Statistical Research of Investment Development of Russian Regions

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Introduction

According to the UN data, given in "World Investment Report – 2015", foreign direct investment inflows fell by 16 per cent, in Russia this fall accounted 70 per cent to $21 billion (according to Bank of Russia, $22.85 billion).
The reasons for such sharp decrease in investor's interest in the country are sanctions against Russia, as well as the negative growth prospects of the economy (The World Investment Report, 2015; Burtseva, 2015; Holland, 2015).

In this regard, the optimization of government efforts to manage concentration of state support in "territorial points of growth" – in the regions, which have proved in practice the ability to implement investment solutions effectively, to increase their own development resources and improve its results, is needed (McConnell & Brue, 2008; Oxenstierna, 2015; Petrovskaya et al., 2016).

Thus, it is essential to conduct the study, which allows identifying groups of Russian regions, which are the "points of investment growth" in order to optimize the allocation of budget investments for growth of the Russian economy.

**Literature review**

Can note that the increase in the negative value of the balance of capital transfers in 2014 amounted 126% in Russia (Russell, 2015). There was a decrease by 0.5 per cent of share of long-term investments of organizations as well (Burtseva, 2015).

Aforementioned economic conditions negatively characterize the investment prospects of the country, reflect the decline in the competitiveness of our country, and reduce an optimism in implementation of economic growth opportunities for in the domestic economy in the short term (Myachin, Royzen & Pershikov, 2015; Gurvich & Prilepskiy, 2015).

The development of quantitative measuring instruments and statistical analysis algorithms for the implementation of region’s investment development monitoring is regarded as a part of state development programs (Investments in Russia, 2015). It is expected that it would provide an increase in the usage of own resources and an achievement of the objectives of economic development.

Moreover, elaboration of framework for measuring the level of investment development of a region, relevant to current development of the state statistics would improve the quality of state administration analytic base (Burtseva & Dmitriev, 2011; Burtseva, 2009b; Aleshnikova, Lisovtseva & Nikitin, 2012). This would have a positive impact on the quality of executive decision-making in the economic sphere at the federal and regional levels in solving the problems associated with the optimization of budget investments, allowing to provide an increase of their effectiveness in the development of Russian regions.

The findings are addressed to the Ministry of Economic Development of the Russian Federation in order to justify the amount of federal targeted investment programs financing in Russian regions.

**Aim of the study**

The purpose of this research is to determine the procedures connected with the implementation of statistical research and monitoring of investment development of the Russian regions.

**Research questions**

The research questions were as follows:
What are the main scientific techniques common for the determination of investment development?

What are the factors influence the accounting and making of investment decisions by business entities in Russia?

What are the indicies of physical volume of investment in Russian regions?

How can the level of investment attractiveness be improved?

**Method**

Theoretical and methodological basis of the study are presented by works of leading domestic and foreign researchers in the field of investment development of the economy, including monographs, articles and analytical reviews.

Scientific methods of management theory, expert, statistical and comparative analysis, comprehensive approach to the study of economic phenomena and processes, methods of structural-functional analysis, analysis and synthesis, expert appraisement, tabular techniques of data visualization were used in present investigation.

**Data, Analysis, and Results**

The role of investment as a factor of economic growth was justified by English scientist-economist J.M. Keynes (1933). He was the first who developed a macroeconomic model, which established the relationship between investment, employment, consumption and income, thereby justifying the leading role of the state in regulating the market economy in a period of instability and crises (Keynes, 1997; Keynes, 2011). According to Keynes, the investment activity in the country is primarily determined by the expected return on investment. The growth of savings by itself has no effect on these expectations, and does not automatically lead to an increase in investment. Therefore, Keynes detected the purpose of government in the impact on the change in the volume of public investment and level of the marginal profitability of capital investments. In the current context within the economic theory, it is customary to believe that a volume of budget investment has a significant impact on the growth of gross domestic product (the main gauge of economic growth at the global level). This thesis is based on the multiplier effect, which was also suggested by John. M. Keynes. This thesis is the only theoretical justification of the need of state investment in the economy (McConnell & Brue, 2008).

The current situation in the Russian and global economy confirms the validity of Keynes’s understanding. In this regard, it is important and urgent to analyze problems of performance measurement of implementing private and state investment, both for investors and for state administration, taking into account regional development goals.

In order to measure the investment development of Russian regions and the world, a wide range of scientific techniques (Burtseva, 2009a; Aleshnikova & Kalashnikov, 2012) and analysis methods is used (Table 1).

A variety of methods and techniques is associated with the objectives of the assessment and tasks of its carrying out. For example, the results of studies assessing the investment attractiveness of regions held by the Bank of Austria, international agencies like Moody’s, S&P and Fitch are for foreign investors. Technique of the Institute of Economics and Industrial Engineering, Siberian
Branch of the Russian Academy of Sciences follows from the allocation of problems of depressed regions. Technique of the Institute of Economics is determined by a need to identify investment potential of the constituent entities of Russia. Method of the Agency for Strategic Initiatives aims to measure the quality of the regional government to attract investors to the region. Analysis of these methods diagnoses that they suppose the usage of inaccessible information, and are based on complex calculations methods that do not involve extensive use of the results.

The issue of attracting investment to the region is not covered by W.F. Sharpe, G.D. Alexander and J. Bailey (1998) as the goal of territorial development or its result. Investments are understood as costs for the creation, expansion or reconstruction and modernization of fixed and circulating capital, carried out for profit. In other words, investments are interpreted as resources for economic development. In this regard, it should be emphasized that the task of evaluating the scope and structure of investments in terms sources of financing has been solved successfully in the modern statistical science. The methodology, which is used during this kind of research, is widely known.

<table>
<thead>
<tr>
<th>Methods of classification</th>
<th>Methods of factors analysis</th>
<th>World practice</th>
<th>Domestic practice</th>
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<tbody>
<tr>
<td>Cluster analysis</td>
<td>Expert appraisement</td>
<td>Technique of assessing the investment attractiveness, &quot;Universe&quot; News Agency</td>
<td>Technique of assessing the investment attractiveness of regions, International group &quot;RAEX&quot;</td>
</tr>
<tr>
<td>Multidimensional grouping</td>
<td>Factorial analysis</td>
<td>BERI index</td>
<td>Technique of the Council for the Study of Production Forces of the Ministry of Economic Development of the Russian Federation and the Russian Academy of Sciences</td>
</tr>
<tr>
<td>Discriminatory analysis</td>
<td>Correlation and regression analysis</td>
<td>Techniques of Bank of Austria and international agencies Moody’s, S&amp;P, Fitch</td>
<td>Technique of the Institute of Economics and Industrial Engineering, Siberian Branch of the Russian Academy of Sciences</td>
</tr>
<tr>
<td>Typology and systematization</td>
<td>Structural analysis</td>
<td>Techniques of Fortune and Multinational Business magazines</td>
<td>Technique of developing the National rating of investment climate, Agency for Strategic Initiatives</td>
</tr>
</tbody>
</table>

Examination of "investment development of the region" concept is out of definitive interest as an object of statistical research, which understanding is different depending on the goals and objectives of its evaluation. In order to solve scientific problem, the content of the object of study is offered to interpret as a process of achieving goals and results of region’s development by attracting investments.

Consequently, investment development of regions as the object of study involves the solution of the problem of its measuring within a framework of the
procedural approach, which considers economic research object as interlacing of processes and spheres flowing into each other in time and space. In turn, this provides the usage of statistical methods, which make provisions for simultaneous comparison of objects by several dynamic measurers. The authors of the paper have applied growth indexes of statistical indicators characterizing the goals and results of development of the regions for measurement of the object of study, and taxonomic method for comparison of objects.

The basis of taxonomic method lays in “fiducial object” and comparison of optimal parameters (coordinates) of its vector with the appropriate parameters of the vectors of all objects. "Fiducial object" is formed of the optimal values of the parameters, found as the maximum or minimum values of the parameters for all the comparison objects. In result of finding the Euclidean distances, categorization of compared objects is been made on the basis of the obtained integral score, having form of a sum of Euclidean distances for each parameter. This method allows us to compare objects, characterized by parameters that have different units of measurement. Parameter values are subject to normalization preliminarily. In order to solve the scientific problem, it was necessary for authors to determine the evaluation parameters of objects (goals and results of development of the region), i.e., to specify their composition and select an appropriate measuring instruments.

Michael Porter has proposed to understand country’s competitiveness as the productivity of using its resources (Porter, 1990). The authors of this article share his point of view and, in accordance with it, offer to consider the factors of competitiveness of the region as the goals and results of development of the region:

1) acceleration of the rate of economic growth (efficiency of factors of production usage);
2) provision of workforce productivity growth (efficiency of human capital assets usage);
3) increase in fiscal capacity (efficiency of state regulation);
4) infrastructure upgrade (efficiency of innovative capital usage).

Considered factors are important not only for accounting and making of investment decisions by business entities, but also for the population of the region, whose role in the investment process is increasing every year, which is confirmed by official statistics. The share of investment in housing construction in Russia increased from 12 per cent to 15 per cent in 2005-2014, in contrast to other types of investments in fixed capital. The system of statistical indicators as measures of the selected goals and results of development of the regions is being specified hereinafter.

"Lucky seven" rule usually works in empirical studies tend. The main number of indicators in order to evaluate the phenomenon or to make the right management decisions should be $7 \pm 2$, i.e., from 5 to 9. The represent structure of the object of research and statistical indicators characterizing its elements are shown in Figure 1.

Figure 1 shows that the authors suggest to use five relative (derived) indexes:

- index of physical volume of investments in fixed capital per capita;
– index of workforce productivity;
– index of gross regional product per capita;
– index of depreciation ratio;
– region’s budget revenue index per capita, derived from seven regional development indicators:
  – investments in fixed capital;
  – average number of population in the region;
  – gross regional product;
  – average number of employed in the economy of the region;
  – original value of fixed assets;
  – residual value of fixed assets;
  – income in the region’s budget.

**Figure 1.** Structure of the object of research

Source: authors’ study

Usage of indexes and relative (derived) parameters is defined by process approach to the study. Value indicators (gross regional product, investments in fixed capital, income of the region’s budget) are taken at constant prices of base years respectively for the studied periods – 2005 and 2011, 2005–2007, and 2011–2013.

The first period (2005 and 2011) is the time of growth of investment attractiveness of Russia, assigning of international investment ratings, arrival of foreign strategic investors to our country. The second period (2005–2007) is the stage obtaining the results of attracting strategic investors in the regions of Russia, as the average payback period and preferential tax is eight years. Such time interval is also determined by the need to eliminate the years of the financial crisis (2008–2010), and the introduction of economic sanctions against Russia. The sources of information are data on the development of Russian
regions of the Federal State Statistics Service of Russian Federation, posted on its official website (Investments in Russia, 2015).

Discussion and Conclusion

In order to identify group of regions "points of investment growth", the integral efficiency scores of the investment development of Russian entities according to taxonomic method were calculated. Integral scores were obtained on the basis of parameters (a set of parameters X₁, X₂, X₃, X₄ in 2011–2013). Quartile combinational grouping on obtained characteristics of integral scores and index Y, calculated for 2005–2007, was held further. Results of grouping are presented in Table 2.

Table 2. Crossed classification of Russian regions

<table>
<thead>
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<tr>
<td>low</td>
<td>Tula Oblast, Kursk Oblast, Udmurt Republic</td>
</tr>
<tr>
<td>above the average</td>
<td>Lipetsk Oblast, Kirov Oblast, Perm Krai, Saint Petersburg, Moscow Oblast, Tambov Oblast, Samara Oblast, Magadan Oblast</td>
</tr>
<tr>
<td>high</td>
<td>Belgorod Oblast, Astrakhan Oblast, Irkutsk Oblast, Republic of Adygea, Bryansk Oblast, Sakha (Yakutia) Republic</td>
</tr>
<tr>
<td>above the average</td>
<td>Tver Oblast, Moscow, Komi Republic, Karachay-Cherkess Republic, Vologda Oblast, Kaliningrad Oblast</td>
</tr>
<tr>
<td>below the average</td>
<td>Chuvash Republic, Republic of Bashkortostan, Smolensk Oblast, Novgorod Oblast, Omsk Oblast</td>
</tr>
<tr>
<td>below the average</td>
<td>Sverdlovsk Oblast, Voronezh Oblast</td>
</tr>
<tr>
<td>below the average</td>
<td>Rostov Oblast, Penza Oblast, Republic of Buryatia, Ulyanovsk Oblast, Tomsk Oblast, Kaluga Oblast, Oryol Oblast</td>
</tr>
<tr>
<td>below the average</td>
<td>Republic of Mordovia, Stavropol Krai</td>
</tr>
<tr>
<td>below the average</td>
<td>Republic of Dagestan, Tyva Republic, Mari El Republic</td>
</tr>
<tr>
<td>below the average</td>
<td>Republic of North Ossetia-Alania, Kabardino-Balkar Republic, Republic of Ingushetia, Orenburg Oblast, Novosibirsk Oblast, Pskov Oblast, Vladimir Oblast, Arkhangelsk Oblast</td>
</tr>
</tbody>
</table>
Based on the analysis of data, authors came to important conclusions:

1. "Points of investment growth" among the Russian entities are: Belgorod Oblast, Astrakhan Oblast, Irkutsk Oblast, Republic of Adygea, Bryansk Oblast, Sakha (Yakutia) Republic

2. Chechen Republic and Nenets Autonomous Okrug are the entities, which could not take an advantage of investments during the favorable period in the development of Russian economy in order to improve resource productivity of their own economy, although in 2014, these territories were the leaders on the index of investment in fixed capital (more than 120 per cent, Table 3).

Table 3. Distribution of Russian regions by the level of investment activity in 2014 (in comparable prices; as a percentage of the previous year)

<table>
<thead>
<tr>
<th>Index of physical volume of investment in fixed capital</th>
<th>Number of entities</th>
<th>Name of the entity of Russian Federation</th>
</tr>
</thead>
</table>
100,0-109,9 28 Republic of Bashkortostan, Komi Republic, Mari El Republic, Republic of Mordovia, Sakha (Yakutia) Republic, Republic of Tatarstan, Udmurt Republic, Altai Krai, Zabaykalsky Krai, Primorsky Krai, Stavropol Krai, Bryansk Oblast, Voronezh Oblast, Kemerovo Oblast, Lipetsk Oblast, Murmansk Oblast, Penza Oblast, Rostov Oblast, Samara Oblast, Saratov Oblast, Sverdlovsk Oblast, Smolensk Oblast, Tula Oblast, Tyumen Oblast without autonomous okrugs, Ulyanovsk Oblast, Chelyabinsk Oblast, Moscow, Saint Petersburg

110,0-119,9 12 Altai Republic, Republic of Dagestan, Republic of Kalmykia, Republic of North Ossetia-Alania, Tyva Republic, Republic of Khakassia, Vladimir Oblast, Kostroma Oblast, Novgorod Oblast, Sakhalin Oblast, Tambov Oblast, Yamalo-Nenets Autonomous Okrug

from 120,0 and more 4 Kabardino-Balkar Republic, Chechen Republic, Volgograd Oblast, Nenets Autonomous Okrug


3. Lipetsk Oblast, Kirov Oblast, Perm Krai, Saint Petersburg, Moscow Oblast, Tambov Oblast, Samara Oblast, Magadan Oblast are the regions that have a high potential for effective investment growth

4. Rostov Oblast, Penza Oblast, Republic of Buryatia, Ulyanovsk Oblast, Tomsk Oblast, Kaluga Oblast, Oryol Oblast are the regions with excessive investment growth, their economies are "unable to cope" with the volume of attracted investments, their efficiency should be higher in order to achieve regional development goals.

Budget investments in Russia have a share of 20 per cent in structure of investments in fixed capital for 2005-2013. The share of investments implemented by the federal budget grew from 7% to 9% during the analyzed period, while the share of investments implemented by the regional budgets, dropped twofold (Investments in Russia, 2015; Burtseva, 2014). Thus, over the studied period the role of federal Center in the implementation of the state investment policy has increased. Table 3 shows the distribution of regions in terms of investment activity in 2014. According to statistical data, Belgorod Oblast, Astrakhan Oblast, Irkutsk Oblast, Republic of Adygea are the regions with low investment activity.

In this regard, the authors of this article recommend to increase the amount of the federal budget investments in these regions by reducing the volume of state support of Chechen Republic and Nenets Autonomous Okrug.

To sum up, this research paper represent methodological procedures: the system of aims and results of the investment development of the region, the structure of the investment development of the region as an object of statistical research, the system of statistical indicators characterizing its elements. The algorithm of statistical research of investment development of regions of Russia was tested, providing the efficiency of its own resources usage and the achievement of the objectives of economic development. Considered procedures allowed us to realize a statistical study and monitoring of investment in Russian regions during 2005 – 2013. In result of this work, a group of Russian regions, which are the "points of investment growth" and a group of regions, ineffectively
using investments to achieve development goals, were revealed, so that substantiated recommendations on optimizing the allocation of public investment during the crisis of the Russian economy.

Implications and Recommendations

It should be emphasized that the authors of this article have taken into account an important feature of the investment process, associated with the fact that the results of the investment development of the region have a delayed effect due to the need of return on investment.

In addition, the need to maintain investment development environment was considered during the implementation of statistical research. All this contributed to the scientific novelty of the proposed algorithm of statistical research, and the enhancement of the objectivity and quality of the results of the work. Thus, the submissions can serve as a basis for development of economic programs optimizing the allocation of budget investments in the Russian economy.

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No potential conflict of interest was reported by the authors.

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References


