; Matyas, Sevestre, 1995; Fischer *et al*., 2011). For quality improvement of the models all matrixes were standardized (the sum on every line is equal to unit). Influence of GRP on indicators of spatial autocorrelation, probably, considerably differs in Russia and Germany. In Russia Moscow is in the lead on the GRP size with a huge lead: the nearest neighbors (Moscow region and St. Petersburg) have GRP five times smaller. Besides them, in 2004 only 6 regions of European Russia had GRP of more than 10 % GRP of Moscow, in 2014 there remained only 3 of them (Krasnodar territory, Republic of Tatarstan and Sverdlovsk region). The coefficient of variation of GRP in European Russia for 2004-2014 fluctuated within the limits from 212 % to 241 % (without Moscow - from 94 % to 105 %). In Germany a getaway of a leader (the government district Upper Bavaria with the center in Munich) is much less: GRP of each of the three districts (Düsseldorf, Stuttgart and Darmstadt) makes more than 80 % of GRP of the Upper Bavaria, and only one statistical region of 38 (Trier) has less than 10 %. The coefficient of variation of GRP for Germany for 2006-2013 made 67-68%[3]. Therefore, it is possible to assume that use of the gravity economic weights (in this case GRP), strengthening weight of interrelations with the economically developed regions, will be much more effective for Russia than for Germany. The elementary test on existence of spatial effects 'influence is a check of relation between YUR and a distance to the capital (Moscow and Berlin). For Germany there is a hypothesis that YUR, as well as the general unemployment rate, depends on the distance not to a point but to a curve, namely, to the border between the 'former' and 'new' lands (the last are understood as the territory of former East Germany). It is meant that with increase in the distance to the west from the specified border the unemployment rate decreases, and to the east it grows. Therefore for Germany both options were considered: a distance to Berlin and to the border of the lands. At calculation of values of the last column of tab. 1 a distance to the east from the border of the lands were accepted as positive values, and to the west - as negative.

Table 1. The Pearson correlation between YUR and distance to capital (Russia, Germany), distance to the border of the lands (Germany)

Year	Russia	Germany	
	distance to Moscow	distance to Berlin	distance to the border of the lands
2004	0.4304	-0.8451	-0.8334
2005	0.4315	-0.8022	-0.7835
2006	0.4987	-0.8344	-0.7761
2007	0.4485	-0.8449	-0.7923
2008	0.4949	-0.8132	-0.7651
2009	0.5184	-0.7752	-0.7236
2010	0.5457	-0.7613	-0.6910
2011	0.4984	-0.7517	-0.6771
2012	0.6183	-0.7174	-0.6390
2013	0.5010	-0.6981	-0.6151
2014	0.5818	-0.6969	-0.5996

Sources: StatistischesBundesamt and Rosstat data, own calculations.
Note: all coefficients are significant at $p<0.001$

It is obvious that spatial effects for the rate of youth unemployment at the beginning of the considered period were much stronger in Germany than in Russia. However, the trends were multidirectional: in Russia influence of the distance to the capital on the unemployment rate intensified a little. In Germany, on the contrary, spatial effects gradually smoothed out. The fact that the distance to Berlin makes a greater impact on YUR, than the distance to the border of the former and new lands, draws attention. It is obviously connected with the fact that the level of youth unemployment in new lands depends on

[1]http://www.gks.ru.
[2]http://www.destatis.de.

[3]Sources: StatistischesBundesamt and Rosstat data, own calculations.

the distance to Berlinmuch more strongly, than on the distance to the border with the former lands. Further, we will be based on the assumption that the distance to Berlin is a more powerful factor than the distance to the border of the former and new lands. Thus, it is possible to ascertain that both for Russia and for Germany dependence of YUR on the distance to the capital is characteristic. However, both the direction and the reasons of the relation are various. Russian economy is a geographically highly centralized system where the overwhelming part of financial, intellectual and other resources is concentrated in Moscow which at the same time is the center of the transport network reminding a spider's web. Berlin, unlike Moscow, is not a labor force center of gravity, but, on the contrary, a problem city from the point of view of an economic situation and, particularly, unemployment. It also shows the relation of the average income in the capital and in the country (Tab. 2).

unemployment between new and old lands goes quicker than economic development of Berlin. The value of Moran's Iis the reliable indicator of existence (or absence) of spatial autocorrelation. A very uneven but appreciable strengthening of spatial autocorrelation of youth unemployment over time attracts attention. The maximum values of Moran index are observed when using a matrix of values (block) inverse to squared distances as in this case influence of spatial effects artificially intensifies. It is possible to consider, as a whole,a smaller level of spatial autocorrelation (except for the crisis period of 2009-2010) when using GEW matrix weighed on GRP in comparison with IDW matrix (γ = 1) as an important result. The probable explanation of this fact is that GRP volumes of almost all other regions of European Russia are comparable among them and are at the same time very small in comparison with Moscow one.

Table 2. Relation of the average level of income in the capital to average income through the country as a whole (Germany, France, Russia)

Year	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Berlin	0.86	0.86	0.87	0.89	0.90	0.88	0.89	0.89	0.89	0.94	…
Moscow	3.51	2.97	2.92	2.82	2.29	2.49	2.32	2.28	2.11	2.12	1.96

Sources: Statistisches Bundesamt and Ross tat data, own calculations.

Table 3. Dynamics of Moran's I for the youth unemployment in 55 Russian regions (for three spatial weights matrixes)

Year	GEW		IDW (γ=1)		IDW (γ=2)	
	Moran's I	z-value	Moran's I	z-value	Moran's I	z-value
2004	0.1409	6.0098	0.1876	8.3664	0.3547	5.2318
2005	0.0994	4.7752	0.1228	6.0671	0.2244	3.4261
2006	0.1708	6.5592	0.2113	8.5797	0.4117	5.9718
2007	0.1541	6.4031	0.2052	9.1179	0.4120	6.0387
2008	0.1841	6.9735	0.2294	9.2248	0.4949	7.1225
2009	0.1329	5.2824	0.1255	5.4417	0.2683	3.9872
2010	0.1429	5.5486	0.1240	5.3049	0.2700	4.0027
2011	0.1175	4.7447	0.1411	6.0489	0.3107	4.5781
2012	0.1725	6.5515	0.1963	7.9788	0.3979	5.7751
2013	0.1462	6.0582	0.1663	7.4545	0.3096	4.5969
2014	0.2051	7.5997	0.2480	9.7642	0.4996	7.1730

Source: Rosstat data, own calculations.

Table 4. Dynamics of Moran's I for the youth unemployment in 54 Russian regions (for three spatial weights matrixes)

Year	GEW		IDW (γ=1)		IDW (γ=2)	
	Moran's I	z-value	Moran's I	z-value	Moran's I	z-value
2004	0.0503	2.6583	0.1832	8.1420	0.3460	5.4544
2005	0.0808	4.0525	0.1164	5.8379	0.2125	3.4875
2006	0.1544	6.0724	0.2049	8.2407	0.3981	6.1566
2007	0.1430	6.1188	0.2001	8.8254	0.4010	6.2780
2008	0.1549	6.0612	0.2214	8.8417	0.4778	7.3317
2009	0.0971	4.1023	0.1151	5.0240	0.2509	3.9939
2010	0.1031	4.2488	0.1091	4.7221	0.2404	3.8285
2011	0.0989	4.1775	0.1381	5.9101	0.3133	4.9204
2012	0.1512	5.9029	0.1918	7.7449	0.3976	6.1471
2013	0.1319	5.6323	0.1598	7.1314	0.2951	4.6876
2014	0.1879	7.0822	0.2427	9.4453	0.4896	7.4851

Source: Rosstat data, own calculations.

The adverse historical background (for many decades the city was in the center of East Germany) led to decline of business and degradation of industrial capacity of Berlin, even its western part. Though the capital is the main cultural center of Germany backlog from Munich, Cologne and Düsseldorf in the sphere of finance, business and high technologies, probably, is not still overcome. Thus Berlin remains the largest agglomeration of Germany that only aggravates the unemployment problem. Most likely, leveling in

Therefore, use of GEW matrix in Russian realities sharply strengthens actually only one relation of the region - with Moscow, respectively, shading spatial relations between other regions. For checking of this assumption Moran indices were recounted for a dimension matrix of 54, i.e. without the capital. It is obvious that exception of Moscow from the list of regions did not almost affect values on IDW matrix (γ = 1), but sharply reduced values on GEW matrix (that confirms our assumptions). Thus, the gap between the values of Moran index, calculated on these two options, increased. Since 2006 (after slight increase) the trend of slow but steady decrease in the level of spatial autocorrelation of youth unemployment was outlined in Germany. Application of GEW weight matrix instead of IDW (γ = 1) does not practically change evaluation of Moran index for Germany. It confirms the assumption put forward above of insignificant influence of GRP of German regions on spatial effects of unemployment. As a whole, the level of spatial autocorrelation in Germany was higher for the considered period, but in 2014 Moran index in Russia exceeded a similar indicator for Germany.

Unfortunately, we should be reconciled with the international distinctions in methodology: in Russia the enterpriseswith a number of employed workers of less than 100 people are considered small, in Germany grouping on a number of employed workers is other. In Germany the interval of 0-49 workplaces was conventionally taken as acriterion of a small enterprise with obligatory registration in social insurance agencies(*SozialversicherungspflichtigBeschäftigte*), taking into account that the actual number of workers at the enterprise, as a rule, is more (data on this indicator were available only for the period of 2006-2013).

Table 5. Dynamics of Moran's I for the youth unemployment in 38 German regions (for three spatial weights matrixes)

Year	GEW		IDW (γ=1)		IDW (γ=2)	
	Moran's I	z-value	Moran's I	z-value	Moran's I	z-value
2004	0.2440	7.3168	0.2433	7.6358	0.5178	6.5948
2005	0.2219	6.7172	0.2197	6.9617	0.4608	5.9046
2006	0.2723	7.9821	0.2708	8.2988	0.5572	7.0550
2007	0.2707	7.9545	0.2722	8.3589	0.5602	7.0950
2008	0.2627	7.7378	0.2905	8.8644	0.5507	6.9791
2009	0.2493	7.3535	0.2472	7.6264	0.5189	6.5910
2010	0.2476	7.3256	0.2446	7.5754	0.5032	6.4036
2011	0.2386	7.1689	0.2352	7.4095	0.4823	6.1648
2012	0.2321	6.9922	0.2253	7.1291	0.4658	5.9651
2013	0.2390	7.0493	0.2308	7.1416	0.4720	6.0200
2014	-	-	0.2315	7.1790	0.4668	5.9595

Source: StatistischesBundesamt data, own calculations.

Table 6. OLS-parameters for Russia and Germany (depended variable – ln(YUR))

Year	Russia			Germany		
	ln(dist)	ln(smallbus)	R^2	ln(dist)	ln(smallbus)	R^2
2004	0,2262***	-0,5609***	0.4679	-	-	-
2005	0.1546***	-0.5424***	0.5125	-	-	-
2006	0.2958***	-0.5632***	0.5241	-0.0178***	-0.0145***	0.6968
2007	0.2661***	-0.5424***	0.4380	-0.0172***	-0.0138**	0.6378
2008	0.2287***	-0.4841***	0.5003	-0.0151***	-0.0150**	0.5828
2009	0.0988***	-0.3281***	0.5399	-0.0126***	-0.0138**	0.5519
2010	0.1267***	-0.3441***	0.4926	-0.0119***	-0.0149**	0.5404
2011	0.0843***	-0.4924***	0.5552	-0.0121***	-0.0161**	0.5016
2012	0.1349***	-0.6020***	0.6779	-0.0107***	-0.0185**	0.5032
2013	0.1268***	-0.5481***	0.6582	-0.0102***	-0.0144**	0.4735
2014	0.1926***	-0.4745***	0.6230	-	-	-

Sources: Rosstat and StatistischesBundesamt data, own calculations.
Note: coefficients are significant at: * p<0.05, ** p<0.01, ***p<0.001.

Table 7. Random effect models (non-spatial and SAR),depended variable – ln(YUR)

Variables	Russia (without Moskow)			Germany (without Berlin)		
	non-spatialmodel	IDW (γ=2)	GEW	non-spatialmodel	IDW(γ=2)	GEW
Const	2.8682***	2.4382***	3.0017***	8.7745***	9.0795***	10.5389***
	(0.1859)	(0.2098)	(0.1856)	(0.8189)	(0.8637)	(0.8817)
Wln(YUR)	-	0.0416***	-0.0456***	-	0.1233***	0.0952***
		(0.0141)	(0.0100)		(0.0300)	(0.0225)
ln(Small	-0.4312***	-0.4025***	-0.3872***	-0.6879***	-0.7960***	-09942***
Business)	(0.0268)	(0.0263)	(0.0276)	(0.1414)	(0.1479)	(0.1543)
ln(dist)	0.1858***	0.2184***	0.1521***	-0.3996***	-0.3841***	-0.4165***
	(0.0184)	(0.0207)	(0.0196)	(0.0364)	(0.0376)	(0.0368)
theta	0.5646	0.4549	0.5342	0.5524	0.4223	0.4132
Breusch-Pagan test	232.18***	183.13***	262.12***	252.30***	102.39***	96.87***
Hausman test	21.46***	56.93***	32.36***	74.18***	119.97***	123.41***
Log-likelihood	-186.34	-174.62	-176.13	-104.66	-81.44	-80.21
BIC	391.84	374.79	377.81	226.39	185.64	183.19

Note: robust standard errors in brackets under the coefficients: * p<0.05, ** p<0.01, ***p<0.001.

RESULTS

We were defined by means of OLS-estimation that contribution which brings the distance to the capital *(dist)* and the level of small business development, i.e. a number of small enterprises on 10,000 people of the population *(SmallBus)*. The empirical model for the analysis (see tab. 6):

$$\ln y_i = \beta_0 + \beta_1 \ln dist_i + \beta_2 \ln SmallBus_i + \varepsilon. \quad (1)$$

It is necessary to emphasize that relation between factor indications is very weak: the correlation coefficient for the considered period did not exceed 0.3 and 0.2 in Russia and Germany, respectively. Therefore, danger of multicollinearity does not arise. Accounting of a time lag in 1 year (on *the Small Bus*parameter) did not raise the determination level of the models.

It again attracts attention the fact that the coefficients at *the dist* variable have different signs: in Russia youth unemployment grows with removal from the capital, and in Germany – decreases. As the distance to the capital does not change in time, *the dist* parameter cannot be used in the models with the fixed effects. However, taking into consideration importance of this variable two empirical models of panel data were compared (Spatial Autoregression Model, SAR):

- random effect model without the capital (see tab. 7):
$$\ln y_{it} = \beta_0 + \beta_1 \sum_{j=1}^{N} w_{ij} \ln y_{jt} + \beta_2 \ln SmallBus_{it} + \beta_3 \ln dist_i + \varepsilon; \quad (2)$$
- fixed effect model with the capital (see tab. 8):
$$\ln y_{it} = \beta_0 + \beta_1 \sum_{j=1}^{N} w_{ij} \ln y_{jt} + \beta_2 \ln SmallBus_{it} + \varepsilon. \quad (3)$$

The model (2) was calculated on the basis of the panel of 594 observations for Russia (54 regions during 11 years) and 296 observations for Germany (37 regions during 8 years). The model (3) was calculated on the basis of the panel of 605 observations for Russia (55 regions during 11 years) and 304 observations for Germany (38 regions during 8 years). For evaluation of models'quality the method of maximum likelihood was used (see, e.g., Yu et al., 2008).

Evaluation of the models with random effects (the Swamy-Arora estimator was applied) and evaluation of the models with fixed effects (the Arellano-Bond estimator was applied). As an auxiliary parameter the Bayesian information criterion (BIC) was used. Though all models (2) win in comparison with the joint model, significant levels of Haussman' test speak about insolvency of OLS estimation. Therefore, preference should be given to the models (3). Comparison of values of the maximum likelihood function in tab. 7 and 8 also points to it. For European Russia the determination coefficient of a usual (not - spatial) model with the fixed effects made 59.6 %, for Germany - 71.3 %.

It indicates a very high explanatory capacity of the signal-factor panel YUR model even without spatial effects. Nevertheless comparison of the values of the maximum likelihood function for models with the fixed effects testifies in favor of the models taking into account spatial effects. However, here there are also international distinctions: for Russia the matrix taking into account GRP appeared the best, while for Germany - IDW matrix (γ = 2). It is possible to assume that for the countries with rather low level of GRP variation (or other regional economic indicator) use of GEW matrix is unjustified. The model (3) for Germany with use of IDW (γ = 1) also showed the worst results in comparison with IDW matrix (γ = 2): the maximum likelihood function is equal to11.85, BIC is equal to 252.38. Difference in signs before a spatial variable in Russia and Germany attracts attention. The paradoxical (considering existence of positive spatial autocorrelation) result for Russia should be attributed entirely to influence of Moscow which considerably intensifies when using GEW matrix.

Table 8. Fixed effect models (non-spatialand SAR),depended variable – ln(YUR)

Variables	Russia			Germany		
	non-spatialmodel	IDW (γ=2)	GEW	non-spatialmodel	IDW (γ=2)	GEW
const	4.8579***	4.8848***	4.4009***	7.1849***	6.6844***	8.0965***
	(0.1405)	(0.1424)	(0.1462)	(0.8684)	(0.8007)	(1.1806)
Wln(YUR)	-	-0.0530***	-0.0665***	-	0.1229***	0.0699**
		(0.0147)	(0.0058)		(0.0246)	(0.0283)
ln(Small Business)	-0.6130***	-0.5922***	-0.4736***	-0.8164***	-0.7787***	-0.9908***
	(0.0325)	(0.0335)	(0.0347)	(0.1422)	(0.1368)	(0.2014)
F test (FE=0)	424.37***	224.61***	306.38***	32.97***	17.57***	15.14***
Breusch-Pagan test	339.47***	367.85***	373.13***	254.43***	162.75***	218.48***
Hausman test	23.01***	35.06***	14.01***	65.27***	50.71***	54.00***
Log-likelihood	-97.85	-89.98	-44.04	-16.60	-7.84	-12.55
BIC	554.40	545.06	453.18	256.16	244.37	253.78

Note: robust standard errors in brackets under the coefficients: * p<0.05, ** p<0.01, ***p<0.001.

Table 9. Fixed effect models (exogenousand SDM),depended variable – ln(YUR)

Variables	Russia, GEW		Germany, IDW (γ=2)	
	exogenous only	SDM	exogenous only	SDM
const	4.4032***	4.4093***	7.1849***	3.9447***
	(0.1426)	(0.1424)	(0.8697)	(0.5762)
Wln(YUR)	-	0.0156	-	0.7959***
		(0.0555)		(0.1038)
ln(Small Business)	-0.4756***	-0.4775***	-0.8176***	-0.3102***
	(0.0337)	(0.0355)	(0.1409)	(0.0964)
Wln(Small	-0.0322***	-0.0396	0.0012	-0.2621***
Business)	(0.0031)	(0.0267)	(0.0074)	(0.0418)
F test (FE=0)	216.14***	146.03***	17.55***	39.75***
Breusch-Pagan test	331.61***	316.46***	249.59***	132.22***
Hausman test	40.56***	89.64***	145.90***	49.56***
Log-likelihood	-43.19	-43.11	-16.59	49.66
BIC	451.47	457.73	261.86	135.08

Note: robust standard errors in brackets under the coefficients: * p<0.05, ** p<0.01, ***p<0.001.

This assumption proves to be true when comparing with the model with random effects (without Moscow), weighed on IDW matrix (γ = 2) which gives the "expected" positive value of a variable with a spatial lag. Obviously, for the capital of Russia the inverse spatial relation, which "outweighs" positive autocorrelation of other regions is characteristic. For Germany influence of Berlin does not bring this sort of distortion in the models. We were estimated influence of a spatial lag of an explanatory variable, in our case it is *Small Bus*, on YUR. Two empirical models (see, e.g., Lesage, 2008) are also possible here:

- spatial model with exogenous variables only:
  $\ln y_{it} = \beta_0 + \beta_1 \sum_{j=1}^{N} w_{ij} \ln SmallBus_{jt} + \beta_2 \ln SmallBus_{it} + \varepsilon$; (4)
- Spatial Durbin Model, SDM:
  $\ln y_{it} = \beta_0 + \beta_1 \sum_{j=1}^{N} w_{ij} \ln y_{jt} + \beta_2 \ln SmallBus_{it} + +\beta_1 \sum_{j=1}^{N} w_{ij} \ln SmallBus_{jt} + \varepsilon.$ (5)

Both models were calculated on the cycle of regions. On the basis of our previous results for Russia GEW matrix was used, for Germany - IDW matrix (γ = 2). Though on formal signs Durbin model is the best for Russia, insignificance of both variables with a spatial lag forces to recognize it unsatisfactory. At that transition to IDW matrix (γ = 2) did not improve quality of the models (4) and (5): function of maximum likelihood made respectively-80.72 and-68.59, BIC was equal to 526.54 and 508.68. Therefore, the models (3) and (4) with use of GEW matrix can be considered approximately equivalent for the description of youth unemployment in the Russian Federation. However, considering serious risk of a multicollinearity between *SmallBus* and the same parameter with a spatial lag, we believe the SAR model to be the best. As for Germany, here the SDM model with use of IDM matrix (γ = 2) is optimal. The similar model with GEW matrixis comparatively worse (function of maximum likelihood is equal to 26.84, BIC is equal to 180.72).

It should be noticed that the level of youth unemployment in Germany in all cases is described by factorial signs much better, than in Russia. Obviously, the Russian model of unemployment should be described by a wider set of independent variables than the German one.

The main results can be summarized as follows:

- The hypothesis about existence of positive spatial effects concerning youth unemployment in both compared countries is confirmed. During the considered period their influence in Russia intensified, in Germany it slightly weakened.
- The hypothesis about significant influence of the distance to the capital on YUR in both countries is confirmed. However, the signs at the coefficients are opposite: in Russia with approach to the capital YUR decreases, and in Germany it grows.
- In the analysis of the panel data models with the fixed effects without obvious accounting of distance to the capital showed the best results. This factor is more expedient for considering directly in a spatial matrix.
- The hypothesis about preference of use of GEW matrix weighed on GRP, at evaluation of spatial effects, is confirmed for Russia and rejected for Germany. In the latter case it is apparently preferable to use the inverted matrix of distances with γ ≥ 2.

Conclusion

The subject of this article is the comparative analysis of youth unemployment in Russia and Germany, and also influence extent of spatial effects on it. Statistically confirmed parameters of spatial models of youth unemployment were the main result of this article. Applying the panel analysis we tried to consider simultaneously influence of temporal and spatial factors on the studied indicator. For both countries positive spatial autocorrelation of YUR is characteristic that from the economic point of view means existence of spatial clusters with high or low unemployment. The level of small business development both in Russia, and in Germany is one of the major (if not key) factors influencing youth unemployment that is convincingly shown by the models given in this work.

Acknowledgements

This research was conducted at the Institute of Agrarian Problems of RAS and financially supported by the Russian Science Foundation (Grant No 14-18-02801).

REFERENCES

Anselin L. 1988. Spatial Econometrics: Methods and Models. Dordrecht: Kluwer Academic Publishers.

Anselin L. 2002. Under the hood.Issues in the specification and interpretation of spatial regression models.*Agricultural Economics*. Vol. 27, Issue 3, pp. 247-267.

Anselin L., Bera A. 1998. Spatial dependence in linear regression models with an introduction to spatial econometrics. In: Ullah, Amman and Giles, David E.A., editors, Handbook of Applied Economic Statistics. Berlin: Springer.

Basile R. 2010. Labour productivity polarization across western European regions: Threshold effects versus neighbourhood effects. In: *The labour market impact of the EU enlargement*. Springer–Verlag, Berlin, Pp. 75–98.

Basile R., Girardi A., Mantuano M. 2012. Migration and regional unemployment in Italy. *The Open Urban Studies Journal*, Vol. 5, Pp. 1–13.

Berlingieri F., Bonin H., Sprietsma M. 2014. Youth Unemployment in Europe – Appraisal and Policy Options. Stuttgart: Robert Bosch Stiftung.

Cracolici M., Cuffaro M., Nijkamp P. 2009. A spatial analysis of Italian unemployment differences.*Statistical Methods and Applications*. Vol. 7, pp. 275-291.

Demidova O., Marelli E., Signorelli M. 2013. Spatial effects on youth unemployment rate: The case of Eastern and Western Russian regions. *Eastern European Economics*, Vol. 9, pp. 94-124.

Demidova O., Marelli E., Signorelli M. 2014.Youth labour market performances in the Russian and Italian regions. *Economic Systems*. Vol. 39, pp. 43-58.

Fischer, M.M., Wang, J. 2011. Spatial Data Analysis.Models, methods and Techniques.*Springer Briefs in Regional Science*, p. 21.

Fuchs-Schundeln N., Izem R. 2012. Explaining the low labor productivity in East German – A spatial analysis.*Journal of Comparative Economics.*Vol. 40. Issue 1, pp. 1-21.

Guriev S., Vakulenko E. 2015. Breaking out of poverty traps: internal migration and interregional convergence in Russia.*Journal of comparative economics*.Vol. 43 Issue 3, pp. 633-649.

Lesage J.P. 2008. An Introduction to Spatial Econometrics. Revue d'économieindustrielle 123, 3èmetrimestre 2008, p. 28-29.

Lopez-Bazo E., delBarro T., Artis M. 2002. The regional distribution of Spanish unemployment: a spatial analysis, p*apers in Regional Science.* Vol. 8, pp. 365-389.

Lottmann F. 2012. Explaining regional unemployment differences in Germany: A spatial panel data analysis.*Discussion Paper 2012-026, CRC 649*.

Matyas L., Sevestre C. 1995. The Econometrics of Panel Data.A Handbook of the Theory with Applications. Dordrecht: Kluwer Academic Publishers.

Molho I. 1995. Spatial autocorrelation in British unemployment. *Journal of Regional Science.* Vol. 35. Issue 4, pp. 641-658.

Niebuhr A. 2003. Spatial interaction and regional unemployment in Europe. *European Journal of Spatial Development.* Vol. 5,pp. 2-24.

Partridge, M. D., Rickman D. S. 1997. The dispersion of US state unemployment rates: the role of market and non-market equilibrium factors, *Regional Studies*, Vol. 31, pp. 593-606.

Schioppa K, p., Basile R. 2002. Unemployment dynamics of the ‘mezzoqiorno of Europe’: Lessons for the mezzogiorno of Italy. *Centre for Economic Policy Research Discussion Paper No.3594*.

Yu, J., De Jong R., Lee L.-F. 2008. Quasi-maximum likelihood estimators for spatial dynamic panel data with fixed effects when both n and t are large, *Journal of Econometrics*, Vol. 146, 118-134.

****