



**ECONOMIC DEVELOPMENT AND DEMOGRAPHIC
CHANGES: ANALYZING THE RELATIONSHIP IN THE
CASE OF THE REPUBLIC OF SERBIA THROUGH THE
LENS OF THE NEOCLASSICAL GROWTH MODEL**

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Abstract: The aim of this paper is to examine the relationship between population size and economic development in the Republic of Serbia over the past 25 years. The initial hypothesis suggests a negative correlation between the population number and GDP, which was tested using the Pearson correlation coefficient on absolute values. The analysis confirmed a negative link between demographic and economic trends, with the theoretical framework based on Robert Solow's neoclassical growth model. Through a graphical interpretation of the model, it is shown that a decrease in population, *ceteris paribus*, may lead to higher capital and output per worker. However, in the long run, population decline limits overall output growth, reduces investment and demand, and may lead to economic stagnation. The original contribution of this paper lies in the application of a classical economic model to the contemporary economic conditions of the Republic of Serbia, while its practical significance is in highlighting the importance of technological progress, institutions and education as corrective measures aimed at mitigating the negative effects of population decline.

Keywords: economic development, population decline, GDP, Solow growth model, labor productivity, capital per worker, demographic trends, technological progress, Republic of Serbia, macroeconomic analysis.

JEL classification: : O11, J11

1. Introduction

The conditions for sustained economic development in the Republic of Serbia are undergoing continuous and substantial change. Demographic indicators reveal a persistent trend of population aging and decline, a phenomenon that significantly shapes the long-term economic outlook of all countries experiencing such shifts, including Republic of Serbia. The economic implications of demographic transformation, particularly changes in population size and age structure, are becoming increasingly complex. These dynamics pose substantial challenges for labor markets, productivity, and fiscal sustainability. As such, they have attracted growing attention from both the academic community (Wertheimer-Baletić, 1999) and policymakers, underscoring the need for comprehensive strategies to mitigate their impact on economic growth.

The general public has become increasingly interested in demographic issues, including population projections, overpopulation, low birth rates, population ageing, the insufficient number of working-age individuals, and migration, as well as their correlation with economic, political, and other questions to which demography can offer valuable insights. To date, the literature on theories of economic growth and development has largely neglected the structure and dynamics of population change. It is often simply assumed that 'the population grows exponentially' (Weber, 2010). While this assumption may hold when considering the global population as a whole, it is essential to distinguish and emphasise the specific demographic conditions prevailing within individual countries, and to formulate tailored economic policies accordingly, based on their particular circumstances.

Furthermore, the literature offers limited discussion on the reciprocal relationship between economic development and population dynamics. Changes in population size, structure, and distribution exert significant influence on economic policymakers at the local, national, and international levels. In addition to tracking overall population size, it is crucial to monitor its age, gender, and racial composition (Bloom, Canning, Sevilla, 2001).

The initial hypothesis of this research is that: *there is a correlation between changes in the total population and its structure, and economic development*. The aim and scope of this research are primarily to demonstrate that the Republic of Serbia is currently in a stage of 'deep demographic ageing', and that prevailing trends and population projections indicate that, in the coming decades, the country will approach the brink of a 'population collapse'. Although the present decline and ageing of Serbia's population may have a short-term positive effect on economic development, if no action is taken, these demographic dynamics are likely to lead first to a population crisis, and eventually to a complete socio-economic collapse.

One of the proposed solutions is the urgent implementation of effective pro-natalist policies, accompanied by comprehensive population policies targeting all

demographic segments. The primary objective would be to slow down, ideally to halt or even reverse, the current negative demographic trends in the Republic of Serbia. The population is an inseparable component of a country's economic development, as it represents the source of the most crucial factor of production, labour, and thereby constitutes a key production factor (the economically active segment of the population). At the same time, the entire population, both economically active and inactive, participates in consumption.

Economic theory has traditionally emphasised the positive influence and importance of population size, particularly the working-age population, on a country's economy. T. W. Schultz (1981), in his work *Investing in People: The Economics of Population Quality*, further highlights the significance of human capital, including education, knowledge, experience, skills, and health, as vital contributors to economic progress. Thus, it is not merely the number of individuals aged 15–64 that matters, but also the qualitative composition of this group, which is of great relevance to economic development. When assessing the role of population in economic development, it is important to recognise that both the size and growth rate of the population can have either a stimulating or inhibiting effect on economic progress. This impact depends on the general developmental conditions and societal context in which the population exists, as well as on the specific pace of its growth or decline.

The advantages of population growth are most evident today in countries with relatively high per capita income and low population growth rates, namely, economically developed nations. In contrast, in countries with relatively low levels of economic development, i.e. developing countries, high rates of population growth often constitute a barrier to economic advancement and social progress (Wertheimer-Baletić, 1999). Therefore, depending on a country's economic, social, and demographic circumstances, population size and structure may serve either as a stimulus or as a significant burden to its economic development. It is crucial to emphasise that population dynamics significantly affect economic development, not only through changes in the overall population size, but also through shifts in its internal structure.

There is considerable uncertainty, along with numerous problems and challenges, that population ageing will pose to healthcare, social welfare and pension systems, future income and economic development, employment and labour markets, regional development, and various other micro- and macroeconomic issues. These are matters that economic and demographic policy-makers will need to confront.

Preparing the economic sector for the impending changes in the age structure of the population, as well as anticipating the complex interplay of these effects, requires a serious and comprehensive economic analysis of population ageing and its impact on economic development. Substantial increases in budgetary allocations for

healthcare—expected to exceed those needed for education—necessary reforms to social welfare and pension systems, and adjustments in business operations, represent the foreseeable future for many countries around the world.

It is important to underline that, generally speaking, people lack a strong capacity for critical reasoning when it comes to thinking about the distant future. This presents a major obstacle when addressing challenges that require long-term solutions before the first ‘visible’ or ‘tangible’ effects emerge. Policy-makers in the field of economics and demography have traditionally operated within a ‘short-term horizon’, often justified by the well-known Keynesian paradigm: *‘In the long run, we are all dead.’*

Planning should be viewed as a form of preventive action or legitimate concern for the future, which is increasingly unpopular in today’s individualistic and alienated societies, where the dominant values are bon vivant lifestyles and hedonism. As a result, long-term strategies are likely to be replaced by short-term measures focused on immediate benefits related to parenting and a larger younger population. These, step by step, may bring societies closer to the necessary goals regarding the transformation of age structures.

Nevertheless, it is crucial that the long-time horizon does not become an excuse for wasting time and resources on short-term, populist policies while neglecting long-term demographic and economic planning. However, if such short-term approaches prove to be the only politically feasible option, they should still receive support as part of a broader policy mix. It must also be recognised that measures successfully adopted and implemented in one area, region, or country may not necessarily be transferable to others, primarily due to specific and unique historical, socio-economic, geographic, and other contextual factors.

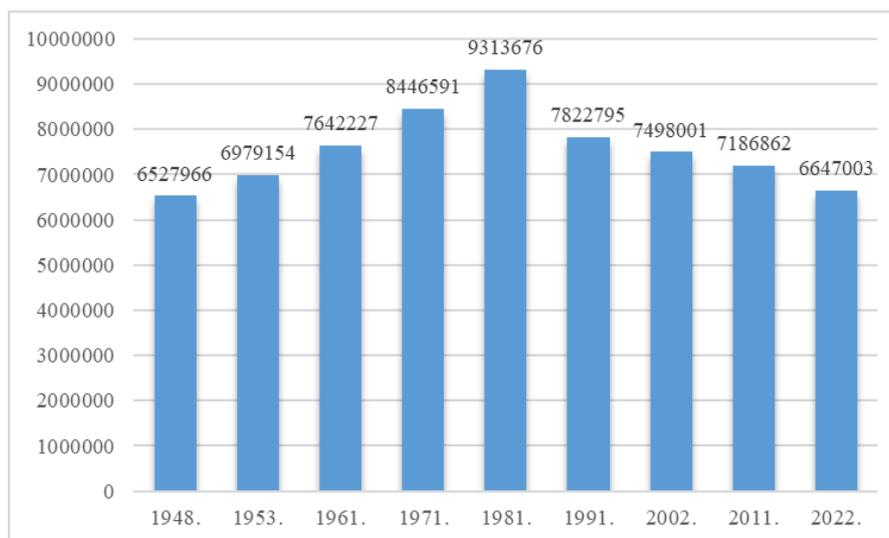
2. Trends in the Total Population of the Republic of Serbia

The changes in the total population depend on natural factors such as birth rates and mortality, as well as mechanical/physical/migratory movements, such as immigration and emigration, taking into account extraordinary circumstances that may lead to a significant reduction in the population, such as wars, epidemics, or natural disasters. It is crucial to distinguish between natural population changes and migratory movements due to the potential influence that a country may have on the latter through economic, social, healthcare, immigration, and other policies, as well as due to the speed and differing impact on population size and structure.

The population of a country is primarily determined by natural population changes, while mechanical migration should have a lesser impact—though there are exceptions in some countries. As previously discussed, immigration and birth rates have a positive impact on population growth, while emigration and mortality have a negative effect, as they reduce the population size.

The basic data on the number, structure, and distribution of the population in a specific area is obtained through population censuses. The Republic of Serbia has a long tradition of conducting censuses, with the first modern census on the territory of present-day Serbia carried out in 1834 according to Statistical Office of the Republic of Serbia. "From the first general population census until the First World War, censuses were conducted on average every five years: 1841, 1843, 1846, 1850, 1854, 1859, 1863, 1866, 1874, 1879, 1884, 1890, 1895, 1900, 1905, 1910." (Statistical Yearbook of the Republic of Serbia 2017. p. 25) "Between the two World Wars, only two population censuses were carried out, in 1921 and 1931. The next census was planned for March 1941. but was not conducted due to political events and the beginning of the Second World War" (Ibidem). After the Second World War, nine more censuses were conducted in the Republic of Serbia: 1948, 1953, 1961, 1971, 1981, 1991, 2002, 2011, and the most recent in 2022. (Figure 1).

Figure 1: Comparative Overview of the Population of the Republic of Serbia According to the Census Results of 1948, 1953, 1961, 1971, 1981, 1991, 2002, 2011, and 2022.



Source: Author's work based on data collected from the website of Statistical Office of the Republic of Serbia (<https://www.stat.gov.rs>)

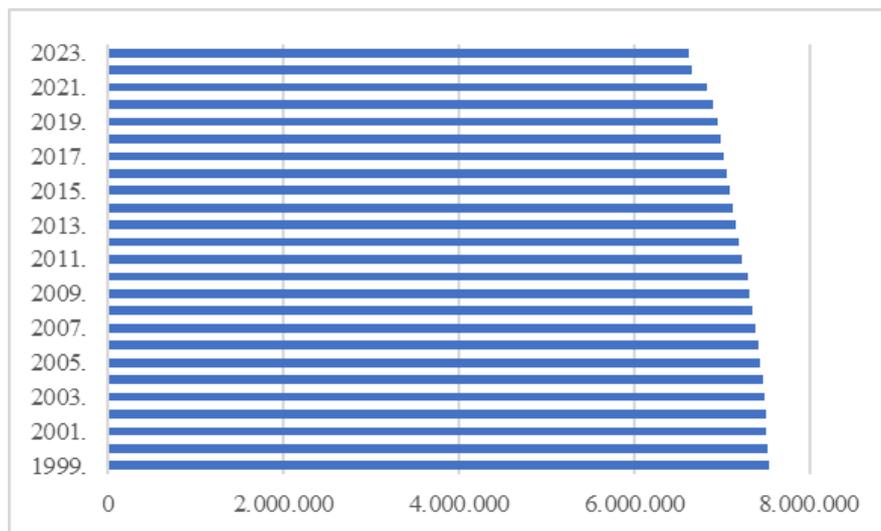
It is important to emphasize that data on the population size, obtained through comprehensive censuses over a period of more than 60 years, can be compared, but with a high degree of caution, given that the methodology for conducting the censuses has changed over this long period, as well as territorial changes in the Republic of Serbia.

Between the last two population censuses, the population of the Republic of Serbia decreased by 539,859 people. The depth of the demographic crisis affecting

the Republic of Serbia is reflected in the fact that the population recorded in the 2022. census is closest to the population recorded in 1948, the first census after the Second World War. The female population is larger than the male population, and the process of demographic aging is intensifying, positioning the Republic of Serbia among the countries with the oldest population in Europe.

The indicators of negative demographic trends in the Republic of Serbia are undeniable and are continuously monitored on an annual basis. The fact that more than half a million people are missing between two censuses should not be surprising, no matter how shocking and disturbing it may be. Between decennial censuses, the Republic of Serbia undertakes an annual estimation of its population size (Figure 2). This practice serves as a crucial mechanism for monitoring demographic shifts in the intercensal periods. Monitoring changes in population size and structure, along with estimating the population between two censuses, is a very valuable tool that should be used to proactively address or mitigate the negative effects.

Figure 2: Population estimates for the middle of the year in the Republic of Serbia from 1999. to 2023.



Source: Author's work based on data collected from the website of Statistical Office of the Republic of Serbia (<https://www.stat.gov.rs>)

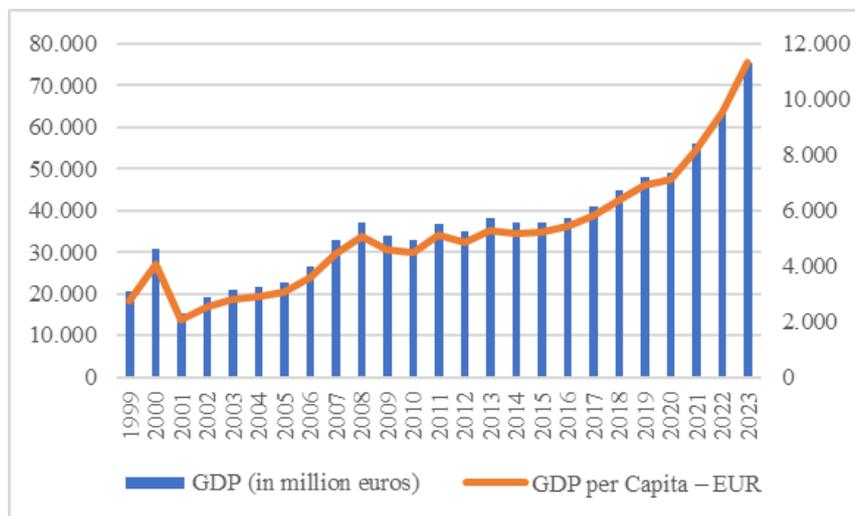
3. Trends in Gross Domestic Product (GDP)

It is evident that overall economic activity in the Republic of Serbia follows, with very little delay, all economic flows that can impact it regionally and globally. At the same time, it also demonstrates a certain degree of resilience, leading to a cumulative

GDP growth of around 18% for the period after the COVID-19 pandemic (2020-2024). All global negative issues, as well as internal problems, can be observed to some extent through the real GDP movement from 1999 to 2023, as presented in Figure 3.

The Statistical Office of the Republic of Serbia conducted a regular five-year comprehensive or benchmark revision of GDP calculations and all domains of the national accounts system, in line with the Eurostat program, i.e., the cycle of large revisions, alongside all EU member states, which will also publish revised GDP data for the period 1995-2022. This revision significantly changes the macroeconomic picture of the Republic of Serbia in the revised and future periods, with the GDP value increasing by an average of about 5%. In accordance with the revised data, the GDP data for 2023. were published, showing a notable increase in both nominal and real GDP growth, with nominal growth exceeding 8%, and real growth rising from the previous 2.5% to 3.8%. Naturally, these increases in GDP also affect other indicators measured by GDP participation (public debt, fiscal deficit, pensions' share in GDP, etc.). Over the past decade, according to assessments and opinions of the Fiscal Council of the Republic of Serbia, this is the third significant revision of GDP, resulting in substantial changes in GDP levels due to methodological improvements, which also occur, though to a lesser extent, in other European countries. The Statistical Office of the Republic of Serbia is expected to always provide reliable data, as these ultimately determine the course of public policy and public finance management.

Figure 3 – Gross Domestic Product in million EUR (left axis) and GDP per capita in EUR (right axis) for the period 1999–2023



Source: Author's work based on data collected from the website of Ministry of Finance, Republic of Serbia (<https://www.mfin.gov.rs>) and from the website of Statistical Office of the Republic of Serbia (<https://www.stat.gov.rs>)

According to Eurostat data for 2023. (<https://ec.europa.eu/eurostat>), Serbia recorded one of the highest GDP growth rates in Europe. However, it is important to emphasise that GDP per capita remains among the lowest on the continent, half the average of Central and Eastern European (CEE) countries and three times lower than the EU average. While Serbia's relatively rapid economic growth should, in principle, lead to convergence in GDP per capita towards the European average, the current pace remains insufficient to close the gap meaningfully. Rather than desirable catch-up, what we observe is persistent lagging behind.

It is also crucial not to overlook the impact of demographic changes, particularly the decline in Serbia's population, on GDP per capita. As the population decreases, GDP per capita may rise mechanically, even in conditions of stagnating overall output. In 2023, the majority of European economies entered a period of slowed economic growth. This risk has been recognised by Serbia's Fiscal Council, which warned of the possibility of "*spillover effects from the negative cycle in the surrounding region into the domestic economy.*" This could, in the coming years, result in a deceleration of Serbia's own economic growth.

Between 2012. and 2023, Serbia achieved cumulative real GDP growth of 30.97%, with an average annual growth rate of 2.58%. These figures place Republic of Serbia not at the bottom, but rather within the top third of observed European countries. This performance may, in part, be attributed to the so-called convergence effect, a process described in modern growth theories which suggests that less developed countries tend to grow faster than more developed ones, although the pace of convergence typically slows as the income gap narrows (Petrović, Gligorić Matić, 2021). Although the cumulative growth reflects some progress, Serbia has not fully exploited the "*advantages of backwardness*" or its potential for faster economic development. This is largely due to *institutional weaknesses*, such as *lack of rule of law, pervasive corruption, inefficiency in public administration, and poor quality of public services* (Petrović, Gligorić Matić, 2021).

Notably, several neighbouring countries, as well as other CEE economies, experienced significantly faster growth over the past decade, thus widening the developmental gap with Serbia. According to Petrović and Gligorić Matić, and as supported by the Fiscal Council's working paper, Serbia should, following comprehensive institutional reforms, educational improvements, and higher investment levels, achieve GDP growth rates at least 1.5 to 2 percentage points higher. In other words, the country is currently underperforming in terms of economic growth, operating below its potential by the stated margin.

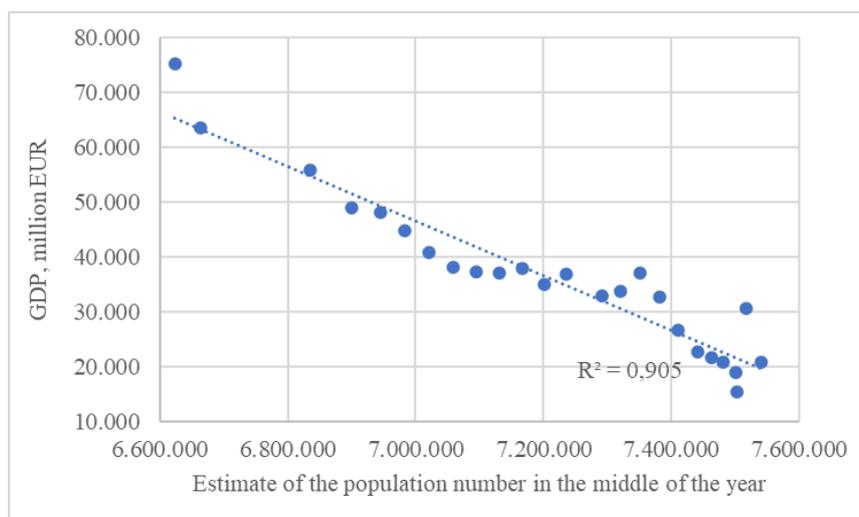
Given that many CEE countries have performed better under similar external conditions, including exposure to global shocks such as climate events, wars, and pandemics, it can be inferred that Serbia's developmental shortcomings are largely domestic in nature. These include flawed economic policies and/or institutional

deficiencies that continue to hinder more robust and sustainable economic advancement (Acemoglu et. al. 2022).

4. The Relationship Between Total Population and GDP as a Core Indicator of Macroeconomic Trends in the Republic of Serbia

We will observe the relationship between the mid-year estimated total population, as a potential explanatory variable, represented on the horizontal (x) axis, and the level of GDP at current prices, measured in millions of euros, as a potential outcome variable, represented on the vertical (y) axis. Before calculating correlation coefficients, it is essential to visually present the potential correlation through a scatter (dispersion) plot with a regression line, in order to assess the presence of linearity and homogeneity of variance (homoscedasticity), both of which are prerequisites for calculating Pearson's linear correlation coefficient.

Figure 4: Pearson Linear Correlation Coefficient between GDP in Current Prices (in Millions of Euros) and Estimated Mid-Year Population in the Republic of Serbia, 1999–2023 (Scatter Diagram and Regression Line)



Source: Author's work based on data collected from the website of Statistical Office of the Republic of Serbia (<https://www.stat.gov.rs>)

In Figure 4, we observe the presence of linearity, as the plotted data points on the scatter diagram align closely along a straight line, rather than forming a curve. Homoscedasticity is also evident, the variability of one variable is relatively consistent with the variability of the other, as suggested by the approximately

uniform spread of the data points across the diagram. The straight line that best represents the observed data is the regression line, derived from a bivariate regression analysis, where the data points deviate uniformly from the estimated linear trend. The scatter plot provides the initial and fundamental insight into the correlation between the two variables, making the nature of their relationship more readily observable.

The data points are not randomly dispersed across the plot—which would indicate an absence of correlation—but rather are systematically arranged, clearly indicating a linear (straight-line) correlation. The downward slope of the regression line, when viewed from left to right, suggests a negative correlation between total population and GDP.

The Pearson correlation coefficient (Table 1), calculated using IBM SPSS software, yields a value of -0.951 at a stricter level of significance ($p = 0.01$) over a period of 25 observed years ($N = 25$). This indicates a very strong negative correlation, with no outliers detected, i.e., no data points were observed to be substantially or significantly detached from the rest of the dataset. The negative sign suggests an inverse relationship between the two variables: as one increases, the other decreases, and vice versa. The absolute value of the Pearson coefficient reflects the strength of this relationship. From an economic and demographic perspective, the observed quarter-century period is sufficiently long to allow for the formulation of meaningful conclusions. However, from a statistical standpoint, the sample size remains relatively small, and this limitation should be considered in the interpretation of this and any future correlation analyses involving the same sample.

Table 1 – Pearson Correlation

		GDP, million EUR	Estimate of the population number in the middle of the year
GDP, million EUR	Pearson Correlation	1	$-0,951^{**}$
	Sig. (2-tailed)		$<0,001$
	N	25	25
Estimate of the population number in the middle of the year	Pearson Correlation	$-0,951^{**}$	1
	Sig. (2-tailed)	$<0,001$	
	N	25	25

** Correlation is significant at the 0,01 level (2-tailed).

Naturally, caution is always warranted when interpreting the results of such analyses. Correlation does not necessarily imply causation; rather, it primarily indicates a tendency or pattern of change between variables. When analysing the results, it is crucial to consider the possible influence of omitted, hidden, unforeseen, or so-called confounding factors, which may significantly or even decisively affect the observed relationship. In the specific case under observation, within the context of economic development, a large population, if underutilised, may diminish the overall effectiveness of economic growth. Therefore, in this instance, it may be reasonable to infer the presence of causal relationships between the analysed variables. In cases where the population size declines, the equilibrium capital per worker increases, leading to higher labour productivity. This, in turn, translates into increased output, as well as higher levels of investment and savings per worker.

The coefficient of determination (R^2) is calculated as the square of the Pearson correlation coefficient, and it indicates the proportion of variance in one variable that can be explained by the variance in the other. Expressed as a percentage (F. Yusuf et al., 2006, p. 51), in this case, R^2 is 0.905 or 90.5%, suggesting a strong explanatory relationship.

Furthermore, in the examined relationship between the mid-year estimated population and the level of GDP at current prices (in millions of euros), Spearman's rank correlation coefficient (ρ) indicates (Table 2) a very strong negative correlation of -0.964 , also significant at the stricter $p = 0.01$ level, across the observed 25-year period ($N = 25$).

Table 2 – Spearman's rank correlation coefficient (ρ)

		GDP, million EUR	Estimate of the population number in the middle of the year
GDP, million EUR	Correlation Coefficient	1,000	-0,964**
	Sig. (2-tailed)		<0,001
	N	25	25
Estimate of the population number in the middle of the year	Correlation Coefficient	-0,964**	1,000
	Sig. (2-tailed)	<0,001	
	N	25	25

** Correlation is significant at the 0,01 level (2-tailed).

This finding confirms the initial hypothesis that there is a correlation between changes in the total population and its structure, and economic development. Specifically, in the Republic of Serbia over the past 25 years, the population size and

economic development, as measured by total GDP, show a trend of inverse movement. A larger population could potentially represent a burden on the path to economic development. However, the analysis needs to be further expanded in order to draw more definitive conclusions.

4.1 Limitations of the Research

In this analysis, the correlation between the estimated absolute population size at mid-year and the total GDP at current prices, over the observed 25-year period, was calculated to determine the basic linear relationship between population size and economic activity. The use of absolute values is justified by the aim of examining the direct/basic relationship between these variables, without additional processing or data adjustments, which is not contrary to the fundamental statistical principles underlying Pearson's correlation coefficient. Although this approach does not account for relative factors such as the growth rate or inflation, it provides a useful starting point for understanding the overall/basic trends. It helps establish and confirm the dependency between economic and demographic trends within the Republic of Serbia over the relatively short 25-year period.

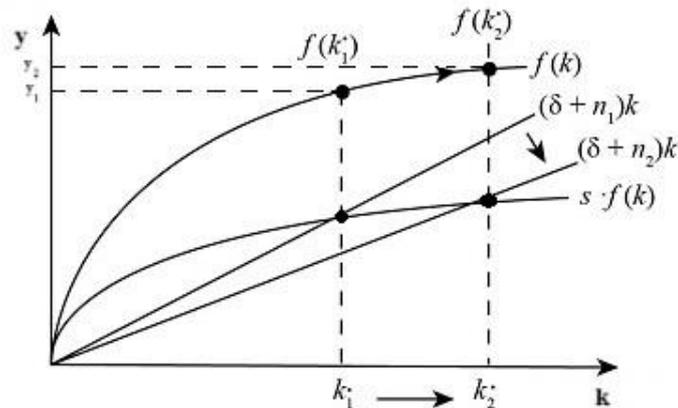
4.2 Robert M. Solow's Neoclassical Economic Growth Model in the Context of Demographic Change

The observed negative correlation between population size and GDP could indicate that a smaller population contributes to higher overall economic output. That is, despite a decline in the total population, higher economic development could still be achieved. While this might not align with traditional economic logic, it is not inconsistent with Robert M. Solow's neoclassical growth model from 1956, as the size of the workforce is not the sole or primary determinant of economic growth. Rather, factors such as capital and technology play significant roles. Thus, with a shrinking population, there is an increase in capital and output per worker, which potentially forms the basis for economic growth.

By presenting the graph of Robert M. Solow's neoclassical growth model (Figure 5) with equilibrium in the case of a population decline, *ceteris paribus*, we can confirm the initially established correlation and the positive impact of population reduction on economic development. Even today, after seventy years, this model forms the basis for a large number of macroeconomic analyses.

Robert M. Solow's growth model is typically represented graphically, with capital per worker (k) on the horizontal axis (x -axis), and output per worker (y), savings/investment per worker ($s \cdot f(k)$), and required capital per worker $(n + \delta) \cdot k$ on the vertical axis (y -axis).

Figure 5: The Effect of Population Decline on Capital and Output per Worker in Robert M. Solow's Model



Source: According to Mankiw, 2022.

The graphical interpretation of Robert M. Solow's growth model and the impact of population decline on economic development includes the following elements on the graph:

- Production function ($y = f(k)$): This is the curve that shows how much output (y) we can obtain per worker for a given level of capital per worker (k). It is usually represented as a concave curve because it exhibits diminishing returns to capital (e.g., $y = k^\alpha$, where $0 < \alpha < 1$).
- Investments ($s \cdot f(k)$): This is the line that represents the savings rate (s) multiplied by the output per worker ($f(k)$). It follows the shape of the production function but is lower because the savings rate (s) is less than 1.
- Required capital or investments to maintain equilibrium or „Break-even investment“ (Mankiw, 2022) ($(n + \delta) \cdot k$): This is the straight line that represents how much capital is needed to maintain a constant level of capital per worker, considering population growth (n) and capital depreciation (δ). If n is positive (population growth), the line is steeper; if n is negative (population decline), the line has a gentler slope.
- Equilibrium (steady state) occurs at the point where the investment curve ($s \cdot f(k)$) intersects the required capital line ($(n + \delta) \cdot k$), i.e., where $s \cdot f(k) = (n + \delta) \cdot k$. At this point, the amount of new capital (investment) exactly offsets depreciation and population changes, so capital per worker (k) remains constant. This point is called k^l - the equilibrium capital per worker or the equilibrium level of labour's technological efficiency, and the output at this point is y^l .

In Robert M. Solow's model, a decrease in population means that the population growth rate (n) is negative. This affects the straight line $((n + \delta) \cdot k)$: If $n < 0$, the slope of the straight line $((n + \delta) \cdot k)$ becomes gentler, as n is now negative, and thus $n_2 < n_1$. Consequently, the equilibrium point shifts to the right on the graph; the new equilibrium capital per worker (k_2) is higher, which means that each worker now has more capital to work with. This leads to higher output per worker (y_2), explaining higher economic growth, output, or GDP per capita, even though the total population is declining. As mentioned earlier, this also results in a higher level of savings/investment per worker, which will directly affect the speed of Serbia's convergence towards developed countries (in this case, representing the speed of transition from y_1 to y_2 , according to Romer, 2018, p. 26), while consumption can only increase up to the level of GDP growth.

5. Conclusion

Undoubtedly, economic progress in the Republic of Serbia exists within the complex conditions of depopulation. However, it is essential to raise the question of whether this progress could be higher and how it influences the improvement of the material and, more broadly, the living standard of citizens, as well as how and to what extent the redistribution of achieved economic growth is carried out in a fair and equitable manner. Furthermore, it is essential to examine how long this pattern of growth can be sustained in the broader economic context.

In the long run, a declining population can slow down overall production and economic growth for several reasons. As the population decreases, the total number of workers (L) also declines. While output per worker (y) may increase, total output (Y) may fall due to the reduced labor force. A decrease in overall production typically leads to reduced total investment. Moreover, a smaller population reduces overall demand for goods and services and may hinder innovation, which ultimately leads to stagnation or slower economic growth. Depopulation not only reduces the available workforce but also diminishes human capital and entrepreneurial potential, further weakening economic competitiveness. At the same time, a growing elderly population increases fiscal pressure on the pension and healthcare systems, threatening their long-term sustainability.

Considering all of the above, population decline can be offset only through significant technological progress (A) and increased labor productivity, that is, through higher output per worker achieved by means of innovation, improved efficiency, and advances in knowledge and education. The condition for reaching a new equilibrium in this extended model is:

$$s \cdot f(k') = (n + \delta + g) \cdot k'$$

where k' denotes capital per effective worker and g represents the rate of technological progress that improves labor productivity (according to Mankiw, 2022). This brings us back to the fundamental production function:

$$Y = F(K, AL)$$

where total output depends on capital (K) and effective labor (AL), with A representing technological advancement (Romer, 2018).

When observed in a broader socio-economic context, it can be concluded that the model partially accounts for social and political factors that may mitigate the consequences of population decline, such as encouraging immigration and introducing automation and robotics into production processes. However, the role of institutional factors in economic development remains outside the scope of this model and warrants further, separate analysis.

Addressing these issues requires comprehensive, multi-sectoral policy responses. In addition to pronatalist and migration policies, it is essential to invest in education, innovation, and technological advancement in order to enhance productivity, as emphasized by the Solow model. Structural reforms in the labor market, healthcare, and regional development are also needed to adapt to new demographic realities.

Serbia's demographic future, and with it its economic prospects, will largely depend on the ability of institutions to recognize the urgency of these challenges and implement forward-looking policies. Without decisive action, Serbia risks entering a demographic and economic spiral that will be difficult to reverse.

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EKONOMSKI RAZVOJ I DEMOGRAFSKE PROMENE: ANALIZA ODNOSA NA PRIMERU REPUBLIKE SRBIJE KROZ PRIZMU NEOKLASIČNOG MODELA RASTA

Apstrakt: Cilj ovog rada je da ispita odnos između broja stanovnika i ekonomskog razvoja u Republici Srbiji u poslednjih 25 godina. Početna hipoteza ukazuje na negativnu korelaciju između broja stanovnika i bruto domaćeg proizvoda (BDP), koja je testirana korišćenjem Pirsonovog koeficijenta korelacije na apsolutnim vrednostima. Analiza je potvrdila negativnu povezanost između demografskih i ekonomskih kretanja, pri čemu je teorijski okvir zasnovan na neoklasičnom modelu rasta Roberta Solova. Kroz grafičku interpretaciju modela, pokazano je da pad broja stanovnika, ceteris paribus, može dovesti do većeg kapitala i proizvodnje po radniku. Međutim, u dugoročnom periodu, opadanje broja stanovnika ograničava rast ukupne proizvodnje, smanjuje investicije i potražnju, što može dovesti do ekonomske stagnacije. Originalni doprinos ovog rada sastoji se u primeni klasičnog ekonomskog modela na savremene ekonomske prilike Republike Srbije, dok je praktičan značaj rada u naglašavanju važnosti tehnološkog napretka, institucija i obrazovanja kao korektivnih mera u funkciji ublažavanja negativnih efekata pada broja stanovnika.

Ključne reči: ekonomski razvoj, pad broja stanovnika, BDP, Solovljev model rasta, produktivnost rada, kapital po radniku, demografski trendovi, tehnološki napredak, Republika Srbija, makroekonomska analiza.

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