

ECONOMIC IMPLICATIONS OF SERBIA'S DEMOGRAPHIC TRANSITION

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Abstract: *A significant shift occurs in the economic trajectory of nations as they transition from a state characterized by limited prosperity, high child mortality rates, and high fertility to a phase marked by increased prosperity, reduced child mortality, and lower fertility levels. Following a review of the economic literature on the connection between demographics and economics, this paper aims to explain the correlation between Serbia's demographic patterns and economic development since 2000. It demonstrates that this transition is best understood through a developmental cycle involving child mortality rates, fertility rates, and nominal GDP. Fertility rates tend to rise alongside GDP growth, while the child mortality rate is closely linked to GDP levels. However, the correlations between fertility rates and child mortality are comparatively weaker. The paper showcases how this research can be utilized to assess policy measures and establish more precise, country-specific development targets.*

Key words: *demographic transition, GDP, fertility, child mortality*

JEL classification: *A120, J1*

1. INTRODUCTION

After a two-year global pandemic that fundamentally altered both societal and individual life, the world is entering a period of new challenges for sustainable development in a post-pandemic era. In addition to short-term and intense shocks, such as the pandemic, our society is also facing subtle changes that are equally challenging, if not more so, to address: from environmental and climate challenges, through digitalization and the decline of trust in institutions, to demographic changes. These represent a less dramatic but equally complex test

of resilience and adaptability, upon which future sustainable development will depend.

Unlike a few decades ago, when the attention of demographers and policymakers was focused on population growth and the threats this process posed to sustainable development and well-being, today the situation is somewhat different. In a significant number of countries, including most Eastern European countries and Serbia, the population is declining. Population decline has occurred in earlier historical periods as well, but due to wars and diseases or circumstances fundamentally beyond the control of ordinary people. This period in history is different because the population is declining due to individual decisions of people, decisions not to have children or to have fewer children, and to migrate to other regions and countries (Lutz and Gailey, 2020).

Serbia has been grappling with a decline in population numbers over the past three decades, prompting increasing attention from the public and government stakeholders on demographic dynamics. Various support measures for parenthood have been in place for some time, ranging from extended maternity leave and childcare absence to a network of public and private preschool institutions (Stanojevic et al, 2022). At the beginning of the 21st century, a one-time parental allowance for second, third, and fourth children was introduced. This program has since been revised to provide parental allowances for up to the fourth child and has been expanded with housing policies aimed at facilitating home purchases for young parents. Although long-standing and complex, these policies have largely been geared toward encouraging childbirth.

Strategies to address declining fertility rates were adopted in 2008 and 2018. At the beginning of the millennium, demographic issues were the

responsibility of the Ministry of Labor. As demographic issues gained prominence, a minister without a portfolio responsible for demographic issues was appointed in 2016. In 2020, the Ministry for Family Welfare and Demography was established (Ministarstvo za brigu o porodici i demografiju Republike Srbije, 2024).

Therefore, the declining birth rate has brought demographic issues to the forefront of public discourse. To date, state interventions in demographic issues have largely been directed toward the private domain, attempting to influence decisions regarding childbirth. The primary focus on demographic outcomes has indeed been in the private domain, where the scope for intervention is simultaneously limited. The state can also intervene in the broader space of public policies and social relations, such as urban planning, labor market, public sector, education, etc. The effects of state interventions will be much greater in these areas and will show the economic implications of the present demographic transition. This shift in focus is precisely what has been looked at in this paper; it demonstrates how demographic changes are a developmental issue requiring a complex and comprehensive societal response.

2. DEMOGRAPHIC TRANSITION IN SERBIA

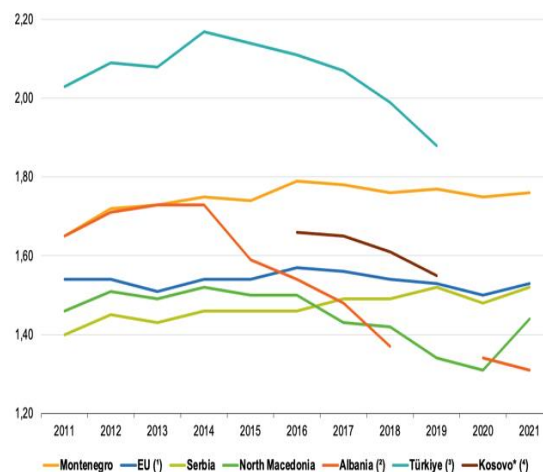
The demographic transition in Serbia is characterized by significant changes in population dynamics, fertility rates, mortality rates, child mortality rates, and migration patterns over the past few decades. On one hand, in addition to all the above-mentioned, Serbia's population is undergoing a rapid aging process, which presents significant challenges and implications for the country's socio-economic landscape. The median age in Serbia has been steadily increasing, reflecting an older population structure. This demographic shift is primarily driven by declining fertility rates and increased life expectancy, resulting in a growing proportion of elderly people relative to the working-age population. On the other hand, internal migration within Serbia has also influenced population changes, with a trend of rural-to-urban migration and movement from smaller to larger cities. The regions around Belgrade, Novi Sad, and other urban centers have seen population growth, while many rural and less developed regions have experienced depopulation. This internal migration pattern has led to regional disparities in population distribution, economic development, and access to services.

For the purpose of the research in this paper, we will specifically focus on fertility rates and child

mortality rates, as one of the most important aspects when it comes to economic implications, as discussed in the literature (Sedano, 2008; Lee and Mason, 2010; Ranganathan et al., 2015; Gotmark and Andersson, 2020).

Serbia, like many other countries in Eastern Europe, has been experiencing a decline in fertility rates over the past few decades (Zgirski, 2020), although with a slight increase in the last couple of years (as shown in Figure 1 and Table 1). The total fertility rate (TFR), which represents the average number of children a woman is expected to have during her lifetime, according to the latest available data, for Serbia is below the replacement level of 2.1 children per woman, standing at approximately 1.63 children per woman, in 2022 (Statistical Office of Serbia, 2023).

Figure 1. Fertility rates 2011-2021



Source: Eurostat, 2022.

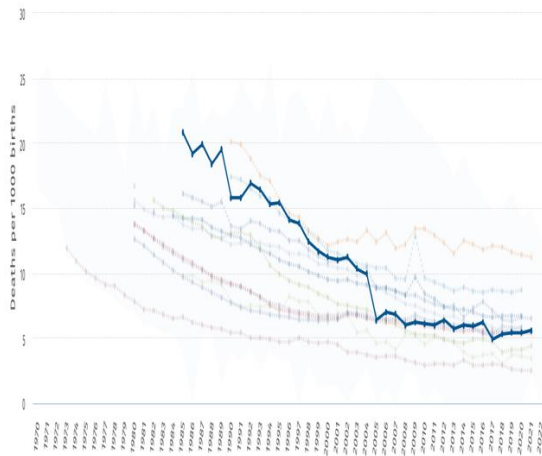
Developed areas around Belgrade and Novi Sad have higher fertility rates than Eastern and Southeastern Serbia, although the average age at first childbirth is above the national average (Nikitović et al., 2019), which should also be noted.

This slight increase in fertility rates in the last few years can be attributed to a combination of economic, social, cultural, and policy factors shaping individuals' decisions about family formation. One significant factor contributing to the uptick in fertility rates is improvements in economic stability seen through the rise in GDP (Table 1). Greater economic security has created a more favorable environment for couples to consider expanding their families. Government policies and initiatives such as family-friendly workplace policies, parental leave benefits,

childcare subsidies, and tax incentives for families provide tangible support to couples contemplating parenthood, thereby contributing to the increase in fertility rates. Shifts towards acceptance of working mothers, and changing perceptions of parenthood have contributed to a more positive outlook on family life, encouraging couples to consider having children, while strong social ties and support from extended family members create a supportive environment for raising children, making parenthood a more appealing prospect for many couples. In addition, delayed childbearing, often driven by educational and career pursuits, may also contribute to the increase in fertility rates as individuals reach their late twenties or early thirties and feel more ready to start a family. Last but not least, access to fertility treatments (Republički fond za zdravstveno osiguranje Republike Srbije, 2023) enables individuals to plan their families according to their preferences and circumstances.

Child mortality rates, which refer to the number of fetal deaths per 1,000 total births, are another critical aspect of reproductive health that warrants attention in Serbia. According to recent data, Serbia has a child mortality rate of approximately 5 per 1,000 total births, which is higher than the rates reported in many Western European countries (Statistical Office of Serbia, 2023).

Figure 2. Child mortality rate in Serbia 1985-2022



Source: World Health Organization, 2022.

Several factors can contribute to the high stillbirth rates in Serbia, including inadequate prenatal care, limited access to quality healthcare services in rural areas, and maternal health issues such as hypertension and diabetes. Additionally, socio-economic disparities and insufficient awareness about the importance of prenatal health and regular health check-ups among expectant

mothers especially the ones living in rural areas contribute to the high stillbirth rates. Efforts to address the high stillbirth rates in Serbia include improving access to quality prenatal care, enhancing maternal health education and awareness, and implementing policies to reduce socioeconomic disparities in healthcare access. Collaborative efforts involving healthcare providers, policymakers, and community organizations are essential to effectively reduce stillbirth rates and improve reproductive health outcomes in Serbia.

Looking at Figures 1 and 2, it can be concluded that fertility rates are slowly increasing, while child mortality rates have significantly dropped from 1985 until the 2000s. After that, they remain around 5 per 1,000 total births.

But what about the economic implications of this demographic transition? Does this transition have a connection with the economic situation in Serbia? To answer these questions, the nominal Gross domestic product (hereafter GDP) will be used as a point of economic growth of Serbia. Serbia's GDP is a key indicator of the country's economic performance and development. Over the past few years, Serbia has seen relatively modest GDP growth rates (see Table 1). The country's economy is primarily driven by industry, and agriculture, with the services sector contributing the largest share of the GDP. To better understand the interconnection between demographic transition shown through fertility rates and the child mortality rate, and economic implications showcased as GDP, this paper will refer to the correlation analysis in point 3.

3. OBJECTIVE AND METHOD OF RESEARCH

The research aims to assess the correlation between the GDP of Serbia, fertility rates, and child mortality rate. The selection of fertility rates and child mortality rates as the focal points of this research is grounded in their recognized significance within the field, as highlighted in the existing literature. Drawing from scholarly sources such as Sedano (2008), Lee and Mason (2010), Ranganathan et al. (2015), and Gotmark and Andersson (2020), these variables have emerged as critical indicators with profound economic implications. By delving into these aspects, this research aims to contribute to understanding the interplay between demographic trends and economic dynamics. Fertility rates and child mortality rates are fundamental components of population dynamics and have far-reaching implications for social welfare, healthcare systems, labor markets, and overall economic

development. As such, they serve as key metrics for assessing the socio-economic well-being of nations and are often used as indicators of a country's demographic transition and developmental progress. By focusing on these variables, this research endeavors to shed light on the underlying mechanisms driving population trends, inform policy interventions, and facilitate evidence-based decision-making in the realm of public health, social policy, and economic development. Therefore, the selection of fertility rates and child mortality rates as the basis for this research and methodology is informed by their pivotal role in shaping economic outcomes and their significance within the broader scholarly discourse.

This paper is founded on data publicly available at the Statistical Office of Serbia (2023). The data has been meticulously collected from 2000, until 2022, when the last population census took place in the country.

Fertility rates show the total fertility rates (TFR_t), i.e. the total number of live births per woman, and were calculated for the age interval from 15 to 49 years per five years, according to the following formula:

$$TFR_t = \frac{5 * \sum f_{t, x1-x2}}{1000}$$

where $f_{t, x1-x2}$ denotes the number of live births born to mothers at age $x1 - x2$.

Child mortality rate (n_{mr}^t) is defined as the number of stillbirths per 1000 live births in the observation year, and is calculated according to the following formula:

$$n_{mr}^t = \frac{N_{mr}^t}{N_t} * 1000$$

Nominal GDP is shown through current prices. Nominal GDP has been chosen as it provides a comprehensive measure and makes it particularly useful for macro-level analysis of economic growth, output, and overall economic activity. The mentioned GDP allows researchers to assess the size and strength of an economy, compare economic performance across different periods, and evaluate trends in economic activity. This makes nominal GDP valuable for policy analysis, and assessing the overall health and performance of an economy (Investopedia, 2024). The publicly available data is shown in Table 1.

Table 1. GDP, Fertility rates, and Child mortality rate in Serbia (2000-2022)

Year	GDP*	Fertility rates	Child mortality rate
2000	434319	1.458	5.02
2010	3250581	1.405	5.68
2018	5072932	1.484	5.39
2019	5421851	1.518	5.56
2020	5504431	1.480	5.77
2021	6271988	1.520	5.47
2022	7097629	1.630	5.37

Source: Statistical Office of Serbia (2023)

* In millions of Serbian dinars (RSD)

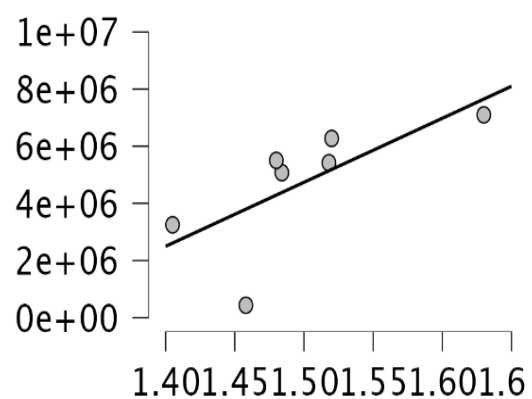
4. RESEARCH RESULTS

To analyze the relationship between GDP, fertility rates, and child mortality rate, correlation was used. The Pearson correlation coefficient denoted as r , measures the intensity of a linear association between two variables. It aims to determine the best-fit line through the data points of the two variables. The resulting coefficient, r , shows how much the data points diverge from this ideal line.

The Pearson correlation coefficient, r , ranges between +1 and -1. A value of 0 signifies no correlation between the variables. A positive r -value indicates a direct relationship, meaning an increase in one variable corresponds with an increase in the other. On the other hand, a negative r -value suggests an inverse relationship, where an increase in one variable correlates with a decrease in the other (Laerd Statistics, 2020).

Figures 3, 4 and 5 show correlation results.

Figure 3. GDP- Fertility rates correlation



Source: Author

Figure 3 displays the relationship between GDP and fertility rates. The positive correlation observed indicates that as GDP increases, fertility rates also tend to rise. This suggests that economic prosperity, as reflected by GDP, influences family

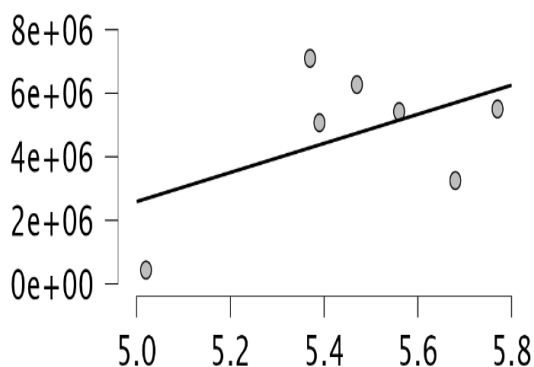
planning decisions and fertility behavior within the population.

Several mechanisms may underline the observed relationship between GDP and fertility rates. Economic prosperity often leads to improved access to education and social services, which can enhance individuals' well-being and confidence in raising children. Higher GDP may also be associated with greater financial stability, enabling families to afford the costs associated with childbearing and child-rearing, such as healthcare expenses, education, and childcare. Moreover, rising GDP may be accompanied by shifts in attitudes towards childbearing, and expectations regarding gender roles, which can impact fertility trends. Additionally, economic growth may contribute to changes in the age of marriage, family structures, and aspirations for parenthood, further shaping fertility patterns.

The Pearson correlation coefficient of 0.699 indicates a strong positive correlation between GDP and fertility rates. This means that approximately 69.9% of the variability in fertility rates can be explained by changes in GDP.

A correlation coefficient of 0.699 falls within the range of 0.5 to 1, indicating a large strength of association between GDP and fertility rates. Such a robust correlation suggests that economic factors play a significant role in shaping fertility patterns in Serbia.

Figure 4. GDP- Child mortality rates correlation



Source: Author

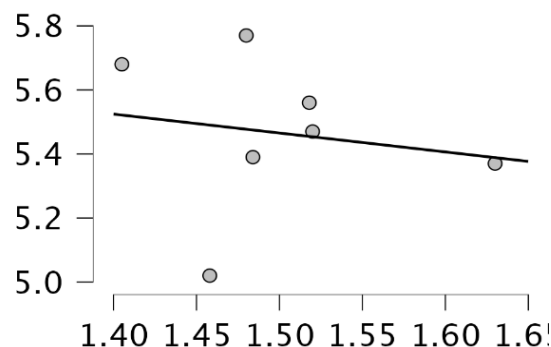
Figure 4 presents the relationship between GDP and child mortality rates. The positive correlation observed indicates that as GDP increases, child mortality rates also tend to rise.

This suggests that economic growth can exacerbate disparities in access to healthcare services. While overall GDP may increase, marginalized or impoverished people living in Serbia may still lack access to essential healthcare services, including prenatal care, vaccinations, and treatment for childhood illnesses. This can result in higher child

mortality rates within these disadvantaged communities despite overall economic growth, which is especially significant for people living outside of Serbia's major cities and towns (Belgrade, Novi Sad, Kragujevac, Niš, etc.). Economic growth does not necessarily address underlying social determinants of health, such as poverty, inequality, and social exclusion. Persistent socioeconomic disparities, especially in rural areas, can limit access to education, employment opportunities, safe housing, and social support networks, all of which are important determinants of prenatal health and well-being. Without addressing these structural barriers, economic growth alone may not translate into improved child health outcomes, i.e. reduced child mortality rates.

The Pearson correlation coefficient of 0.504 indicates a positive correlation between the two variables. This means that approximately 50.4% of the variability in child mortality rates can be explained by changes in GDP. A correlation coefficient of 0.504 falls within the range of 0.5 to 1, indicating a large strength of association between GDP and child mortality rates.

Figure 5. Fertility rates- Child mortality rate correlation



Source: Author

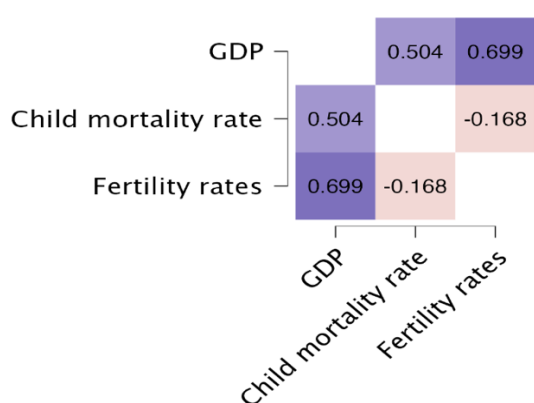
The final correlation figure (Figure 5) presents intriguing insights into the relationship between fertility rates and child mortality rates, revealing a notable negative correlation between these two critical demographic indicators. The observed negative correlation suggests that as fertility rates increase, child mortality rates tend to decrease, underscoring the complex dynamics between population growth and child health outcomes.

A number of elements may contribute to the observed negative correlation between fertility rates and child mortality rates. Higher fertility rates may lead to changes in population structure, including a larger proportion of younger individuals, which can influence investment in maternal and child health, healthcare infrastructure, and social support systems. Additionally, the rise in fertility rates may be

associated with improvements in maternal and child healthcare, and family planning services, which can contribute to lower child mortality rates.

The Pearson correlation coefficient of -0.168 , indicates a modest strength of association between fertility rates and child mortality rates. This implies that approximately 16.8% of the variability in child mortality rates can be explained by changes in fertility rates. While the correlation coefficient falls within the range of 0.1 to 0.3, representing a small strength of association, it nonetheless highlights the importance of considering demographic factors in understanding child health outcomes seen through child mortality rates.

Figure 6. Pearson's r heatmap



Source: Author

Pearson's r heatmap illustratively points out the correlation coefficients between GDP, fertility rates, and the child mortality rate. As shown in Figures 3,4, and 5, GDP correlates positively with fertility rates and the child mortality rate ($r=0.699$ and $r=0.504$, respectively), while fertility rates and the child mortality rate correlate negatively and with a small strength of association ($r=-0.168$).

CONCLUSION

Serbia's demographic transition is progressing rapidly, with significant shifts in age distribution towards older cohorts. The country has been experiencing declining fertility rates for decades, and child mortality rates have been stagnant for 20 years instead of decreasing, which is contributing to negative rates of population growth. This decline in fertility rates can be attributed to various factors, including economic challenges, migration, and societal changes.

Migration patterns in Serbia, particularly the emigration of young and skilled individuals, are affecting the country's fertility rates. A significant number of young Serbians are leaving the country in search of better opportunities abroad, leading to

a decrease in the working-age population and contributing to the overall decline in fertility rates. This migration trend, if not addressed, could exacerbate the demographic aging process and its economic implications.

Serbia's demographic projections indicate that before facing a significant increase in the elderly population, the country will see a declining share of the working-age cohort. This demographic pattern provides Serbia with a limited window of opportunity in the next two decades to shape a positive demographic transition. To maximize this potential, Serbia needs to focus on further improving education and training, labor market reforms, and infrastructure development to enhance the overall economic welfare of its citizens.

Thankfully, Serbia has introduced several reforms in recent times to address the economic implications of decades of demographic aging and declining fertility rates, which shows some results as seen in the slight increase in fertility rates in the last couple of years. These reforms include measures to improve education and training, make the creation of formal jobs more affordable, and enhance infrastructure, particularly in less developed regions. However, more comprehensive and targeted policies are needed to fully capitalize on the demographic transition and stimulate economic growth.

As for scenarios for economic implications of demographic transition, two can be plausible:

Scenario 1: Stagnant Economic Progress

If Serbia fails to implement further reforms to turn around the low fertility rates and suppress child mortality rates, the economic outlook is not promising. A larger elderly population with insufficient income to afford goods and services could lead to weak economic development and lower demand for sophisticated goods and services. In comparison, the younger population will be less prominent and mostly migrate to the West.

Scenario 2: Economic Reforms and Growth

Under this scenario, Serbia implements further reforms to make its economy more competitive and create a significant number of jobs. A larger, better-educated, and more productive workforce finds employment opportunities, raising living standards and stimulating demand for goods and services. Young people stay in the country which raises the fertility rates. Due to economic progress, people get better medical attention which leads to a decrease in child mortality rates.

For the European Union, particularly neighboring countries and potential trading partners like Serbia, a stronger Serbian economy capable of capitalizing on the demographic transition would result in higher exports of goods and services and smaller migratory flows. Policymakers should focus on channeling policies and laws in terms of reducing the “brain drain” by creating better potential for young people to stay in the country. Fertility rates as a result of bigger income will increase respectively, as the paper shows there is a correlation between GDP, fertility, and child mortality rates.

In conclusion, Serbia's demographic transition, characterized by declining fertility rates, and child mortality rates which are still not decreasing, has significant economic implications that are interconnected with the country's economic situation, labor market, healthcare system, and overall socio-economic development. Proactive and integrated policy responses are essential to address these challenges, capitalize on the opportunities presented by demographic aging, and ensure sustainable economic development, prosperity, and well-being for all citizens.

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