

## **THE FEATURES OF REGIONAL INVESTMENT ANALYSIS IN RELATION TO THE CORPORATE SECTOR OF ECONOMY IN CONDITIONS OF GLOBALIZATION**

Vladimir G. Ignatyev<sup>1,a</sup> and Ilgiz I. Nurtdinov<sup>2,b,\*</sup>

<sup>1</sup>Kazan national research technological university (KNRTU), 420015, Russian Federation, Republic of Tatarstan, Kazan, K. Marx Street 68, Faculty of Industrial Policy and Business Administration, Department of State Municipal Management and Sociology

<sup>2</sup>Kazan State Medical University, 420012, Russian Federation, Kazan, Butlitrov Street, 48, Department of Economic Theory and Social Work

<sup>a</sup>wg\_\_@mail.ru, <sup>b</sup>ilgiz2010@mail.ru

\*Corresponding author

*Cite as:* Ignatyev, V.G., NurtdinovIlgiz, I. (2018). *The features of regional investment analysis in relation to the corporate sector of economy in conditions of globalization, Ekonomicko-manazerske spektrum, 12(1), 75-82.*

*Available at:* [dx.doi.org/10.26552/ems.2018.1.75-82](https://doi.org/10.26552/ems.2018.1.75-82)

---

**Abstract:** The article deals with the regional features of the influence of investments on the dynamics of the gross regional product in various groups of regions as well as in relation to the corporate sector of the regional economy under globalization. An assessment system is proposed to substantiate the strategic priorities in their development. The role of the investment factor in the formation of the regional economic dynamics is defined. The author of the article is constructing the factorial regression models that express the statistical dependence between the average annual growth rates of investments in fixed assets and the average annual growth rates of the gross regional product by groups of regions of the Russian Federation that differ in the type of urban settlement as well as demographic and raw material profiles. The method of strategic positioning and comparative analysis of regions has been developed in terms of the nature and type of dependence between the average annual growth rates of investments in fixed assets and the average annual growth rates of the gross regional product in the regional economies, their industrial sector and services. A system of indicators was proposed in order to carry out a comparative interregional analysis and identifying the regional features of the impact of the average annual rate of investment in fixed assets on the relative dynamics of the gross regional product. An economic-mathematical model has been constructed on the basis of which the algorithm for determining strategic priorities by groups of regions has been formulated and tested in regulating the average annual growth rates of the gross regional product in the Russian economy. In the article, the comparative assessments of strategic development priorities in the study groups of regions were developed and calculated for the main sectors of the economy and, in general, for the regional economy. The findings can be used for the optimization of the average annual growth rates of investment in fixed assets by different groups of Russian regions when solving the problems of forming stable high growth rates of the gross regional product created in general in the Russian economy or its enlarged regional blocks. This article is the confirmation of the necessity to study the effect of the average annual growth rate of investment in fixed assets on the average annual growth rate of the gross regional product.

**Keywords:** Investments, economic development of the regions, raw and demographic profile of the region, the type of urban settlement.

**JEL Classification:** O11, M21

## 1. Introduction

One of the most important principles in interregional comparison of basic characteristics of the investment process and their influence on quality and pace of economic growth is a preliminary forming of groups of region under analysis. These groups are relatively homogeneous according to certain criterion, according to Lambin et al. (2014), and Jaillard et al. (2014).

Horacio Easdale et al. (2009) states that structural economic reforms, rationalization of reproductive, sectorial and regional makeup of national economy are highly dependent from the taken investment decisions, dynamics and the investment process orientation. At the same time, the impact of investments to the basic stock on the pace of regional economic growth can vary significantly, argued by Wheeler (2015).

The aim of our study is to single out regional features of investments influence on gross regional product dynamics in different groups of regions. Another aim is to create an evaluation system as a basis for strategic priorities in investment development.

Objectives:

- to develop a schematic model (algorithm) and a rating system for comparative analysis of basic stock investment growth pace on gross regional product growth pace;
- to single out the regional features of investment factor influence on gross regional product for each group of regions under analysis

Academic novelty:

- classification criteria of structural investment types of regions of Russia according to the nature and extent of investment factor on quality and pace of gross regional product growth;
- factorial regression models are made. They express the statistic dependence between average annual basic stock investment growth rate and average annual gross regional product growth rate for each group of regions of Russian Federation with various type of urban settlement, demographic and commodity profile.

In our research we examined works of foreign and Russian scholars, which deal with the typology of regions, factors of intensive regional investment attractiveness, such as Levin & Xepapadeas (2017), Chala et al. (2015), Mascaro et al. (2015), Viturka & Paril (2015), Inkelas et al. (2015), Remington & Thomas (2015), Iwasaki & Suganuma (2015), Safiullin (2013), Nurtdinov (2012, 2016), Belderbos & Somers (2015) and others.

## 2. Methodology

Corinna (2006) states that the criteria for grouping must be important both from exigency and possibility of investment process with certain degree of intensity point of view, and from direct and indirect influence of the mentioned criteria on developing the characteristics of regional economic dynamics. In the most generalized and concentrated way it is expressed by the pace of the gross regional product growth. It is appropriate to select the following criteria for grouping: the demographic inflow (outflow) of permanent population in the regions resulting from natural and migrational population growth, types of urban settlement, as well as marketable commodities flow

created by mining and primary process operations in the regions concerned, in accordance with Niccolucci et al. (2012).

Kocourek et al. (2009) argue that in the first case it is recommended to single out inflows (outflows) of urban, rural and whole permanent population of the region. In this type of analysis, the grouping is done not using only one scalar value. The regions are grouped according to their demographic profile of the studied changes of the population number.

Kraft & Kraftova (2012) provide another important grouping criterion according to the type of urban settlement. In the grouping according to the urban settlement type four types of regions are usually singled out. The first group includes regions having at least one city with permanent population of less than 50 thousand. This type is expressed as type «A». The second, type «B» generally resembles type «A». Like the type «A», it doesn't have an integral system of urban settlement. At the same time, along with cities having 200 thousand of permanent population and towns of less than 50 thousand the type «B» has cities of 50 to 100 thousand of permanent population. The third type is type «C». Its structure is more similar to the integral system of settlement and type «D» of the urban settlement. Type «C» region has at least one city of 200 thousand, cities of 100 to 200 thousand, towns of less than 50 thousand. But it has no cities of 50 to 100 thousand.

The fourth type is type «D». It comprises the biggest number of Russian regions. The region of this type has cities of all abovementioned size groups. The comparative analysis of structural investment types of Russian regions according to demographic, commodities profile and the type of urban settlement. The most important classification in the analysis of the investment factor on gross regional product dynamics is the grouping according to commodities profile. When conducting it, several methodological questions arise.

The first question is what to be taken as a basis for the design of the commodities profile of regions: the existing production of oil, gas, coal, ores, metals, the existing production and the proved reserves (possibly, only in place reserves of proved reserves) or the existing production, the proved reserves and the anticipated (preliminarily estimated) reserves. We have chosen the existing production, because the actual relative changes of the gross regional product can only be reflected by the existing production levels of marketable commodities resources. The second question is the set of commodities groups, products which must be taken into consideration in the design of the region's commodities profile. Apart from hydrocarbons, ores of ferrous and non-ferrous metals, there are many other natural resources which can be commodities. It is the nonmetallic feed (limestone, marble, granite, phosphates, potassium salts, nitric commodities, sulphur, minerals, industrial wood, mineral waters, high-quality fresh water etc). The preliminary analysis shows, that the nonmetallic feed, except for industrial wood, has little impact on the level and growth pace of gross regional product. In spite of forestry, woodwork and timber, and paper industry impact on relative gross regional product change, they are the leading sector of territorial specialization only in Republic of Karelia and Arkhangelsk oblast. This is why it is hardly necessary to include them to the set of grouping criteria of the multidimensional classification according to the regions commodities profile as part of the ongoing analysis, in accordance with Romero-Avila (2013). Gold, platinum group metals, silver and diamonds mining also deserves separate consideration.

The third important methodological question is the design of the grouping system. The grouping types allow for investigation of effect that the valuable marketable commodities resources of the region have on characteristics of the basic stock investment impact, on the quality and quantity of gross regional product rate in order to achieve the aim of multidimensional taxonomy. We propose to limit the criteria to hydrocarbons and to take into consideration the oil and gas production and primary processing. We propose to limit the ferrous metal industry to iron, uranium, tungstic,

molibdenic, chrome ores mining and steel production. We are to limit the nonferrous metallurgy, respectively, to nephelitic, bauxite, cooper, nickel-cobalt, stanniferous antimony, lead ores, the production of their concentrates, alumina production, primary aluminum, blister copper, nickel liquation. When choosing the period for annual growth rate calculation, the key parameter is the period length. It must eliminate the fluctuations which usually take place in annual basic stock investment values. Having created the phase portrait for each group (cloud of average annual investment to basic stock growth rates and the gross regional product), the complex problem is to compose the regression equation using the least-squares method. It reflects the most probable values of average annual gross regional product growth rates depending from average annual investment to basic stock growth rates. The regression equation of average annual investment to basic stock growth rates and average annual gross regional product growth rates allows, our opinion, to reveal the degree of homogeneity (heterogeneity) in relatively homogeneous (from the point of view of demographic, commodities profile and the type of urban settlement) regional groups, concerning the presence, closeness and type of statistical link between the relative changes of investments and average annual gross regional product growth.

When composing a linear equation, a possibility of calculation of several values characterizing the investment activity appears. One of these values is a minimal average annual investment to basic stock growth rate, which allows the average annual real gross regional product growth rate of more than one (or 100%). This would allow maintaining the size of the regional economy (in real terms) on the same level despite the demographical trend of region population decrease. We propose the following way of calculation of this minimal average annual growth rate. They in the regression equation  $y = ax + \epsilon$  is substituted by value of deflator index of gross regional product or any other considered sector of regional economy. Provided  $Ip = ax + \epsilon$ . Solving the equation for  $x$ , we calculate  $x_{min}$  as

$$x_{min} = \frac{Ip - \epsilon}{a} \quad (1)$$

The next step of the proposed approach (algorithm) is a comprehensive analysis, generalization and systematization of the results received using the designed system of values (indicators). After the analysis, generalization and systematization of the results received as a part of the described approach in comparison of investment efficiency between two any previously created groups of regions «I» and «K» it is recommended to use the scheme that maximizes the compound annual growth rate of gross regional product. As is well known, average annual growth rate can be calculated as

$$\bar{y}_{ik} = \sqrt{y_1 y_k} \quad (2)$$

Maximizing them, we can also maximize  $(\bar{y}_{IK})^2$ . The final result will not change, this is why when maximizing the compound average annual growth rate for regions I and K the following problem is to be solved:

$$\text{with the constraints } \left\{ \begin{array}{l} \max [(\hat{a}_1 x_1 + \hat{\epsilon}_1)(\hat{a}_K x_K + \hat{\epsilon}_K)] \\ x_1 \geq x_{1\min} \\ x_K \geq x_{K\min} \\ x_1 \times x_K = (\bar{x})^2 \\ x_1 \leq x_{1\max} \\ x_K \leq x_{K\max} \end{array} \right. \quad (3)$$

Here  $x_i$  is the most probable average annual investment to basic stock growth rate for a whole system consisting of two regions  $I$  and  $K$ ,  $x_{i \max}$  and  $x_{k \max}$  – their maximal value for each region. The objective function being quadratic and having a unique extreme, we calculate it regardless of the introduced constraints. The calculations allow figuring out that the extreme point of unconstrained optimization is the point of minimum which is reached

$$\text{at } x_i = \bar{x} \times \sqrt{\frac{\hat{\theta}_I}{\hat{a}_I}} \text{ and } x_k = \frac{1}{\bar{x}} \times \sqrt{\frac{\hat{\theta}_K}{\hat{a}_K}} \quad (4)$$

Therefore, the maximum in the set problem of constrained maximization of average annual gross regional product growth rate is reached on the border of the introduced constraints. If  $x_{\min}$  and  $x_{\max}$  are smaller than  $\hat{x} \times \sqrt{\frac{\hat{\theta}_I \div \hat{\theta}_K}{\hat{a}_I \div \hat{a}_K}}$ , it is obvious that in order to maximize the gross regional product growth rate for two regions, we have to choose the optimal  $x_{i \min}$ , and  $x_{k \max}$  is calculated  $x_{k \max} = \frac{(\bar{x})^2}{x_{\min}}$ . However, there may appear a situation when value of  $x_{i \max}$  is bigger than  $x_{i \min}$ . In this case average annual investment to basic stock growth rate should be corrected. As an optimal investment to basic stock growth rate in the region  $K$  we choose  $x_{k \max}$ , and  $x_{i \max}$  is defined as  $x_{i \max} = \frac{(\bar{x})^2}{x_{k \max}}$ . The logic described above can be used in other possible cases.

### 3. Results and Discussion

When composing the regression equation for each group of regions and the economy as a whole, we used the data of national accounts system from the year of 2013 to 2016. Based on them, for each region of the Russian Federation there were calculated the average annual investment to basic stock growth rate and average annual gross regional product growth pace. Then, according to the proposed approach the regression equations were composed  $y = \hat{a}x + \hat{b}$  for each group of the regions under study. The obtained investment values are indicated in the table 1. As we may see in the table, the smallest value of incremental investment resource productivity is 0.2516. In the demographic profile grouping regions, it is the result of the group where the permanent population of the cities grew or maintained its level, and the whole population did not change. Small average value of incremental investment resource productivity coefficient of 0.2538 were obtained for the groups of regions, where the urban, rural and a whole region population decreased (to 7-9%). Irkutsk, Nizhny Novgorod, Tomsk oblasts and Primorskiy and Krasnoyarsk krays of group «B» had special characteristics of dependence of average annual gross regional product growth from relative changes of investments. At the same time these two region groups had the highest inertial components in gross regional product rate growth pace – 0.9371 and 0.9348, respectively. This allowed them to have relatively high values  $YL$  and created a lower increase of gross regional product due to activation of the investment factor on the level of 28.9 and 33.2%. This is why minimal average annual investment to basic stock growth rate, ensuring the maintaining of the real gross regional product, is to be maintained at 82.0%, which is remarkably less

*The Features of Regional Investment Analysis in Relation  
to the Corporate Sector of Economy in Conditions of Globalization  
Authors: Vladimir G. Ignatyev, Ilgiz I. Nurtdinov*

than one. This allows us to conclude that it is unreasonable to accelerate the increase of investment to basic stock in these two groups.

*Table 1: Comparative evaluation of strategic priorities in investment development of Russian Federation regions groups*

Groups of regions	Whole regional economy						
	Deflator index $I_p=1,143$						
	Investment values						
	a	b	Xmin	$\delta x$	Yfact	YL	$R^2$
<b>Demographic profile grouping</b>							
1.1 DP 1	0.4638	0.6765	1.006	0.531	1.294	1.138	0.74
1.2 DP 2							
-subgroup $\alpha$	0.6384	0.4188	1.134	0.792	1.274	1.057	0.92
-subgroup $\beta$	0.4092	0.7848	0.875	0.329	1.289	1.194	0.89
1.3 DP 3	0.2516	0.9371	0.818	0.289	1.266	1.189	0.72
1.4 DP 4							
-subgroup «A*»	Statistic link is not revealed						
-subgroup «B*»	Statistic link is not revealed						
-subgroup «C*»	0.2538	0.9348	0.820	0.332	1.283	1.189	0.77
1.5 DP 5							
-subgroup $\alpha$	0.4239	0.7483	0.931	0.399	1.286	1.172	0.77
-subgroup $\beta$	0.5764	0.494	1.126	0.744	1.273	1.070	0.94
<b>Grouping according to the type of urban settlement</b>							
2.1 Type «A»	0.2079	0.9934	0.720	0.249	1.268	1.2013	0.71
2.2 Type «B»	0.1730	1.0327	0.638	0.217	1.263	1.2060	0.74
2.3 Type «C»	0.2064	1.0217	0.588	0.229	1.296	1.228	0.49
2.4 Type «D»	0.3928	0.7617	0.971	0.444	1.279	1.155	0.66
<b>Grouping according to the commodities profile</b>							
3.1 CP 1	0.8214	0.271	1.062	0.682	1.308	1.098	0.75
3.2 CP 2	0.3604	0.8133	0.915	0.380	1.279	1.173	0.46*
3.3 CP 3	2.8221	2.0334	1.126	1.000	1.212	0.789	0.98
3.4 CP 4	0.6775	0.344	1.538	0.766	1.094	1.022	0.91
3.5 CP 5							
-subgroup $\alpha$	0.3861	0.7487	1.021	0.460	1.250	1.135	0.75
-subgroup $\beta$	0.2761	0.8513	1.057	0.477	1.243	1.127	0.92
3.6 CP 6	0.4148	0.7176	1.026	0.478	1.253	1.132	0.76
3.7 CP 7							
-subgroup $\alpha$	0.3978	0.7475	1.011	0.344	1.221	1.145	0.70
-subgroup $\beta$	0.3705	0.7315	1.111	0.538	1.221	1.102	0.80
3.8 CII 8							
-subgroup $\alpha$	0.8583	0.1168	1.196	1.00	1.240	0.975	0.85
-subgroup $\beta$	0.1935	0.9808	0.838	0.331	1.260	1.174	0.98
3.9 CP 9	0.4038	0.7144	1.061	0.520	1.246	1.118	0.65

*Source: author's compilation*

At the same time in other subgroups of DP 4, where the decrease of permanent population exceeded 10.0%, the statistic link between average annual investment to basic stock growth rate and average annual gross regional product growth pace was not revealed. In our opinion, the main reason of this state is the significant difference between the values of capital intensity of gross regional product for subgroups «A» and «B» of DP group 4, given the relatively high capital intensity of these regions.

The most efficient in the sense of high steady GRP growth rates are DP 1 regions, both having high values of incremental investment resource productivity coefficient  $\hat{A}$  of 0.4638, and the inertial

component  $\hat{B}$ . This allows group DP 1 to have high values  $Y$  and factual average annual GRP growth rates. GRP increased due to relative investment increase of 53,1%.

In comparative analysis of region groups according to the type of urban settlement, as it comes in table 1, «A», «B» and «C» types have low value of incremental investment resource productivity coefficient and high inertial component in average annual GRP growth rate. Apparently, the strategic investment priorities of investment process activation must be oriented to «D» type urban settlement regions.

The analysis of commodities profile impact on average annual investment and GRP growth rate. The study of a commodities profile impact on the statistical link between average annual investment to basic stock growth rate and GRP shows that the most efficient, from the activation of investment process point of view are groups CP 1, CP 3, CP 4, and CP 8.α. The first three groups are closely connected with hydrocarbons production and processing. In CP 1 only oil and/or gas production is done. In composing the regression equation, Sakhalin and Arkhangelsk oblast are special regions. In CP 3 regions oil and/or gas production and oil processing is done. There is a specific correlation between  $x$  and  $y$  in the regression equation of Samara, Volgograd oblast and Kasnodarkray. In CP 4, as it was already mentioned, oil and/or gas production is done on a relatively small scale. Tyumen oblast (without Khanty-Mansy and Yamalo-Nenets autonomous districts) and a Republic of Kalmykiya are specific regions of this group. The CP 8.α group performs the mining and/or processing of nephelinic, bauxite, copper, nickel-cobalt ores. It comprises Murmansk, Sverdlovsk, Chita oblasts, Republic of Bashkortostan and Krasnoyarsk kray.

All regions grouped according to commodities profile have high incremental coefficients of investment resource productivity growth from 0,3604 for CP 2 to 0,4148 for CP 6. They differ dramatically in their inertial component. Of groups having relatively high incremental investment resource productivity coefficient, the high inertial component is in groups CP 2, CP 5, CP 6, CP 7, and CP 9. Consequently, in these groups the ratio of the relative investment contribution to GRP growth pace is quite moderate and makes up from 38,0% in CP 2 group to 53,8% in CP 7. In practically all groups of commodities regions (except for CP 8.α) which are connected with ferrous and non-ferrous metal industry, the role of the inertial component in average annual growth rate was significant. There is a relatively low level of incremental investment resource productivity and high inertial component values in groups CP 5.β and CP 8.β. It is mostly northern regions where ores of ferrous and/or non-ferrous metals are mined.

#### **4. Conclusion**

The theoretical and methodological apparatus of the comparative analysis was developed. The regions were grouped according to the type of urban settlement, demographic and commodities profile. The regional features of strategic priorities system in economic development of various structural investment types were singled out. The influence of average annual investment to basic stock growth rate on the resulting characteristics of the regional economy were analyzed. The implementation on federal and regional levels of the proposed approach and the relevant methodology and algorithm of comparative interregional investment analysis can facilitate a more active mobilization of the available resources of the Russian regions, and more efficient usage of them.

#### **References**

Belderbos, R. & Somers, D. (2015). Do Technology Leaders Deter Inward R&D Investments? Evidence from Regional R&D Location Decisions in Europe. *Regional Studies*, 49(11), 1805-1821.

*The Features of Regional Investment Analysis in Relation  
to the Corporate Sector of Economy in Conditions of Globalization*  
Authors: Vladimir G. Ignatyev, Ilgiz I. Nurtdinov

- Corinna, H. (2006). Uneven Dietary Development: Linking The Policies and Processes of Globalization with the Nutrition Transition, Obesity and Diet-Related Chronic Diseases. *Globalization and Health*, 2(4).
- Horacio, E.M., Aguiar, M.R., Roman, M. et al. (2009). Socio-Economic Comparison of Two Biophysical Regions: Livestock Production Systems from Rionegro Province, Argentina. *Cuadernos de Desarrollo Rural*, 6(62), 173-198.
- Chala, B.W. & Lee, H.-H. (2015). Do Regional Trade Agreements Increase Bilateral Greenfield Investment? *Journal of Economic Integration*, 30(4), 680-707.
- Inkelas, M., Brown, A.F., Vassar, S.D., et al. (2015). Enhancing Dissemination, Implementation, and Improvement Science in CTSA through Regional Partnerships. *Cts-Clinical and Translational Science*, 8(6), 800-806.
- Iwasaki, I. & Sugauma, K. (2015). Foreign Direct Investment And Regional Economic Development In Russia: An Econometric Assessment. *Economic Change and Restructuring*, 48(3-4), 209-255.
- Jaillard, B., Barry-Etienne, D., Colinas, C. et al. (2014). Alkalinity and Structure of Soils Determine the Truffle Production in the Pyrenean Regions. *Forest Systems*, 23(2), 364-377.
- Kocourek, A., Svoboda, J. & Novotna, M. (2009). Financial Analysis Assessment of Agricultural Holdings in the LFA Regions. *Proceedings of the 9th International Conference Liberec Economic Forum*. Liberec, Czech Republic: 344-351.
- Kraft, J. & Kraftova, I. (2012). Innovation - Globalization - Growth (Selected Relations). *Inzinerine Ekonomika-Engineering Economics*, 23(4), 395-405.
- Lambin, E.F., Meyfroidt, P., Rueda, X. et al. (2014). Effectiveness and Synergies of Policy Instruments for Land Use Governance in Tropical Regions. *Global Environmental Change-Human and Policy Dimensions*, 28, 129-140.
- Levin, S. & Xepapadeas, A. (2017). Transboundary Capital and Pollution Flows and the Emergence of Regional Inequalities. *Discrete and Continuous Dynamical Systems-Series*, 22(3), 913-922.
- Li, Ch., Murshed, S.M. & Tanna, S. (2017). The Impact of Civil War on Foreign Direct Investment Flows to Developing Countries. *Journal of International Trade & Economic Development*, 26(4), 488-507.
- Mascaro, G., White, D.D.; Westerhoff, P. et al. (2015). Performance of the CORDEX-Africa Regional Climate Simulations in Representing the Hydrological Cycle of the Niger River Basin. *Journal of Geophysical Research-Atmospheres*, 120(24), 12425-12444.
- Niccolucci, V., Tiezzi, E., Pulselli, F.M. et al. (2012). Biocapacity vs Ecological Footprint of World Regions: A Geopolitical Interpretation. *Proceedings of Academic Sessions of the Footprint Forum on State of the Art in Ecological Footprint - Theory and Applications*. Univ Siena, Colle Val della: 23-30.
- Nurtdinov, I.I. (2016). Using Insurance Instruments for Reduction the Risks in International Leasing Operations. *Proceedings of the 16th International Scientific Conference Globalization and Its Socio-Economic Consequences*. Rajecke Teplice, Slovak Republic: 1579-1587.
- Nurtdinov, I.I. (2012). Leasing As a Tool for Business Development in Modern Conditions. *Financial Analyst Journal: Problems and Solutions*, (11), 41-46.
- Remington, T.F. (2015). Institutional Variation Among Russian Regional Regimes: Implications for Social Policy and the Development of Non-governmental Organizations. *Volunta*, 26(6), 2215-2237.
- Romero-Avila, D. (2013). Is Physical Investment the Key to China's Growth Miracle? *Economic Inquiry*, 51(4), 1948-1971.
- Safiullin, M.R., Shakirova, A.I., Ermolaeva, P. O., Elshin L.A. & Prygunova, M.I. (2013). Influence of Territorial Ecological Load Factors on Social and Economic Well-Being of Population: Methodology Development and Econometric Model Construction. *World Applied Sciences Journal*, 25(7), 1057-1061.
- Safiullin, M.R., Prygunova, M.I., Galyavov, A.A. & Elshin L.A. (2013) Complex Analysis of Prospects of the Volga Federal District Regions Development: Methodology and Practice. *World Applied Sciences Journal*, 27(4), 508-511.
- Viturka, M. & Paril, V. (2015). Regional Assessment of the Effectiveness of Road Infrastructure Projects. *International Journal of Transport Economics*, 42(4), 507-528.
- Wheeler, S.M. (2015). Built Landscapes of Metropolitan Regions an International Typology. *Journal of the American Planning Association*, 81(3), 167-190.
- Zhang, B., Qiao, H. & Chen, B. (2015). Embodied Energy Uses by China's Four Municipalities: A Study Based on Multi-Regional Input-Output Model. *Ecological modelling*, 318(SI), 138-149.