

Is It Possible to Increase Life Expectancy in Russia Considering the Reached Level of Socio-Economic Development of the Country's Territorial Entities?

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Abstract—The research provides a statistical proof of the possibility of implementation of "May decrees 2018" of Russia's President Vladimir V. Putin in terms of increasing life expectancy at birth to 78 years. The research was conducted with the use of STATISTICA program, by the method of multivariate regression. As a result, a correlation between the average life expectancy of the population and eleven socio-economic indicators was revealed basing on the research data, and a work model for forecasting the average life expectancy of Russians was constructed.

Keywords—*regional economy, regression analysis, life expectancy, demography, territorial development*

I. INTRODUCTION

It is impossible to find a region in Russia with no socio-economic development problems. However, in problem regions these problems are especially strongly marked. In the sphere of academic studies, a problematic field of depressive regions is created, which includes the regions' characteristics, classification, similarities and differences, peculiarities, potentials.

As a definition, a problem region is a territory unable to solve its socio-economic problems or to realize its potential on its own, and therefore requiring considerable support from the State.

The problems are so serious, there are so many of them, and they show themselves so differently in every Russian Federation constituent entity, that there is no definite idea how to cope with the situation [4], as well as no uniform knowledge of classifying the problems [1-3], in theoretical sphere.

Alongside with that, the problem regions have all the opportunities to speed up their development, basing on the competitive advantages they have. With these issues being covered thoroughly enough in scientific and educational

literature [5-8], they are explored yet insufficiently in terms of step-by-step realization of legislative initiatives.

One of priority goals for Russia today is to overcome the adverse demographic dynamics. Population growth, along with other factors, will provide necessary conditions for the intensification of commercial and production activities [9]. It will also serve as a source for innovation and investment activity of the regions [10].

Today, we witness a continuing process of urbanization of Russia's localities [11,12]. The inequality of regional development results in the degradation of suburb and rural territories. Dramatic number of localities is disappearing from Russia's map. A thorough analysis of the causes of increase/decrease of population in regions is needed in order to find out all the factors of social comfort/discomfort of living. Presumably, the problem of population decrease in Russia is not only economically based, but also system (structure, institution etc.) based.

The inequality of regional development results in the degradation of suburb and rural territories. Big cities are likely to grow further, small towns will keep disappearing (fig. 1-2).

The decrease of the number of rural localities takes place because they get included into the territory of cities and towns, alongside with other causes. Besides, according to the recent population census, there are more than 19 thousand rural localities in Russian Federation, where nobody lives. In comparison with the previous census, the number of localities inhabited by "dead souls" (people who are registered in a certain place or who own a property there but live in a different place) has increased by half.

Taking all said above into consideration, it is urgent to develop tactical methods for earliest coping with adverse economic dynamics. Nevertheless, the best way to solve this problem is obviously to formulate an appropriate socio-economic development strategy.

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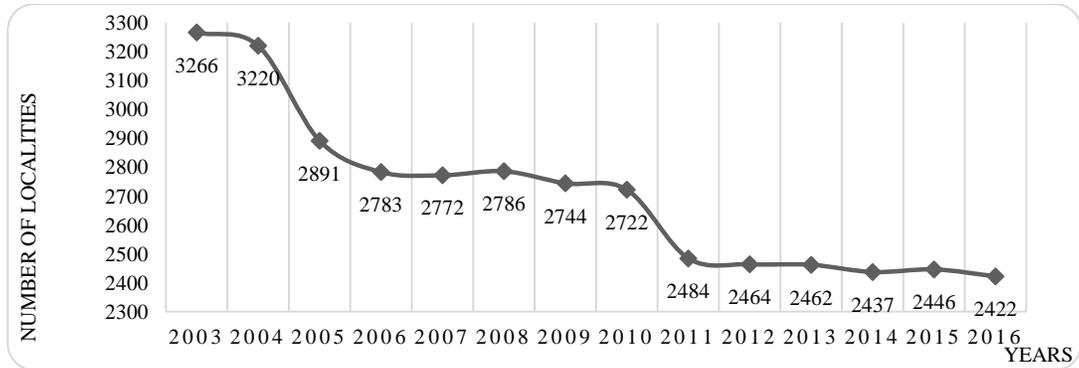


Fig. 1. Number of urban localities in Russia (compiled by the authors according to the Rosstat)

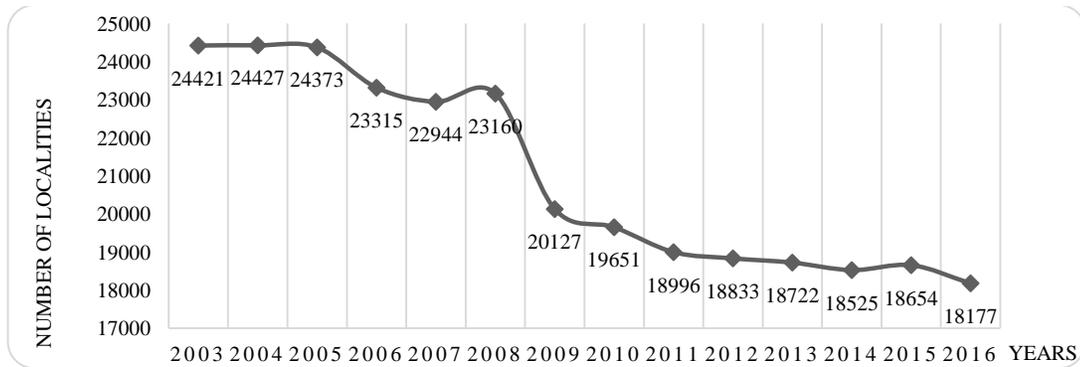


Fig. 2. Number of rural localities in Russia (compiled by the authors according to the Rosstat)

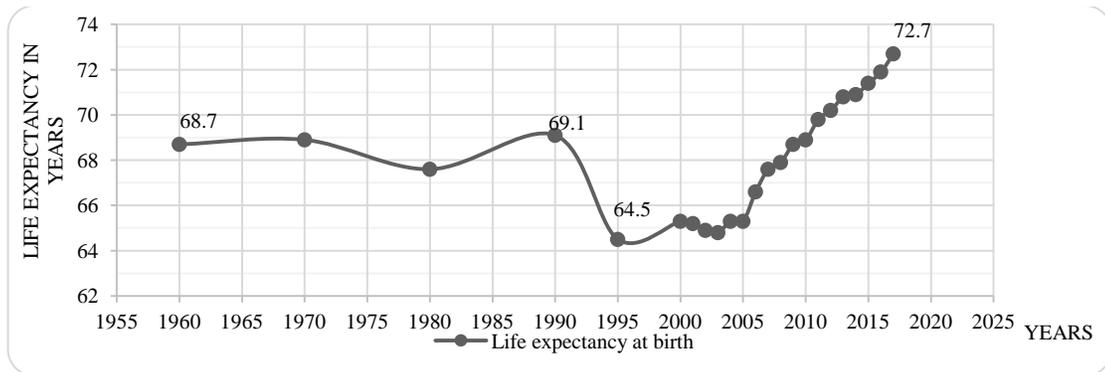


Fig. 3. Changes in life expectancy at birth in recent years (compiled by the authors according to the Rosstat)

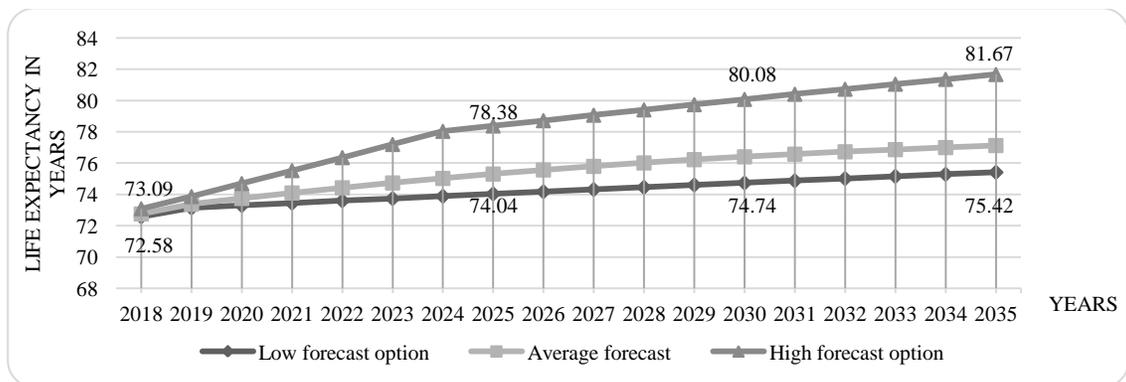


Fig. 4. Forecast of life expectancy at birth (compiled by the authors according to the Rosstat)

Aiming at breakthrough socio-economic development in Russian Federation, the increase of population, the increase of the citizens' life-standard and creating a friendly environment for life, the "President's Decree no. 204 dated May 7, 2018" was issued. The increase of life expectancy at birth up to 78 years by 2024 and up to 80 years by 2030 became a national goal (fig. 3-4).

Given the fact that one cannot find the estimation procedure of the forecast data in public media, it is the academic society who is to estimate the possibility to realize certain statements of the President's Decree no. 204 dated May 7, 2018, namely 1.b. [13-16]

Life expectancy is one of indicators to judge the life quality of population. Moreover, important enough, this information is available for analysis due to officially published data of the Rosstat (the Russian Official Statistic Agency). Number of years a person is likely to live, all other conditions being equal, tells of quite many things: environment quality, the individual's personal growth, work conditions, social relations etc. [17,18]

Let us consider which of the published statistic data have the highest impact to the life expectancy of Russians.

II. METHODS

The "root database" we used for our study was the complex of indicators published at the official website of the Rosstat ("Regional Statistics" section) to monitor the

efficiency of the Russian Federation constituent entities. More than one thousand of the regional dynamics indicators have been analyzed.

Today, due to automation of the methods of multiparameter statistic calculations, one can quite compactly display big data characterizing socio-economically the Russian Federation constituent entities' current state and development. STATISTICA by StatSoft is a program for basic information processing that is widely popular in Russian home market. For the purposes of this study, the official version of STATISTICA 13.3 EN was used.

Theoretical basis of the stages of regression analysis, as well as the possibility of using up-to-date program products for statistical data processing, is broadly covered in specialized literature [19-22]. So we are moving straight to the results of the calculations.

For the purposes of this study, the maximum possible life expectancy in Russia for nowadays was taken as the dependent variable. This value was reached in the Republic of Ingushetia and the figure is 81.59 years.

The forecast was made basing on the regression model. The selected meaningful indicators most highly correlating with the increase of life expectancy are tabulated in Table 1. These indicators were selected as predictors for the future model.

TABLE I. THE LEADING REGIONS BY THE CHARACTERIZING PARAMETERS

| No. | Name of indicator | Unit | Current value of the indicator | The leading region |
|-----|---|--------|--------------------------------|--------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| 1 | Percentage of high-tech and knowledge-intensive industries in gross regional product | % | 35,3 | Tula Region |
| 2 | The ratio of average monthly nominal salary of employees of state (municipal) institutions of culture and art to the average monthly nominal salary of employees working in the sphere of economy of the region | % | 114,0 | The Republic of Ingushetia |
| 3 | The ratio of number of people employed in the sphere of economy of the region to the able-bodied population of the region (men of 16-59, women of 16-54) | % | 130,1 | Nenets Autonomous Okrug (Region) |
| 4 | The tension coefficient in the labour market | Unit | 0,6 | Moscow |
| 5 | Mortality of the able-bodied population (number of deaths per 100 thousand people of the corresponding age) | Person | 147,2 | The Republic of Ingushetia |
| 6 | Total fertility rate | Unit | 3,194 | The Republic of Tuva |
| 7 | Sufficiency of places in pre-school educational institutions (number of places per 1000 pre-school children) | Unit | 1048 | Chukotka Autonomous Okrug (Region) |
| 8 | Percentage of loss-making municipal housing services organizations. | % | 11,1 | St. Petersburg |
| 9 | Percentage of working population in the average annual population of the region | % | 76,2 | Nenets Autonomous Okrug (Region) |
| 10 | Gross regional product per capita | Rouble | 4990259,7 | Nenets Autonomous Okrug (Region) |
| 11 | The coefficient of renewal of fixed assets | % | 19,8 | The Republic Of North Ossetia-Alania |

Basing on the eleven indicators the best performances achieved were selected from all the Russian Federation

constituent entities. For example, Tula Region was recorded to have the highest percentage of high-tech and

knowledge-intensive industries in gross regional product, and the Republic of North Ossetia-Alania is the leader in terms of the coefficient of renewal of fixed assets.

It is evident that each region individually does not have all the model values listed in Table one. However, every region has its inner hidden potential which is able to get the region close to high rates of socio-economical well-being of the leading regions. Basing on the figures reached by the regions leading in socio-economic development, the “ideal” region was constructed.

Thus, for the purposes of this study, the “model” region was designed, by selecting the highest values of each indicator used in the model we were aiming to create. In this model region, there would be maximum life expectancy possible in terms of today level of scientific and technological and socio-economic development.

Preliminary test of the statistic model detected no multicollinearity among the indicators used. Correlation matrix also detected no multicollinearity, so the next step was the analysis of residuals. The histogram curve looked as a bell-like inverted curve, therefore the hypothesis of normality of the residuals distribution was not rejected. There were no critical deflections found on the normal probability graph, so the residuals were normally distributed. On the correlating diagram, no system of the distribution of dots was detected, i.e. the dots were distributed chaotically enough. Consequently, residuals did not depend on the predicted values.

The analysis of residuals showed that the model was good enough. Next, the acceptability of the regression model in whole was estimated. Since the significance level was less than 0.05, one can claim the model to be acceptable and likely to work better than “naïve” average forecast.

The following step was to analyze the coefficient of determination. It shows how many factors influencing the analyzed indicator of “average life expectancy at birth” have been taken into consideration in the model. The coefficient of determination is $R^2 = 0.97$. 97% is a good value. So the model is workable.

III. RESULTS

The results of substitution of unique indicators of the reached level of socio-economic development of certain regions into the calculation model allowed us to statistically prove the following results of the study.

Basing on the results of predicted values, one can conclude that nowadays Russia has all the possibilities to increase average life expectancy up to 77.64 years. Alongside with that, in fact average life expectancy presently is 72 years.

The possibility to increase life expectancy of Russians in a natural way by minimum 5-6 years was statistically proved. Life expectancy can thus reach 78 years. And, as

well known, it is not just a theory, but also the component of the program to implement by 2024 according to "May decrees 2018" of Russia's President Vladimir V. Putin.

So, if we are asked a question "Is it possible to increase life expectancy in Russia considering the reached level of socio-economic development of the country's territorial entities?" We will answer "Yes, it is, but it is necessary to fulfil the conditions listed below.

Firstly, the State should make every effort to improve the quality of life of people. We should bear in mind that said life quality depends not only on the data specified in this study, but also on a large number of other factors.

Secondly, total upgrade of the system of statistical service and regional monitoring is absolutely necessary for achieving this goal. Due to said upgrading a more complete list of factors is expected to be formed, so that Russia will be able to reach not forecast values but real results by affecting these factors.

Lastly, it is urgent to improve the methodology and statistics model that will provide a better foundation to the implementation of strategies of the Russian Federation's development for the period up to 2024.

IV. CONCLUSION

The main objective of national policy should be to overcome centrifugal forces of regional dynamics. It is necessary to form conditions for self-development of local territories, provide conditions for increasing of human capital assets, labour capacity and renewal of exhausted funds. Moreover, step-by-step decrease of technological environmental impact in environmentally neglected regions should be aimed at. Besides, factors which could improve demographic situation in remote regions should be found out. Solution of these problems will assist in inflow of internal and external investments to the region's economy and in growth of its general capitalization.

To sum up, we find it important to repeat that in terms of modern economical situation it is necessary to develop complex approach to the estimation of potential of each region. Underestimating certain factors of economical growth limits opportunities for realization of strategic initiatives and program components, set by the Russian Federation Government. An objective, individually implementable to each entity and at the same time the broadest possible system of statistical service for socio-economic indicators of regional dynamics should become one of important components of this process. The methods of statistical analysis suggested in the study can be used as a basis for defining development strategies of various regions, while the regional strategies themselves have to be interconnected in order to realize the tasks set nationwide.

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