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ECONOMIC-GEOGRAPHICAL POSITION (EGP) AS A FACTOR OF REGIONAL DEVELOPMENT IN RUSSIA

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PURPOSE

The relevance of our research:

- Political discussion about factors of regional development – 'Do we need to be more open and where should we invest more?'
- Are there any advantages of regional geographical position and how to measure it?
- The basic concept of regional science in Russia – economic-geographical position (EGP) – was not sufficiently formalized

The purpose of the research:

- to formalize the EGP category and assess the benefits (potential) of economic-geographical position in its relation to regional development in Russia in 1998-2012

The hypothesis:

- Economic-geographical position is one of the main factors of regional development in modern Russia

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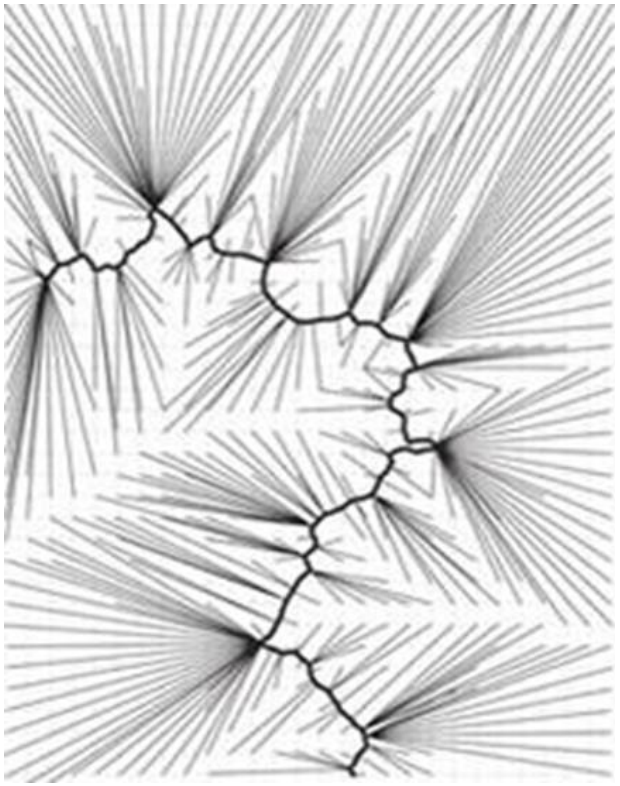
WHAT IS EGP?

The classical definition:

- Economic-geographical position is "*an attitude of any place, area or city to other outside regions, which have a particular economic significance*... It is extremely important for a country (or region, or city) to be within a short distance to the main roads, markets, and large centres (industrial, commercial, administrative, cultural)" [Baranskiy, p. 129].

Favourable economic-geographical position:

- ✓ Regions near large agglomerations
- ✓ Coastal regions
- ✓ Cities in river bends (left figure)
- ✓ Border regions
- ✓ Cities in centre of settlement system



EGP is a historically evolved, but varying set of potential spatial relationships between economic agents of this region and external factors potentially influencing their development

HOW TO MEASURE EGP?

Approach	Methods	Disadvantages
Analysis of location in space or network	Topological distance, proximity matrix, methods of the theory of the central places	The approach do not give quantitative characteristics of potential economic benefits. 'Centrality' is not always beneficial.
Calculation of economic distances	Calculation of transport costs, isochronous	The approach considers transportation costs, but does not take into account potential benefits of cooperation
Calculation of an integral index	Construction of indices	The subjective evaluation of a set of variables and weights. The approach assesses relative capacities of EGP.
Calculation of potential interactions	Gravity models	The approach often fail to take into account the actual distance, and specific types of positions (such as coastal)

FROM GRAVITY MODELS TO EGP

$$V_{ij} = \sum \frac{P^{\alpha}{}_i \times P^{\beta}{}_j}{R_{ij}{}^a}$$

- *V* is the number of potential interactions between regions *i* and *j*
- *P* is a size of a region, for example, gross regional product, population, etc.
- *Rij* is the distance between regions
- *α, β* are empirical coefficients
- *a* is a coefficient of proportionality, showing the speed of interaction decrease between regions caused by an increasing distance between them

$$EGP^{All}{}_i = EGP^{Reg}{}_i + EGP^{World}{}_i = \sum_{j=1}^{n} \frac{MV_j}{R_{ij}{}^a}$$

- *EGPi* is an EGP potential of a region *i*
- *MVj* is gross regional product of a region *j*, or gross domestic product of a country *j*
- *Rij* is **actual distance** between the capital of a region *i* and capitals in other regions or countries *j*
- *a* is an empirical coefficient, showing the speed of potential socio-economic interaction decrease between regions as the distance increases between them

HOW TO MEASURE *a*?

Let us assume there is a critical distance $Dist_{crit}$, after which an interaction between two regions becomes insignificant, and **δ** is the threshold number of interactions, for example, a single interaction. *P* is an equivalent of market potential

$$a \geq \frac{\ln\left(\frac{Mean(P_j)}{\delta}\right)}{\ln Dist_{crit}} \qquad \frac{Mean(P_j)}{\delta} \leq Dist_{crit}^{a}$$

An average GRP in Russia during 1998-2012 was nearly 64 billion roubles (approximately 2,06 billion USD based on 2012 exchange rates)

If we assume that the minimal interaction in any given year between two distant regions, situated at a distance of 8000 km from each other (for example, the distance between Amur and Arkhangelsk regions) is 1000 roubles, then

$$a_{\mathrm{Re}\,g} = \frac{\ln 64597810}{\ln 8000} \approx 2 \qquad a_{World} = \frac{\ln 10779445}{\ln 25000} \approx 1{,}6$$

INTERREGIONAL AND INTERNATIONAL EGP POTENTIAL

$$EGP^{Reg}{}_i = \sum \frac{GRP_j}{R_{ij}{}^2}$$

- *i* is a region
- *GRP* is gross regional product (in prices of 1998) (million roubles)
- *j* is other regions (83)
- *R* is a distance (km) by rail

$$EGP^{World}{}_i = \sum \left(\frac{GDP_q}{\min(R_{i,p}{}^2 + R_{p,q}{}^{1,5})} \right) + \sum \left(\frac{GDP_n}{(R_{i,e}{}^2 + R_{e,n}{}^2)} \right)$$

- *GDP* is gross domestic product (million roubles)
- *q* is a distant country (170)
- $R_{i,p}$ is a distance from a region *i* to the Russian port region *p* (km)
- $R_{p,q}$ is the distance from a port region *p* to the distant country *q* (km)
- *n* is a border country
- *e* is a border region for interaction with a particular border

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INTERREGIONAL EGP POTENTIAL

REGIONS

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INTERREGIONAL EGP POTENTIAL

CITIES

Interregional EGP potential, mln rub. in 2012

0 0,01 0,35 1,04 1,73 3,10 4,82 9,97 18,22 51,54 87,27

GRP (for cities), mln rub. in 2012

0 1193619

INTERREGIONAL EGP POTENTIAL

- The **higher the EGP potential** is, the **more intensive potential interactions** can be and **the higher benefits** for economic agents in regions will be
- This **natural advantage** is **not directly related** to activities of economic agents in the region because it does not include the market of the estimating (considering) region (unlike '*market potential'* concept)
- It is **potential** benefits excluding interaction barriers, politics, etc. (unlike '*market access'* concept)
- Let assume a company with revenues of 64 billion roubles per year (average GRP in Russia) in the Moscow region. It could earn by exporting products to other regions **484 million roubles per year more** than the same company in Chukotka. The benefit from the EGP will be **0.75%** of the revenue of the enterprise
- Not all economic agents are **located in regional capital city**
- Method can be used for **transport projects evaluation**

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TOTAL EGP POTENTIAL

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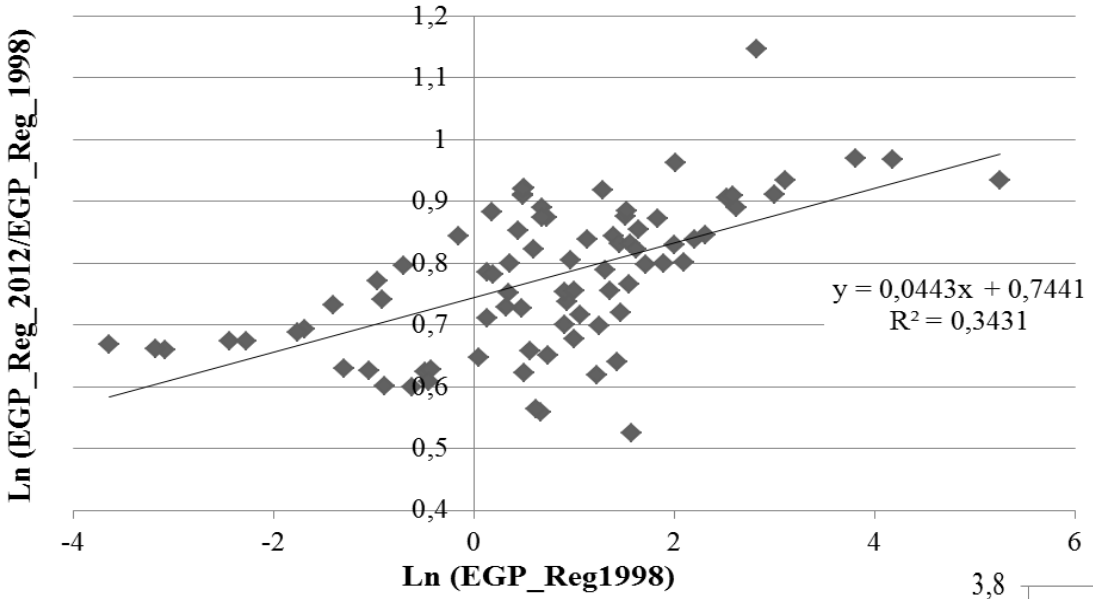
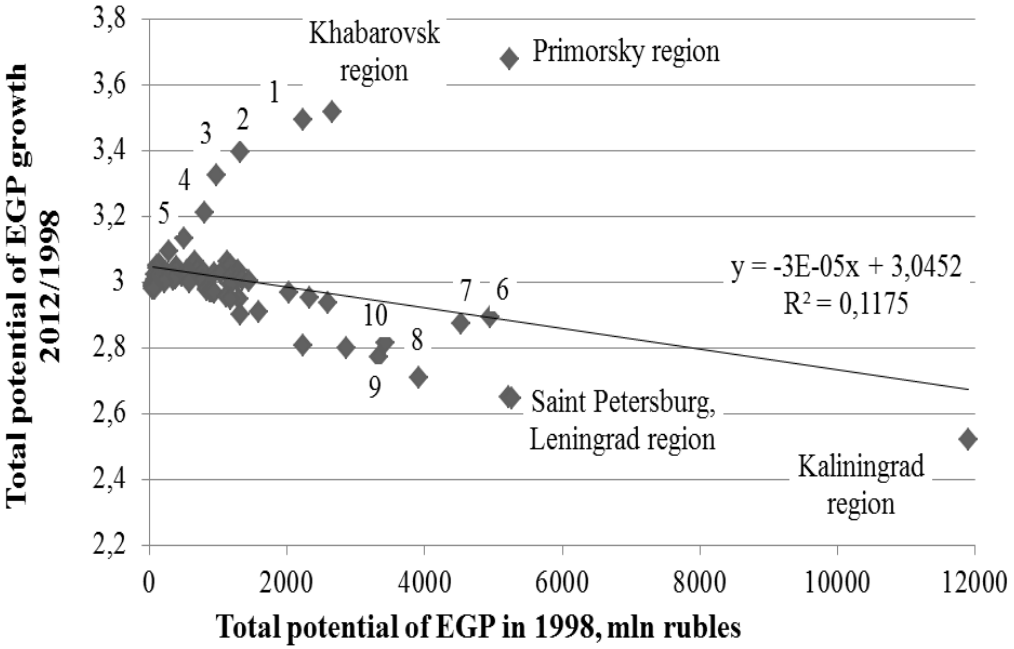
DYNAMICS OF EGP POTENTIAL



- Interregional EGP **potential grew** by more than 2.5 times in St. Petersburg, Moscow, Leningrad, Novgorod, Moscow, Tver regions
- **Average increase** – 220%

- The **maximum growth** (more than 3.5 times) in southern regions of the Far East: Primorsky, Khabarovsk regions
- **The lowest** (less than 2.5) in regions close to Nordic countries: St. Petersburg, Leningrad, Kaliningrad
- **Average increase** – 300%



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EGP POTENTIAL PER GRP

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EGP POTENTIAL INFLUENCE ON REGIONAL DEVELOPMENT

Indicators of socio-economic development of the Russian regions	Total potential of EGP, million roubles	Potential of interregional EGP, million roubles
GRP, million roubles		**0,21**
Growth of GRP, %	**0,06**	
Investments in fixed assets, million roubles	0,14	**0,33**
Ratio of fixed investment to GRP, %	**0,15**	
Export, million roubles		**0,18**
Ratio of imports to the GRP, %	**0,56**	0,18
Foreign direct investments, million roubles		**0,33**
Number of enterprises per 1,000 employees	**0,24**	0,2
Share of employment in wholesale and retail trade, %	**0,24**	0,15
Population density, persons per km2	0,11	**0,41**
Urbanization, %	0,07	**0,16**
Net migration, migrants per 10 thousand citizens	0,11	**0,16**
Technology export, million roubles	0,1	**0,24**
Technology and technical services import, million roubles	**0,23**	0,23
Number of mobile phones per 1000 citizens	**0,26**	0,18
Number of personal computers with Internet access per 100 employees	**0,22**	0,12

Note: all the coefficients are significant at the 5% p-value

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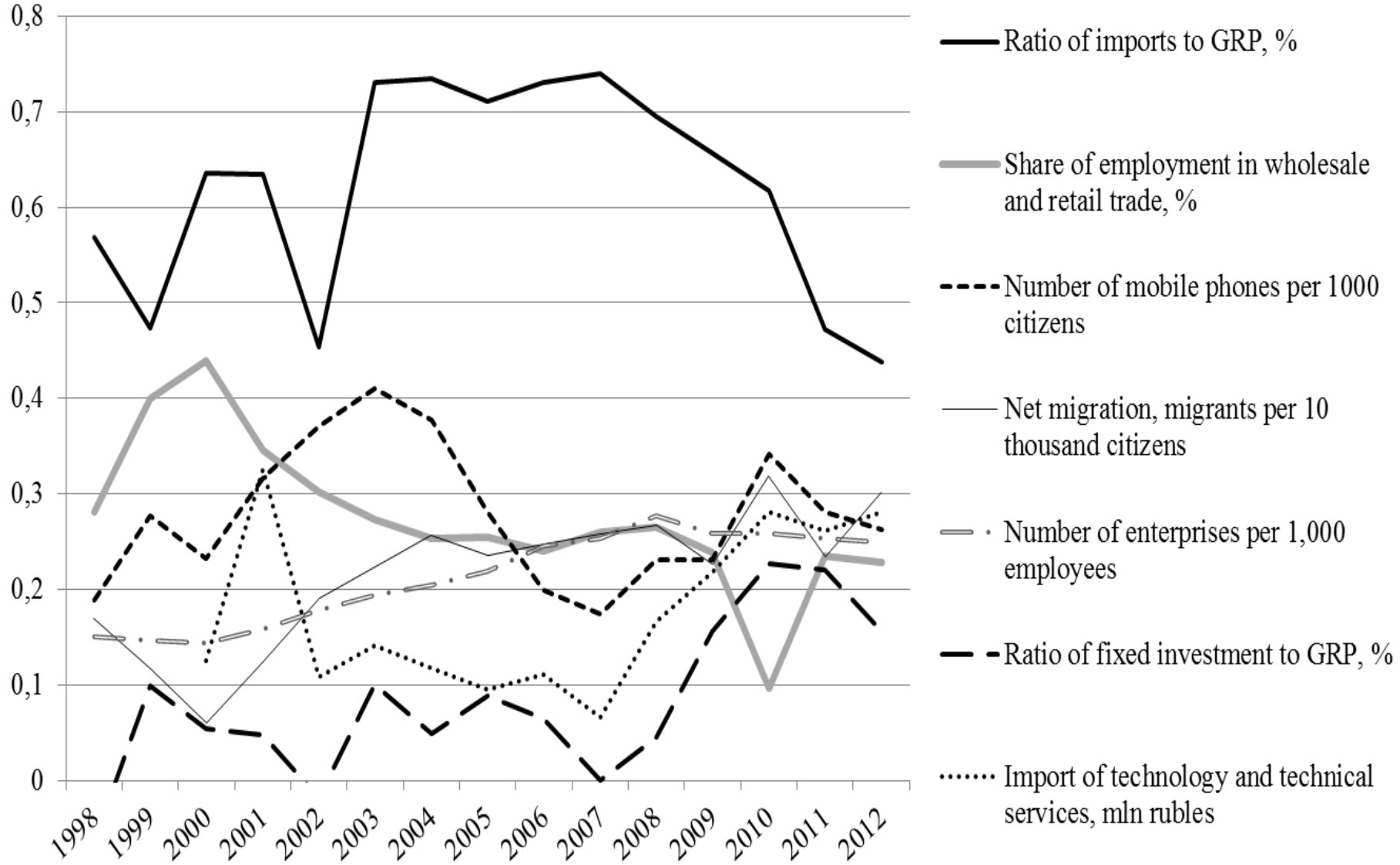
INERREGIONAL EGP POTENTIAL INFLUENCE



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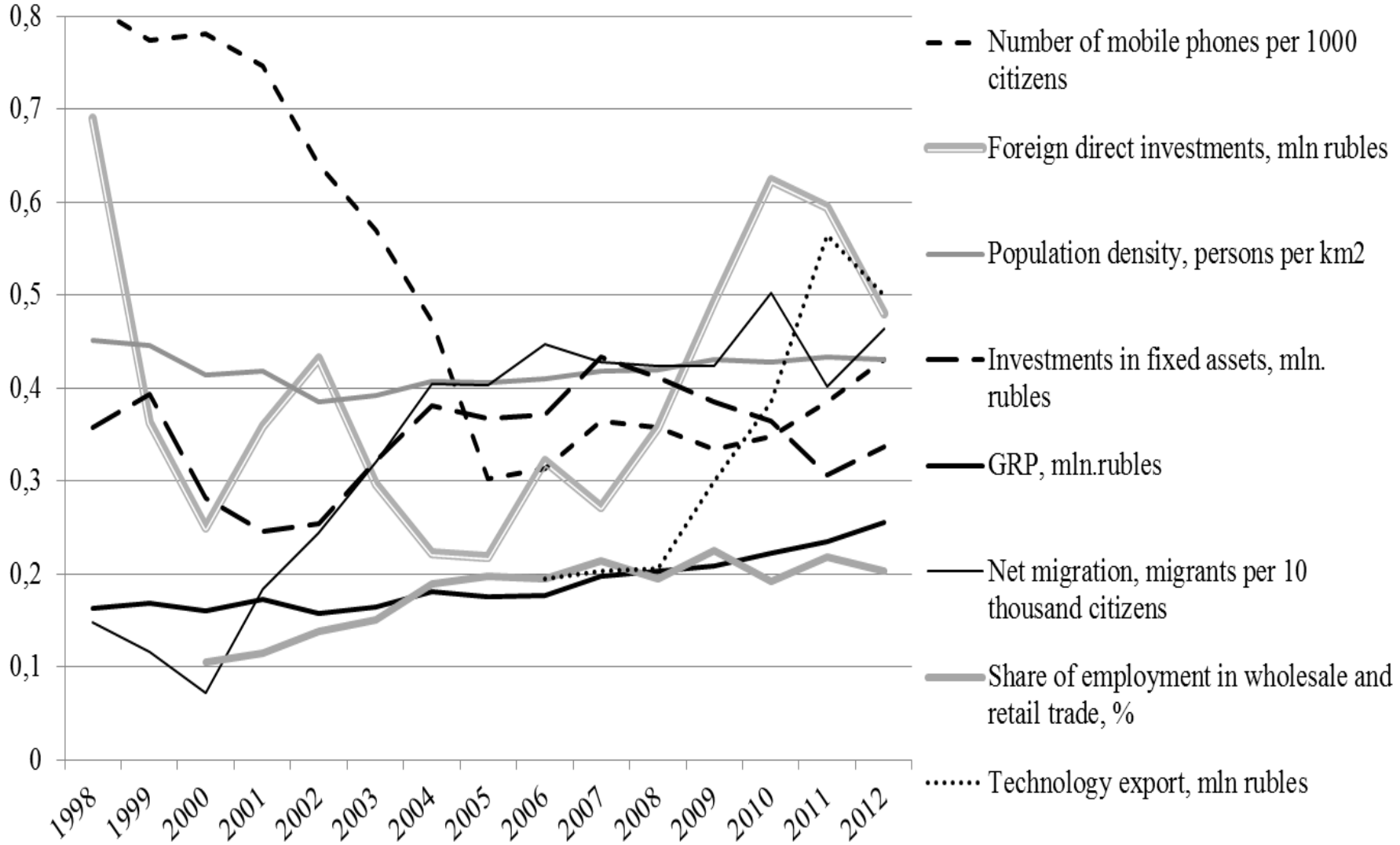
INTERNATIONAL EGP POTENTIAL INFLUENCE



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EGP POTENTIAL INFLUENCE ON REGIONAL DEVELOPMENT

$$Ln(GRP\ per\ capita_{2012/1998\ i})$$
$$= const + \alpha \times ln(GRP\ per\ capita_{1998}) + \beta_1$$
$$\times \ln Invest_i + \beta_2 \times \ln Population_i + \beta_3 \times \ln EGP_i + \beta_i$$
$$\times \ln factors_i + \varepsilon_i$$

- *GRP per capita*$_{2012/1998}$ is GRP per capita in 2012 relative to 1998
- *i* – is a region
- *Invest* is an arithmetic mean of investment per GRP in 1998-2012, %
- *Population* is a growth of economically active population (2012/1998), %
- *EGP* is a total potential of economic-geographical position (EGP) in 1998, million roubles
- *factors* – other variables
- ε – residues.

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EGP POTENTIAL INFLUENCE ON REGIONAL DEVELOPMENT

	1	2	3	4	5
const	3.9 (0.64)***	5.3 (0.29)***	5.6 (0.39)***	6 (0.23)***	4.44 (0.66)***
GRP per capita in 1998, million roubles	-0.08 (0.03)***	-0.08 (0.02)***	-0.14 (0.03)***	-0.1 (0.02)***	-0.08 (0.02)***
Average investment per GRP, %	0.33 (0.06)***	0.23 (0.03)***	0.26 (0.07)***		
Growth of active population (2012/1998), %	0.24 (0.1)**				0.3 (0.02)**
Export growth (2012/1998), %		0.07 (0.01)***	0.09 (0.01)***	0.05 (0.007)***	0.05 (0.008)***
Average import of equipment per GRP, %			0.04 (0.01)***		
Total potential of economic-geographical position (EGP) in 1998, million roubles				0.026 (0.015)*	
Average foreign direct investment per GRP, %				0.03 (0.02)*	0.04 (0.02)**
Average total potential of EGP per GRP, %					0.02 (0.01)*
R-squared	0.6	0.68	0.65	0.79	0.81
Adjusted R-squared	0.58	0.66	0.62	0.78	0.8
Schwarz criterion	348.6	387.8	335.9	351.5	353.9

CONCLUSION

- Significant **spatial differentiation** of EGP potential
- Regions located **near the agglomerations** of Moscow and St. Petersburg have the maximum potential of interregional EGP
- The maximum potential of international EGP is concentrated in the regions **on the coast** of the Black Sea, the Baltic Sea, and the Sea of Japan
- The total EGP potential of Kaliningrad region is **5.6 times higher** than in the distant inland region of the Republic of Tyva
- The total EGP potential **shifts towards the southern regions of the Far East** due to the growth of the economies of the Asia-Pacific region
- The Kaliningrad region and the North Caucasus republics have more opportunities to build the regional economy by harnessing the benefits of their position

CONCLUSION

- The favourable EGP is **one of the factors of GRP, investment, foreign trade growth**, migration increase, and diffusion of new technologies
- Exporting, importing, foreign direct investment, and economic-geographic position are **significant variables** of regional development
- The **high importance of external economic relations** to regional development in Russia
- Our results contradict to ideas in today's Russia about the need to improve **self-sufficiency** (autarky) as a benefit from sanctions are **dominated**
- Conversely coastal regions, regions with and nearby large agglomerations need more investments, because they do not use fully the potential of EGP

РАНХиГС
РОССИЙСКАЯ АКАДЕМИЯ НАРОДНОГО ХОЗЯЙСТВА И ГОСУДАРСТВЕННОЙ СЛУЖБЫ ПРИ ПРЕЗИДЕНТЕ РОССИЙСКОЙ ФЕДЕРАЦИИ

Thank you for attention!

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