

## THE IMPACT OF INTEGRATION ON SOCIAL AND ECONOMIC INEQUALITY OF REGIONS

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### ABSTRACT

Integration is always effect positive on the economy of the country: due to increase of competition between firms, growth of production's volume, more effective territorial distribution of economic activity, reducing the cost of resources and the cost of goods to the value of the border's costs. Domestically, the more successful regions receive more benefits from the integration that enhances the existing socio-economic inequality among the regions. The aim of the study is to identify and evaluate the effect of integration factors on regional inequality, building an econometric model of such a relationship and test a model in the Russian regions.

**Keywords:** Economic integration, economic inequality of regions, Russian regions

**INTRODUCTION.** The integration processes cover all sides of social, political, economic life of the modern society. The integration fundamentally changes the course of the basic economic functions, stimulates formation of new patterns and methods of business activities by means of natural or forced development. The integration processes changing the world economy structure exercise significant influence on development of the Russian regions too. The evidence that the integration has a positive effect on economic growth is traditional as absence of trade barriers facilitates formation of more effective structure of economy. The recent scientific doctrines (modern economic geography, modern and contemporary international trade theory) consider the integration processes through the lens of trading costs reduction, increase in the volume of trade and note their influence on growth of social and economic inequality of the regions. Thus the economic integration has also negative effects.

It is important to realize the mechanism of action of different forms of Russia integration into the world economy on the state of its regions to prevent enhancement of their inequality. The results of empiric studies with use of modern economic and mathematical methods and theoretical provisions of leading world scientific schools shall be the basis for understanding this mechanism.

The aim of the study is to identify and evaluate the effect of integration factors on regional inequality, building an econometric model of such a relationship and test a model in the Russian regions. The calculations were performed on 83 regions of Russia in the period from 2002 to 2013 with the help of the least squares method. The article presents the results of the analysis of the dynamics of integration factors of socio-economic inequalities in the regions.

**Theoretical background and bibliography.** The integration processes in the world economy firstly occur through changes in trade. It is recognized that within the long-

term period liberalization is positive as it leads to obtaining economic and noneconomic benefits for trading parties [1, 2]. At that its process is accompanied by two types of short-term expenses: distribution costs (protected economy sectors come off losers) and balance of payments position related to rapid growth of import [3].

Some works are related to the problems of integration processes influence on the regional inequality within the countries. In 1996 the integration processes in the countries of African South were described in the works due to the fact that they would be determined by interaction of the global and regional circumstances, liberality and active regional inequality [4]. It is assumed that obtaining positive effects is possible only in the long run and by means of definite losses.

In this sphere of the study action of integration on interregional inequality is analyzed through different trends. Firstly, this is change of industrial concentration and distribution of human resources due to reduction in transport expenditures [4].

Secondly, the integration processes are commonly associated with trade liberalization. Open economy creates the conditions for manifestation of scale effects. The majority of studies of regional concentration is based on the models of new economic geography, where returns to scale proceed from external technology factors. The models [6] explain how the factors of “the second nature” determine inequality in regional salaries and distribution of economic activity, that economic activity concentration is optional result of influence of the Marshall's theory external factors. The regional inequality is mainly intensified where the scale effect is observed. Minor inverse relation between the regional inequality and economic development level (as an integration prerequisite) was revealed in a range of the subsystems and European regions [7].

Intensification of regional inequality under conditions of the integration processes shall be considered through influence of economic growth. A variety of scientists studied comprehensively the problems of interconnection of globalization, regional inequality, growth and development of countries with the basis of the European countries' experience [8]. The study of interrelation of economic growth (as an inherent attribute of integration processes) and inequality explains the positive effect of redistribution for economic growth [9].

Relations of economic growth and inequality during 2000s were analyzed mainly in economies with identical participants, at that subjects for study were often interactions between endogenous technical changes resulted from improvement in quality of innovations and dynamics of reward structure [10].

The works with advisory character for economic policy of constraining interregional inequality caused by integration processes are of interest. As per the results of analysis of relations of globalization and global inequality, poverty and marginalization of the society it is suggested to pursue the alternative policy of containment of desperate poverty and inequality growth [9]. The similar conclusions are made in the work of Basu K. [12]; the importance of a rational share of the state participation in reduction in regional economic inequality is emphasized by Bowles S. and Gintis H. [13].

**3. Research methodology.** The task of assessment consists in obtaining the required and sufficient information about influence of integration on social and economic inequality of the regions for use at pursuing the corresponding regional policy. We suggest the following formulation of the model of influence:

$$Y=F(L, K, Intel, Dist, Exp, Imp, Spec), \quad (1)$$

where  $Y$  is social and economic inequality of regions;  $L$  is human resources;  $K$  is physical capital;  $Intel$  is intellectual capital;  $Dist$  is market access;  $Exp$  is export;  $Imp$  is import;  $Spec$  is specialization.

The mathematical formulation of the assessment task consists in necessity of analysis of the dynamics of resulting indicator and factor indicators, determination their interrelation. The following stage of the procedure is determination of resulting indicator of the dynamics of regional inequality. If we assess the influence of globalization factor on social and economic inequality of the regions, assessment of static inequality level, for a definite moment of time, will not provide us with the required information. It is important to realize how globalization processes which involve Russia (trade liberalization, economic integration, growth of investment flows, inclusion in world financial markets, migrations, exchange of knowledge and technologies) change economic geography of the country, which regions intensify its position and which of them lose it. For such assessment the most appropriate indicator is indicator of the region percentage in aggregate Gross Regional Product (GRP) of the country which shall be considered in dynamics.

Let us to determine the system of factor indicators. *The first trend* of such action occurs through enhancement of efficiency of manufacturing production location, change of region sectoral structure and appearance of agglomerative effects [14]. Change of specialization occurs significantly slower than change of geographical concentration. At active participation in world economic relations the regions start to get profits from specialization in manufacture of export-oriented production and consequently the specialization level shall rise. The specialization dynamics shall be considered by the basic types of manufacturing activity.

In addition to total specialization indicator we suggest to assess **agglomerative effects by four economy sectors**. This will allow determining the extent to which the regions use the returns of concentration of one or another type of the economic activity. In particular, it is necessary to calculate agglomerative effects in agriculture, extractive industry, manufacturing and services. *Agglomerative effects* are determined as a sector size (that is number of employment in the region economy sector) multiplied by its specialization index. If the index value exceeds 1, the region specialization in this economy sector takes place.

One more factor indicator of this group is region access to large market. We consider that to reveal and assess influence of nothing else but globalization factors on social and economic inequality it is necessary to separately analyze the relation of the region to inner and outer markets. The region access to inner markets can be estimated by distance to the nearest big city (with population over 1 mln. people). Note that a distance to the state capital city is commonly estimated in the foreign literature. However our understanding is that for the Russian regions taking into account the country territorial sizes such approach will be incorrect and have controversial results. For this purpose 12 cities with population over 1 mln. people were selected. By every region the nearest big city was determined and distance to it along motor roads was calculated.

*The second block of the indicators* assesses influence of the globalization factors on social and economic inequality of the regions through growth of industrial and trade outputs. Here it is reasonable to calculate such indicators as *volume of export and im-*

port of the regions (paying special attention to export as import is basically transitional in a range of boundary regions considered in the statistics). In addition to determination of absolute indicator and analysis of their dynamics it is necessary to assess **the degree of the region involvement in external trade**, to this end the indicators of export and import quotas shall be calculated. Both indicators are calculated as export/import relation to GRP.

One more indicator the dynamics analysis of which is necessary for determination of influence of the globalization factors on social and economic inequality of regions is *an index of manufacturing concentration* in regions – Herfindahl-Hirschman Index. Assessment of concentration of production and economic activity can be carried out both at the level of the region companies (this allows to form representative sampling of the data for empiric studies), and at the level of regions or cities (in this case for expansion of sampling it is appropriate to use panel data). For assessment of geographic concentration of industry and economic activity we suggest to use Herfindahl-Hirschman Index.

**The third block of the indicators** assesses influence of the globalization factors on social and economic inequality of the regions through change of territorial employment structure and labor efficiency. In this complex it is appropriate to analyze the dynamic of labor efficiency in the regions, change of a region share in total number of employment in the economy and to calculate the Herfindahl-Hirschman concentration index for employment in the economy.

The *labor efficiency* dynamics is an important indicator of the region development as, for instance, its growth shall exceed growth of wages (expenses for remuneration of labor) and this is mandatory requirement of intensification of the economy. The labor efficiency does not just reflect the efficiency labor utilization. In case of active implementation of new technologies into production, modern methods of managements the labor efficiency shall also rise. The dynamics of the *share of the region in total employment* is indicative of human resources transfer. If human resources are concentrated in more “prosperous” big regions then we can speak of growth of interregional inequality. The Herfindahl-Hirschman index calculated by the employment in the Russian regions economy is also indicative of such concentration tendency.

**The fourth block of the indicators** reflects influence of the globalization factors on social and economic inequality of the regions through the dynamics of capital investments including direct foreign investments. In this connection our understanding is that the indicators of this block of the assessment procedure can include the *volume of direct foreign investments* in the regional economy, *Herfindahl-Hirschman index for capital investments*, as well as such indicator of capital consumption as density of motor hard-surface roads. *The motor roads density* does not just reflect capital consumption in the regional economy but also is an important growth factor. High quality of motor roads of the region have a positive effect on access to the inner market and in case of boundary regions to outer markets.

As it is mentioned above the regional inequality occurs through the economic growth which in “prosperous” regions has higher rates than in “poor” regions. Addressing to theories of economic growth we can see that besides the basic factors such as labor and capital the third factor in the modern studies is influence of scientific and technical progress. This factor is suggested to consider in a separate **fifth block**, the basic indicator will be *export and import of technologies* to the Russia’s regions.

Let us determine the following independent variables of the model by each influencing factor (Table 1).

Table 1. Independent variables of equation of influence model of globalization factors on social and economic inequality of regions.

| Factor  | Designation | Variables  |
|---|-------------|--|
| Value of human resources ( <i>L</i> )                           | $x_1$       | Region share in the country employment                                 |
|   | $x_2$       | Labor efficiency in the region   |
| Value of physical capital ( <i>K</i> )                          | $x_3$       | Volume of direct foreign investments in the regional economy of Russia |
|   | $x_4$       | Density of public motor hard-surface roads                             |
| Value of intellectual capital ( <i>Intel</i> )                  | $x_5$       | Export and import of technologies to the Russian regions               |
| Market access ( <i>Dist</i> )                                   | $x_8$       | Distance along motor roads to big cities                               |
| Export ( <i>Exp</i> )   | $x_6$       | Export quota (relation of region export volume to GRP)                 |
| Import ( <i>Imp</i> )   | $x_7$       | Import quota (relation of region import volume to GRP)                 |
|   | $x_9$       | P. Krugman's specialization index of regional economy                  |
| Specialization of region, agglomerative effects ( <i>Spec</i> ) | $x_{10}$    | Agglomerative effects for agriculture                                  |
|   | $x_{11}$    | Agglomerative effects for extractive industry                          |
|   | $x_{12}$    | Agglomerative effects for manufacturing industry                       |
|   | $x_{13}$    | Agglomerative effects for services                                     |

In view of the fact that dependence of social and economic inequality on the provided factors is not linear the model has the following form:

$$Y = A \cdot \prod_{i=1}^{13} x_i^{\beta_i} + \varepsilon_{it} \quad (2)$$

where  $A$ ,  $\beta_i$  are equation coefficients which will be obtained by the least squares method;  $\varepsilon_{it}$  is a measurement error.

The provided model allows considering direct and indirect factors of globalization for social and economic inequality of the region in comparison with the other regions which means that it reveals the causes of region inequality.

**4. Integration processes and external trade of Russia.** At the moment the integration processes affect all countries and regions of the world and Russia is not an exception. Transparency of the Russian economy rises with accession to the WTO, development of the Customs Union activity (Russia, Kazakhstan, and Belarus). We can determine that “documentarily” the closest integration of Russia takes place within the former Soviet Union territory: Eurasian Economic Union, CIS free trade area, the Union State of Russia and Belarus, EurAsEC, Single economic space of Russia, Belarus and Kazakhstan, Black Sea Economic Cooperation. As per the other trends it shall be noted that Russia has been a member of the Council of the Baltic Sea States since 1992, a full-fledged member of the Asia-Pacific Economic Cooperation forum (APEC) since 1998, a full-fledged partner of ASEAN since 1996 (not included into the group).

Note that within the Asian-Pacific Region Russia is also a full-fledged member of such organization as the Pacific Economic Cooperation Council (1991), Pacific Basin Countries Economic Committee (1995). Russia has a status of a “non-regional member” of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). Let us consider the dynamics of the Russia's external trade by the indicators of export and import with the CIS states and non-CIS states in 1995-2014 (Fig. 1).

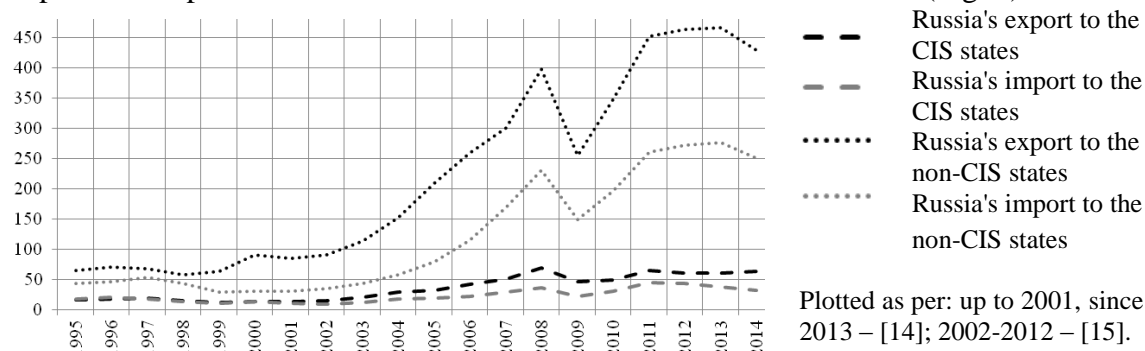


Fig. 1. Dynamics of external trade of Russia with the CIS states and non-CIS states for 1995-2014, USD billion

We can see that on the whole positive dynamics of trade is observed which is indicative of increase of degree of transparency of the Russian economy. The exception is provided by the crisis period of 2009 and period from 2014 as per the reasons stated above. The Russian external trade is territorially diversified. A significant separation of the volumes of trade with the non-CIS states from the similar indicators with the CIS states started in 2000s, sharp decrease of which occurred in 2009. And if in 2000-2012 the annual growth of the Russia’s export with the non-CIS states was 16.84 % on an average (import – 22.33 %), then in 2013 the volumes of trade did nearly not change, and in 2014 reduction by 8.07 % and 9.32 % respectively occurred. Thus, the sanctions led to reduction of the volumes of external trade of Russia both with the non-CIS states and CIS states (exception is growing import from the CIS states).

**5. Analysis of social and economic inequality of the Russia’s regions.** The level of competitiveness and economic efficiency of the Russian regions development is different (fig.2).

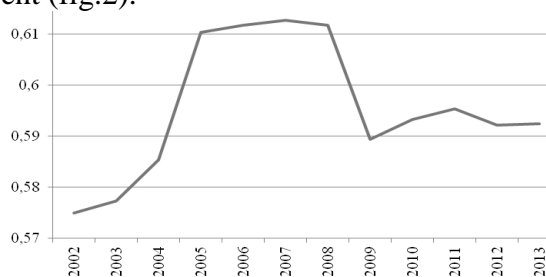


Fig.2. Gini index for GRP of the Russian regions in 2002-2013

So, in 2013, the maximum value of GDP per capita was in the Nenets Autonomous District - 4003 353.8 rubles per head, the minimum - in the Chechen Republic - 88 462.4 rubles per head.

**4. Empirical results.** As a resulting indicator of the model (dependent variable) let us take a share of the region in aggregate gross regional product ( $Y$ ). The following model is obtained:

$$\ln Y = -7.84 + 0.70\ln(x_1) + 0.53\ln(x_2) - 0.01\ln(x_3) - 0.047\ln(x_4) + 0.001\ln(x_5) +$$

$$\begin{array}{rcccccc}
(0.59)^{***} & (0.085)^{***} & (0.039)^{***} & (0.0053)^{**} & (0.012)^{***} & (0.001) \\
+ 0.048\ln(x_6) & -0.033\ln(x_7) & -0.0017\ln(x_8) & + 0.0145\ln(x_9) & -0.016\ln(x_{10}) & + 0.025\ln(x_{11}) + \\
(0.011)^{***} & (0.011)^{***} & (0.003) & (0.023) & (0.01) & (0.007)^{***} \\
+ 0.037\ln(x_{12}) & + 0.25 \ln(x_{13}) & & & & \\
(0.018)^{**} & (0.05)^{***} & & & & (3)
\end{array}$$

The values of root-mean-square errors are given in brackets, \*\*\* is significance level 1 %; \*\* is significance level 5 %; \* is significance level 10 %. The determination coefficient is 0.77. Let us consider independent variables of the model and obtained results to some detail. First of all the model includes the basic factors of production that is labor and capital. Labor is represented by two variables:  $x_1$  – the region share in the country employment,  $x_2$  – labor efficiency in the region. Both factors have positive effect on social and economic development of the region, in the model they are statistically significant. The value of physical capital is estimated through the indicators of the direct foreign investments in the region economy ( $x_3$ ) and density of motor hard-surfaced roads ( $x_4$ ) – as a reflection of the state of the regional infrastructure. It shall be noted that both indicators are statistically significant, but they negatively affect the region development. In fact, direct foreign investments are not always a panacea for the economy, their nature (and this is mainly the investments in extractive industries) is indicative of a possibility of receipt of quick profits for the foreign companies without costs for any needs of the regions. Adverse effect of direct foreign investment on the regional economy can be related to the specificity of Russia. As for negative influence of the indicator of density of motor hard-surfaced roads there is also a peculiarity of the Russian regions. Considering the length of country territory, it is also necessary to estimate influence of railway, air and water transport infrastructure.

The value of intellectual capital is assessed in the model of variable of total export and import of the region technologies ( $x_5$ ). Among the Russian regions for the analyzed period there are such regions which did not export and import technologies at all. At large export and import of technologies have a positive effect on social and economic development of the region, which is to be expected.

The factors of foreign economic activity are relation of export to GRP ( $x_6$ ) and import to GRP ( $x_7$ ). The results of modeling show that domination of export-oriented productions in the regional economy has positive effect on its development at large and high level of import in relation to GRP has an adverse effect.

The market access is an important factor of the regional development, key one in positions of new economic geography ( $x_8$ ). Taken for its calculation was a distance along the roads from the region (center) to the nearest big city with population over a million. It is obvious that the more the distance is between the region and the “center” (significant large-scale market), the less effective is development of such region.

The level of specialization of its economy ( $x_9$ ) assessed by the corresponding P. Krugman’s index has a positive effect on social and economic development. It is also important to consider the sphere of the region specialization. To this end it is necessary to calculate agglomerative effects occurring in agriculture ( $x_{10}$ ), in extractive industry ( $x_{11}$ ) and manufacturing industry ( $x_{12}$ ) as well as in the sphere of services ( $x_{13}$ ). Agglomerative effects are calculated as a sector size (that is number of the region employment) multiplied by its specialization index. Among the Russia’s regions 45 are specialized in one or another sphere of agriculture. The analysis results showed that such specializa-

tion is not profitable for the regions – it does not lead to growth of efficiency of social and economic development. 23 regions of Russia are specialized in extractive industry. Such specialization has a positive effect on economic development. Earlier in one of the studies [15] it was proven that for the Russian regions deep specialization is profitable only when it takes place in extractive industries of the economy. Only 6 regions of Russia have the highest indicators of the specialization in manufacturing as well as high level of agglomerative effects. Presence of agglomerative effects in this case positively influences on social and economic development of the region at large. The last factor included into the model is agglomerative effects in services positively influences on social and economic inequality of the regions.

**Conclusion.** Thus, among the factors provided in the model the following shall be distinguished: regional share in the country employment, labor efficiency, density of public motor hard-surface roads, export quota, distance along motor roads to big cities. These factors are significant at pursuing the policy of social and economic development of the Russian regions.

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