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The Difference of Spatial Effects in the Eastern and Western Russian Regions

(by the example of the Youth Unemployment Rate)

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Structure of presentation

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- **Previous studies**
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- **Traditional spatial model**
- **Modified spatial model**
- **Econometric results**
- **East and West similarities and differences**
- **Conclusions**



Motivation

- **E.Marelli, M.Signorelli**

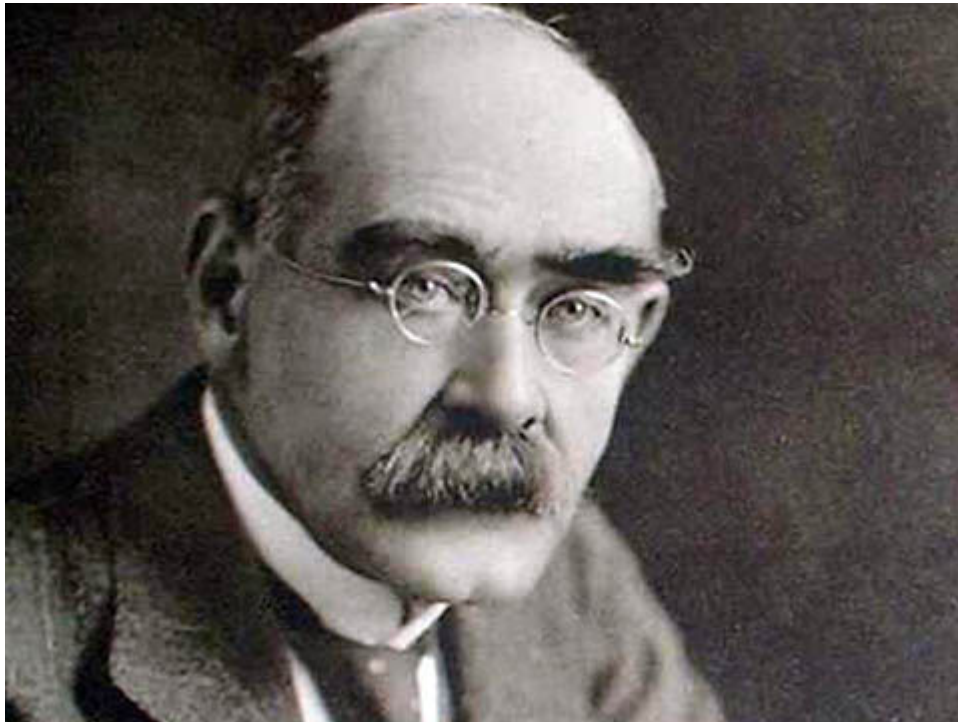
- **Perugini C., and Signorelli M. (2010b). Youth Unemployment in Transition Countries and Regions,**

- **Perugini C. and Signorelli M. (2010a). Youth Labour Market Performance in European Regions**

- **Marelli E. and Signorelli M. (2010b). Transition, Regional Features, Growth and Labour Market**

- **Marelli E., Patuelli R. and Signorelli M. (2012). Regional Unemployment in the EU before and after the Global Crisis“**

- **O.Demidova: Spatial models**



THE BALLAD OF EAST AND WEST

**Oh, East is East, and West is West,
and never the twain shall meet ...**



Previous studies

- Basile R. “Labour productivity polarization across western European regions: threshold effects versus neighbourhood effects”// The labour market impact of the EU enlargement, Springer-Verlag Berlin, 2010, pp.75-98
- Fuchs-Schundeln N., Izem R. “Explaining the low labor productivity in East German – A spatial analysis // Journal of Comparative Economics 40, 2012, pp. 1-21
- Demidova O., Signorelli M. “Determinants of Youth Unemployment in Russian Regions”// Post-Communist Economies, v.24, n.2, June 2012, p.191-217
- Kolomak E.A. (2011). Spatial Externalities as a Source of Economic Growth // Regional Research of Russia, 1, 2, pp. 114–119.



Data

75 Russian regions (we have to omit data for 8 regions)

Time period 2000-2009 years

Dependent variable: YU - the unemployment rate in the 20-29 age group

Some descriptive statistics

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total unemployment (mean)										
All Russia	11.77	10.02	8.85	9.29	8.85	9.19	7.75	6.7	7.31	9.16
West	11.1	9.46	8.39	8.76	8.46	7.87	7.29	6.3	6.82	8.78
East	13.48	11.45	10.06	10.64	9.83	9.2	8.94	7.71	8.57	10.16
Youth unemployment (mean)										
All Russia	15.84	13.53	11.68	12.49	10.5	11.1	10.99	9.48	10.06	13.18
West	14.9	13.08	11.28	11.72	9.34	10.42	10.23	8.69	9.47	12.5
East	18.26	14.68	12.71	14.48	13.48	12.84	12.95	11.53	11.56	14.94

Map of youth unemployment



Moran's index

$$I(X) = \frac{N \sum_{i,j} w_{ij} (X_i - \bar{X})(X_j - \bar{X})}{\sum_{i,j} w_{ij} \sum_i (X_i - \bar{X})^2}$$

Moran's index

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Moran's I for Russia in total	0.306 ***	0.306 ***	0.249 ***	0.307 ***	0.41 ***	0.201 ***	0.332 ***	0.431 ***	0.372 ***	0.318 ***
Moran's I for west part of Russia	0.372 ***	0.336 ***	0.262 ***	0.278 ***	0.344 ***	0.167 ***	0.315 ***	0.43 ***	0.37 ***	0.233 ***
Moran's I for east part of Russia	-0.007	0.063	0.105	0.189 *	0.21* *	0.081	0.114	0.182 *	0.096	0.256 **



Hypotheses

- (i) The situation with youth unemployment in Russia is more serious than that of total unemployment
- (ii) it is necessary to take into account the temporal dynamics of youth unemployment and impact of the 2008-09 crisis
- (iii) In modelling the processes of youth unemployment in Russia, it is necessary to consider the **spatial correlation**
- (iv) **There exists a difference between west and east Russian regions**



Traditional Spatial Model

$$Y = X\beta + \rho WY + \varepsilon,$$

Where W is a weighted matrix (very often boundary matrix),

ρ is spatial correlation coefficient,

Usual methods of estimation: ML, Arellano-Bond (for panel data)



New Model

$$\begin{pmatrix} YUW_{i_w t} \\ YUE_{i_e t} \end{pmatrix} = \sigma \begin{pmatrix} YUW_{i_w t-1} \\ YUE_{i_e t-1} \end{pmatrix} + \theta \begin{pmatrix} T UW_{i_w t} \\ T UE_{i_e t} \end{pmatrix} + \begin{pmatrix} \rho_{ww} W_{ww} & \rho_{we} W_{we} \\ \rho_{ew} W_{ew} & \rho_{ee} W_{ee} \end{pmatrix} \begin{pmatrix} YUW_{i_w t} \\ YUE_{i_e t} \end{pmatrix} + \begin{pmatrix} X_w \beta_w \\ X_e \beta_e \end{pmatrix} + \sum_{k=1}^9 \gamma_k d_{200k} + \alpha_i + \varepsilon_{it},$$

$$i_w = 1, \dots, 54, i_e = 55, \dots, 75, i = 1, \dots, 75, t = 2000, \dots, 2009$$

Examples of "west" and "east" variables

$$shurbanw = \begin{cases} shurban, & \text{if } i = 1, \dots, 54 \text{ (west regions)} \\ 0, & \text{if } i = 55, \dots, 75 \text{ (east regions)} \end{cases} \in X_w$$

$$shurbane = \begin{cases} 0, & \text{if } i = 1, \dots, 54 \text{ (west regions)} \\ shurban, & \text{if } i = 55, \dots, 75 \text{ (east regions)} \end{cases} \in X_e$$

No.	Statistical hypotheses	Interpretation H1
1	$H_0 : \theta = 1$ $H_1 : \theta > 1$	Hypothesis 1 – The situation with youth unemployment is more serious than with the total one
2	$H_0 : \gamma_1 = \dots = \gamma_9$ $H_1 : \exists i \neq j : \gamma_i \neq \gamma_j, i, j \in \{1, \dots, 9\}$	Hypothesis 2 - We expect negative impact of 2008-09 crisis $\hat{\gamma}_9 > \max \{\hat{\gamma}_1, \dots, \hat{\gamma}_8\}$
3	$H_0 : \rho_{ww} = \rho_{ee} = \rho_{we} = \rho_{ew} = 0$ $H_1 : \exists i : \rho_i \neq 0, i \in \{ww, ee, we, ew\}$	Hypothesis 3 - it is necessary to consider the spatial correlation
4	$H_0 : \rho_{ww} = \rho_{ee} = \rho_{we} = \rho_{ew}$ $H_1 : \exists i \neq j : \rho_i \neq \rho_j, i, j \in \{ww, ee, we, ew\}$	Hypothesis 4 - There exists a difference between west and east Russian regions
5	$H_0 : \beta_{wk} = \beta_{ek} \quad \forall k = 1, \dots, K$ $H_1 : \exists k : \beta_{wk} \neq \beta_{ek}$	



Independent variables

Four types of explanatory variables

Assumptions about the impact of factors

1. Variables characterising the socio-demographic situation in a region

The share of urban population in a region

The higher the urban population in a region, the easier it is for young people to find a job because there are more employment opportunities in urban areas

The share of individuals aged 20-29 years

The higher the proportion of young people in a region, the more difficult it is for individuals to find jobs due to increased competition

The number of pensioners per 1,000 people

The more pensioners in a region, the more difficult it is for young people to find a job because more retired people could be in the "irregular labour market" and may compete with young people for jobs



Independent variables

Four types of explanatory variables

Assumptions about the impact of factors

2. Variables on the migration processes in a region

The number of migrants arriving in and departing from a region per 10,000 people

On the one hand, a large number of migrants arriving in a region may indicate the possibility of finding a job in this region. On the other hand, numerous migrants can compete with the youth of an area by agreeing to work for lower wages .

The percentage of migrants arriving from other regions and from other countries

Migrants from other regions of Russia, rather than other countries, may be more "dangerous" competitors for youth.

The percentage of migrants departing to other regions and to other countries

Migrants from economically developed countries usually claim high-paid jobs that are inaccessible to young people. At the same time, migrants from the CIS countries often accept low-skilled and low-wage jobs (e.g., construction) for which young people are not suited



Independent variables

Four types of explanatory variables	Assumptions about the impact of factors
<i>3. Variables characterising the economic situation in a region</i>	
Productivity (GDP per person employed),	The more economically developed a region is, the lower is the youth unemployment therein
GDP per capita	
Average monthly pension	
<i>4. Variables about export-import activity of a region</i>	
The openness of the regional economy to export and import	The export activity of a region contributes to the creation of new jobs, and thereby reduces youth unemployment, and that regional import activity has the opposite effect.
Openness of regional economy for export (import) to CIS in the previous year	
Openness of regional economy for export (import) to other countries in the previous year	

Results of estimation (Arellano-Bond). Example

Variable	Coefficient estimate	Variable	Coefficient estimate	Variable	Coefficient estimate
Time lag	0.02	d2002	-0.57***	shurbanw	-0.01
w-w spatial lag	0.14***	d2003	-0.0005*	shurbane	0.08
w-e spatial lag	0.13**	d2004	-0.85***	shareyouthw	-4.26***
e-w spatial lag	0.06	d2005	0.4*	shareyouthsquarew	0.09***
e-e spatial lag	0.18***	d2006	0.99***	shareyouthe	3.06
totalunem	1.06***	d2007	0.95***	shareyouthsquaree	-0.07
		d2008	0.97**	numberpensionw	0.0005
		d2009	1.57***	numberpensione	0.001**

Tested hypotheses. Example

$$H_0 : \rho_{ww} = \rho_{we},$$

$$\rho_{ew} = 0,$$

$$\beta_{shurbanw} = \beta_{shurbane},$$

$$\beta_{numberpensionw} = \beta_{numberpensione}$$

H_1 : *restrictions are not valid*

Wald test

$$p - v(H_0) = 0.57$$



Results of estimation with incorporated restrictions

Variable	Coefficient estimate	Variable	Coefficient estimate	Variable	Coefficient estimate
Time lag	0.02	d2002	-0.58***	shurban	0.03
w-(w+e) spatial lag	0.13***	d2003	0.02		
		d2004	-0.86***	shareyouthw	-4.49***
		d2005	0.41	shareyouthsquarew	0.1***
e-e spatial lag	0.17***	d2006	1.0***	shareyouthe	2.83
totalunem	1.07***	d2007	0.98**	shareyouthsquaree	-0.06
		d2008	0.99**	numberpension	0.0008
		d2009	1.62***		



Econometric results

East and West

Similarities	Differences
<p>A negative relationship between the share of regional urban population and youth unemployment has not garnered empirical evidence (the coefficient of variable s_{urban} is insignificant)</p>	<p>The dependence of the level of youth unemployment on the share of young people in the region is not positive - as we expected theoretically; moreover, it is also different for east and west regions: for east regions the relationship is insignificant, for west regions the relationship is quadratic</p>
<p>The higher the level of economic development in the region, the lower the level of youth unemployment</p>	<p>The relationship between the number of pensioners and the youth unemployment rate in the region is positive (but only for east regions)</p>
<p>We found no relationship between the positive net migration rate in the region and youth unemployment</p>	<p>Our hypothesis about competition of migrants and youth was confirmed only for east regions</p>
<p>Our assumption about the positive influence of regional export activity on youth unemployment was confirmed</p>	<p>A negative influence of regional import activity was confirmed only for import from other (non-CIS) countries and for import activity from CIS countries in west regions</p>



Conclusions

- **There is more serious situation for youth unemployment with respect to the total unemployment rate, confirming our first hypothesis**
- **It is necessary to take into account the temporal dynamics of youth unemployment and the greater impact of the 2008-09 crisis to young people, confirming our second hypothesis**
- **The existence of the boundary spatial correlation for youth unemployment in Russian regions is clearly detected, which confirms our third hypothesis**
- **The differences between “east and west” estimates of some variables are statistically significant, that confirms our fourth hypothesis**



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Thank you for your attention!

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