

# Demographic Aspect of Sustainable Development of the Samara Region, Russia

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**Abstract:** The article analyses the demographic factors affecting the sustainable development of Russian regions. The impact of demographic factors on sustainable development is primarily determined by the number of human resources. Population decline leads to a reduction of labor potential and further reduces employment and the volume of the regional product. This theoretical fact is proved by the author's calculations. Using statistical methods for producing trends and increases estimates, including by the base year, the demographic trends of the Samara region of Russia were identified in the context of its sustainable development. An analysis of the population size showed population and labor resources decline in the region. An analysis of economic indicators also shows a reduction in the volume of the regional product. All this confirms that demographic factors have a direct impact on the sustainable development of the region and its economic growth. The deterioration of the demographic situation causes the proposal to continue the implementation of the pension reform in the region, as well as to provide the possibility of improving the quality of education and educational level of the older population in order to compensate the decrease in the labor efficiency of the analyzed category of the population. The sustainable development of the regions depends on a sufficient number of labor resources in the present and future, which makes it necessary to focus on restoring the region's ability to reproduce the population.

## 1 INTRODUCTION

The sustainable development of the regions is a priority for ensuring the external and internal security of the state. Regional policy should reflect the country's sustainable development goals. One of these priority goals is to improve the demographic situation, which varies significantly in the regions.

The fundamental documents for the development of the Strategy for the sustainable development of the regions are the Constitution of the Russian Federation, the Law "On Security", the National Security Strategy of the Russian Federation and the Strategy of the Economic Security of the Russian Federation for the period up to 2030 and a set of regional and local legal acts. Thus, sustainable development of a region is understood as the ability

of a region to survive and improve development indicators in the face of external and internal threats. Together with the concept of sustainable development, it is also considered such concept as national security and economic security - a state in which the economic independence and sovereignty of the region is preserved in the face of external and internal threats. Considering the above, the concept of "economic stability" can be defined as the ability of a region to the economic growth based on an increase in demographic potential in the face of external and internal threats (Tsibareva, 2013). Demography provides a basis for assessing the impact of population on national security.

The sustainable development has been associated with environmental issues since 1972. The deterioration of the ecological situation began to

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affect human health, its ability to reproduce and self-development (Bhargava, 2019). Bhargava A. associates sustainable development with fertility, and believes that it is necessary to monitor demographics that threaten sustainable development. So, to assess human potential, the UN introduces an indicator that takes into account the level of education, health, life expectancy, income level, quality of life, called the human development index (Tsibareva, 2019).

Thus, there is a connection between the sustainable development and human resource development. Some authors put forward the idea that demographic decline (population decline) results in the decline of cities and regions, which is a justified necessity, but only in some parts of the region, for the sake of the sustainable development. The authors apply a regional landscape approach to preserve the sustainable development of the region (Segers et al., 2020).

## 2 RESEARCH METHODOLOGY

Demographic factors influence the economic and sustainable development of the country. To reveal this phenomenon, we took into account the research of scientists carried out in this field of science.

In our work, we considered the sustainable development of regions as a change in demographic indicators and socio-economic indicators. The gross regional product, the number of the labor force and the number of the employed population are used as socio-economic indicators. Among the demographic indicators, the population of the region, the number of men and women, the number of natural population growth, the number of the able-bodied population, the population over the working age, and the proportion of the population over the working age in the total population were selected. The analysis was carried out from 2000 to 2020. All economic and demographic indicators were calculated in dynamics based on the growth rates and increase, as well as the increase to the base year 2000.

The assessment of the demographic situation in the region was carried out in order to determine the rate of growth and increase in the population, assess the ability to reproduce the population, increase in the able-bodied population and the population over the working age, and increase the aging of the population. Demographic indicators are analyzed from 2000 to 2020.

Statistical data were taken on the official website of the Federal State Statistics Service - Unified Interdepartmental Statistical Information System

(EMISS) - <https://fedstat.ru/>, and on the territory site - Territorial Body of the Federal State Service for the Samara Region - <https://samarastat.gks.ru/>

Thus, the authors applied general scientific cognition methods, search method, analysis method, factor analysis, statistical method, graphical method, and mathematical method.

## 3 RESULTS OF RESEARCH

Demographic factors are becoming a source of sustainable development for the region. There is a connection between economic growth and sustainable development of the country and demographic factors.

Demographic changes are characterized by such factors as population size, birth rate, mortality, migration, which reflect the state of the sustainable development in a certain territory (in the region).

It should be noted that with all the independence of the manifestation and change of demographic processes, their depth and intensity depend on the socio-economic conditions of living and functioning of people. Thereupon, the living conditions of people affect the demographic processes (Figure 1).

Since A. Smith, many scientists have wondered about the impact of demographic factors on economic development.

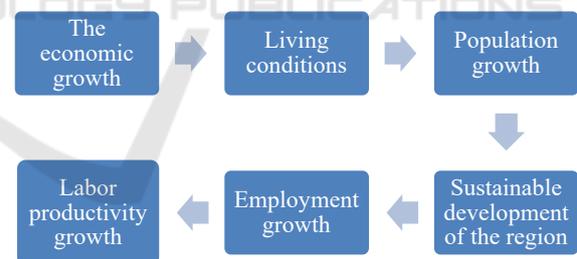


Figure 1: Sustainable development of the region in terms of demographic factors.

If there is a rise in unemployment, then the increase in production slows down. The following demographic factors, such as aging population, deteriorating health and low wages can have a negative impact on employment. Consequently, the lower the demographic potential of the region, the lower the employment.

Consider some demographic potential indicators of the of the Samara region. For this purpose the population growth in the Samara region is shown in

Figure 2 on the basis of the Federal State Statistics Service data.

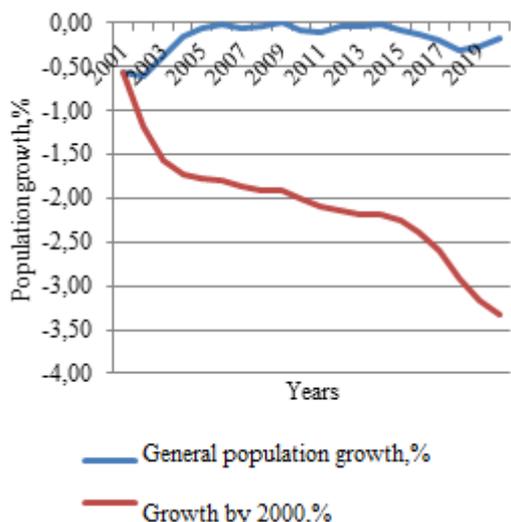


Figure 2: Population growth in the Samara region, %  
\*Source: author's calculations based on the Federal State Statistics Service data.

Figure 2 illustrates that there is an outflow of the population in the Samara region during the study period of 2000-2020. The whole problem of the demographic situation in the Samara region is especially well demonstrated by the growth/outflow indicator against the base year, in this case, by 2000. So, for a long time until 2017, the outflow remained at the level of -2.5%, but then it accelerated and by 2020 amounted to more than 3%.

Next, let us consider the indicators of population reproduction in the region Figure 3.

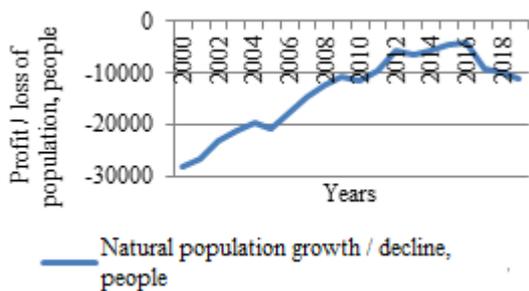


Figure 3: Natural population growth/decline of the Samara region, people\*  
\*Source: author's calculations based on the Federal State Statistics Service data.

Figure 3 illustrates the population decline in the Samara region from 2000 to 2019. At the same time, the population decline decreased from 2000 to 2016, and then from 2017 to 2019, the decline began to

increase. The decline in 2019 amounted to 11,057 people, which is 9.8% more than in 2018.

Population decline occurs more among men and less among women (Figure 4).

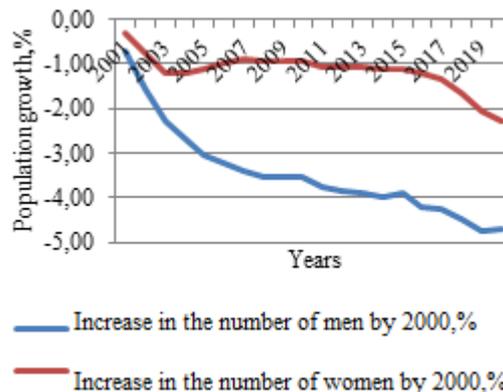


Figure 4: Population growth in the Samara region by gender by 2000, %  
\*Source: author's calculations based on the Federal State Statistics Service data.

Figure 4 shows that the number of men and women declines in 2000-2020. In 2020, the decline in the number of men reaches almost 5%, women more than 2%. Since the rate of decline in the number of men is higher, there is a threat of extinction of the male population. The burden of doing hard work falls more and more on women.

The demographic decline has led to a decrease in the labor potential of the Samara region. Consider the change in the able-bodied population in the Samara region (Figure 5).

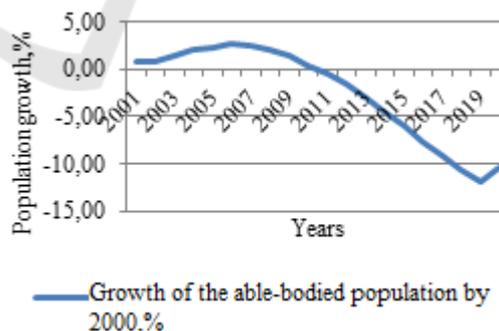


Figure 5: Growth of the able-bodied population of the Samara region by 2000, % \*  
\*Source: author's calculations based on the Federal State Statistics Service data.

Able-bodied age should be considered:

- for men from 16 to 59 years old and from January 1, 2020, from 16 to 60 years old;

- for women from 16 to 54 years old and from January 1, 2020, from 16 to 55 years old.

Figure 5 illustrates that the able-bodied population from 2011 to 2020 in the Samara region is decreasing. Consequently, the labor resources in the region is decreasing. And in 2020, by 2000, the population decline reached 10.5%.

A labor resources reduction leads to a decline in regional production, and the region's population becomes poorer. The consequences of a labor resources reduction for the region can be extremely tragic, such as the poverty of the region, its attenuation (extinction), as well as a decrease in the living standards and incomes of the population in the region, which characterizes unsustainable development and economic recession. At the same time, the part of the able-bodied population is decreasing: in 2019 was 54.5%, in 2015 was 57.1% and in 2005 was 63.1%.

The impact of demographic factors on the sustainable development of the region is increasing with the growth of the population aging. Next, consider the dynamics of the population aging in the Samara region (Figure 6).

Figure 6 shows that the population over the working age in the Samara region is growing rapidly from 2009 to 2020. In 2020, by 2000, the population growth over the working age was 23.5%.

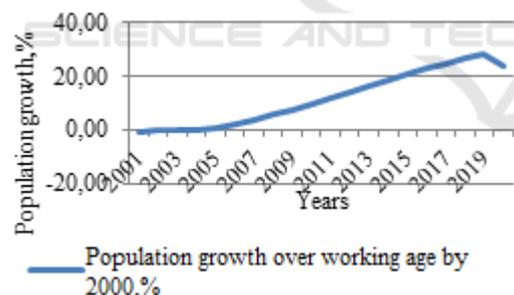


Figure 6: Population growth over working age in the Samara region by 2000, %\*

\*Source: author's calculations based on the Federal State Statistics Service data.

The growth of the older population took place not only in absolute terms but also in proportion to the total population of the region. So the part of the population over working age in 2019 was 27.8%, in 2015 was 25.8% and in 2005 was 21.7%. It is seen that the growth of the population over the working age and its part in the total population are increasing.

The analysis of the demographic situation in the Samara region made it possible to identify the following demographic problems that hinder the

sustainable development of the regions and the improvement of economic indicators:

- total population decline in the region;
- excess of death rate over birth rate;
- the rapid decline in the male population, threatening its extinction;
- able-bodied population decline in the region;
- region's population aging.

Demographic problems threaten the sustainable development of the regions with a shortage of labor resources and a decrease in the ability to reproduce. Most significantly, demographic indicators affect the employment rates of the population Figure 7. The analysis of labor resources is carried out according to the indicator of the number of labor resources in the Samara region, and a trend line is also laid.

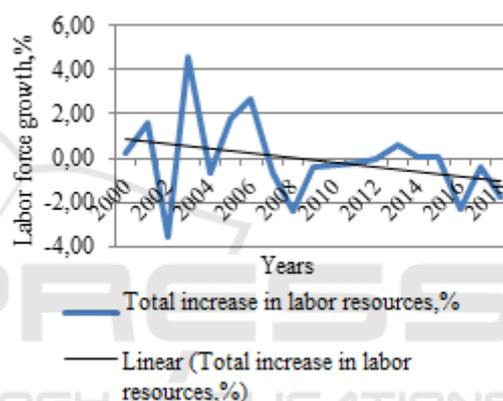


Figure 7: Increase in labor resources in the Samara region, %\*

\*Source: author's calculations based on the Federal State Statistics Service data.

Figure 7 shows that the labor resources have been declining from 2000 to 2019, and the downward slope of the trend line underscores this trend. In 2019, by 2018, the labor resources decreased by 1.44%.

Let us consider the dynamics of the employed population in Figure 8. The population has been declining from 2000 to 2020. The largest employed population decline occurs in 2009 and further in 2017 (Figure 8).

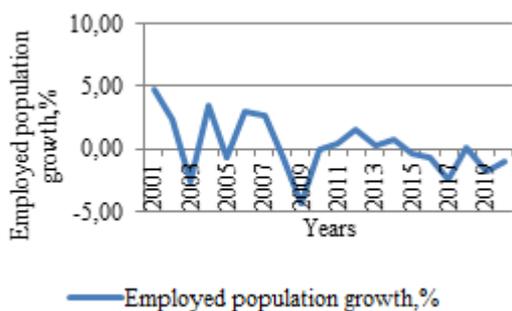


Figure 8: Employed population growth in the Samara region, %\*

\*Source: author's calculations based on the Federal State Statistics Service data.

In 2020, by 2019, the employed population decline was 1.01%.

The volume of labor force affects the volume of the gross regional product (GRP). The GRP analysis can be carried out according to the indicator: the GRP growth rate and GRP per capita (Fedorov and Kuznetsova, 2020).

The GRP dynamics in terms of growth rates/increases of the indicator is presented in Figure 9, and a linear trend line is drawn.

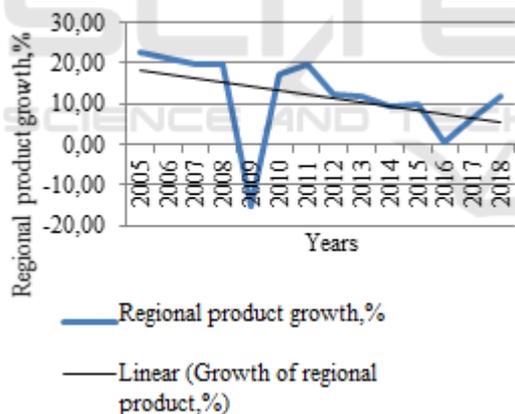


Figure 9: Gross regional product growth in Samara region, %\*

\*Source: author's calculations based on the Federal State Statistics Service data.

Figure 9 illustrates that the regional product of the Samara region is decreasing from 2005 to 2018. The regional product decline is also indicated by the downtrend line.

Figure 9 illustrates a strong decline in the regional product of the Samara region in 2009, after which the growth rates only slowed down.

## 4 RESULTS AND DISCUSSION

The authors analyzed the trends in the demographic and economic indicators of the region.

The population decline is revealed, the rate of decline has significantly increased since 2017. The population decline in the Samara region in 2020 by 2000 reached more than 3%.

The population decline is detected during the period from 2000 to 2019. The decline in 2019 amounted to 11,057 people, which is 9.8% more than in 2018.

The population decline has affected the male population to a greater extent. Thus, the decline in the number of men in 2020 by 2000 was about 5%, women more than 2%.

The deterioration of the demographic situation is observed in terms of the able-bodied population. Thus, the decline is observed from 2011 to 2020. At the same time, in 2020 by 2000, the able-bodied population decline reached 10.5%.

The able-bodied population decline is also confirmed by the decrease in the part of the able-bodied population, from 63.1 in 2005 to up to 57.1% in 2015 and up to 54.5% in 2019

The population aging of the region was revealed, which began to accelerate from 2009 to 2020. In 2020, by 2000, the population growth over the working age was 23.5%. The part of the population over working age in the total population also increased from 21.7% in 2005 to 25.8% in 2015 and to 27.8% in 2019. The population aging negatively affects the labor market. Andreea Claudia Serban also believes that the old labor resources are not able to adapt and accommodate to the external new working conditions, indicating the inevitability of the economic growth decline in the event of population aging (Serban A.C., 2012). It is proposed to raise the educational level, primarily, among the able-bodied population.

All demographic factors affected the labor resources and the employed population decline in the Samara region. Thus, the labor resources and employment have been declining from 2000 to 2019, which is clearly seen in Figure 7 and Figure 8. The linear trend in the labor resources is downward.

At the same time, the labor resources and the employed population decline affected the volume of the regional product, which has been decreasing from 2005 to 2018 (Figure 9).

Thus, we have established the relationship between the demographic and economic indicators of the sustainable development of the Samara region. Thus, demographic factors have an impact on the

economic growth of the region. Changes in demographic factors are determined by the living conditions of the population and the level of wages. Consequently, demographic indicators are a way of assessing, including the living conditions of a person, his prosperity and wealth, as well as the wealth of the region, its sustainable development. Some authors also consider and refer the condition and trends of human capital to the conditions of sustainable development (Sodiq et al., 2019).

The growth in the number of high-quality labor resources affects the economic growth and the sustainable development of the region, which is determined by increasing labor efficiency and improving the living conditions of the population. The presence or absence of opportunities in the region for the development of human capital generates social and economic incentives for the population, which lead to resettlement in territories with favorable living conditions. The lack of opportunities leads to the extinction of the population in regions with unfavorable living conditions.

The economic indicators of the Samara region from 2000 to 2020 decreased significantly.

The highest threat to economic growth and sustainable development of the Samara region is posed by the able-bodied population decline. To maintain the population, we propose to continue to carry out pension reform in the region, which will allow retirement at a later date, increase the educational level among the older population, as well as by attracting students to vocational schools. Some similar activities are proposed by scientists from China, including urbanization to increase the workforce (Cao et al., 2020).

## 5 CONCLUSIONS

The analysis of trends in demographic factors in the Samara region showed a deterioration in the demographic situation from 2000 to 2020.

The population aging, the labor resources decline, and the reduction in the volume of the regional product are revealed.

The main conclusions are as follows:

- demographic and economic indicators are interrelated;
- population decline leads to a decrease in the sustainable development of the region;
- a decrease in the number of labor resources leads to an economic recession and a reduction in the volume of the regional product;

- the population aging reduces the efficiency of work, even if the pension reform is applied to increase the period of retirement, since the quality of work of the older population is decreasing for objective natural reasons (physical activity decreases);
- for the sustainable development of regions, it is necessary to strive to increase the population of a young age, to improve the quality of education and educational level of the population.

The fact that the methodology of measures aimed at increasing the population of the region in general and the labor resources of the region separately has not been sufficiently developed can be considered as an unsolved problem. The validity of certain measures to increase the population size implies the development of labor resources effective number model in the context of limited resources in the region.

To assess the potential for population growth with a simultaneous growth in economic resources.

To assess the regional potential of economic resources and determine the minimum and maximum size of the total population and the number of labor resources.

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