АНАЛИЗ ЭФФЕКТИВНОСТИ СОЦИАЛЬНО-ЭКОНОМИЧЕСКОГО РАЗВИТИЯ РЕГИОНА

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Аннотация

Целью исследования является сравнительная оценка эффективности регионального социально-экономического развития. В качестве объекта исследования нами были выбраны регионы центрального федерального округа. Оценка социально-экономической эффективности развития проведена в период с 2011 по 2015 гг. Методы исследования: Анализ динамики ВРП, ВРП на душу населения, доли регионального ВРП в округе, расчет средней минимальной и средней ВРП, рейтинг регионов по продолжительности жизни. Основным методом выступил расчет сводного индекса оценки социально-экономического развития Д.Е. Давыденц с использованием матричного подхода. Результаты. Матричный метод показал, что в 2015 году региональное социально-экономическое развитие регионов округа увеличивается за счет прироста как экономической, так и социальной составляющей. Полученные результаты могут быть использованы органами власти, участниками, обеспечивающими социально-экономические и управленческие отношения в регионе, что в конечном итоге будет способствовать достижению главной цели - повышению качества жизни населения.
ANALYZING THE EFFICIENCY OF REGIONAL SOCIO-ECONOMIC DEVELOPMENT

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Abstract
The purpose of this article was a comprehensive assessment of the efficiency of regional socio-economic development. As an object of study, we chose the of the Central Federal district regions. Assessment of regional socio-economic development was carried out in the period from 2011 to 2015. Methods of research: analysis of trends in GRP, GRP per capita, the share of regional GRP in the district, the calculation of the average minimum and median GRP, the ranking of regions by life expectancy. The main method was the calculation of the D.E. Davydyants composite index of socio-economic development assessment using the matrix approach. Results. Matrix method shows that in 2015, regional socio-economic development increases due to the growth of both the economic and social component. The obtained results can be used by the authorities, participants, providing socio-economic and managerial relations in the region, which ultimately contributes to the achievement of the main goal - improving the quality of life.

Keywords: composite index, individual index, GRP, life expectancy, socio-economic development, region, development efficiency, matrix method.
Introduction

The relevance of the research topic is determined by the need for effective use and distribution of limited resources in Russian regions, which has evolved into an acute problem of uneven economic development, which causes social inequality. On the one hand, the regions determine the development strategy and outline the main tasks of their activities independently, conduct investment and trade policies to attract additional reserves of economic growth. On the other hand, an important function of the state authorities is to smooth out the ‘distortions’ in the regional development of individual entities of the country through the implementation of targeted programs, support for the implementation of nationally significant projects.

Degree of elaboration of the problem. The problem of the efficiency of regional socio-economic development has been a subject of scholarly research for quite a long period. Domestic and foreign writing about this problem: A.I. Borodin, S.N. Bludova, V.I. Vidyapin, D.E. Davydyants, V.N. Zadorozhny, V.A. Zalevsky, O.V. Lomovtseva, V.P. Oreshin, S.N. Rastvortseva, L.E. Rosseikina, V.V. Fauser, G.G. Fetisov, B.M. Shtulberg, V.N. Shchukov [1,2,3]. This area of research cannot be considered fully developed, as the regional socio-economic development is subject to rapid changes due to the impact of many factors. The activities of the regions require more thorough study to identify current trends and draw up development programs for the future.

The purpose of this article is to evaluate the trends of regional socio-economic development, taking into account the analysis of economic and social ratio, using the matrix method.

Methods

A comprehensive analysis of socio-economic development is very important, including the impact of all key indexes on the effective functioning of the economy. In order to determining the degree of the efficiency of regional socio-economic development, as a rule, data characterizing its economic and social status are applied. In the case of Russia, such information is provided by Rosstat, which deals with the
satisfaction of state structures needs, the media, the society, the scientific community, commercial enterprises and entrepreneurs, international companies in diverse, reliable, complete statistical information. At the regional level, the system of regional accounts (or CDS), which is maintained in accordance with the system of national accounts, deals with statistical accounting [4].

It is quite difficult to designate a group of indexes, that accurately characterizes the level of the efficiency of regional socio-economic development, because some of them have a positive effect on efficiency, others - negative, and others manifest themselves only in dynamics [5]. On this basis composite indexes, including latent variables-indexes, are usually used as factor attributes. Tangible shortcomings of many methods of developing composite indexes (indices, weighting method, method of expert evaluation) are considered nonlinearity of the measurement scale as well as subjectivity of expert scales [6].

In addition to generalizing indexes, individual indexes, characterizing the efficiency of the resources using involved in the region production are used: savings on fixed and circulating funds, use of material costs, increased efficiency in the use of wage labor, production funds, environmental and material resources [7].

To assess the socio-economic development in statics and dynamics, we use the composite index of Professor D.E. Davydyants, with the help we measure and evaluate the level of development of the system in the whole – ‘Life expectancy - Gross Regional Product’ [8].

The index of socio-economic development at the regional level can be calculated as follows:

\[
\text{Composite index D.E. Davydyants} = LE \times GRP,
\]

where LE - life expectancy at birth, years;
GRP - per capita gross regional product (per year), rubles.

The index includes two elements: the average life expectancy of a person and the per capita gross regional product (per year).
The index ‘average life expectancy at birth’ shows the level of the nation's health, because it is directly determined by the level of regional economic development, accessibility and quality of medical services, social programs.

The next index - the gross regional product per capita - demonstrates the scale of the processes of production, consumption and distribution that are formed in this subject of the Federation.

The considered parameters of socio-economic efficiency have a significant advantage, as they include traditional indexes available in statistical compilations and do not require additional research.

Results

As an object of study, we chose the economy of the Belgorod region, and to conduct a comparative assessment of socio-economic development of the Central Federal district regions: Belgorod, Bryansk, Vladimir, Voronezh, Ivanovo, Kaluga, Kostroma, Kursk, Lipetsk, Moscow, Oryol, Ryazan, Smolensk, Tambov, Tver, Tula, Yaroslavl Oblast. Assessment of regional socio-economic development was carried out in the period from 2011 to 2015.

Describing the regional socio-economic development, first, it is necessary to analyze the dynamics of the gross regional product, which is the sum of the gross added value, produced by the institutional units-residents of the regional economy for the reporting period.

The gross regional product is a general index of development at the regional level and an objective index of the contribution of each region - the subject of the Federation to the development of the country's economy. Let us turn to Figure 1 to analyze the dynamics of the GRP of the Belgorod Oblast in comparison with the other regions of the Central Federal District for the last 5 years.
Figure 1 Dynamics of the structure of production of total GRP by regions of the Central Federal District in 2011-2015.

Compiled by: [9]

The leader in this index among the considered subjects is the Moscow Oblast and Moscow, as there are large financial institutions, which manage huge cash flows, concentrated here. The total GRP in 2015 in Moscow was 13532598 million rubles with an average level of 1261884 million rubles by the district. The next place in the volume of GRP is Voronezh Oblast with an index of 823133.6 million rubles in 2015. Almost equal total GRP is produced by its competitive region Belgorod Oblast: 686,357 million rubles. The remaining regions for the five years produce GRP, which does not exceed 500000 million rubles.

Consider the dynamics of the share of GRP of the Central Federal District in the total GRP volume produced by the district in order to assess which of the regions makes the most significant contribution to the economy of the Okrug and, therefore, the country as a whole, for this we consider the calculations in Table 1.

<table>
<thead>
<tr>
<th>GRP, million rubles</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moscow Oblast</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moscow</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Voronezh Oblast</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Belgorod Oblast</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other regions</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 1

The share of Russian regions in the total GRP of the Central Federal District in 2011 - 2015, %
Based on the calculations, we can draw the following conclusions. In general, for the reporting period (2011-2015), Belgorod Oblast and Moscow show a slight decrease in the share of GRP in the total volume of GRP, produced in the Central Federal District. Voronezh, Lipetsk, Oryol, Tambov, Tula and Yaroslavl Oblast, on the contrary, occupy a stable economic position, increasing their share of GRP in its total volume by district.
Comparison of regions by absolute GRP cannot give a complete picture of interregional differences in the level of economic welfare, since it does not take into account the scale of the regions. For this goal, we use a derived index - GDP per capita, which will more accurately describe the level of socio-economic development of the region (Figure 2). In order to eliminate the effect of changes in prices and values to ensure comparability of GRP, use deflator, taking the base price level of 2007.

![Figure 2 GRP per capita by the regions of the Central Federal District, 2007 and 2015, rubles. (in the prices of 2007)](image)

Compiled by: [9]

It is possible to select regions that are characterized by a significant excess of the per capita GRP above the average level. The number of such regions includes Voronezh (the per capita GRP was 173697 rubles, with the average level of 172489 rubles in 2015), Lipetsk (194639 rubles), Moscow (217428 rubles), Belgorod Oblast (218072 rubles) and Moscow (543081 rubles). It should be noted that Moscow, despite the leading position in terms of output, was the only entity in the Central Federal District with a per capita gross regional product in 2015 less than in 2007.

By the magnitude of regional inequality, Russia is ahead of not only developed but also developing countries - if in the United States and large European countries the per capita GRP for regions can differ by 3 or 5 times, in Russia it is more than 20 [10].
In order to identify interregional differentiation in the Central Federal District, let us turn to the dynamics of per capita GRP of the regions of the Central Federal District in 2007-2015, shown in Figure 3.

![Figure 3](image.png)

**Figure 3 Dynamics of per capita GRP of the regions of the Central Federal District in 2007-2015, rubles (in the prices of 2007)**

Compiled by: [9]

In the period from 2007 to 2015, the increase in the average per capita GRP was accompanied by a stable growth of the median value of this parameter, which indicates that economic development took place not only in wealthy regions, but also in less developed regions of the Russian Federation. At the same time, a slight drop in GRP per capita in the regions of the Central Federal District in the last few years is also associated with a reduction in the scope of interregional inequality, as indicated by the approximation of the median values to the average.

The increase in GRP per capita creates material conditions and opportunities for the government and people, health, education, culture, sports, housing construction, cities, etc. Life expectancy is result factor, an effective characteristic in relation not only to the quality of life, but also to all other intermediate factors [11].

Life expectancy is a complex of all the intermediate factors that determine and influence ultimately life’s change, but not vice versa. Any socio-economic system is
designed to reproduce the growth of life expectancy, whose duration reflects, in particular, the quality of life, the standard of living, ecology, comfort [12]. Individual indexes help only deeper disclose the content of the ultimate social performance. For a visual comparison of life expectancy in the regions of the Central Federal District and monitoring dynamics, we arranged the analyzed subjects of the Federation in descending order, based on the statistical values of life expectancy (Table 2).

Table 2
Rating of the regions of the Central Federal District for the life expectancy in 2007 and 2015.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Region</th>
<th>Life expectancy, year</th>
<th>Rank</th>
<th>Region</th>
<th>Life expectancy, year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Moscow</td>
<td>72.5</td>
<td>1</td>
<td>Moscow</td>
<td>76.77</td>
</tr>
<tr>
<td>2</td>
<td>Belgorod Oblast</td>
<td>70.33</td>
<td>2</td>
<td>Belgorod Oblast</td>
<td>72.61</td>
</tr>
<tr>
<td>3</td>
<td>Tambov Oblast</td>
<td>67.9</td>
<td>3</td>
<td>Moscow Oblast</td>
<td>72.26</td>
</tr>
<tr>
<td>4</td>
<td>Voronezh Oblast</td>
<td>67.52</td>
<td>4</td>
<td>Voronezh Oblast</td>
<td>71.67</td>
</tr>
<tr>
<td>5</td>
<td>Lipetsk Oblast</td>
<td>67.31</td>
<td>5</td>
<td>Tambov Oblast</td>
<td>71.67</td>
</tr>
<tr>
<td>6</td>
<td>Oryol Oblast</td>
<td>67.23</td>
<td>6</td>
<td>Ryazan Oblast</td>
<td>71.46</td>
</tr>
<tr>
<td>7</td>
<td>Yaroslavl Oblast</td>
<td>67</td>
<td>7</td>
<td>Lipetsk Oblast</td>
<td>71.07</td>
</tr>
<tr>
<td>8</td>
<td>Moscow Oblast</td>
<td>66.93</td>
<td>8</td>
<td>Yaroslavl Oblast</td>
<td>70.98</td>
</tr>
<tr>
<td>9</td>
<td>Kursk Oblast</td>
<td>66.66</td>
<td>9</td>
<td>Kursk Oblast</td>
<td>70.8</td>
</tr>
<tr>
<td>10</td>
<td>Kaluga Oblast</td>
<td>66.64</td>
<td>10</td>
<td>Kaluga Oblast</td>
<td>70.73</td>
</tr>
<tr>
<td>11</td>
<td>Kostroma Oblast</td>
<td>66.27</td>
<td>11</td>
<td>Ivanovo Oblast</td>
<td>70.62</td>
</tr>
<tr>
<td>12</td>
<td>Bryansk Oblast</td>
<td>66.11</td>
<td>12</td>
<td>Kostroma Oblast</td>
<td>70.38</td>
</tr>
<tr>
<td>13</td>
<td>Ryazan Oblast</td>
<td>65.61</td>
<td>13</td>
<td>Oryol Oblast</td>
<td>70.38</td>
</tr>
</tbody>
</table>
The index life expectancy shows a positive trend throughout the period: the increase in the average for the district was a 3 year, thus the average level increased from 66.8 to 71.1 years in 2015 compared to 2007.

In terms of life expectancy, Moscow, which ranked first with a steadily increasing survival rate (72.5 and 76.7 years) throughout the entire period and the Belgorod Oblast, which demonstrated an increase in life expectancy for 2 years (from 70.3 to 72.6 years) were the leading regions.

Voronezh and Tambov Oblast are among the five leading regions in this index. Oryol, although do not belong to the regions with the shortest life expectancy, is shifted by 7 positions down for 9 years, which is a clear confirmation of the deteriorating demographic situation.

Moscow, Ryazan and Ivanovo Oblast, on the contrary, quickly move up in the rating (in the direction to the leaders) with an increase in the life expectancy over the period under review by 5 or more years.

Dynamics of regional socio-economic development of the Central Federal District for 2007-2015 using the composite index of Professor D.E. Davydyants, taking into account inflation processes, is presented in Figure 4. Leading regions are Moscow, Lipetsk, Belgorod Oblast and Moscow. With a small margin, there are the Voronezh and Kaluga Oblast. Development in 2009 and 2010 shows a decline in all the observed regions, starting in 2011, however, we can see a recovery in the economy, which, nevertheless, in 2014 - 2015 again significantly deteriorating. Therefore, for example,
in Moscow, socio-economic development in 2015 deteriorated almost to the crisis level of 2008-2009.

Figure 4. Dynamics of regional socio-economic development of the Central Federal District regions in 2007-2015, thousand rubles by the number of years (in 2007 prices).

Compiled by: [9]

To determine the key points of the analysis of regional socio-economic development, it is important to analyze the correlation of the economic and social component of the region development. For this goal, we construct two matrices in which we map the coordinates of each region of the CFD, where we take the GRP per capita in rubles for ‘x’, and the expected life expectancy in years for ‘y’. We arrange the coordinate axes and the matrix boundaries based on the calculation of the middle and critical values of the two indexes (excluding Moscow, in view of the considerable remoteness of its indexes from other regions). Matrices of the correlation between the social and economic component of the Central Federal District regions development in 2007 and 2015 (in 2007 prices) are shown in Figure 5.
In 2007, the average life expectancy was 67 years, and the median GRP per capita, excluding Moscow, was 114700 rubles, which served as the basis for applying the axes of coordinates on both matrices. Figure 5 clearly shows that the bulk of the 2007 regions is concentrated in the two left sectors ‘low GRP per capita - low life expectancy’ and ‘low GRP per capita - high life expectancy’. The only exception is the

Compiled by: [9]

Figure 5. Matrices of correlation between social and economic component of the Central Federal District regions development in 2007 and 2015. (in the prices of 2007).

1 - Belgorod Oblast; 2 - Bryansk Oblast; 3 - Vladimir Oblast; 4 - Voronezh Oblast; 5 - Ivanovo Oblast; 6 - the Kaluga Oblast; 7 - Kostroma Oblast; 8 - Kursk Oblast; 9 - Lipetsk Oblast; 10 - Moscow Oblast; 11 - Oryol Oblast; 12 - Ryazan Oblast; 13 - Smolensk Oblast; 14 - Tambov Oblast; 15 - Tver Oblast; 16 - the Tula Oblast; 17 - Yaroslavl Oblast; 18 - Moscow. (The dashed lines indicate the coordinate axes, calculated from the average values of the indexes 2015)
Belgorod Oblast with a life expectancy of seventy years and a per capita GRP of 156032 rubles, as well as Lipetsk, Moscow Oblast and Moscow with indexes of 67.3, 66.9 and 72.5 years and 179488, 194163, 639566 rubles respectively.

In 2015, regional socio-economic development increases due to the growth of both the economic and social component. All regions exceeded the minimum life expectancy limit in 2007 - 64 years and after 8 years, the average value was 71 years. As for GRP per capita, here we should note the improvement of the sign - practically all the subjects of the Central Federal District have moved to the upper right of the matrix ‘high GRP per capita - high life expectancy’ except for the Bryansk and Ivanovo Oblast with per capita GRP below the average level of 2007. Having designated on the matrix of 2015 additional axes of coordinates, adjusted for the average values of ‘x’ and ‘y’, we will analyze the dynamics of social and economic region development for 2007-2015 taking into account inflationary processes. The left lower sector ‘low GRP per capita - low life expectancy’, characterized by a difficult economic and not the most prosperous social status of people, is still represented by Bryansk, Vladimir, Ivanovo, Kostroma, Smolensk and Tver Oblast. The number of successful regions (the upper right sector of the matrix) has been replenished by the Voronezh and Tambov Oblast.

The sectors ‘low GRP per capita - high life expectancy’ and ‘high GRP per capita - low life expectancy’ remain virtually unfilled, which is not surprising, since the statistical relationship between the analyzed indexes is very strong (the correlation coefficient is 0.71) and an increase in the added value in the region is associated usually with an increase in the standard of living and life expectancy. In this regard, regions in two specified sectors is rather an exception.

**Conclusion**

The toolkit for assessing the regional socio-economic efficiency includes individual and composite indexes, among which the D.E. Davydyants index, consisting of two components: the average life expectancy at birth and the gross regional product per capita.
Analysis of individual indexes of regional socio-economic development. Moscow Oblast and Moscow in 2011-2015 had the highest GRP among the regions of the district. Voronezh and Belgorod Oblast occupied the next places. Voronezh, Lipetsk, Oryol, Tambov, Tula and Yaroslavl Oblast increased their share of GRP in its total volume by district; Belgorod Oblast and Moscow show a slight decrease in this index. In the period from 2007 to 2015, the increase in the average per capita GRP was accompanied by a stable growth of the median value of this parameter, which indicates a reduction in the scope of interregional inequality. The index life expectancy shows a positive trend throughout the period: the increase in the average for the district was a 3 year, thus the average level increased from 66.8 to 71.1 years in 2015 compared to 2007.

Assessing the regional socio-economic efficiency using the D.E. Davydyants composite index shows that the bulk of the 2007 regions is concentrated in the two left sectors ‘low GRP per capita - low life expectancy’ and ‘low GRP per capita - high life expectancy’. In 2015, regional socio-economic development increases due to the growth of both the economic and social component. All regions exceeded the minimum life expectancy limit in 2007 - 64 years and after 8 years, the average value was 71 years. Practically all the regions of the Central Federal District have moved to the upper right of the matrix ‘high GRP per capita - high life expectancy’ except for the Bryansk and Ivanovo Oblast with per capita GRP below the average level of 2007.

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