National Human Development Report - Serbia 2022

HUMAN DEVELOPMENT IN RESPONSE TO DEMOGRAPHIC CHANGE

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Foreword

The Republic of Serbia has one of the most rapidly declining populations in the world. In the past two decades, the number of people has dropped by a million, reaching 6.87 M today. This trend is shaped by years of emigration and declining fertility rates. At the same time, the population in the Republic of Serbia is aging and urbanising. There is an acceleration of the concentration of people and resources in fewer urban centres while many regions are left without sufficient opportunities for people to work and prosper. Together, these fundamental quantitative and qualitative changes create new realities across the country, and future development may well be conditioned by how society adapts and responds to demographic change.

The Government of the Republic of Serbia has recognised demographic change as a priority and boldly initiated new conversations on this topic, as well as making concrete investments in several critical areas - such as infrastructure, digital transformation, and education. This National Human Development Report aims to shed new light on a highly complex set of challenges and opportunities related to population change and to offer an enlarged landscape for policy action.

Traditionally, responding to demographic change has been framed around numbers: can population decline be reversed, and how? But change is not only about numbers - and it is not entirely negative. With people becoming a scarce resource, the Republic of Serbia can redefine what it takes to be a thriving and productive society. The country can invest in its human capital and create opportunities for every individual to contribute to the fullest - whoever and wherever they may be. Challenging traditional ideas on age, family dynamics, and migration, a new approach for adapting to demographic change should be closely aligned to Serbia's innovation and digital agendas. The society of the future will be smaller, more urban, older, and wealthier - and it can reap the benefits of the digital revolution and engage the country's globally-based human capital to reinvent work, industry and learning. The fifth National Human Development Report for Serbia (NHDR), Human Development in Response to Demographic Change, sets the challenge of decreasing overall population in its development context, for the first time outlining a broad range of policies that can serve to address it. It introduces new and sometimes provocative ideas, such as busting myths around increasing long-term emigration, proposing to prioritise mid-sized towns over rural areas, or initiating discussions around links between population change and environmental protection. It positions social inclusion as an essential component in addressing population decline.

UNDP and UNFPA are committed to continued partnership with the Republic of Serbia on this issue. This report is part of a broader investment into understanding and addressing a seemingly impossible, wicked problem. It sets out an ambitious path for transformative change. In developing this path, we discovered a broad and vibrant ecosystem of actors in Government, civil society, academia and private sector, along with a wealth of innovative actions that demonstrate Serbia's capacity to develop in a more sustainable and inclusive way. The new outlook proposed in this report is a result of these partnerships, with hope that findings and recommendations will be relevant for many other countries in the world, which are already taking an interest in learning from actions taken in the Republic of Serbia. The demographic transition will shape the global future, along with the digital and green transformations.

We would like to thank everyone who took part in this journey, and we hope that this report will inspire many productive discussions in the future.

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Human Development Policies for New Population Dynamics

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1 Population Dynamics and Human Development

After a two-year pandemic that has radically changed social, as well as individual life, we are gradually entering a period of new challenges to sustainable development in the post-pandemic world. The pandemic brought to light the issues that our economically progressive and technologically advanced civilisation used to ignore, from the biological vulnerability of individuals and societies, to the fragility of the acquired political and civil liberties. At the same time, it rediscovered how strong the ability to adapt is, for both people and institutions, as well as the economy, politics and entire societies.

In addition to relatively short-lived and strong shocks, such as the pandemic, our societies are facing quiet changes that are equally difficult, if not more difficult to respond to: from environmental and climate challenges, through digitalisation and erosion of trust in institutions, to demographic changes. They represent a less dramatic, but equally complex test of resilience and adaptability, on which future sustainable development will depend. This *Human Development Report* is dedicated to the challenges that one of these changes, shrinking and ageing population, poses to our societies, as well as the aspirations to establish balanced demographic development.

Unlike the situation we had a few decades ago, when the attention of demographers and politicians was focused on population growth and the threats that the process posed to sustainable development, liberties and prosperity, today the situation is somewhat different. In a considerable number of countries, including East European countries and Serbia, the population is shrinking. Population declines have occurred in earlier historical periods, but as a consequence of conflicts and diseases or circumstances that were essentially beyond the control of ordinary people. This period in history is different, because the number of inhabitants is shrinking due to people's individual decisions, decisions not to give birth or to give birth less and to move to other regions and other countries (Lutz and Gailey, 2020).

From the human development perspective, the type of challenges posed by new demographic conditions is in principle no different than the challenges of a demographic explosion. The key questions we are facing are: how will demographic change affect the development of societies and how will it affect people's ability to develop their liberties and make their own choices in life?

Although the links between demographic change and development are ambiguous, experience and research to date show that population change affects development and vice versa (Ahlburg and Cassen, 2008). Population growth has been studied much more than decline and its unfavourable impact on poverty, access to public services and freedom of choice for women and girls has been documented (UN, 2021). However, the scarce experience of a smaller number of declining countries suggests that these demographic changes may also have negative effects in terms of access to services, labour and the economy, wellbeing and inequalities. Population decline puts pressures on social security systems, as fewer workers fund pensions, health care and social security systems. As population decline goes hand in hand with ageing, these challenges become greater, because the older population has more pensioners and has an increased need for health care and social protection. Population decline and ageing can negatively affect economic development, productivity growth and technological progress and investment in development and innovation. These processes often go hand in hand with regional inequalities, the growth of metropolitan areas and rural and small town decline. Depopulation[1] can jeopardise the basic functions of communities due to a shortage of labour force, professionals or students, and affect reduced investment or the shutdown and relocation of businesses and public institutions. When communities decline in this way, the overall wellbeing of households and individuals declines and their future becomes uncertain (Coleman and Rowthorn, 2011; van Dalen and Henkens, 2011; Beunen, Meijer and de Vries, 2020; Hospers and Reverda, 2014; Reher, 2007). In view of all these processes, this *Human Development Report* views population decline not only as a demographic and social change, but also as a challenge to development. It seeks to initiate a comprehensive new framework for responding to demographic change in a way that unlocks new development opportunities created by the demographic transition.

Human development is the process of enlarging the opportunities and choices that people face. The most critical of these choices are to live a long and healthy life, to be educated and to have access to the resources we need for a decent standard of living, but also political freedoms, human rights and personal self-esteem (UNDP, 1990: 1). Our freedoms and ability to choose depend on a number of social factors, from politics and institutions, to culture and values. They depend on economic growth, which is not only an end in itself, but also a means to achieve rich and fulfilling lives and exercising freedoms, as well as on social and economic living conditions, including access to education and health care and political and civil rights (Sen, 2000: 3; Sen, 2003). In other words, human development depends on the characteristics of societies, social and political institutions and economic orders which are based on people and which depend on people.

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[1] Throughout the report, the term "depopulation" is used as shorthand to denote the broader demographic transition of society. It primarily refers to a reduction in population size, but often also encompasses qualitative changes such as aging, urbanisation, and regional demographic imbalances.

2 Depopulation as a Social and Political Issue

Serbia has been facing shrinking population for three decades, and, during that period, demographic dynamics has drawn increasing attention of the public and governments. Various measures to support parenting have been in force for some time, from relatively long maternity leave and childcare leave to a network of public and private preschool institutions, and a one-off parental benefit for the second, the third and the fourth child was introduced in early 21st century. This programme was later amended, so that today there is a generous parental benefit for children up to the fourth one in order of birth, which has been expanded by housing policies that make it easier for young parents to buy an apartment or house.

> **Institutional and political response to population decline**
>
> Issues of declining fertility were addressed by the Birth Incentivising Strategies adopted in 2008 and 2018. In the early 2000s, demographic issues were within the remit of the Ministry of Labour. As demographic issues gained importance, first in 2016 a minister without portfolio in charge of demographic issues was appointed, and, in 2020, the Ministry of Family Care and Demography was introduced.

Although lengthy and complex, these policies have been largely aimed at encouraging births. In the last decade, in addition to pro-natal measures, the attention of the public has been occupied by migration management issues. The growth of occasional and permanent migrations to new and old European Union member states has contributed to that, which has even led to a shortage of workers in certain areas. The Strategy on Economic Migration adopted in 2020 tried to offer an answer to some of the challenges. But, since the problem is relatively new and very complex, and its roots go beyond the borders of one country, the effects of these strategic documents have yet to be seen.

So, in addition to the shortage of babies, now the lack of skilled labour has drawn the public's attention to demographic issues. However, a number of nuances to which this *Human Development Report* draws attention have for now remained beyond the remit of the measures. Among them are the following questions: is fertility affected by factors other than direct material benefits (for example, labour market, public services, tax and urban and regional development policies, etc.); can depopulation be delayed by prolonging life expectancy and if so, what is the role of health policies, i.e. what should be done so that people could live longer, bearing in mind that this is easier to achieve than to raise the birth rate; what are the regional demographic inequalities and what policies can delay them, etc. In other words, the government has so far directed interventions in demographic issues at the private domain, trying to influence decisions about whether or not to give birth and whether or not to migrate. The private domain truly is key to demographic outcomes, but this is also the space of very narrow possibility to intervene. For greater impact, the government could intervene in the much wider space of public policies and social relations, such as issues of urban planning, labour market, education, etc. These spaces hold much greater potential for impact. It is exactly this step that the *Human Development Report* makes, showing how demographic change is a development issue that requires a complex and comprehensive response from society.

Each of the chapters of this *Human Development Report* offers analyses and possible solutions in line with this general perspective. In the paragraphs that follow, this large number of findings and ideas are summarised as the ten basic messages of the *Human Development Report*. They help shape this complex and comprehensive narrative of demographic change, the factors that shape it, and possible courses of action, so that it can become a new paradigm of public policies.

3 Message One: Population Shrinking Is Inevitable

> The population of Serbia will continue to shrink in the future. Raising the fertility rate cannot compensate for losses. The proximity of the EU labour market and its needs for new labour will continue to be an incentive for out-migration. From the perspective of population size, pro-natalist measures will not be sufficient. If it wants to mitigate population decline, Serbia will have to develop new migration management policies, including immigration policies.

A large number of European countries, including Serbia, are facing population decline (UN, 2019: 15). This process has been going on in Serbia for three decades. The Statistical Office of the Republic Serbia estimates that at the end of 2020, there were 6,871,547 inhabitants in Serbia without Kosovo[2]. That is 315 thousand people fewer than in 2011, 626 thousand people fewer than in 2002 and as many as 965 thousand fewer than in 1991.

Today, Serbia has the same number of inhabitants as half a century ago, but the population is much older, so the future decline is quite certain. The projections show that the population of Serbia will decrease by 1.4 million or one fifth by the middle of the century (Nikitović, 2022). If that scenario comes true, Serbia will remain among the countries in Europe and the world that are losing their population the fastest.

Population decline will affect the whole country, but it will not affect all parts of the country equally. Belgrade will lose 3.8% of its population, Vojvodina 19.4%, Šumadija and Western Serbia 28.5%, Southern and Eastern Serbia 33.4%, and Southeastern Serbia over 40%. Population will shrink less in those parts of Serbia that can attract internal migrants (Belgrade, Novi Sad, Niš and Subotica) and in the Raška district, which has a younger population and higher fertility rates.

Balanced regional development can balance migration and thus slow down depopulation in certain parts of the country. If migration is not balanced, the growth in fertility will not help, because it will benefit large centres that attract population. Moreover, pro-natal policies that stimulate long-term births may have effects at the national level, but without the balancing of migration the cost will be high: further regional inequalities, uneven demographic development of rural areas, shrinking and ageing labour force in mountainous and border areas, especially in their rural communities and marked depopulation and ageing of most areas in Serbia (Nikitović, 2022).

At the national level, migration management is one of the key available strategies. Obstacles to immigration could be economic, because Serbia is not yet a sufficiently attractive destination country, but also cultural and political, due to potential resistance to the arrival of migrants, especially those who differ in culture from our population (Nikitović, 2019: 221).

4 Message Two: There Are Fewer People and They Are Becoming a Valuable Resource

As the population of a country is shrinking, each inhabitant becomes a more valuable resource for its future development. That is why policies that integrate people into society, from integration in various fields, such as education, through health and the labour market, to regional development, become a prerequisite for balanced demographic and general development of society and the state.

Leading local and international demographers agree that it is unlikely that Serbia's demographic decline will stop, and that adaptation to depopulation is inevitable (Coleman & Rowthorn, 2013: 83; Nikitović, 2018). In this *Human Development Report*, we assume that no particular population size, specific growth rate, specific fertility rate, or specific age structure is considered an end in itself. Instead of striving to achieve some quantitative goals, population policies should manage our public human resources efficiently and flexibly to achieve the highest long-term well-being of present and future generations (Lutz & Gailey, 2020: 31).

This approach marks the transition from *quantity* to *quality*. The public discourse and political response to demographic change was focused on the question of number: number of inhabitants, number of children and number of migrants. This *Human Development Report* advocates for an approach designated as quantity and quality. Future population policies will not be able to give up quantity, but they will not be able to disregard quality either. At some point, quantity turns into quality: if there are fewer of us, each inhabitant becomes a more valuable resource (Buchanan & Rotkirch, eds. 2013). That is why demographers recommend that population policies be focused on strengthening human resources (Lutz, 2014; Nikitović, 2019), and one of the key mechanisms is investing in education. Investing in education is important because it brings a number of benefits: educated people will be healthier, they will live longer and be the basis of economic growth, while education has a beneficial effect on democracy and civil liberties, but also on our ability to adapt to climate change (Lutz, 2014: 640; Nussbaum, 2006: 385-286). Population policies will then be seen as "managing public human resources" (Lutz and Gailey, 2020).

Although higher education is often associated with lower fertility rates, it is significant because it improves society's potential to develop. For this reason, the state cannot give up education development policies, but must develop nuanced policies that will support the demographic development of all sections of society, including the

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[2] References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

highly educated. In addition to that, the issue of education cannot be separated from health care, labour market, regional and urban development and other dimensions of social and economic life, which reflect the unwillingness of our society to "use" all available human resources. That is why in this *Human Development Report* we show that we need new economic, educational, health and other policies that will be sensitive to demographic considerations.

In order to become responsive to population issues, sectoral policies must become *inclusive* and *cohesive.* There is still a large "pool" of non-integrated people, such as youth, lower socio-economic classes or residents of underdeveloped regions. Serbia will feel the problem of population shortage less if it is able to integrate those children, adults and older persons dropping out of the education system and the (formal) labour market now, if it is able to preserve the health of those who are less likely to live long and healthy lives and activate its ageing population, if it manages to ensure more even regional development and offer an economic and social perspective to all its citizens, as it has been offered to the more privileged urban middle and upper classes. That is why population-responsive policies must primarily be *inclusive development* policies.

5 Message Three: Parts of Serbia Are in a Vicious Circle of Depopulation and Slow Growth

Depopulation is essentially a regional issue because it particularly affects certain parts of Serbia. Migrations from underdeveloped to developed parts of Serbia are very pronounced. They are based on large regional inequalities. Therefore, for the balanced demographic development of the country, the policies of balanced regional development are key, but also population policies that would be sensitive to local and regional particularities.

For now, the population is growing in Belgrade, Novi Sad and Novi Pazar, while in all other towns and municipalities in Serbia it is declining or stagnating at best. Certain parts of Serbia are particularly affected by the decrease in the number of inhabitants: rural and border areas, Southern, Eastern and Western Serbia. That is why depopulation is essentially a regional issue.

The regional dimensions of depopulation are affected by differences in fertility. Developed areas around Belgrade and Novi Sad have higher fertility rates than Eastern and Southeastern Serbia, although the average age at first birth is above the national average (Nikitović, Arsenović, Sekulić & Bajat, 2019). However, internal migrations have an even stronger impact, taking place under two simplified patterns: from rural to urban areas, that is, from towns to cities with the south-north direction dominating. Only five districts have a positive balance of internal relocations, the centres of which are the largest cities in the country: Belgrade, Novi Sad, Niš, Kragujevac and Subotica. These cities are university, economic, cultural and administrative centres, which is the basis of their attraction force.

Internal migration is based on large regional inequalities. According to the level of economic development, Serbia today is divided into three parts. Belgrade and Novi Sad are the most developed areas, characterised by high population density, high employment rate and a higher GDP per capita. Two thirds of Serbia's GDP is generated in this area. They are followed by about 15 districts in Vojvodina and Central Serbia, which are at the level of the national average, while the least de-

veloped districts of Southern and Southeastern Serbia are the lowest ranked (Uvalić & Bartlett, 2021; Golić & Joksimović, 2017; Živanović & Gatarić, 2017; Stamenković & Savić, 2017). Regional development has a positive impact on industrial development and foreign direct investment, which has led to an increase in the quality of jobs in less developed regions, while there was a minimal growth of their share in the total wages pool (Arandarenko, Aleksić & Lončar, 2021).

In addition to economic inequalities, there are broader social inequalities. The Human Development Index, which was calculated at the level of districts and regions for the purposes of this *Human Development Report*, clearly shows this (Nikitović, 2022). At the national level, the HDI is 0.806, ranking Serbia 64th globally. The regions of Belgrade and Novi Sad are above the national average, while the other two are below the national average. Only Belgrade can be compared to a European country (Poland), while other parts of Serbia are at the level of countries in the region, North Africa, the Caribbean and East Asia.

Regional inequalities manifest themselves in many dimensions, from the economy, through culture, to education. They are a permanent feature of Serbian society and are historically rooted. Regional inequalities drive internal migration, which in turn is a powerful driver of regional depopulation. That is why balanced regional development and the development of population policies that would be responsive to local and regional particularities should guide the direction for responding to depopulation.

6 Message Four: Medium-Sized Towns Are Key for Balanced Demographic Development

The decline of medium-sized towns is a key issue for the future demographic and overall development of Serbia. These towns need to develop higher-order urban functions in the economy, services, culture, trade, and education. This approach would lead to a more balanced regional development.

Although the public discourse is dominated by the topic of rural depopulation, in fact, much bigger challenges are posed by the decline of medium-sized towns (30,000 to 100,000 inhabitants) and the sustainable growth of large metropolitan areas. Mid-sized cities are especially important because they represent a link between rural areas and small towns on the one hand, and larger cities that have regional or international significance on the other. They are the bearers of balanced regional development. In some of these cities there is a demographic decline, and all of them are characterised by lower wages, local revenues and investments in relation to the national average, and especially in relation to Belgrade and Novi Sad (Antonić, 2022). That is why this *Human Development Report* shows that the demographic decline of medium-sized cities is a key demographic and development problem for Serbia.

Like Serbia, depopulation is a problem in many European countries that affects individual regions and cities more than the state as a whole (Hospers & Reverda, 2014). Declining cities and regions face a number of challenges related to future development, maintenance of the local economy, utilisation of the construction fund and public space, etc. Some of these processes have direct effects on the wellbeing of families and individuals.

This Report analyses in detail the declining medium-sized Serbian towns. The analysis demonstrates that there are considerable inequalities in their social and economic capacities (for example, the level of development of the economy and education, urban infrastructure, fiscal capacities, etc.). These inequalities are correlated with the geographical position of the towns and their connection with their surroundings and the principal roads in the country.

Domestic and comparative European experiences show that different measures can have a positive effect on urban development. Towns located on the main roads are declining more slowly, so the construction of the road network and better traffic connectivity of towns is one of the measures that reduces regional depopulation. Opening of new border crossings boosts the local economic and social life of border areas, while active urban strategies such as thematisation of towns and better use of public space and buildings contribute to towns adapting to new demographic circumstances. European experience shows that the development of universities as one of the higher functions of the city, and "studentification", have a positive effect on the development of other higher functions of the city and demographic development. In towns in which new universities have been established, such as Kosovska Mitrovica and Novi Pazar, the demographic picture is far better (although other factors are also at work). However, the decentralisation and deconcentration of administrative and other public functions are especially important, as they will enable the development of the tertiary and quaternary sectors and make towns in Serbia more attractive for living (Antonić, 2022). This delays or reverses the economic and social decline of the towns, slows down internal and external migrations and raises the quality of life of both the town and its rural hinterland. All parts of this report strongly point to the negative consequences of centralisation in a number of areas, from administration to the economy, and emphasise that one of the solutions is decentralisation and deconcentration.

7 Message Five: Today Gender Equality Is Part of the Solution, not the Cause of the Problem

The decline in fertility was influenced by structural and cultural changes, including increased gender equality. Today, however, developed European societies with a higher degree of gender equality (at the level of attitudes and in practice) often have higher fertility rates. This is the point at which traditional discourse focused on patriarchal values and high birth rates overlap with modernist discourse on gender equality. But society must be ready to support both modern families, which are characterised by equality of men and women, and traditional ones.

Reduced fertility is one of the key factors in depopulation. The decline in fertility is influenced by cultural changes that place greater emphasis on issues of self-realisation, identity and life satisfaction, but also structural changes that occurred when women entered the labour market and achieved new freedoms in the public arena. The equalisation of men and women in the public sphere went hand in hand with undermining traditional views on women's primary role in raising children and caring for the family. Gender equality, in a way, is part of the formula for the problem of low fertility. However, gender equality may also be part of the solution formula.

Satisfaction with the quality of life and the relationship between spouses is one of the factors that contribute to higher birth rates (VRS, 2018). Satisfaction with the relationship depends, as *Human Development Report* highlights, on the harmonisation of gender roles and expectations. Attitudes on gender roles are changing and the differences between men and women, especially those highly educated, are decreasing (Babović, 2021; Stanojević, 2022). On the other hand, women carry a greater burden of caring for the family and children: women over the age of 15 spend about four and a half hours on average in unpaid household chores, while men spend two hours. Among men, younger, more educated men and those living in urban areas are more involved. Thus, in the private sphere, traditional patterns and divisions of roles prevail, although there are more and more women and men who advocate the ideas of gender equality in the private sphere as well.

European experience shows that greater gender equality, both in terms of values and in terms of practice, goes hand in hand with higher fertility rates. Fertility rates are higher in those societies in which attitudes towards gender equality are more widespread. This is true for all people, but especially for highly educated women (Baizan, Arpino, Delclòs, 2016: 23-24). Countries with a culture of gender equality also have higher fertility rates, so women can combine private and business life in different ways (i.e., they can choose whether to dedicate themselves to raising children, return to the labour market, or combine the two roles in different ways) (Brinton & Lee, 2016: 426). This is how different value orientations are met. Of course, the analysis of gender attitudes and patterns and public policies largely depends on the specific context (Sobotka, 2011), so future policies should be adjusted to a specific culture, history and institutional setting.

Changing attitudes about gender roles is one of the ways of consolidating the demographic development of Serbia. This is the point at which traditional narratives focused on patriarchal values and high birth rates are approaching the modernist discourse on gender equality. If the struggle for gender equality has influenced the change of a woman's role in society and lower birth rates, paradoxically, gender equality today can bring higher fertility rates and greater participation of women in the labour market (and thus better use of a society's human potential).

8 Message Six: Serbia's Society Is Less Family-Friendly Than It Believes

Although Serbian society highly values the family, children and parenthood, in many aspects it is not family-friendly. Public policies at the national and local levels are often not tailored to the needs of families and children, while the labour market is insensitive to these issues.

Serbian society perceives itself as a society that values children, family and family life, while parenthood is understood through the model of sacrifice for the benefit of the children. There is also some pressure to get married and have children early, and these norms are stronger in rural than in urban areas, among the less educated rather than among the more educated inhabitants (Babović, 2021; Tomanović, Stanojević & Ljubičić, 2016: 47 et seq.).

Contrary to the wishes and collective perceptions, data shows that the labour market is unfriendly to current and future young parents. Youth unemployment rates are higher, while the quality of their jobs is low. The position of women in the labour market is particularly problematic: women's activity rates are low compared to those of men as well as women in developed societies, and the main reason is the inability to achieve a work-family balance. Many among those

employed perform temporary and occasional jobs with a low level of labour protection. Women with higher education are in a better position than those with secondary and lower education.

The chapter on family support shows that the work and organisational culture is also not parent-friendly, especially when it comes to fathers who have an active role in the upbringing of their children. A small number of companies offer the possibility of flexible or sliding working hours, or work from home. By contrast, most parents believe that such arrangements would help them achieve the work-parenting balance (Stanojević, 2022)

Preschool institutions are more developed in urban than in rural areas. The number of children attending them is growing, but the percentages are still below the European average. Due to the small number of places available in them, children of employed parents have an advantage in

enrolment, which hinders the social integration of young unemployed parents, primarily mothers (Pavlović Babić, 2022). Other policies are not particularly family- and child-friendly: the tax system that does not include tax reliefs for families with children (Kostić, 2017), public and private transport are not always adapted to the needs of women and families (SeConS & Dornier, 2019), educational institutions shift much of the burden of the educational process to parents (Vuković, 2017; Teodorović, Bodroža and Stanković, 2015) etc.

So, although the Serbian society highly values family and parenthood, in many segments it is "hostile" towards the family and parents. Public policies at the national and local levels are often not tailored to the needs of families and children, while the labour market is insensitive to these issues. Therefore, one of the priorities is the analysis of public policies from the perspective of population policy and their adjustment to new demographic circumstances. Some form of mainstreaming of this issue is inevitable for a society and state facing such dramatic declines in population and human capital.

9 Message Seven: With a Declining Number of Students, the Education System Must Achieve Greater Quality and Become More Equitable

The education system is a key mechanism for the development of the human resources of a shrinking population. However, the education system fails to develop the competencies needed for active economic and social life, and in this regard, it achieves more success with children from higher socio-economic strata than those from the lower ones. Children with developmental difficulties and disabilities are not sufficiently integrated into the system, and a small percentage of adults and older persons are included in lifelong learning programmes.

The number of new-borns in Serbia has decreased by almost one fifth in the last two decades, and the number of students by almost one third. Our population is shrinking and ageing and, in these circumstances, educating every member of society becomes an even more important task. If it wants to adapt to these demographic changes, the educational system will have to become more efficient and equitable, that is, more inclusive. From the point of view of society, the development of good quality and inclusive education (as well as the labour and health markets) is becoming a tool for both development and population policies. Both indicators essentially show the ability of the system to use all the human potentials of society, especially in the situation of demographic decline, and thus the decline of those potentials.

International measurements and domestic evaluations point to chronic weaknesses of the Serbian educational system, but also to some of its virtues. The school knowledge of Serbian students is typically at reproductive level, and the school is not doing enough for their integration and functional application. The results of PISA tests (performed by children aged 15) are below the average of OECD and EU countries in three measured dimensions (reading, mathematics and science). In that respect, Serbian students are one and a half years behind their peers from the OECD countries. Significantly better results have been achieved on the TIMSS test, which is conducted in the fourth grade of primary school, and this difference could be explained by more adequate support from teachers in lower school grades (Pavlović Babić, 2022).

Education is still not inclusive, although significant progress has been made in the last two decades. Some social groups, such as Roma and

children from lower socio-economic backgrounds, constantly face difficulties in education that come down to dropping out of the educational process early. The learning process is shifting from school to home, which is why parents are more involved in the learning process, so the outcomes depend on their cultural and economic capital. Thus, children of parents who can assist them with learning or pay for such assistance will have a better chance of achieving good success (Teodorović, Bodroža and Stanković, 2015: 178). Education in Serbia is expensive, especially for the lower socio-economic strata. The processes of marketisation of education and the development of private providers of educational and education support services (among which private additional and supplementary classes, foreign language classes and sports and recreation classes have a special place) contribute to this. Support of this kind is used more by children from higher socio-economic strata, who already have better school achievement (Kovač Cerović et al. 2014: 76; OECD, 2011). Lifelong learning and education of older persons are still underdeveloped and will become increasingly important with population ageing.

Inequalities in education also exist in other countries and the PISA survey shows that it is not higher in Serbia compared to OECD countries (OECD, 2019). However, the importance of inequalities in education is all the greater in view of the declining student population and the increasingly scarce human resources in society, which are under additional pressure from internal and external migration. If it wants to have an educated population that will be more active, productive, healthier and politically and socially integrated, Serbia will have to increase the quality and equity of its education system.

10 Message Eight: The Labour Market Encourages Young and Low-Skilled Workers to Migrate

The labour market is an important factor in future demographic change. The current situation not only does not encourage fertility, but is a strong incentive for migration. Roma, young people and lower-skilled workers, working in the small private sector or in the informal labour market, have lower incomes and lower levels of labour protection. Other policies, such as education, tax, housing and social ones, also fail to help them improve their position. In the absence of better living and working conditions, they turn to permanent or temporary migration.

A reduced number of inhabitants also means the reduction in the number of the working-age people. Developed countries solve this problem through immigration. However, as population decline is also expected in underdeveloped countries, labour shortages may also affect developing countries in a few decades (Reher, 2007: 199-200). The outlines of this process are clearly visible in European terms. The new European Union member states from Central Europe have long been a reservoir of labour that supplied the market of the developed parts of the EU. Economic growth and labour demand in this region, coupled with decades of migration, have led to labour shortages that are now sought further in Eastern and Southeastern Europe. That is why in Serbia there are more and more occasional and circular migrants working in Central European countries. In the future, these processes could lead to a crisis in the Serbian labour market.

Although the working age population is declining, this *Human Development Report* demonstrates that Serbia is still not facing a general crisis of labour shortage. The reason lies in the fact that there is still a lot of room for raising labour market participation rates, especially among Roma, women and older workers. Their greater involvement, especially in the formal labour market, should be a priority. However, there are some obstacles along the way.

The Serbian labour market is dual and consists of (1) better quality jobs in the public sector and large private companies and (2) poorer jobs in the small private businesses (Aleksić, Arandarenko and Ognjanov, 2021). This market is characterised by high differences in income relative to the education level, so the salaries of workers with higher education are increasing compared to workers with secondary and lower education. The rise in the salaries in the public sector, which employs a significant percentage of workers with higher education, also contributes to this growth. On the other hand, low-skilled workers have not only lower wages, but also more precarious jobs with poorer labour protection. These features of the labour market not only make migration desirable, but also prevent the full social integration of all workers.

The incomes of the lower socio-economic strata have also been affected by the social benefits reform. Material social assis-

tance is granted to a small number of the poorest families and its amount is low (only families with four children receive the amount of financial social assistance that reaches the amount of one minimum wage, VRS, 2018b: 199). The criteria for granting child benefits are also restrictive, so a family of four loses the right if they have an income one-fifth higher than the minimum wage (Arandarenko, 2022), and the amounts are low. These policies affect the poorest people in Serbia, discouraging them from the formal labour market and further encouraging them to migrate to countries that offer better wages, higher material benefits and better services.

The position of young people in the labour market, especially those with lower and secondary education, is very bad. Their first jobs are of poor quality, with low wages and unfavourable working conditions, very often in the informal labour market. In addition to the characteristics of the labour market, a string of policies such as education (Vuković, 2017), housing (SIPRU, 2021), tax and labour market policies (Aleksić, Arandarenko and Ognjanov, 2021), aggravate the position of young people and their integration into society. This is especially true for young people from lower socio-economic strata, those who migrate and those who should be the bearers of positive demographic change. If it wants to use the potential of all its inhabitants and offer some of them a sustainable alternative to leaving, our society will have to develop inclusive economic and labour market policies. Among them are intergenerational solidarity and youth employment support policies, raising the quality of jobs offered, inclusive policies, like activation and employment support policies, etc.

11 Message Nine: Benefiting from Older People's Human Capital Will Be a Great Test of Adaptability for Society

Demographic change affects the welfare state due to increased demand for services and benefits and fewer workers financing the system. A key aspect of this change is population ageing. The whole society, as well as public policies must adapt to new demographic circumstances. This includes adjusting the pension system, developing preventive health care, and social protection and long-term care for older people, as well as changes in the labour market, infrastructure, housing etc.

One of the most important transformations of the 21st century will be population ageing. It is the result of people living longer lives, and the rising share of older persons in the population can present many long-term development opportunities globally as well as locally. For these benefits to materialise, however, numerous adjustments will have to be made to enable the full economic and social integration of older persons – including investing in the human capital of future older generations, as advised throughout this report.

But depopulation will also deepen or intensify new and old social risks and place new demands on the welfare state. New social risks are a consequence of changes in society, such as ageing and the transition from an industrial to a post-industrial economy, which rendered some occupations and skills irrelevant. Families may also have difficulty balancing work, parenting and caring for older persons, while the welfare state faces challenges of caring for an increasing number of old people (Taylor-Gooby, 2004; Bonoli, 2005).

In the Serbian context, ageing poses the greatest pressure, both on the social and pension insurance system, and on long-term care and health care. Ageing is a key demographic characteristic of Serbia at the beginning of the 21st century (Matković, 2022). However, Serbia is not among top-ranking European countries in terms of the share of people aged 65+, and especially those aged 80+. This is due to the low life expectancy of 65-year-olds, which has been stagnant for decades and amounts to 16.2 years, which is four years less than the EU average. According to the World Health Organization data, the health-adjusted life expectancy at birth for men in Serbia in 2019 is between 8 and 10 years below the total life expectancy.

This Human Development Report opens a series of questions to which we, as a society, will have to give answers in the coming years. It appears that major systemic changes in the pension system are not necessary, but additional research and public dialogue on parametric changes are needed, such as changing the indexation formula, moving the retirement age in line with the extension of the life expectancy, early retirement, reviewing eligibility for subsidised pensions and encouraging later retirement (Matković, 20212).

Population ageing exerts new pressures on the system of long-term care and health care, since ageing not only prolongs healthy life years, but also the years with health problems and disabilities. That is why this Report proposes to consider changes in the system of long-term care, which range from the establishment of a government institution for long-term care, to the development of community services for older people. Although the system of social protection, and especially the system of local community services, is largely adapted to the needs of older people (Vuković, 2017; MRZBSP, 2020), due to the growing number of older people, changes are needed both at the level of services themselves (more home assistance services, establishment of day care and supported housing) and at the system level (for example, a review of earmarked transfers) (Matković, 2022).

Older people (65+) are not significantly poorer than the general population or are even in a slightly more favourable position, but those older than 75 are significantly more vulnerable. Older persons who have not exercised their right to a pension (approximately 136 thousand people) are in a particularly unfavourable position. Given the prevalence of women among those aged 75+ and especially among those who do not exercise the right to a pension, the introduction of a state-subsidised pension is also becoming an important gender issue. With this in mind, the Human Development Report considers two options for the introduction of state-subsidised pensions, in the form of a guaranteed minimum income for older people and in the form of a special module within the cash benefits programme.

12 Message Ten: Poor Health Outcomes Are a Demographic and a Developmental Challenge

Although much has been done to improve health outcomes, there is still room for improvement. High mortality and preventable disease rates, difficult access to health services, high private health spending, poor environmental factors, low socioeconomic status and poor health habits are major obstacles to improving health and prolonging a (healthy) life expectancy.

The health of every inhabitant of Serbia becomes all the more important if their number decreases. Improving the health of the population can slow down depopulation and make the smaller population not only live longer, but also be more productive and place less social and economic expenses on society. Thus, the health of a small population can become its development resource.

Socio-economic status and the quality of health care have a special impact on the health of the population. Low socio-economic status, and that means low education and material standard of living, affects the prevalence of unhealthy lifestyles and lower health literacy, which later translates into higher health risks. This Human Development Report illustrates the widespread unhealthy lifestyles that later lead to the emergence of chronic non-communicable diseases and high morbidity and mortality rates. Many of these diseases, such as cardiovascular diseases and lung cancer, are the most common causes of death and can be avoided through appropriate prevention (Stamenković, 2022).

Caring for the demographic future implies more intensive early care for public health and the promotion of healthy lifestyles much more intensively than is the case today. Therefore, it is necessary to introduce new and improve existing preventive health activities aimed at healthy people and youth, which would include, in addition to the health care system, other social actors (for example, schools and companies). This would reduce health expenditures, both private and public, and improve outcomes. In addition, the Report demonstrates how innovative solutions, from more flexible and available health care and telemedicine, to prevention in schools and the labour market, can lead to better and more equitably distributed health outcomes. A key role in this should be played by a health system that is more efficient, equitable and adapted to new demographic circumstances.

One of the biggest shortcomings of the public health system is the insufficient availability of health care services, which is a consequence of low public health expenditures. This leads to high private health care expenditures (as much as 42%). Patients turn to the private health sector to avoid long waiting times and complicated procedures in the public sector, but also when they buy medical devices that the public sector is unable to provide. Private health services, as well as health services in general, are more often used by citizens of higher socio-economic status (Boričić et al., 2014: 61-64). Roma and other citizens of lower socio-economic status have no alternative to a slow and inefficient public system. This is one of the factors of poor health of the population of Serbia and high mortality rates. Therefore, changes in the health care and social protection system that are adapted to the needs of all social strata, including the lower strata and the poor, would improve health outcomes, reduce mortality and increase the odds for all citizens to better integrate into society, from education through work to political and public life.

In addition to poverty, low health culture, and the unavailability of health care, other factors also contribute to poor health outcomes. One of them is the subject of the analysis in this Report – environment pollution. It is estimated that due to excessive air pollution, between 6,000 and 16,000 people die prematurely in Serbia every year (Petrović, 2022). That means that the population of a smaller town disappears every year. If only the existing laws were to be applied, 2,400 lives would be spared annually and large funds spent on health care would be saved. In addition to direct health costs, high pollution also produces a decline in the productivity of people and communities, as well as other indirect losses.

Broader policies also have an impact on the better health of the population. Among them, education, labour market policies and redistributive measures to reduce poverty and social inequalities have a special place. More educated and richer people can lead a healthy life, eat healthily, avoid alcohol and cigarettes, and live healthier thanks to that. In this regard, the health and social status of the poor and Roma is particularly devastating. For example, life expectancy for Roma from unhygienic settlements is 12.4 years shorter than that of the general population. In the new demographic circumstances that are emerging before our eyes, when the population of Serbia is shrinking, every inhabitant, regardless of the socio-economic status, ethnicity or place of residence, represents a more valuable "resource". In such circumstances, inclusive education labour market and health care policies are becoming the most important population policy dimension.

13 Conclusion: Development Policies for New Population Dynamics

This *Human Development Report* develops the idea that, in light of the inevitable demographic changes, public policies should be aimed at strengthening the opportunities, potentials and freedoms of all people, while demographic issues should be included in all relevant public policies.

In this *Human Development Report*, we perceive population policies as multisectoral development policies. These are policies that support human choices to give birth, be educated, lead a healthy lifestyle, work, migrate or return, and policies that support integration, social cohesion and development tailored to the individual. These are the policies of strengthening demographic quality, not just quantity, policies to build strength and knowledge, in addition to population size. Developmental population policies thus become policies of human capital quality, that is, human resource development policies. Such policies may possibly influence population size, but they will certainly be human-centric and value individual potential per se as well as a contribution to society.

If the goals of population policy are defined in this way, then demographic changes must be addressed by various public policies, from education, through tax policies, to environmental and urban development policies, and institutions at different levels, especially local, even when they have no direct competence in the domain of demographic policies. In order to contribute to balanced demographic development and the use of all human potentials of a society, these policies and institutions will need to become responsive to demographic issues. Mainstreaming demographic issues into sectoral policies will be an expression of a society's readiness to address long-term demographic challenges.

Finally, this *Human Development Report* proposes us to address demographic changes as a society, but not necessarily to set specific quantitative targets. Because, even if we fail to stop the demographic decline through inclusive development policies, we will mitigate the consequences of that fall and we will succeed in making our society a better society to live in. We will make it more educated, healthier, more satisfied and richer, and that is, in itself, a success.
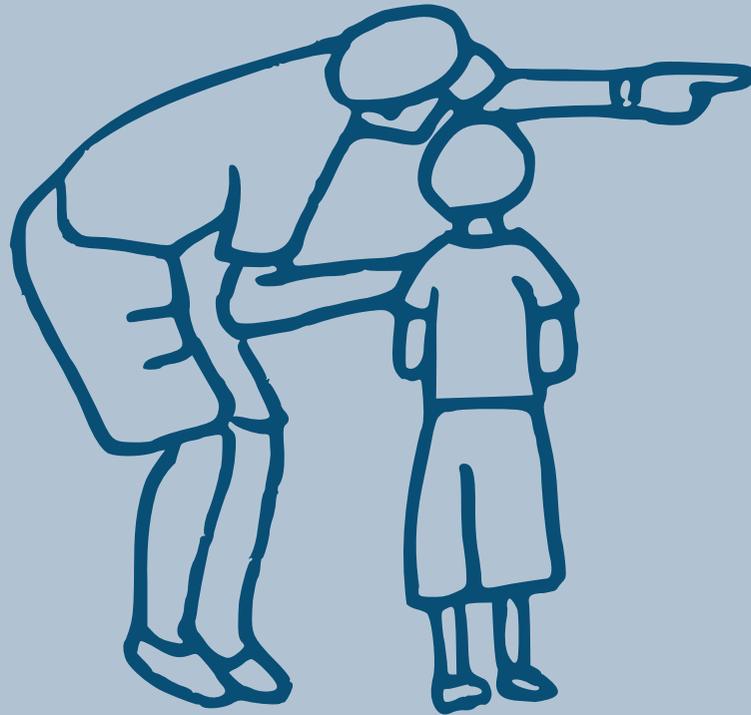
Depopulation As a Policy Challenge in the Context of Global Demographic Trends

Wolfgang Lutz and Nicholas Gailey

1 Introduction: Population Decline from a Historical Perspective

Human populations have survived cycles of growth and decline in their numbers throughout history. Up until the late 1800s, changes in death and migration rates were the main forces behind fluctuations in population size all around the world, after which declining birth rates became a third important factor. Depopulation confronted many parts of Europe, such as in the territory of today's Republic of Ireland. Its population declined from 6.5M in 1841 to 5.1M within ten years during the "Great Famine," and was followed by continued losses, with the population bottoming out at 2.8M in 1961 (McCarthy, 1961). While this came with massive disruptions to society at the time, it did not prevent the Irish population from recovering to a degree, and later becoming a textbook example of developmental success. In historical context, the population decline now in Serbia and other Southeastern European countries is not unprecedented, nor does it necessarily imply doom for the future. In this introductory section we will put these concerns in a global demographic and historical perspective.

There may even have been instances in our early history when homo sapiens were close to extinction. Three main threats directly affected human mortality in historical context: food shortages, diseases, and conflict. When the Neolithic revolution some 12000 years ago led to more bountiful and stable food supplies, this resulted in a marked increase in the human population. But it is estimated that up until 1500 the world population stayed well under 500M. In the mid-14th century, the total world population actually declined; the bubonic plague ended an unprecedented number of lives – estimates range from 35 to 200M deaths caused by (contracting) the plague (see Table 1). It took more than 100 years following the bubonic plague for population growth to resume its earlier trajectory.

The one billion mark for the human population was only reached in the early 19th century, with the year 1804 often given as an estimate of this milestone. The second billion came in 1927, and the third already by 1960 after a much shorter period. Despite generally high fertility rates of the time, the mortality rates, particularly among children, kept population growth to a relatively slower pace than it could have reached. The recurrent pandemics shown in Table 1 were only one reason for this high level of mortality, with the main causes lying in chronic conditions of malnutrition and the high prevalence of common infectious diseases. By 1850, life expectancy was quite consistent across Europe at around 40 years, with only minor regional differences. Today, newborn children in Europe can expect to live more than twice that number of years.

Time Period	Pandemic	Estimated Deaths
1331-1351	Bubonic plague	35M -200M
1520	Smallpox	56M
17th Century	Plague outbreaks	3M
1817-1923	Cholera outbreaks	1M
1855	The "Third Plague"	12M
1889-1890	The "Russian Flu"	1M
1918-1919	The "Spanish Flu"	40M - 50M
1957-1958	The "Asian Flu"	1.1M
1968-1970	The "Hongkong Flu"	1M
1991-present	HIV/AIDS	25M - 35M
2002-2003	SARS	770K
2009-2010	The "Swine Flu"	200K
2012-present	MERS	850K+
2014-2016	Ebola	11.2K
2019-present	COVID-19	~1M* (as of Sept. 28, 2020)

Table 1. Summary of the most important pandemics since the year 1300 (with death estimates labelled "M" for millions and "K" for thousands) (LePan, 2020 and World Health Organization 2020).

A constant struggle for survival led to virtually all traditional cultural value systems and religions placing a strong emphasis on reproduction to enhance population growth and avoid decline, as any meaningful influence society had over mortality levels remained beyond reach. In Abrahamic tradition, "be fruitful and multiply" was the essential command that God gave to Adam and Eve, according to the book of Genesis, sentiments echoed by many other cultures.[3] The value of greater population growth even included the realm of political power and governance, as written in the Bible's Proverbs 14:28: "In the multitude of people is the king's glory." Roman philosophers were largely of the same mindset, with many arguing in favor of early marriage, taxes for celibacy, and rewards for marriage and parenthood (Goswami, 1985).

However, already in ancient Greece the philosopher Plato had speculated about an optimal population size, which implied that already there was a concept that there could be too many people as well as too few, depending on the circumstances. He suggested the ideal population size for a Greek city state would be at a constant level of 5,040 households, mostly because the number is conveniently divisible by many numbers (including 12, which had a sacred dimension in ancient Greece), as well as this numerical limit helping people to capably perform their roles as citizens by knowing the community and avoiding anonymity.[4] Debates on the relative merits of a small or large population were also being held in ancient China as far back as the 6th century B.C.E. (Xueyuan, 2019).

During most of the Middle Ages, when social phenomena were viewed in fatalistic terms and population growth was valued as a byproduct of nature, Henry IV of England made a famous statement connecting the viability of the state to the well-being of those who live in the kingdom and the sheer size of the population: "The strength and riches of kings consist in the number and opulence of their subjects," he supposedly said around the year 1400 (Stangeland, 1904). Around the same time the Arab philosopher and historian Ibn Khaldun in Tunis wrote about the economic benefits of a growing population as it created the conditions for increasing specialisation and division of labour, which in turn would lead to higher incomes.[5]

The connection between population growth and economy was also stressed by the Mercantilists in England, in particular John Graunt, William Petty, and Edmund Halley as well as Johann Peter Süssmilch in Prussia. These 17th century thinkers held the view that the nations strongest in people and material goods would survive and prevail over others. Quite specific policy recommendations flowed from this outlook, such as penalties for non-marriage, or limiting out-migration (except to their colonies). In 1662, John Graunt, who is sometimes called the father of demography, published the "Bills of Mortality" which are the first known statistical tables in demography. He famously showed that for every 100 children born in London only 16 were still alive at age 36, and only 3 at age 66 (Graunt, 1662). This extremely high level of mortality, seen from today's perspec-tive, also showed that the biggest potential for enhancing population growth was in the reduction of child mortality. This is what actually happened in the beginning of the demographic transition in the 19th century, but it was not considered as a viable option before modern medicine and hygiene, and therefore the discussion at the time of Graunt and the Mercantilists focused mostly on fertility.

Reproduction was also the main focus of Robert Malthus, who believed that human beings, like plants or animals, are "impelled" to grow by a powerful "instinct" until they are held back by certain limits. He saw the decisive limit to human population growth in the availability of food and what he called the means of subsistence. Malthus famously argued that while the population grows geometrically (exponentially), the food supply could only grow linearly due to limited availability of land and the diminishing returns to labour input. He thus predicted repeated famines that would stop population growth (positive checks) when growth would hit such limits. He did not overlook the possibility of voluntary reductions in fertility (preventive checks) through celibacy or abstinence within marriage, though he considered this unrealistic because "the passion between the sexes will never diminish" (Malthus, 1798).

This perspective on human nature and the inclinations for populations to grow has survived as a powerful narrative up to this day and has since found different expressions. It notably inspired the 1972 report "The Limits to Growth," published by the Club of Rome (Meadows et al., 1972). This scientific report has had the highest number of published copies in history, and used computer simulation methods to put numbers on the Malthusian claims noted above, with the addition of oil supplies as a decisive limiting factor as well as the limiting factor of food supply. In the same tradition, the two influential books "The Population Bomb" and "The Population Explosion," both by biologist Paul Ehrlich (Ehrlich, 1968; Ehrlich and Ehrlich, 1990) have greatly contributed to raising global political attention with respect to the potential dangers associated with rapid world population growth. In recent years, this fear of population growth has been linked to directly contributing to greenhouse gas emissions, and making it more difficult to adapt to already unavoidable climate change (IPCC, 2014).

Notwithstanding these concerns about the dangers associated with rapid population growth, in the field of national politics a growing population continued to be mostly seen as something desirable. Changing population size at this level has always been closely linked to the perceived viability of states and their strength relative to neighbouring populations, exemplified by the traditional Franco-German struggle for influence and survival. After the French defeat in the 1870-1871 war, divergent demographic trends received much more attention, where the markedly lower French fertility in the preceding decades was linked to weakness on the battlefield.

Even people of sharply different philosophical views at the time agreed on population matters. As expressed by demographer Ar-

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[3] For example, also in Hinduism, see Gudorf's "Comparative Religious Ethics: Everyday Decisions for Our Everyday Lives" as well as various cultures of Sub-Saharan Africa, see Manuh and Sutherland-Addy's "Africa in Contemporary Perspective".

[4] For more information, see Plato's Laws.

[5] For more information, see Ibn Kaldun's Al-Muqaddimah ("The Prologue").

sène Dumont, "a nation must have a population dense enough to keep stable an equilibrium with her neighbours" (Dumont, as cited in Teitelbaum and Winter, 1985). Dumont sought balance to what he described as the growing unintended consequences of modern life on reproduction, known as "social capillarity," or the limiting of fertility when it was advantageous to climb the social ladders. "From the moment when the imagination and the attraction of the ideal enter the scene, we find ourselves in the presence of a new principle of population," he argued as the trends marched on. Upon surveying the French census results in 1907, an unnamed German professor is reported to have said, "more coffins than cradles: this is the beginning of the end... Finis Galliae" (Savant, as cited in Teitelbaum and Winter, 1985). In the years that followed, these realisations gave birth to France's demographic fears and cycles of pro-natalism, a tradition that carries on in some form to this day and that inspired the thinking in many countries beyond France.

The causes of contemporary population declines, low fertility rates, and high out-migration are linked to a high degree of individual agency and is relatively new in the scope of human history. Rather than being determined more directly by nature or unavoidable events, these population declines flow from modern life and the broader passage of demographic behaviours – fertility, mortality, and migration – deeper into the sphere of personal control. Demographic behaviours are still not simply "elective" or independent of outside influence , however. A number of competing responsibilities and barriers exist that discourage people from having the family sizes they reportedly desire, 2.2 children on average in Europe (OECD, 2016) and migration often involves an element of being pushed, out of economic necessity. Contemporary population change, to the extent it is driven by persistent transfers of people from one region to another, is perhaps the most consequential, long-term aspect of international relations. As the dynamic between countries is less rivalrous today in Europe than in the past, the conversation around migration is turning to one

of examining imbalances and finding solidarity with the sending regions affected by population decline due to migration.

Both the economic system and popular sentiment generally expect population growth to continue to occur, as it is a fixture in the psyche of modern society. This fixture has been influenced by the human experience especially over the last four decades of the 20th century during which, indeed, the vast majority of countries in the world experienced rapid population growth. While a reckoning with the end of this larger 300-year-long trend is coming this century, Western Europe has at least temporarily avoided confronting this change through in-migration from its neighbours as well as from other continents. This leaves other regions, such as the Balkans, as covered in this report, to be among the first group of countries (together with others in East Asia) to deal with modern "voluntary" depopulation. Simply taking a country's current population size as the norm is rather arbitrary, and unending population growth is, by definition, unsustainable. So, at some point, the slowing or ending of population growth is natural and to be expected (Lutz, Sanderson, and Scherbov, 2001). Still, there are multiple challenges associated with population decline, within certain bounds, given the causes behind it.

In this report we will address this issue from a multi-dimensional demographic perspective, which means that we will not only look at population size and age structure, but also differentiate by level of education and labour force participation. We expect smaller but higher-skilled societies across Europe, and as human resources grow more specialised and valuable there will be even more consequential competition for workers. If Western European countries that target the Balkans for migration do not pay greater attention to the impacts on the countries of origin, instead of being primarily driven by their own domestic labour market shortages, they risk undermining the long-term economic and social development of the Balkan region. In the following sections, the importance of human capital in the context of population decline and associated greater rates of ageing will be discussed.

2 The Final Phase of the Demographic Transition

Demographic transition is the progression of demographic regimes, from the high birth and death rates of the pre-industrial era, to a middle-stage when death rates decline and spark rapid population growth until, finally, birth rates correspondingly decline and population growth moderates or ends. This transition, which was also previously labelled as the "demographic revolution," has been characterised as the transition from uncontrolled high levels of birth and death rates to a modern system of controlled and low levels of these rates (in the context of fertility, "controlled" refers essentially to the reproductive behaviour of individuals/couples, while in the context of mortality it also has a strong public health component). Intermediate stages of the demographic transition – when death rates have already fallen

while birth rates remain high – are associated with rapid natural population growth, where "natural" refers to the balance of births and deaths not considering out-migration, which in open populations is a third factor impacting population change.

While in the process of demographic transition, declines in mortality are almost always an object of universal aspiration but high fertility norms are often deeply rooted within cultures and typically take longer to correspondingly adjust to any improvements in mortality. Only after (i) birth rates fall below the so-called "replacement level" of two surviving children per woman and (ii) a period of time passes when a young age structure results in an increase of women entering reproductive age (with a slowing of growth momentum over time)

does population growth then eventually come to a halt. The precise timing of this process varies from one population to another also depending on trends in mortality.

While in a few cases, such as historical France, the mortality and fertility declines happened only gradually and at about the same time, in most countries there was a distinct lag time of several decades between the two. In terms of what is generally agreed upon, the framework of the three basic preconditions for a lasting fertility decline is widely accepted (Coale, 1973):

1. Fertility must be within the calculus of conscious choice (at the level of women or couples), meaning it must move from the realm of fatalism to that of consciously planned behaviour;

2. Lower fertility must be advantageous; and

3. There must be culturally acceptable means for preventing births.

This framework effectively presents the idea that there is no single causation of fertility decline. Rather, the cognitive (education-related), economic (also urbanisation-related), and contraception-related factors all need to come together. These pre-conditions were required in historical Europe to precipitate fertility decline in the same way as they are still required in today's African countries seeking to moderate fertility and speed their process of demographic transition, and economic development.

Mortality rates have shown continuous improvements for the most part, but there have also been some notable discontinuities, such as the AIDS pandemic leading to significant falls in life expectancy in some African countries, or the deterioration of mortality conditions mostly among low educated men in some parts of the former Soviet Union. But in its generalised form, the process of the demographic transition is considered to be universal in modern history, and essentially irreversible.

At the moment, various populations around the world are at very different stages of this universal process of demographic transition. While the process was completed in Europe decades ago, it is now also complete in most countries in Asia and the Americas, but still underway in large parts of Africa, where most countries are still in the phase associated with rapid population growth. The striking contrast in demographic patterns currently observed in various parts of the world is essentially a consequence of different populations being at different stages of this universal process.

The concept of demographic transition was originally triggered by the observation of declining birth rates in many European countries over the first few decades of the 20th century. Demographers Warren Thompson (1929), Adolphe Landry (1934), and Frank Notestein (1945) were the first to classify countries into different stages of this universal process that brings countries from a condition of high birth and death rates to one that is ultimately characterised by low birth and death rates. In this early literature, the driver of this process was simply called "modernisation" without a deeper specification in terms of the relevant causal mechanisms propelling these changes. But what they likely had in mind was general socioeconomic development as the reason for a decline in crude death rates ("CDR") that was typically followed by a decline in crude birth rates ("CBR") after a time-lag of varying length. As a consequence of the difference between the two, the rate of natural increase ("RNI") of a population would rise for a
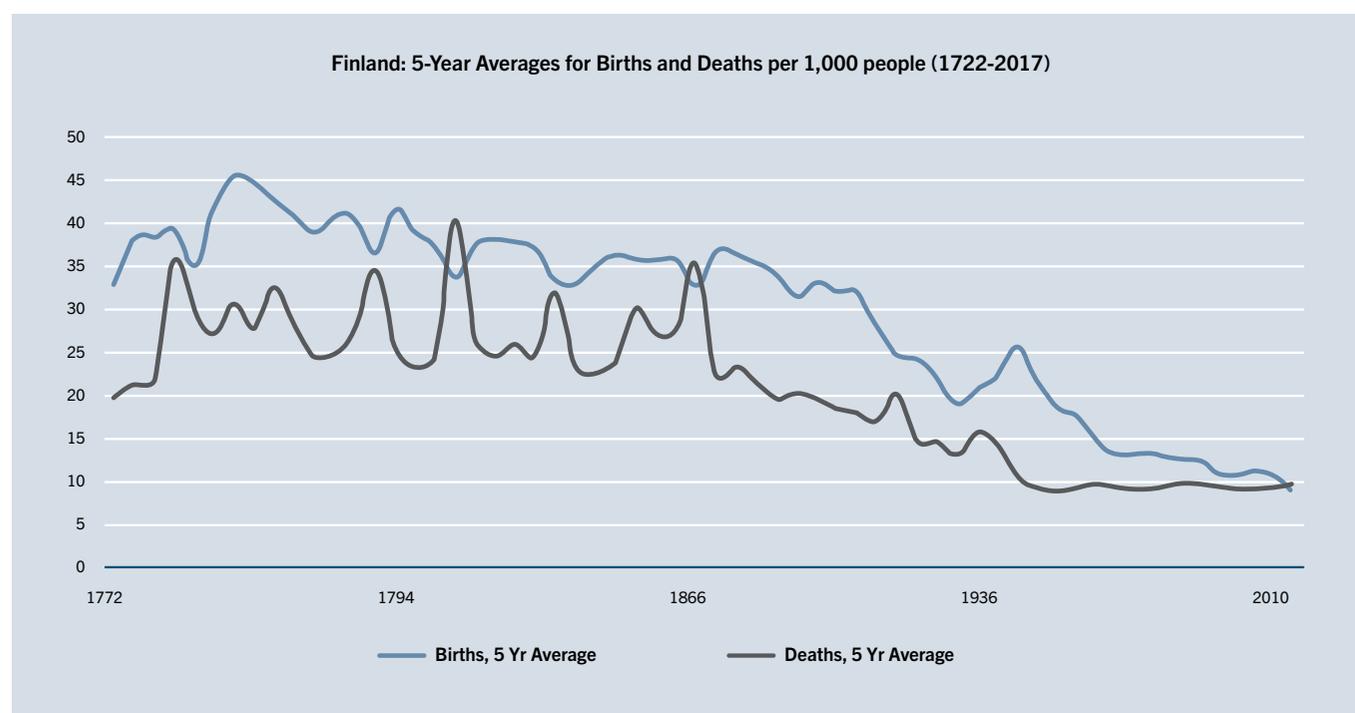
Figure 1. The Demographic Transition in Finland, with five-yearly averages of birth and death rates per 1000 people from 1722-2017 in Finland

Source: Lutz, 1987; and the public statistics agency "Statistics Finland" for more recent years)

period of time. Disregarding in- and out-migration, this difference is the reason for population growth in all populations around the world.

Figure 1 illustrates this process for Finland, which has the world's longest national-level demographic time series with annual data on death and birth rates since 1722. After strong fluctuations through the middle of the 19th century, the 1870s saw a lasting decline in death rates begin. By comparison, the birth rates in Finland only started a steeper decline around 1920. During this 50-year period, or the lag period, the population grew at around 1.3%-1.4% per year.

While initially just a description of the demographic experience in today's low fertility countries, the concept of demographic transition has been further refined over the past few decades. The demographic transition has essentially become the basis for all international population projections, which uniformly assume that once the process of mortality decline has started, fertility decline will follow until a level around or below a replacement level is reached. The predictive power of the demographic transition justifies its characterisation as a "theory" in the spirit of critical rationalism (Popper, 1959), although it has been criticised that the theory is still not specific enough in terms of which precise conditions mortality and fertility declines occur in, and what impacts the speed of decline.

A core component of the demographic transition theory is also the prediction of its irreversibility, a hypothesis that has not yet been falsified by any population. Quite the contrary, with respect to fertility there are examples of countries that after having gone through the fertility transition have fallen back into poverty, such as the Republic of Moldova after the dissolution of the Soviet Union (which became the poorest country in Europe with a GDP per person adjusted for purchasing power parity lower than countries such as Angola and Nigeria). Yet the fertility rate in Moldova has further declined to a level of 1.6 children per woman, as opposed to 5-6 in early demographic transition countries in Africa. In spite of a minor recovery, Moldova's birth rate is unlikely to go back to pre-transition levels.

Changing marriage patterns and in particular the rise of non-marital unions together with value changes concerning sexuality and post-modern values in general have also been labelled a "Second Demographic Transition" by scholars Lesthaeghe and Van de Kaa (Lesthaeghe, 2010; Van de Kaa, 1987), because they view these social changes as the reason for a second wave of fertility decline that has brought fertility to below replacement levels.
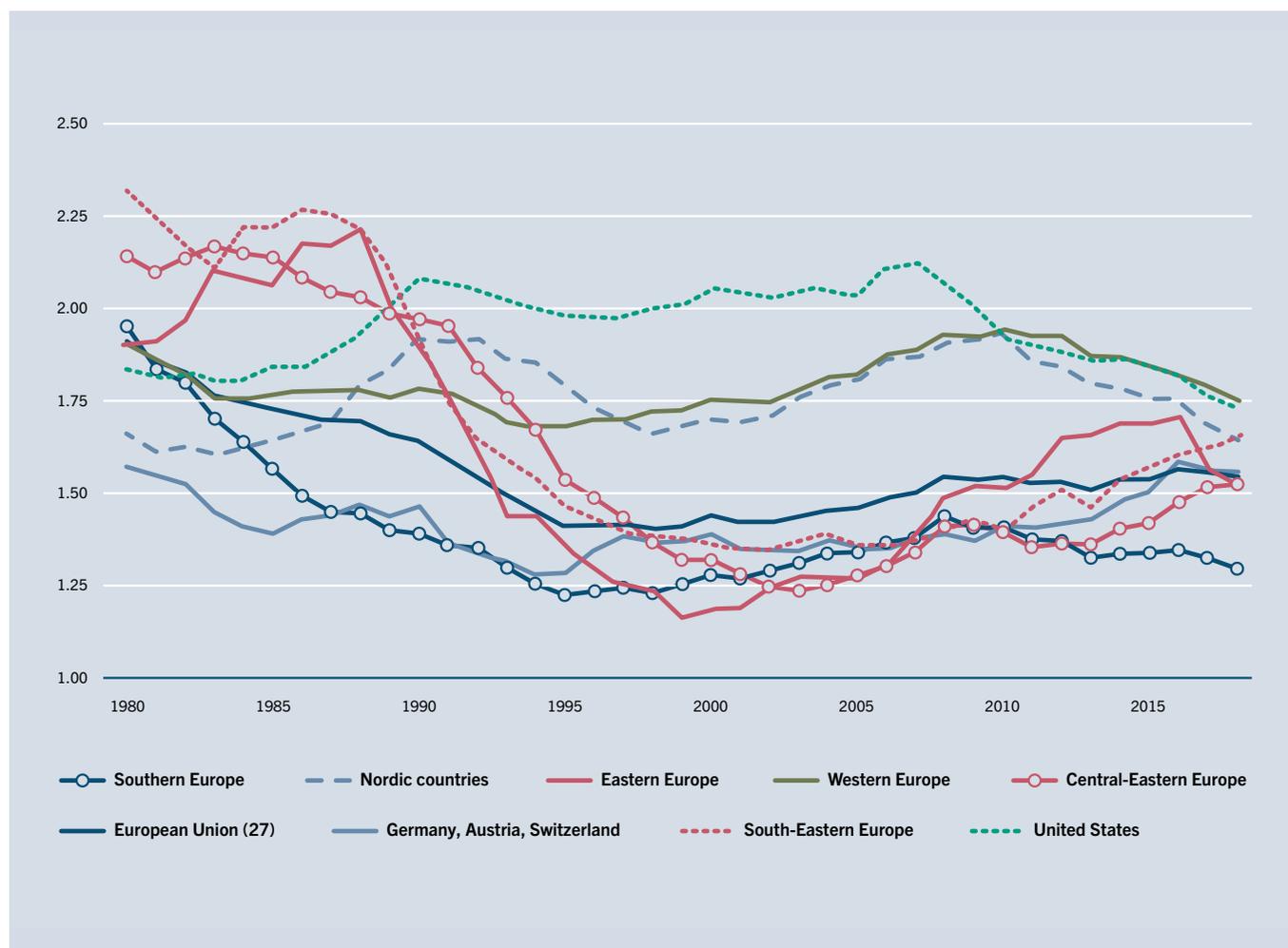
Figure 2. Trends in Total Fertility Rate ("TFR") in different parts of Europe and the U.S. since 1980 (VID and IIASA, 2020).

Uncharted Territory: Fertility and Mortality after the Demographic Transition

There is no widely shared, consistent theoretical framework for understanding how fertility and mortality levels develop once the demographic transition is completed. The intuition of many demographers and other analysts in terms of thinking about future fertility levels has been strongly influenced by the numerical values provided by the series of the widely used world population projections regularly produced by the UN Population Division since the 1960s. These projections reflected the dominant thinking at the time – that increases in life expectancy would level off with the survival curve becoming more and more rectangular but not shifting to the right and the fertility of all countries would converge to a "Total Fertility Rate" (or, "TFR") of 2.1, the so-called replacement level of fertility, reflecting a new long-term equilibrium that would be reached. These assumptions, together with the assumption of a future of little to no international migration, resulted in a demographic outlook where in the long run, after having gone through the turmoil of demographic transition, every population would be in a stable equilibrium with no countries shrinking or increasing. In the absence of any convincing alternative narrative about the future, this set of assumptions made sense and was also politically convenient in the context of the United Nations ("UN") because no government needed to be afraid of a future in which their population would either shrink or grow indefinitely.

However, in recent decades all three assumptions that led to this predicted stability proved to be wrong. Life expectancy in an increasing number of countries surpassed the previously assumed upper limits (Oeppen and Vaupel, 2002), while migration has continued and even increased over time in some regions. Additionally, fertility rates – which are the most influential drivers of long-term demographic trends – continued to fall below replacement level in almost every country that has reached that threshold. As discussed in Section VI, the replacement level of 2.1 is a theoretical construction, so it is unsurprising it has no analogue in the real trends of any country, which do not miraculously stop their decline once reaching replacement level of 2.1, or other. As a consequence, most international population projections now assume a convergence of fertility levels at a lower level, such as a TFR of around 1.85 according to projections by the UN and the Wittgenstein Centre for Demography and Global Human Capital (the "*Wittgenstein Centre*"), a research institution focused on such topics (United Nations 2019; WIC 2019). A set of new global population projections published in July 2020 by the Institute for Health Metrics and Evaluation assumes that ultimate fertility levels will be much lower, settling around 1.3 in most countries by the end of the century (Vollset et al., 2020). But such alternative numbers for a long-term post-transition fertility level are as arbitrary as the choice of 2.1 because there is simply no theoretical or empirical basis for choosing an ultimate fertility level moving forward.

An influential article in 2009, however, showed that for a certain time interval the TFR had a positive correlation with the Human Development Index ("*HDI*"), after reaching a minimum level (Myrskylä

et al., 2009). This was taken as an indication that fertility would not stay at very low levels, but instead recover to some extent as social and economic development progressed. But the experience over the last decade contradicts that assumption. South Korea, which showed the most rapid progress in socio-economic development, had further declining TFRs, which in 2018 reached the lowest national level of any country at 0.98 children per woman and in 2019 even further decreased to 0.92 children per woman. Some of the highly developed countries in Northern Europe that also used to have relatively high fertility, such as Finland and Norway, saw steep TFR declines over the past few years.

Figure 2 summarises the most recent fertility trends in different parts of Europe and the United States. It clearly indicates a departure from the patterns of the early 2000s, when there seemed to be rather stable patterns of high fertility around 1.85 in Northern Europe and the US, and low fertility around 1.3-1.4 in the rest of Europe. There now appears to be some convergence in TFRs across this region to a level of around 1.5. This picture certainly does not confirm the view of a convergence around the higher rate of 1.85, which had been seen in the U.S. and Northern European countries.

Given all these uncertainties and national differences in fertility levels, what then do we know about the likely long-term fertility levels at the end of demographic transition? A major effort to summarise the state of our knowledge about the drivers of low fertility and future trends involving hundreds of population experts from around the world is reported in the work of Basten et al. (Basten et al., 2014). It includes a detailed assessment of different arguments concerning the determinants of fertility in such dissimilar domains as biomedicine and contraception, cultural and social forces shaping fertility ideas, norms and desires, changes in partnership and living arrangements, employment and the economy, education and finally the possible role of policies trying to directly or indirectly influence fertility. This last factor will be discussed in more detail in Section VI. The conclusions from this most comprehensive assessment was that fertility trends will likely continue to be context-dependent, implying that global convergence to any particular level is unlikely, but if such a level needs to be assumed for the purpose of producing population projections, it should be well below 2.1. For projections, an alternative to assuming one convergence level is to produce alternative scenarios reflecting plausible ranges of possible future trends and comparing the outcomes in terms of future population sizes. This approach will be taken for the projections presented in the next section, combining different fertility scenarios with different scenarios on future migration levels, which are even harder to forecast than fertility because of their greater volatility.

At this point it is also appropriate to say a word about the possible impact of the COVID-19 crisis on future mortality and fertility trends. Several recent studies have modelled how COVID-19 mortality could impact life expectancy as a function of the prevalence of the disease in the population, and the age structures of the populations at risk, since the virus affects older age-groups much more severely than younger ages (Marois, Muttarak, and Scherbov, 2020). Generally, the results show that for the year 2020, in countries with a COVID-19 prevalence below 1%, there will be hardly any visible effect on life ex-

pectancy. In the hardest hit regions of Europe, however, there could be short-term decline of some 3-4 years of life expectancy on average, if no harvesting effect is assumed (i.e. if the people dying of COVID-19 would not have died anyhow from other causes over the course of the same year). To what degree there is such a harvesting effect can only be assessed retrospectively, 2-3 years in the future when we will have more detailed information.

If there are no serious lasting health problems among those surviving a COVID-19 infection, then over the coming years the trend in life expectancy should revert back to its earlier tendency to increase, rather than decrease. One can even speculate that in highly developed countries the possible consequences of strong efforts to improve health systems and vaccination rates during the COVID-19 crisis could even reinforce the likely future increases in life expectancy, contributing to longer term continued health outcomes. On the other hand, economic depression together with high unemployment could have serious psycho-social consequences that contribute to higher mortality, depending on the length and severity of the crisis. With respect to fertility, the impacts are even more speculative. There may be two competing forces: one leading to higher fertility due to strengthening family bonds and more time spent together at home, and the other leading to lower fertility as a consequence of economic uncertainty and fears about the future. To see which of the effects dominates, we will have to be patient for at least nine months after the beginning of the lockdown efforts and review the available data at that point in time.

There may be other lasting effects of COVID-19 on the social and economic development of Serbia in particular, and other countries in the region, particularly in the field of migration and possibly on the education system, both relevant for an assessment of future human capital. Greater emphasis by countries on epidemiological safety and economic recovery is likely to keep international travel and labour migration at lower levels, at least in the short-term. Initial political responses continue to evolve, but some have reflected a view that the COVID-19 outbreak and secondary effects will force a larger reassessment of how interconnected states remain, including migration regimes and the Schengen area in Europe. Although it is too early now to make definitive statements about such potential impacts, we will address some of these questions in the following sections.

3 Migration, Ageing, and National Population Dynamics

Migration is the third factor of population change in addition to fertility and mortality. Regardless of a birth deficit (i.e. more deaths than births) populations can either grow or reduce in size depending on migration rates. In Germany for example, the resident population has continued to expand in spite of natural conditions for it to reduce in number; this has been due to migration, with Germany prominently taking migrants from other EU member states. It is hence interesting to disentangle the effects of natural population growth and of migration on future population size.

Table 2 presents population comparisons and projections (both accounting for migration, and excluding migration) for all European countries as well as a number of East Asian countries which are also expected to shrink based on recent scenario projections by European Commission ("EC") and the International Association for Applied Systems Analysis ("IIASA") (Lutz et al., 2018) (with Serbia and other neighbouring Balkan countries highlighted in blue for effect). These results are derived from multi-dimensional demographic modelling techniques that take into account age, sex, education, and other characteristics, building on approaches used by the Centre of Expertise on Population and Migration (CEPAM), a joint research initiative of the EC's Joint Research Centre (JRC) and IIASA.

Country	2015 Population	2045 Pop. Projection (Medium)	2075 Pop. Projection (Medium)	2045 Pop. Projection (Medium) − Zero Migration	2075 Pop. Projection (Medium) − Zero Migration
China	1,397.1	1,341.5	1,040.7	1,348.0	1,053.1
Japan	128.0	110.3	89.8	108.6	85.3
South Korea	50.6	49.8	39.8	49.5	38.8
Thailand	68.7	67.4	56.0	65.5	50.9
Vietnam	93.6	106.5	95.8	109.3	101.8
Albania	2.9	2.3	1.5	3.0	2.6
Austria	8.7	9.2	9.7	8.2	6.9

Belarus	9.5	8.6	8.0	8.4	7.1
Belgium	11.3	12.4	13.3	11.4	10.7
Bosnia-Herzegovina	3.5	2.3	1.2	3.2	2.6
Bulgaria	7.2	5.3	3.7	5.9	4.8
Croatia	4.2	3.7	3.2	3.7	3.2
Czech Rep.	10.6	10.0	9.2	9.7	8.4
Denmark	5.7	6.2	6.8	5.8	5.8
Estonia	1.3	1.2	1.2	1.2	1.0
Finland	5.5	5.6	5.8	5.5	5.5
France	64.5	72.8	80.0	68.3	68.5
Germany	81.7	80.5	80.4	72.7	60.5
Greece	11.2	11.0	10.6	10.3	8.6
Hungary	9.8	8.6	7.5	8.3	6.8
Iceland	0.33	0.39	0.42	0.39	0.41
Ireland	4.7	5.5	5.8	5.4	5.5
Italy	59.5	56.1	50.9	53.3	43.4
Latvia	2.0	1.7	1.6	1.7	1.4
Lithuania	2.9	2.4	1.9	2.6	2.2
Luxembourg	0.57	0.77	0.97	0.6	0.56
Montenegro	0.63	0.6	0.55	0.62	0.56
Netherlands	16.9	18.2	18.8	17.1	16.1
North Macedonia	2.1	1.8	1.4	2.0	1.8
Norway	5.2	6.2	7.2	5.7	5.8
Poland	38.3	34.5	28.8	35.5	30.7
Portugal	10.4	9.1	7.7	9.4	7.8
Moldova	4.1	3.6	2.9	3.7	3.0
Romania	19.9	15.4	10.5	17.3	14.0
Russia	143.9	134.2	129.4	126.0	108.3
Serbia (excl. Kosovo[6])	6.9	5.6	4.4	6.0	5.1
Slovakia	5.4	5.0	4.3	5.1	4.5
Slovenia	2.1	2.1	2.1	1.9	1.6
Spain	46.4	4.8	46.9	43.5	35.9
Sweden	9.8	11.4	13.4	10.3	10.6
Switzerland	8.3	9.8	11.0	8.4	7.5
Ukraine	44.7	38.4	34.1	37.3	30.4
United Kingdom	65.4	73.3	80.0	69.2	69.0

Table 2. Population size across countries (in the millions) (i) as of 2015, projections for countries' populations in both (ii) 2045 and (iii) 2075, according to a "medium assumptions" scenario ("SSP2"), and projections for countries' populations in both (iv) 2045 and (v) 2075, assuming no inbound or outbound migration, with a focus on countries of East Asia and Europe, with Serbia and neighbouring Balkan countries highlighted in blue

Source: WIC, 2019 (Projections for Serbia were updated by Michaela Potančoková)

[6] References to Kosovo shall be understood to be in the context of Security Council Resolution 1244 (1999).

A comparison of the "medium assumption" scenario and the "medium assumption – zero migration" scenario (combined with medium fertility and mortality) shows that under the hypothetical assumption of no international migration, 23 of the current 27 member states of the European Union would have a lower population size in 2075 than today. This population decline results from the complex interactions of current age structures (resulting from past fertility, mortality, and migration trends), assumed further increases in life expectancy (contributing positively to population growth) and assumed fertility levels not so different from the currently observed ones (contributing to long-term population decline). In the EU, only France, Ireland, Sweden, and Finland would experience modest population growth by 2075 under the scenario of no international migration. This is mostly due to a relatively higher level of current fertility, together with a somewhat younger current age structure.

The broader pattern for European countries not in the EU is rather similar as those in the EU. All countries listed in Table 2 would be naturally shrinking without considering in- and out-migration, except for Iceland, Norway, and the UK. Many countries also would shrink under the assumption of a continuation of past in- and out-migration rates, which is the migration assumption in the "medium assumptions" scenario. For Serbia's Balkan peers (highlighted in blue in Table 2 below), the gaps between the "medium assumptions" and "medium assumptions – zero migration" scenarios show how large the impact of out-migration becomes over time. Furthermore, unlike other major demographic events like births and deaths, out-migration is difficult to capture since emigrants often do not register when leaving the country. These population projections use official estimates, but they are in turn susceptible to under-reporting, particularly relevant for the high out-migration countries like those across the Balkans.

Serbia can expect a smaller, but better educated future population according to all the divergent scenarios explored in this study, in keeping with the broad direction of the other countries across Europe. However, depending on how and whether out-migration from Serbia to Western Europe reduces or accelerates over the coming years, the severity of Serbia's population reduction could vary substantially. By 2050, this would mean a nearly 1,000,000 person difference between the high vs. low out-migration scenarios that assume a doubling of recent migration streams or, alternatively, zero future migration (calculated as extreme cases for sensitivity analysis) with otherwise equal assumptions on future fertility and mortality trajectories.

In the "medium assumptions" scenario, in- and out-migration rates are assumed to be constant at the levels observed over the past decades, but when the population base to which these constant rates are applied diminishes over time, this has a compounding effect and also results in declining absolute numbers of emigrants. This constant migration rate assumption is combined with relatively constant future fertility at 1.6 children per woman in Serbia, and slowly improving mortality conditions, similar to conditions in other European countries. Under this "medium assumptions" scenario the population of Serbia reaches 5.35M by 2050, or 28% less than the population today in 2020. This middle-of-the-road "medium assumptions" scenario future falls between the "zero migration" scenario (resulting in a pro-

jected 5.87M in population by 2050) and the "double migration rates" scenario (resulting in a projected 4.89M in population by 2050).

Populations Aging Ahead

In all cases modelled, the proportion of the population above age 65 in Serbia will be higher than today, growing from approximately 21% in 2015 to 31% by 2050 in the "medium assumptions" scenario. These ageing trends are largely set. In the purely theoretical case where (i) fertility would immediately increase by 50 percent – which would bring it closer to the current desired family size (Živković et al., 2017) – and (ii) there would be no (zero) migration, the rate of population ageing could be slowed by more than half. The increase in the average age would only reach 24% of the population being above the age of 65 by 2050, mostly due to the change in birth rate (Lutz et al., 2019).

As described above, population ageing in Serbia is inevitable to some degree regardless of the fertility or migration scenario, and is a product not only of past low fertility and high out-migration, as reflected in the current age structure of the country, but also successes in extending longevity. According to UN data, life expectancy at birth (for both sexes together) in Serbia has increased from 66.7 years in 1956-70 to 75.8 years in 2015-20, thus increasing life expectancy in the country by over 9 extra years of life in the last five decades (UN, 2019). But population ageing does not necessarily mean a growth in dependency if social policies like retirement are flexible and incentivise labour force participation, even in older years. Serbia's educational attainment, a proxy for the skills and adaptability of a population, is expected to grow, with the proportion of people holding post-secondary training or university degrees rising from 21% in 2015 to nearly 33% by 2050 if trends continue.

Actually, this improvement in the educational attainment of the adult population is a near certainty: in Serbia – like in almost every other country – the younger cohorts are better educated than the older ones. As those better educated cohorts move up the age pyramids and the older, less-educated pass away (a process called demographic metabolism) the average education of the population improves, even if there would be some stagnation in the expansion of schooling and a country's education strategy. For example, if the COVID-19 crisis would cause a serious interruption of the schooling system and that would lead to lower learning outcomes over 1-2 years, this new trend – if it cannot be compensated for while children are still of school age – would only translate into a slower increase (rather than a stagnation or a decrease) in human capital for the working age population, as it would slow but not overcome or reverse the broader momentum of educational attainment in Serbia.

A recent analysis in the trends of mean years of schooling ("MYS") and skills-adjusted mean years of schooling ("SAMYS") of the working age population for all countries in the world showed a rather favourable trend over the past few decades: while in 1990 the Serbian working age population had on average 9.91 years of schooling, this increased to 11.16 years in 2000 and 12.06 years in 2015 (Reiter et al., 2020). Based on actually-tested skills, the SAMYS increased even more rapidly from 9.10 years in 1990 to 12.14 years in 2015. Hence,

adults' skills today are even slightly above today's OECD average (by 0.1 years) and increased over the past 25 years by the equivalent of more than three years of schooling. Similarly, the UN's comprehensive index of various education measures shows a steady rise in Serbia's development (UNDP, 2020). Strategies for dealing with population ageing and associated questions of economic dependency (which underscore the importance of human capital) are further covered in the next sections.

4 Human Capital and Labour Force Participation

Population ageing and decline bring a set of clear macro-economic challenges. These relate most immediately to the balance of contributions and payments and the solvency of pension funds, health services, and other social policy programmes. Such national programmes tend to differ substantially from one country to another and a proper assessment of the resilience of the systems to specific demographic changes requires a detailed model for each specific system, which is typically only done within national social security administrations. For this reason, comparative international assessments of the economic burden of demographic changes tend to refer to more general ratios describing the relative sizes of segments of the population that contribute to the system and those that benefit from the system. These ratios are usually called "demographic dependency ratios" and exist in several forms.

Conventionally, these demographic dependency ratios simply involve the rather crude assumption that an individual's contribution is entirely based on their age, i.e. that adults contribute up to age 65 and thereafter everybody is considered a dependent. However, multiple factors including the changing nature of ageing itself require an update as to how demographic change is considered. This has very real implications for whether ageing is seen as having serious economic consequences, or not. Use of chronological age to reflect economic dependency does not do justice to the present-day reality where "age 70 is the new 60" – health and education measures among older persons have vastly increased, extending the older population's productivity far beyond levels in the past. Often overlooked is the fact that even when older persons require care, delivery of such care is an economic activity, and contributes to the national economy in and of itself.

The simple *age dependency ratio* (the green line seen in Figure 3) is still frequently used, but in many cases paints a misleading picture. The projections below for five countries in and around the Balkan region illustrate this point. The results come from a micro-simulation model recently published for all EU member states (Mirdal, Bélanger, and Lutz, 2020). These calculations do not include Serbia but five other countries in the region and thus allow for some comparison against countries that share similar context with Serbia. As can be clearly seen, the age dependency ratio is expected to climb in all of these countries, underpinning popular narratives and reporting of upcoming economic doom. For some of these countries, the number of dependents will seemingly outnumber the number of productive workers by nearly 2 to 1 as of 2060. But these dramatic results obscure important nuances and hide an otherwise uplifting story.

Viewed over the past decades, not only are lifespans longer, but we are living more years in good health (rather than just living). This reality, together with the changing role of women in society and the labour market, is among other factors also reflected in labour participation rates, making the simple use of age as the sole indicator of productivity, as described above, harder to defend. As shown by the *labour force dependency ratio* (the red line in Figure 3), when taking into account actual labour participation rather than using the crude assumption that participation and productive life ends at 65 and everybody below age 65 participates in the labour market at the same rates, a large portion of the feared-increase in dependency never happens. This is due to improving participation rates among the general population and particularly women, but also due to those at older ages.

It is not only for the reason of economic sustainability that labour participation should be encouraged even among older populations however, as studies show that well-being and connection with community are key benefits that people get from continuing to work in their later years. The precise definition of labour force participation differs by survey, in particular with respect to participation in informal work, which might have implications for pension systems depending on how they are structured. The European Labour Force ("*ELF*") Surveys used for the projections in this section define workers broadly, considering as part of the labour force, who is either working for pay, self-employed, or looking for work. This, however, still does not include other types of work, for example, as many women perform work as mothers and caregivers, which is surely of great value to society and allow families to save on the cost of otherwise outsourcing some of these tasks.

With reference to the possible impacts of the current COVID-19 crisis, a lot depends on whether people still in the working ages will suffer lasting health consequences that will make them less productive. While it seems clear that in terms of mortality the highest age groups and people with already multiple health problems are most seriously affected by COVID-19, which would actually lower the dependency in the future due to the so-called harvesting effect, the degree to which working age people will be hampered in their productivity by the pandemic is not yet clear.

The *productivity-weighted dependency ratio* (the blue line in Figure 3) adds another layer of consideration to demographic dependency ratios. This ratio accounts for the fact that not all individuals are

equally productive in society. This ratio uses the educational composition of the population as a proxy for productivity (measured by different wage levels for different educational attainment groups) and shows how trends suggest that there will be more economic output produced per worker, given the improving levels of completed education. While this effect may be diminished as the highest levels of education become less selective and pursued by a larger proportion of the population, making it less of a sorting mechanism at the higher

end of the spectrum, education is importantly linked to adaptability, among other skills. Such skills are ever-valuable in the context of the changing nature of work (particularly with the onset of more remote work brought about by COVID-19), and the uncertainties that further automation and artificial intelligence might bring.

Lastly, the *productivity-weighted dependency ratio - Swedish scenario* (the dashed blue line in Figure 3) explores what demographic de-

Figure 3. : Different demographic dependency ratios predicting the economic burden of demographic changes (primarily, an ageing population) across segments of the population for select countries in the region, 2015-2060)

Source: Marois, Bélanger, and Lutz, 2020

pendency would look like if these countries slowly converged with the highest participation rates for men and women that are seen in the European Union; those observed in Sweden today. In most cases, such improvements in labour participation would in fact mean a future reduction in dependency compared to today, the opposite of the prevailing expectations that an ageing population will bring an overpowering drain on the economy over time. Even if these Swedish-like levels are not reached, the purpose of this scenario is to illustrate the power of incentivising labour participation as a strategy for avoiding ageing-related economic declines. Successes in both labour participation and education, two critical factors for describing any population, imply that the feared rise in dependency from population ageing is largely overstated.

The examples of these five countries in Figure 3 below clearly show that the possible future economic burden of population ageing that tends to come along with population decline very much depends on the perspective and the indicators taken. Whereas the conventional (and even old-school) age dependency ratio assumes that everybody above age 65 is a burden and shows very strong increases over the next four decades by over 80% in Croatia and Slovenia and over 60% in the other countries, the other more meaningful and nuanced indicators show much less of an increase of the economic burden of an ageing population. Already considering the actual labour force participation rates in each country reduces the increase in the burden of nonworker to workers to around 20% in Hungary and Romania and around 30% in Bulgaria and Croatia (using the *labour force dependency ratio*). The outlook improves further when considering the fact that highly skilled people are on average more productive combined with the reality that the future labour force will be better educated that the current (using the *productivity-weighted dependency ratio*). Additionally, if it is imagined that women in the countries covered in Figure 3 below gradually start participating in the labour market to the same degree that Swedish women do today, and pension ages also approach those in Sweden today (the *productivity-weighted dependency ratio – Swedish scenario*), then the demographic burden of dependency would actually decline by about 20% in all countries except for Slovenia, where it would stay about constant.

5 Serbia Amid High Out-Migration

Depopulation in Serbia comes from a specific mix of trends now common across Eastern Europe. Many countries in the region have the low fertility rates typical of the highly industrial countries, paired with high out-migration often seen in lower-middle income countries. This combination has made Serbia one of the fastest depopulating countries in the world. In earlier times, such as during World War I, Serbia suffered immense casualties – by many estimates Serbs had the highest proportional losses of the war with about 16% of the population or 1.25M dead (Keegan, 1998; Radivojevic and Penev, 2014). The historical depopulation was different from today not only because it was the result of conflict, but also because at the time the Serb population could at least "rebound" in some sense given the country's high fertility rates. By contrast, Serbia had only 1.49 children per woman in 2018. If Serbia's 21st century depopulation trend is to be moderated, then it will be critical to guarantee practical and reliable policy support for families as well as reduce the deeply felt economic and cultural push-factors contributing to high rates of out-migration.

Definitive statistics on out-migration, and by extension net migration, are difficult to come by for the whole of the Balkan region. A recent investigation into the data (which labeled the task a "statistical nightmare,") found that approximately 60,000 people leave Serbia each year, with about 15,000 to 20,000 more leaving each year than returning (Judah, 2019). The OECD estimates that more than 650,000 people, mostly young, have left Serbia in the last two decades (OECD 2020). While the scale of movement varies, observers and international organisations widely look to the future with expectations of continued high out-migration in Serbia. Below, Figure 4 details population projections for the "medium assumption" scenario, in which current trends largely continue. As outlined in earlier sections, Serbia can expect a smaller, better educated population in the future.

Serbia's combination of an educated population and the country's close proximity to European economies wanting their labour make it difficult for the country to build up human capital. As measured by the World Economic Forum,[7] the ability of Serbia to retain its talent or prevent "brain drain" currently ranks among the worst of all countries, within and outside the region, placing Serbia 134 out of 137 countries included in the assessment. Peers in the region, like Croatia, Romania, and Bulgaria, fare similarly poorly as they continue to struggle with the same westward migration outflows, which in some cases have accelerated as a natural result of being integrated into the European single market while also being at clearly different levels of economic strength.. Many Eastern European countries have seen a spike in out-migration after their accession to the European Union, and out-migration remains higher in newly acceded countries than their levels before joining, but it is unclear at what new levels they might eventually stabilise.

These experiences give a sobering reason to put out-migration among the highest of priorities in discussions about EU membership and national planning efforts, as this type of out-migration acceleration would likely repeat itself in Serbia if Serbia gets closer to (and eventually attains) EU membership status. Surveys indicated that in the minds of Serbs, EU membership is now closely associated with the facilitation of individuals to move away (Regional Cooperation Council, 2018). The consequential nature of this issue calls on Serbian leadership to proactively reduce migration push-factor pressures before accession, yet still, most of the out-migration dynamics would inevitably be set by the western countries and the reality of the current single market policy framework. Even amid COVID-19, Balkan-focused migration policies in prominent destination countries like Germany have been publicly stated to be based on the interests of the German labour market (rather than the interests of Balkan countries' human capital development). In response, the European Union should provide convincing strategies for avoiding large unintended out-migrations as part of their ongoing outreach to the Western Balkans, as the talks often blur the distinction between a freedom to move and in-effect promotion of the outflows of people from these countries.
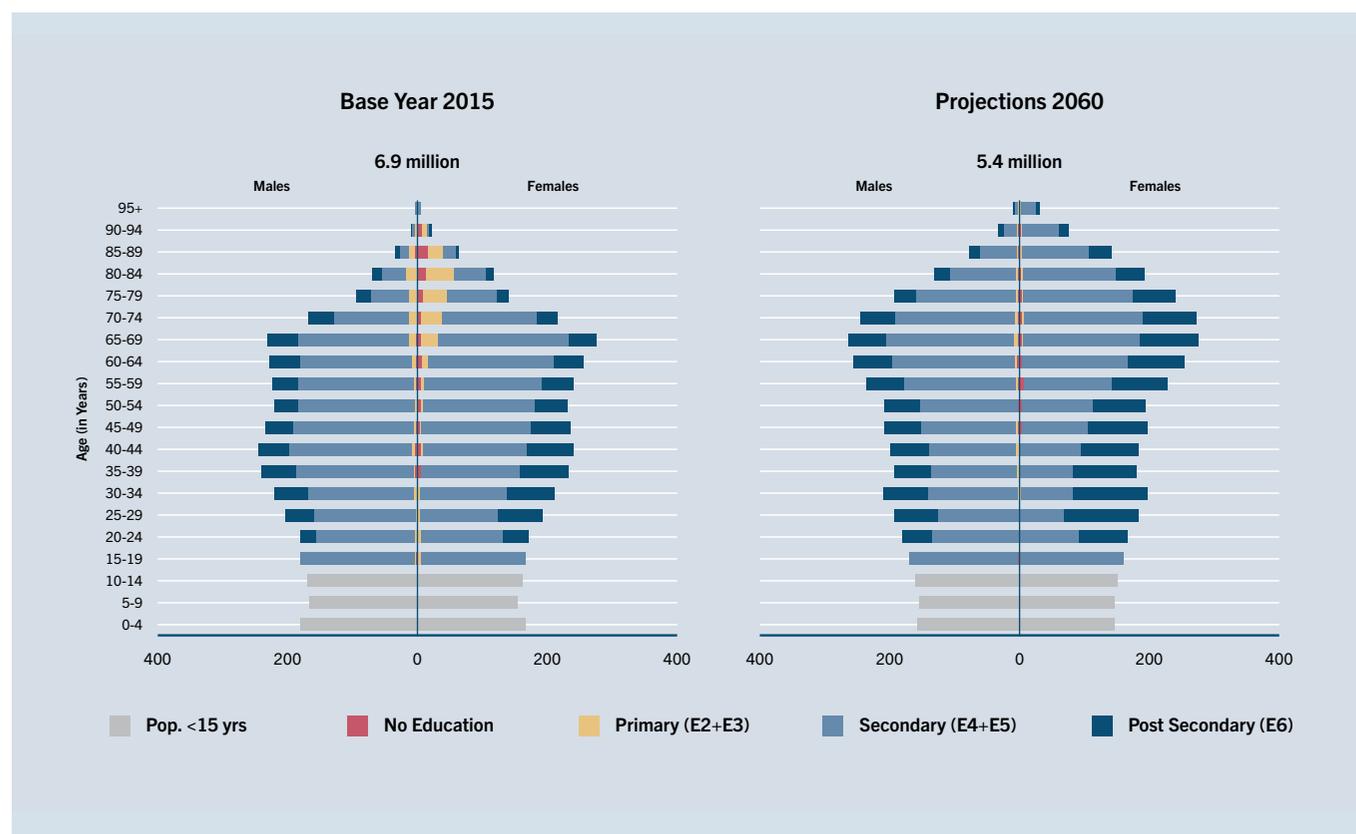
Figure 4. Serbia's population size, and age/education composition, 2015-2060

Source: WIC, 2019

Who is leaving, and why?

Data shows that in terms of human capital composition, out-migration in Serbia has been disproportionately concentrated among the high-skilled and low-skilled workers, as shown in Figure 5. This pattern may be self-reinforcing because low and high-skilled workers have an economic complementarity that can be disturbed. The movement of highly educated people, in particular, the phenomenon known as "brain drain," is commonly discussed with hopes for these workers' return, or a "brain circulation", that brings the most educated and skilled people and their human capital back to their home country. This ideal remains rather theoretical, however, as most of the emigrants from Eastern Europe have stayed in their destination countries (Atoyan et al., 2016). Furthermore, the contemporary trends in emigrant skill composition that is seen in many Western Balkan countries stand in contrast to trends from earlier decades. During the 1970s there was a significant wave of about 1.3M Yugoslavs, many of them Serbs, who left as guest workers heading especially for Germany, Austria, and Switzerland (Bernard, 2012). These workers were used for relatively menial jobs in their destination countries. Today however, a significant proportion of Serbian emigrants carry with them more years of schooling, a product of overall educational attainment rising in the country, with migration becoming more education-selective within the population in Serbia.

Serbian Emigration Rate by Education Level
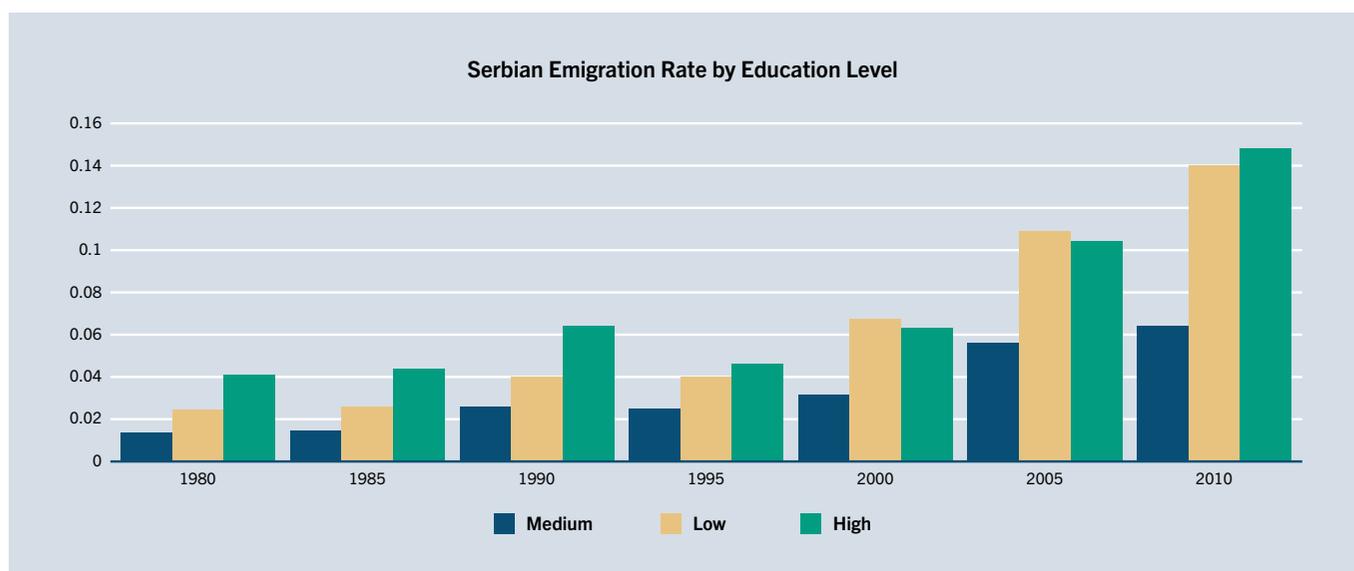
Figure 5. Emigration Rates by Level of Education in Serbia

Source: Brückner, Capuano, and Marfouk, 2013.

Furthermore, many of these emigrants are deciding not to return, in a break with past tendencies.

The reasons behind the outflows of migration in Serbia in current times are primarily economic, but also cultural to a degree. Surveys have found that when asked, roughly a quarter to a third of respondents express a desire to leave the country (Simić, 2018; Regional Cooperation Council, 2018). Students are even more likely to hold such sentiments, with as many as 60% indicating so in one public opinion survey on youth migration (Bjelotomic, 2018). Actual realised migration is naturally much lower, but these sentiments are in line with widespread unhappiness with the general economic, social, and political situation in the country. A study by the Government of Serbia (the "*government*" or "*GoS*") confirms this, finding that the main push-factors for Serbian students to leave are the inability to find a job in their field (27%), low incomes (21%), and low living standards (29%) (Government of Serbia, 2018). Objective material standards have increased for Serbs in recent decades, as in almost all countries, but what is considered to be normal is often more a question of relative wealth and expectations, meaning in the case of Serbia the relative wealth expectations are comparisons against its neighbours and Western European economies.

Besides the economic drivers, a common theme throughout Eastern Europe is the equivocation between going abroad and success. Serbia is no exception in this regard. "Staying here is what young people would call 'a loser's move'," said one Serbian social psychologist in a media report on the topic, a trend confirmed by a broad media review in which the author summarised popular thinking as, "get out of Serbia for a better life" (Simić, 2018; Brezjanović-Shogren, 2019). These blunt characterisations sum up an uninspired narrative of the future that has persisted in Serbian culture, and is accompanied by parental support for young peoples' decision to leave 90% of the time (Government of Serbia, 2018). Both migration and fertility decisions involve a calculation about the future and rely on a general optimism that is lacking not only in Serbia, but in many European societies today.

While Serbian emigrants can give concrete examples of migration push- and pull-factors at work, returnees offer insights into what attracts people to build lives at home in Serbia. Returnees, a self-selected group who have often achieved some financial success, cite as motivations to come back a feeling of belonging, family ties, day-to-day comforts, and even prospects of giving their children a better childhood in Serbia than where they had lived abroad (Brezjanović-Shogren, 2019). Interestingly, the perception of quality of life was found to change with experience in Western Europe and North America, as Serbian returnees seemingly changed from placing highest value on better pay and material success that compelled them to leave, to instead stressing intangible cultural factors that drew them to return home. This finding seems to support the idea that once basic economic security is met, many people would naturally prefer to pursue options other than out-migration if not otherwise feeling compelled to do so out of financial necessity.

What's at stake?

In terms of impacts on the labour force, the food and hospitality, wood, and transportation sectors are some of those left understaffed that are in need of more workers in Serbia. For the higher-skilled workforce, a large number are composed of medical professionals and IT specialists. Serbia produces more health workers than the OECD-average, but the majority of current medical doctors are considering leaving and there is already a lack of necessary specialists in some health sectors (Institute for Public Health of Serbia, 2015). Serbia's youth-concentrated "brain drain," especially in the science, technology, and innovation sectors, results in a loss to the country of around 1.2B Euro each year (WFD and IDI, 2019). Looking at the broader Central and Eastern European ("CEE") region,

the IMF found that emigration from 1995–2012 equated to cumulative real GDP losses of 7% on average for countries in the region, as well as broadly reduced competitiveness, and worsened productivity (Atoyan et al., 2016). Overall, these impacts underscore what is at stake when the education system – the primary skills-forming institution in society – does not adequately align itself with needs of the economy and people are left without fulfilling and experience-relevant channels to make a living. Such coordination is done to varying degrees across Europe, but it is those countries like Serbia with already high out-migration that can least afford the consequences of not highly coordinating and aligning the education sector to the job market. Any possible allocation of study spots or funding configurations for educational programmes inherently require such calculations about the future.

It is too early to say what the consequences of the COVID-19 crisis may be on migration patterns in Serbia. There is preliminary information that around 400,000 Serbs living outside the country came back to Serbia in March 2020, just before borders were closed. If accurate, this would be a significant proportion of the Serbian diaspora returning home. But at this stage it is unclear whether these individuals will mostly return to their earlier workplaces outside Serbia or a sizeable proportion of them will stay home in Serbia for longer. In any case, this could be an opportunity for the government to produce incentives and make attractive offers for them to stay in Serbia rather than leave the country again. Government initiatives to support returnees could include a number of efforts focused on maintaining diaspora ties, hosting virtual job fairs and lowering administrative burdens of return. However, these efforts cannot substitute fixing the underlying causes driving people out of Serbia. To help solve the disconnect between years spent in education and the lack of available jobs that feed resentment and pessimism among youth particularly in Serbia, the Serbian government has among other initiatives started promoting dual education, which brings companies into the educational and training process, as well as forming sectoral skill councils focused on employment fields (Vasić, 2019). These actions are a healthy and necessary development, and if successful in streamlining the transition from student to worker, should be expanded throughout the vocational and university systems.

Simulations for Serbia and the European Union confirm that to deal with the future demographic changes of depopulation and ageing, improving labour participation is key (Kupiszewski, Kupiszewska, and Nikitovic, 2012; Lutz et al., 2019). Automation and increased worker productivity offer additional strategies to thrive with a smaller labor force. To harness human capital and maximise returns, it is in the interest of Serbia to continue to further its efforts to consciously and flexibly manage its education system to be responsive to labour market needs, which works against the current skills mismatch and is a source of common frustration that could be mediated by providing viable paths for Serbs to find experience-relevant livelihoods and build fulfilling futures.

6 Pro-Natal Policies in Europe

As recently as the 1980s, Serbia had a birth rate at replacement level. By 2018, the birth rate stood around 1.49 children per woman, indicating a variety of economic and cultural changes that have since prioritised other pursuits. Low fertility levels have concerned national governments at least since the Franco-German conflict in the 1870s, as described in the historical section. Once fertility levels in several European cities and among specific ethnic sub-populations fell below the replacement level of two surviving children per woman in the 1920s and early 1930s, there was another wave of concern about the assumed negative consequences of low fertility. Shifting national power balances and economics drove the renewed focus on low fertility during and after this time period, with policies attempting to counteract the trend finding very different expressions in a variety of countries.

In Sweden the famous pro-natal population policies go back to Gunnar and Alva Myrdal's work in the 1930s, which pointed to the fertility-enhancing effect of a welfare state that incentivises women to both participate in the workforce and also raise children, which was a rather radical view at the time. A more authoritarian approach was taken by Nazi Germany, which gave strong moral and material support to families with many children, with an explicit emphasis on the benefits this was providing for the German nation. After World War II, partly because of the excesses these policies were taken to in Germany, in most countries the special fertility-enhancing policies were no longer high on the policy agenda (except for France, where pro-natalism was in fact strengthened). In the aftermath of World War II these countries experienced the post-war baby boom, which in the U.S. and many European countries brought fertility rates up to three or more children per woman on average. This baby boom resulted from a combination of growth in early marriages (thus ending the previous "European marriage pattern" characterised by late marriage and high proportions of people never marrying) together with economic growth and widespread optimism about the future.

During the 1970s, many European countries experienced rather sharp declines in fertility rates. Because this decline coincided with the introduction and broad use of the hormonal contraceptive pill, this decline was even labelled the "Pillenknick" (meaning a bend in the

birth rate resulting from the pill) in German-speaking countries. But the pill was only a more effective method of contraception than the previous ones, and not the underlying reason for the decline in fertility rates which instead resulted from social and normative changes as discussed above in the section on demographic transitions. Already in 1978, an important book published by the Council of Europe, "Population Decline in Europe," described the social changes unfolding (Council of Europe, 1978).

An interesting quasi-natural experiment in pro-natal policy can be tested by the comparison of the two German states, east and west, split by the iron curtain. Up until around 1974, the two states shared the same steep decline in fertility rates until the East German government decided to implement strong countermeasures, whereas no new specific pro-natal policies were introduced in the West (Büttner and Lutz, 1990). East German fertility showed a sharp recovery whereas in West Germany fertility continued to decline. The effective policies in the East explicitly addressed a barrier to family life (and thus desire for fertility), which was an acute housing shortage for young couples (including those looking to start families). Every woman got privileged government supported housing with the new reforms as soon as she was pregnant, even irrespective of her marital status. Together with generous financial support and childcare facilities, these policies helped to turn around the decline in fertility in East Germany. Interestingly, many female university students also decided to have at least one child early on, contrary to the general trend in industrialised societies, presumably in order to benefit from these support measures. As a heritage of this pattern, even after German unification, women in the Eastern part of Germany continued to have their children much earlier than in the West.

In more recent decades, an increasing number of governments have tried to raise fertility rates from below replacement fertility through various forms of family-related policies. This increase in attention at the level of national leadership is documented by regular surveys taken by the Population Division of the UN Department of Economic and Social Affairs. This data shows that the share of countries in the world stating that they have explicitly pro-natal policies has risen from 10% in 1976 to 15% in 2001, and up to 28% by 2015. Such policies range from direct pro-natalist campaigns to softer regulations that try to help people to balance work and family life and have the number of children that they consider personally ideal. A key differentiating characteristic of policies across countries is whether they emphasise general financial assistance, mandated flexibility to take parental leave after childbirth, or the provision of childcare facilities. There is no clear evidence of cross-national convergence in such policies. Different mixes of these three policy instruments are rooted in welfare state histories as well as different attitudes towards families and the role that governments should play in influencing such personal decisions.

In terms of the scientific literature studying the effectiveness of pro-natal policies, there have been several attempts to summarise the experiences and the effects of such policies on the level of fertility in different countries. Among the mixed cases, not all of the implemented policies have achieved the intended changes in the conditions under which young women and men decide to start their families or extend them, and not all changes in these conditions actually resulted in changes in observed fertility rates. Gauthier concluded from a comprehensive survey of many such policies and their effects that the evidence of family policies on fertility trends is inconclusive (Gauthier, 2007).

Luci-Greulich and Thevenon studied the experience of 18 OECD member countries over the period from 1980 to 2007. Due to the fact that the early 2000s were a period of increasing TFRs (total fertility rates) in many rich countries, this study aimed at assessing the role of different policies in what they called the "recent fertility rebound" (Luci-Greulich and Thevenon, 2013). Their results show that all instruments of family policy (paid leave, childcare services, and financial transfers) had positive influences on fertility. Comparing the different interventions, they found that both in-cash benefits during childhood and childcare services had bigger impacts than leave entitlements or benefits granted around childbirth. Findings on the most effective pro-natal policies suggest that parents have a longer time horizon in mind and calculate the anticipated stability and persistence of such policies when making fertility decisions. . Changing such policies every election cycle or otherwise not guaranteeing their durability undermines the confidence of would-be parents in such support mechanisms.

Another very recent comparative study also takes the latest TFR declines in several industrialised countries into account (Stone, 2020). With a specific view towards the U.S., it asks what the U.S. can learn from the experience of other countries, mostly those in Europe. It compares the experiences of Poland and Hungary as prominent examples of large-scale public efforts to boost the birth rate. Studying short-term trends in CBR (the crude birth rate) it shows that in Poland, the birth rate increased rather quickly after the policy initiatives by some 10% before falling to a level that was still 6% higher than prior to such policies. In Hungary, on the other hand, different but equally ambitious efforts have resulted in a 2% short-term increase followed by a decrease, falling to below the initial CBR levels before such policies were put in place. One problem the author speculates in the study is that the Hungarian system is designed to heavily encourage larger families, in particular for couples to have a 3rd child (or more). Still, at only a couple of years old, it is too early to judge the long-term success of these ambitious initiatives and the results may change.

In the study described above, Stone also provides a meta-analysis of 34 academic studies since 2000 assessing the effectiveness of specific pro-natal policies, 22 of which contain sufficiently detailed analyses of the policies' effects to be used to estimate how fertility can be influenced by various pro-natal incentives (Stone, 2020). The results show that an increase in the present value of child benefits, equal to 10% of a household's income, can be expected to produce between 0.5% and 4.1% higher birth rates. In summary, the study finds that more financial support does yield more children, but it takes substantial funding. Or, in other words, trying to boost fertility rates to replacement levels, purely through cash incentives, is prohibitively expensive.

More fundamentally, what is the goal of fertility policies? Technically, replacement fertility is defined as the level of fertility by which one

generation of women is fully replaced by another. In practical terms this is often approximated by a TFR of 2.1 (which is slightly above two per woman, to adjust for child mortality and the sex ratio at birth). In high mortality settings a replacement fertility rate TFR can even be as high as 2.4-2.5, and in very low mortality settings it can be as low as below 2.1. But replacement level fertility does not necessarily mean that the population size is constant in the longer run. This is only the case when the effect of the starting age structure (the momentum of population growth) has disappeared and there is no migration and no further changes in mortality or life expectancy. Since no real population has these features, replacement fertility is really a very abstract concept in the context of stationary population theory – one that has escaped the lab of technical demographers and influenced the thinking of many people who do not really understand the implications or relying on these measurements which are ill-suited for the features of the real world.

Discussion of fertility indicators — which is best to rely on?

Different fertility indicators can tell very different stories. When trying to assess the question as to whether fertility levels should be seen as too low and whether certain policy measures actually influence fertility trends, it is of great importance which indicator is being used.

Up until the 1980s the most frequently used indicator was also the most easily available – CBR, which simply states the number of births in a given country divided by the total population of that country. But this indicator is unsatisfactory for several reasons, mostly because it is greatly dependent on the age structure of a specific population. In a country with a high proportion of women in reproductive age, the CBR can be higher than in another country with fewer women in

that age group, even though the number of children per woman might actually be higher in the latter. This fact greatly limits the comparability of CBRs across countries and over time. To avoid this problem, the TFR indicator instead uses the sum of all the age-specific fertility rates observed in one country in a given calendar year, thus eliminating the misleading effect of differing age structures across countries and over time.

The TFR is the currently most frequently used indicator and can be interpreted as the mean number of children a cohort of women would have if, at a given age, they experience the age-specific fertility rates observed in this calendar year. This hypothetical cohort of women is sometimes also called a synthetic cohort because in reality, no group of women actually pursues such a set of constant fertility rates. But more recent research has shown that TFR has another problem, in that it is very sensitive to distortions caused by the changing timing of fertility (called the "tempo effect"). Specifically, even minor changes in the mean childbearing age of have significant impacts on the TFR – for example, if 10% of women decide to postpone their births a year into the future, the TFR for the current year will be 10% lower, even if women have the same number of children by age 45. Meanwhile, the mean childbearing age would only increase by a tenth of a year.

The impact of these timing, or "tempo," distortions on the TFR indicator is illustrated in the case of another Eastern European country, the Czech Republic in Figure 6 above. While the TFR was rather stable, at a comparably high level, until the country's transformation in 1990, it entered a precipitous decline, falling from around 1.9 to less than 1.2 by 1996 and staying at this very low level until 2003. As the figure illustrates, this steep decline in the TFR was associated with a rather strong increase in the mean age of first birth. Since 2004, the TFR has recovered to its current 1.7 and the increase in the age at first birth has largely stopped. Similar patterns have been observed
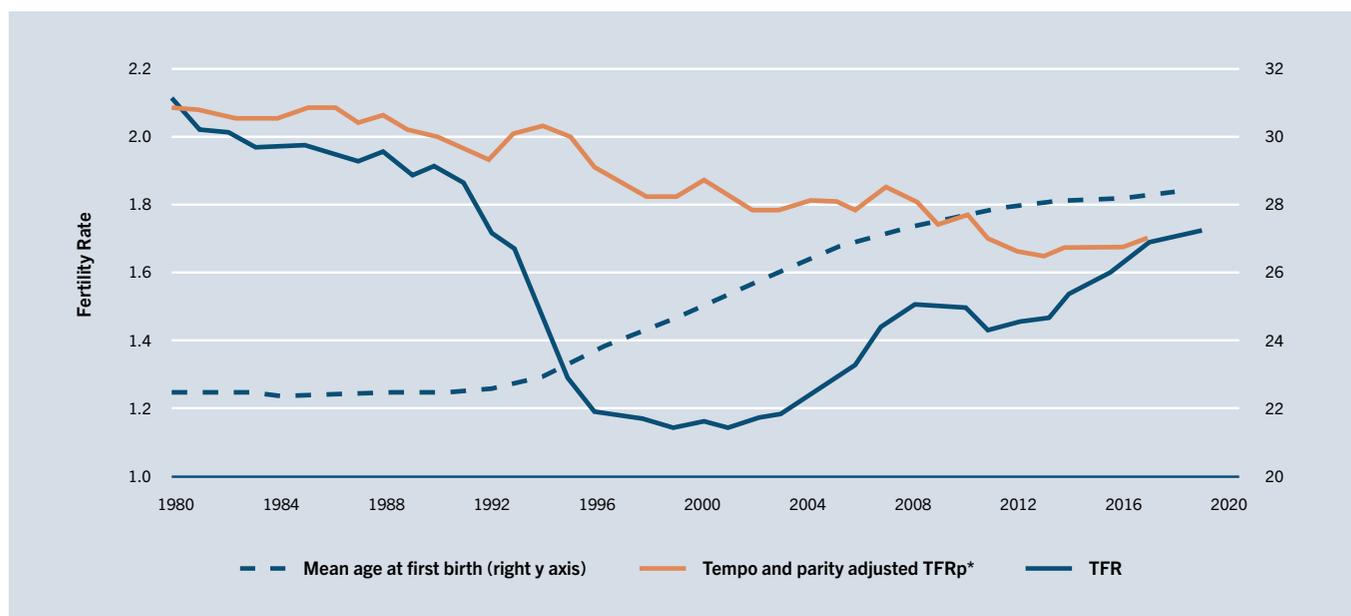
Figure 6. Trends in TFR and Adjusted TFR in the Czech Republic Region from 1980-2019

Source: VID and IIASA, 2020.

in many European countries. However, the recent recoveries are very dependent on the technicalities of the measure of fertility and are often hastily interpreted by national governments as successes of their respective policies aimed at higher fertility.

Do these trends in the TFR tell the right story in terms of the "quantum" of fertility, or the undistorted level of fertility or the actual number of children women on average have over the course of their lives? The best measure clearly would be completed cohort fertility. This ultimate number of children that women had over their lives can, however, only be assessed once a female cohort has completed its childbearing, which in practical terms requires waiting until age 45-50. For the impatient observer, this is usually too long a period of waiting to understand the impact of certain policies on fertility, in particular since most of the children of this cohort will have already

been adults by the time the cohort is "completed," born 20-25 years prior. An effective and relatively new approximation of the ultimate, true level of fertility using contemporary information is called the "adjusted TFR," which is designed to eliminate the distortions due to tempo effects and changes in the parity distribution (Bongaarts and Sobotka, 2012). This adjusted TFR is shown as the orange line in Figure 6 above. For the Czech Republic, with some minor fluctuations, there was an almost linear decline in the quantum of fertility from the 1980s to the more recent years. There is neither a precipitous decline nor a spectacular recovery, as implied by the TFR. This also indicates that claims that certain policies have led to higher fertility levels in this case would, at best, be valid in terms of slowing the increase in the mean age at births without influencing the quantum of fertility.
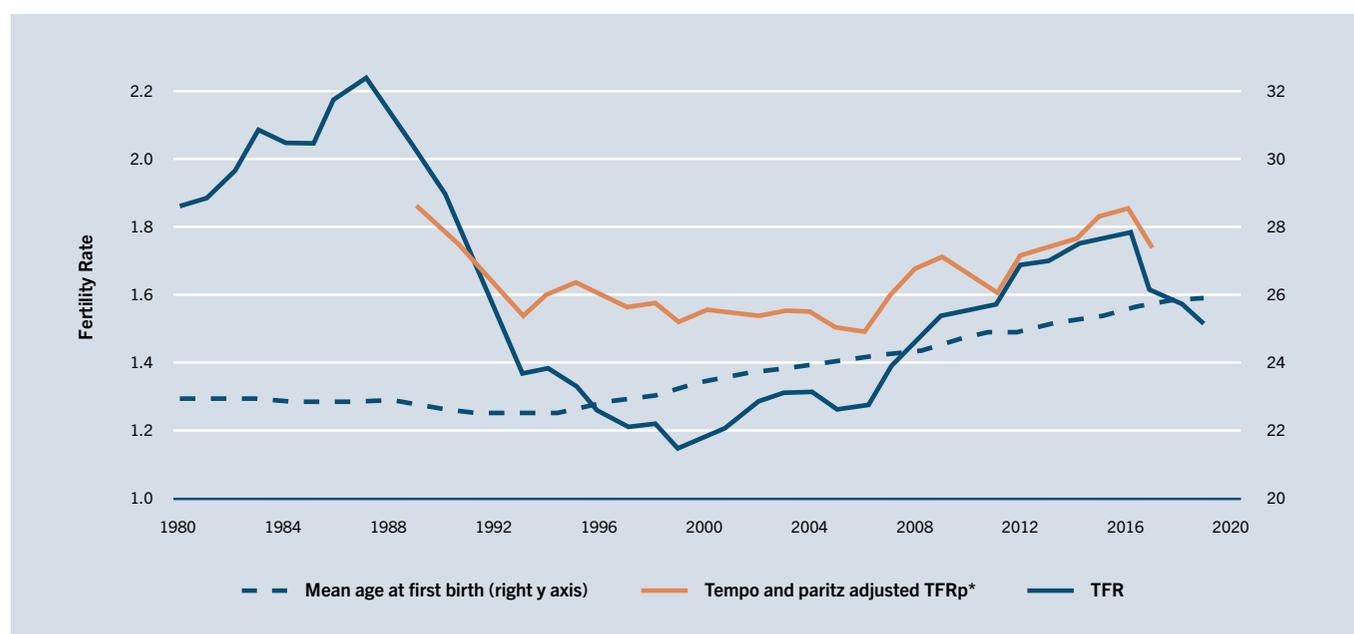
Figure 7. Fertility Trends in Russia

Source: VID and IIASA, 2020.

Figure 7 shows a graph comparable to that in Figure 6, but for Russia, which is probably the most prominent case of robust pro-natal policies in recent years in Europe. The pattern in Russia is actually quite similar to that in the Czech Republic, with Russia experiencing a precipitous decline in TFR from more than 2.0 to less than 1.2 associated with the political, economic, and social upheaval during the 1990s. In Russia, the increase in birth rates has been correlated with quite significant pro-natal measures and is widely interpreted as evidence that such policies indeed work if they are generous enough. The TFR in Russia reached a level of almost 1.8 in 2016, though it was followed by a regression of TFR back down to 1.5 in recent years. The orange line in Figure 7 giving the "adjusted TFR" again shows much less fluctuation when relying on the "adjusted" methodology, although, unlike the Czech Republic, there was a real increase in the estimated quantum of fertility in Russia between 2005 and 2016. Whether or not

this higher fertility will continue its momentum will be shown by the data over the coming few years.

But beyond these technicalities, is it really desirable for all populations to aim for the stationary effect that is implied by maintaining replacement-level fertility? A study has systematically addressed this question by asking what the "optimal" fertility level is, according to different sets of criteria (Striessnig and Lutz, 2013). If the goal is for a country to outnumber its neighbours then the "optimum" level of fertility is tied to the competing group. And if the neighbours have the same goal, then the search for an optimum fertility level can become an unsustainable arms race. If, on the other extreme, the goal is to minimise the human footprint on this planet without attaching special value to human life – as is suggested by proponents of strong sustainability measures – then the "optimum" fertility might be as low as zero.

If indicators of human well-being and the cost of population ageing are taken as criteria, and if the population is stratified by education groups to account for differential productively, then there is a rather broad long-term "optimum" TFR range, from 1.5-1.8 (Striessnig and Lutz, 2013). From this perspective, the optimum TFR may be below 2.0 because with fewer children, more can be invested in each child, thus enhancing productivity. But below 1.5 the cost of ageing and associated pensions would offset this benefit in this economic weighing of costs and benefits, and there are surely tipping points along the way between 1.5 and 2.0 where economies of scale are lost and the broader economy becomes less productive. If other considerations like natural resource degradation or climate change are added to the equation then the "optimum" would be arguably lower, depending on the local conditions and the weight that longer-term environmental concerns are given in relation to shorter-term economic concerns. Still, unless we become immortal or migration inflows for a given country become never-ending, at some point (at least over several centuries) any population that does not reproduce itself eventually disappears. In the timeframe of policy-making and the plannable, what should be considered as an optimal level of fertility is a matter of values, judgement, and priorities – whether that means below, at, or above a replacement level TFR of 2.1.

7 Economic and Geopolitical Consequences of Population Decline

In the economic literature a lot has been written about the economic consequences of population ageing, but much less so on population decline and depopulation associated with strong out-migration (possibly because it has not yet affected the countries in which the leading economists are based). But it is reasonable to assume that the economic effects of declines in population size go beyond those associated with population ageing, through lesser economies of scale in terms of market size or certain sectors of the economy that are closely linked to an increasing population, such as the construction industry.

Since economists often tend to think in terms of equilibria, their first approach would be to view population decline as just a transitory phenomenon up until a new stationary population is reached. However, the process of shrinking may lead (a) to significant societal adjustment costs during the transition from larger to smaller population numbers, (b) a change in the distribution of the population as well as a change in the distribution of outcomes (wellbeing) across sub-populations, and (c) possibly different long-term outcomes in terms of economic performance and wellbeing depending on how the process is shaped by policy-making (e.g. the extent to which the shrinking of the labour force can be counteracted by investments in education or other positive productivity gains).

In trying to address more systematically the possible economic challenges associated with population shrinking one can first think in terms of undesirable imbalances arising in the process.[8] The first imbalance refers to ageing, which is typically associated with population shrinking. This in turn is creating the well-known problem of a (possible) increase in economic dependency due to the older, more dependent population. The policy challenge is to offset this by ensuring human capital investments, besides increases in female labour force participation and raising the retirement age.

A second possible imbalance lies in the geographical distribution of the population, since in many empirically observed cases of population shrinking there is a tendency for the population to cluster in agglomerations, which implies: (a) regionally differentiated processes of localised shrinkage (or even growth) of populations, which are typically characterised by strong inter-regional migration within the country; (b) cross-regional gradients (often an urban-rural gradient) in terms of the scope or needs for policy-making or even the direction of policy-making (for example, policy needs for the housing market, calling for expansion in agglomerations, but for "downsizing" in rural areas and minor towns). In addition, there are cross-regional patterns of behaviors and attitudes, as well as spillovers (for example, with respect to all the incentives that govern migration); and (c) population sorting (for example, the young and educated moving into agglomerations, leaving the old and lesser-skilled behind), which is a particular challenge in cross-regional migration (and may reinforce cross-regional imbalances).

Finally, in terms of aggregate economic activity, population shrinking (all else equal) will typically reduce total GDP or lead to lower aggregate growth in a country. However, unless pure size of a population is one of the most important factors (for example, for defense, or the ability to undertake large-scale investments in infrastructure), the focus should be on per capita values because this is what matters for the economic well-being of people. Interestingly, lower population growth is traditionally perceived as beneficial for per capita income. The reasoning for this is weaker capital dilution: less investment is needed to equip new workers with capital (and thereby maintain the capital stock per capita) so that a given volume of savings can be invested to increase the capital stock per worker and, thus, raise labour productivity. Lower population growth can bring other eco-

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[8] This section benefited greatly from scientific input from Michael Kuhn.

nomic benefits in terms of higher female labour force participation, the quality-quantity trade-off as a facilitator of human capital investment, and the weakening of congestion effects (related to common infrastructure, the environment, etc.). But there are also possible offsetting effects that negatively influence per capita income in the event of lower population growth: scale effects (or reverse scale effects) of a dwindling population can lead to reductions in specialisation and slower innovation, as well as imbalances in the supply and demand for labour leading to mismatch and possible brain-drain effects (in open economies), especially if there is selective migration.

While this list of possible economic implications of population shrinking is only a summary from the state-of-the-art economics literature, this list also presents a research agenda for deeper and empirical analysis of the various different mechanisms at work that can have offsetting effects in competing directions. In other words, from a theoretical point of view, it is not clear at all whether the economic effects of population shrinking are on balance positive or negative. The policy challenge is, thus, to contain the potential negative side-effects of population shrinking by ensuring adequate investments into education or

health, so as to raise the human capital per worker by enough to offset a potential reduction in the number of workers through productiviy gains. Investment into the automation of labour offers another management strategy to produce more output with fewer workers, a prospect being pursued by many advanced economies.

Aside from possible economic impacts of population decline, there are also widely discussed geopolitical implications from the shifts in relative population sizes due to rapid growth in some parts of the world – in particular in Africa – combined with declines in other parts (such as countries in Europe). But as we have discussed in the introduction and illustrated in several other sections, it is the headcount that matters, but rather what is inside the heads that matters most, i.e. the human capital mostly in the form of education and skills. Figure 8 below shows the trends in four world regions of populations by level of educational attainment, with reconstructed data back to 1950 and projections according to the "medium assumption" scenarios from the most recent population scenarios produced by joint efforts of the EC and the Wittgenstein Centre (WIC, 2019).

Figure 8. Actual and projected populations (in millions) by level of education from 1950 – 2075 (grey = current children, red = no education, orange = primary-school educated, light blue = secondary-school educated, dark blue = post-secondary school educated), assuming "medium assumption" scenario across four key UN regions

Source: VIC, 2019

Figure 8 contrasts the two European regions (East and West, using the UN regional definitions) with relatively stable population sizes against the rapidly growing continents of Asia and Africa. While the population of Eastern Europe (including Russia) is clearly on a declining trajectory in terms of total population (from over 300M around 2000 down to less than 250M projected by 2075), the population with post-secondary education is quite strongly expanding to almost 100M. Given the overriding importance of human capital discussed above, this is actually a quite promising future trend and looks certainly much less negative than the total population numbers alone would imply through a focus on shrinkage.

In Western Europe the trend is not so different, with the difference of some further projected population growth, mostly due to the assumption of continued migration inflows. The projected expansion of the population with post-secondary education is more rapid in Western Europe than in Eastern Europe due to stronger recent investments in higher education, if trends continue. But there is no reason why Eastern Europe could not try to also pick up speed in its future education expansion, and already the ratio of non-workers to workers in Eastern European countries is often at a more favourable balance compared to Western Europe.

In Figure 8, Asia is clearly the most populous continent with current population levels of 4.6B people, which is almost 60% of the world population. But fertility trends in most Asian countries – in particular in China – have seen a very rapid decline and therefore Asia's total population is expected to peak around 2050, at somewhat more than 5B people, though the highly-educated population will continue to grow. Considering that in 1950 still more than half of the adult population of Asia had no formal schooling at all (the red area in Figure 8), it is remarkable that today more than half have secondary school education (meaning they have completed at least junior secondary schooling) or higher education.

Africa's population is still likely to more than double, from its current 1.3B to around 2.8B by 2075. But in Africa today, still a third of the entire adult population has no formal education at all, and the proportion with post-secondary education is marginal. In the theoretical case of current trends continuing for the next decades, Africa would take decades to catch up with where Asia is today in terms of education levels, and only by the end of the time horizon in 2075 would its education levels be comparable to those of Eastern Europe today. Geopolitical changes will depend heavily on the human capital and associated economic performance of countries and world regions. In this respect, education-specific population projections reveal a relatively advantageous position for highly developed countries compared to the future that trends in future population size alone may imply when viewed in isolation.

8 Comprehensive Policy Responses: Strengthening the National Human Resource Base

While during the second half of the 20th century (at least up through 1994) the dominant population policy paradigm, also supported by strong donor agencies, focused on curbing rapid population growth in developing countries through family planning. There were also dissenting voices to this paradigm, mostly from socialist countries at the time, that pointed at the importance of population growth for social and economic development. In the 1980s, the view that population was a neutral factor with respect to development also became a popular belief. The beginning of the new century has seen increasing differentiation, if not confusion, about the goal of the population policies and the appropriate instruments for pursuing them. While before 1994, fears relating to population growth in developing countries dominated discussions in international fora, some forms of pro-natalism have always existed and shaped the policies of certain countries, though they had distinctly specific national perspectives. The 1994 International Conference on Population and Development ("*ICPD*") in Cairo codified a major shift away from demographic targets to a focus on individual reproductive and human rights. While important from a human rights perspective, this shift also resulted in generally less attention given to aggregate population-level considerations. There now remains a vacuum with respect to population policies addressing populations in the proper meaning of the word, as aggregates of people whose changing size and composition is consequential for the well-being of individuals and societies alike.

Today, governments of an increasing number of countries, whose low fertility levels and rapidly ageing populations cause serious concern, are actively searching for policy interventions that are both effective at the population level and socially acceptable at the individual level. This issue is exacerbated in countries like Serbia that experience significant out-migration and thus lose people and their skills to other countries that pay higher wages. It is this combination of negative natural growth (the balance of births and deaths) and significant

out-migration that makes depopulation a hot issue of highest policy concern in the countries affected by these phenomena.

What would be an appropriate population policy paradigm that could effectively address these concerns of depopulation and at the same time also be applicable more broadly to other countries that are still in earlier phases of their demographic transitions? In an article entitled "*A Population Policy Rationale for the Twenty-First Century*" it was suggested that the goal of population policies ought to be to strengthen the human resource base for national development as well as global sustainable development (Lutz, 2014). Population policies with this purpose can be viewed as "public human resource management," to stress an analogy that is widely understood among the private sector. Under this approach no certain population size, specific growth rate, set fertility rate, or a particular age structure is viewed as a goal in its own right. Within the human rights framework, population policies should – rather than achieve what could be arbitrary targets – try instead to efficiently and flexibly manage our public human resources to achieve the highest long-term well-being of current and future generations.

Similar to a big company which tries to advance the skills of its employees and retain the talent it employs, a national government should also have consistent and coherent strategies that strengthen the skills and maintain the well-being of their population as a way to help its people establish satisfying lives and build up the human resource base of their country. The instruments for pursuing such aims involve a broad range, from family and social security policies, to education and health policies, to migration and labour market policies. Education in particular, as the most important state institution for preparing young people, should prioritise giving the next generation the skills (quality and type) a country needs from its labour force for meeting its collective needs, both to the benefit of individuals and the country as a whole. Such policies to limit gaps in skills should involve several of the existing ministries which typically work in isolation on specific sectors rather than feeling responsible for cross-cutting collaboration to jointly address the different aspects of human resources. It might even be worth thinking about the creation of a new coordinating agency (or new ministry) directly reporting to the Prime Minister that would oversee the synergistic collaboration of public efforts to this end. Comprehensively addressing the challenge of public human resource management can help to integrate the often separate policy areas into one overarching policy to the benefit of each country, its economy, and its population.

For highly developed countries, a lack of coordination on these matters and resulting labour shortages often mean that labour migration policies compete against the goals of international aid or regional development, all of which are expressed by the same government. As a matter of good practice and to avoid these disconnects, there should be explicit consideration of how relevant policy decisions impact the human capital resources of the countries of origin in the case of high out-migration areas. Already in the 1970s these concerns sparked heated discussion at the UN after economists Bhagwati and Dellalfar proposed a tax on professional and technical emigrants from developing countries to help repay the communities for their consuming of the developing country's limited educational resources, and transferrance of this "wealth" and the unrealised contributions they were expected to make in the richer countries rather than their home country (Bhagwati and Dellalfar, 1973). This was seen as administratively and even more so politically difficult to implement, but it is not without precedent that a country requires a tax relationship with its citizens abroad, as for example the U.S. today requires of its citizens working abroad. While Bhagwati and Dellalfar's direct correction of externalities focused on the individual who had benefited from a developing country's investment in them, later variations of the proposal dealt with the topic at the country-level, requiring the active recognition of the problem by governments and potentially uncomfortable changes on the part of the highly developed countries.

In Europe specifically, there is much talk of solidarity, which perhaps in its most agreeable form can be defined as pursuing mutually beneficial interactions of countries between and among each other. To the extent indifference, or active recruiting and policy frameworks, fuel persistent out-migration – especially of highly educated individuals – from more economically vulnerable and depopulating neighbours, such as between the Balkans and Western Europe, it should raise questions of solidarity. This is perhaps easiest to understand and less abstract when the outflows get dramatic, as in the case of Romania losing more than 50% of its medical doctors to its fellow EU Members over the last 10 years. A domino effect has ensued as Moldova lost similar proportions of its medical doctors to Romania, with the poorest most often paying the price in the end. For what is sometimes talked about as a force of nature, these outflows are inevitably partial products of political decisions or indecision in both the sending and receiving countries. Besides the self-interest countries have for crafting coherent national human capital management strategies with the purpose of meeting their needs, it is also a matter of acting responsibly for those leaders in the international community.

Multifaceted Nature of Depopulation in Serbia - Recent Trends and Prospects

Vladimir Nikitović

1 Demographic Challenges

Very low or negative rates of population change are among demographic issues of great concern in all countries of the developed world. The population growth in Europe is the lowest of all the major world regions, and the Europe's population is expected to gradually decline by the end of this century unlike the global population (Van Nimwegen, 2013; United Nations, 2019b). Although the population of the EU-27 is still growing but at a rather slow rate, which is assumed to turn negative beyond 2050 (Eatock, 2019), 13 EU member states have experienced decline in total population. Four of them are neighbouring countries of Serbia: Croatia, Bulgaria, Hungary and Romania, all of which have been affected by a negative rate of population change. In Croatia, Bulgaria and Romania, the population decline was induced mostly by a negative natural change supplemented by net emigration, while in Hungary it was solely due to a negative natural change. In all of them except in Hungary, the decline by more than 15 per cent is expected by 2050, which is the world highest according to the UN Population Division (UN, 2019b).

1.1 Population change in Serbia

1.1.1 General trends

The population in the current territory of the Republic of Serbia[9] has been continuously increasing during the period of the former Yugoslavia (1945-1991). However, since the dissolution of that country, the population of Serbia has started to decline as indicated by the 2002 and 2011 censuses. As a result, the population size of Serbia was almost the same in 1971 and 2011 and amounted to about 7.2 million inhabitants (Fig. 1). However, the much older total population in 2011 when compared to 1971, and its decreasing trend, keep the depopulation issue very high on the agenda of Serbian policy makers in this century.

Yet, the tempo of the decreasing trend (1991-2020) seems to be slower comparing to the increasing trend (1961-1981). The latest official estimate suggests that the total resident population of Serbia has been uniformly decreasing during the last three decades – about 300 thousand people per decade. However, if the undoubtedly negative net international migration in the 2011-2020 period, which is officially unknown, were to be accounted for, the estimated size of 6,871,547 residents at the end of 2020 (SORS, 2021a) would be certainly smaller.

Both components of population change – natural change and migration – induced the declining trend of Serbia's population of which the former has become increasingly important as time passes. The rate of natural change turned negative for the first time in 1992 since when it has started to continuously decline reaching the annual av-
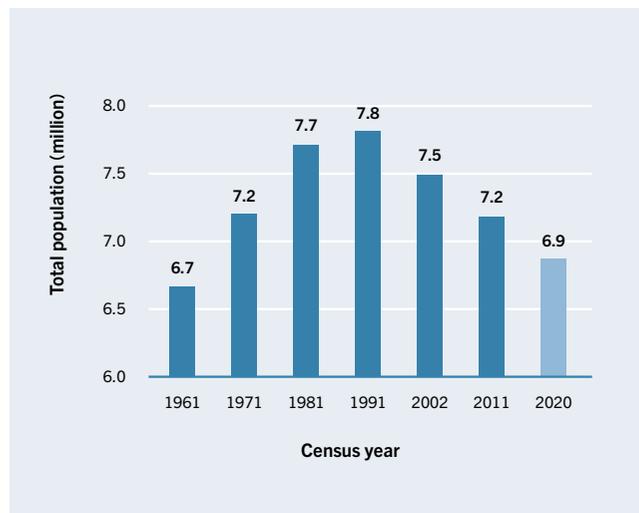
Figure 1. Population change in Serbia according to the 1961-2011 censuses and the 2020 estimate

Source: SORS (2021a)
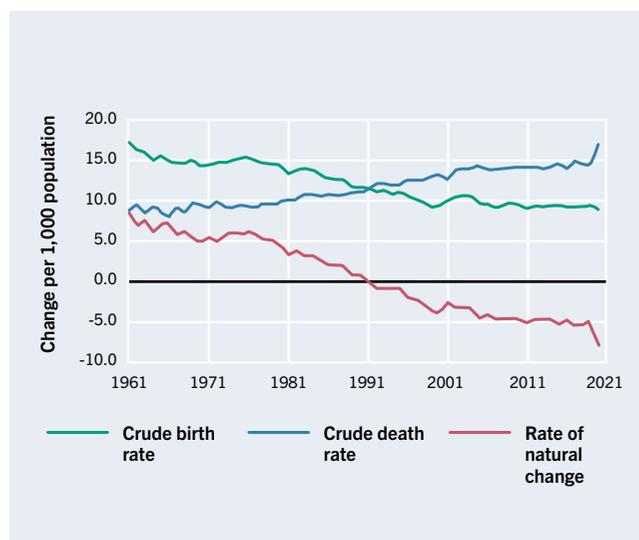
Figure 2. The rate of natural change in Serbia, 1961-2020

Source: SORS (2021a)

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[9] In this chapter, the population of Serbia does not include the population residing in the Autonomous Province of Kosovo and Metohija (References to Kosovo shall be understood to be in the context of Security Council Resolution 1244 (1999)) due to the data availability issues for this territory. The Statistical Office of the Republic of Serbia has not been producing demographic statistics for this region since 1998, while the quality of the 1990-1997 data series is regarded as not fully reliable (Penev, 2002).

erage of –5.4 per thousand population in the 2017–2019 period, with the peak of -8.0 in 2020 – the first COVID-19 year (Fig. 2).

The rising negative impact of natural change on the total population size of Serbia since 1992 had been only partially mitigated by the modest positive migration balance by 2000. However, this net immigration during the 1990s wars in the region of the former Yugoslavia had a controversial effect on the total population of Serbia. It was a peculiar result of a strong inflow of refugees from the region of Yugoslavia on the one side and somewhat lower migration outflow from the country on the orher side. As these two flows had substantially differed in age patterns due to the different nature of their migration drivers, the resulting net migration age structure helped increase the the median age of total population in Serbia (Penev, 2006; Nikitović & Lukić, 2010).

Moreover, net emigration joined the negative natural change in reducing the total population size of the country at the beginning of the 21st century. The migration contributed to this drop by at least 15% or at most 26% between the census years of 2002 and 2011 (Nikitović et. al, 2015: 101). The trend of net emigration certainly continued after 2011 according to the recent estimates (UNFPA Serbia, 2019; Nikitović, 2019).

1.1.2 Regional differences in population distribution

The average population density in Serbia (about 93 inh./km2) according to the 2011 census is almost double the world average (about 50 inh./km2), but typical for the countries of South and East Europe. It is similar to those in the neighbouring countries – somewhat higher than in Croatia, Bulgaria and Romania, and a bit lower than in Hungary or Slovenia. However, the population distribution is markedly uneven across the country. The population density in the regions of Vojvodina (89), Šumadija and West Serbia (77), and South and East Serbia (60) is below the national average, while in the region of the capital city (Belgrade) it is several times higher, with an average of 514 inh./km2 and a peak of 18.8 thousand inhabitants per km2 in the urban core of the city. At the same time, around 43% of the total population of Serbia has lived in the high-density zone covering 20% of the country (Figure 3a).

Regional differences in the rate of population change in Serbia have been strongly pronounced since the breakdown of the former Yugo-
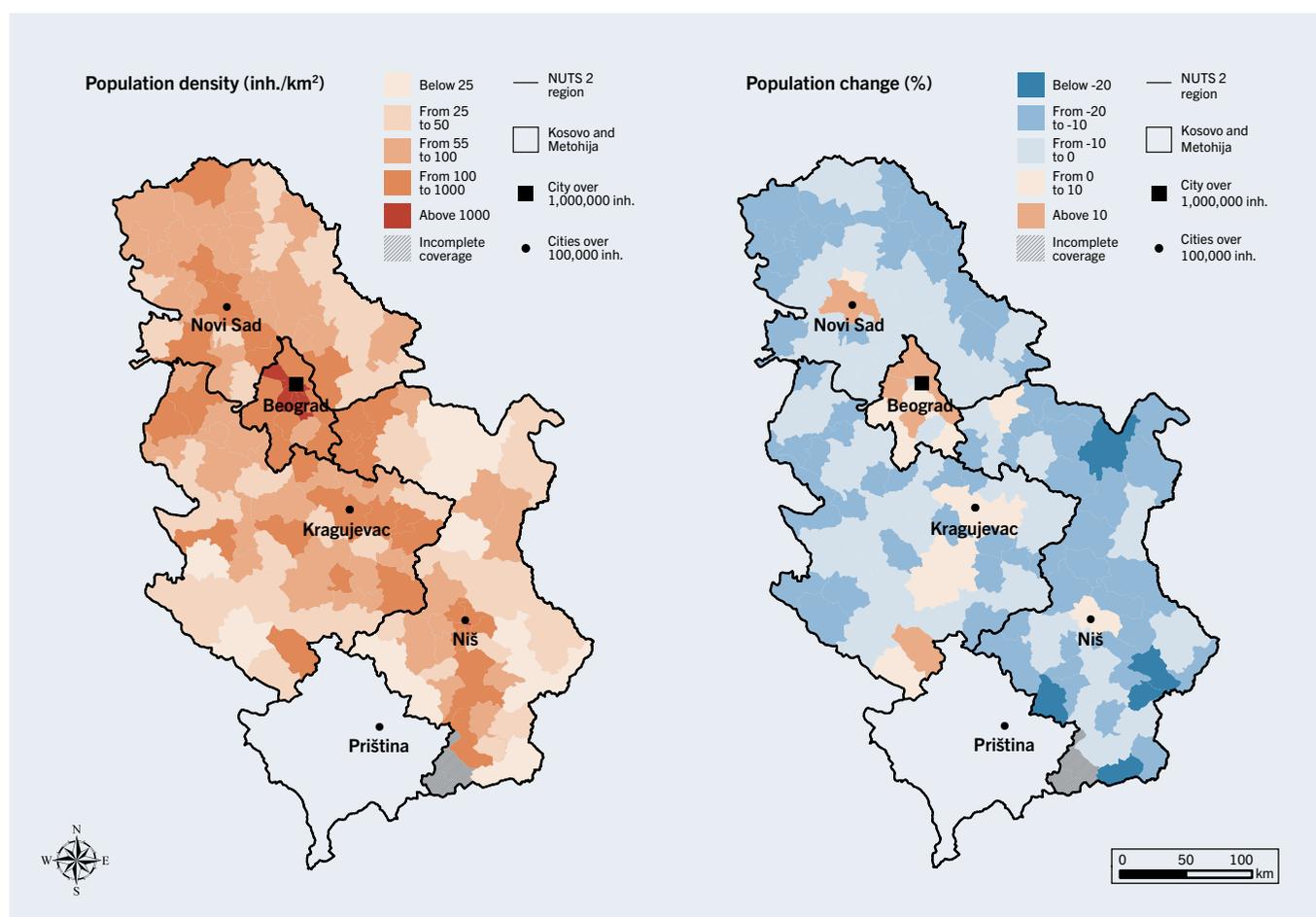
Figure 3. Population density in 2011 (a), and population change 2002—2011 (b) across local administrative units of Serbia.

Source: Arsenović and Nikitović (2022).

slavia. The two northern regions – Belgrade (coinciding with the capital city) and Vojvodina – had a positive rate of population change in the 1991-2002 period, while the two southern regions – Šumadija and West Serbia (ŠWS) and South and East Serbia (SES) – had a negative rate. The majority of the growth in the north was provided by the migration inflow, particularly in the region of Vojvodina where about 48 percent of the refugees from the former Yugoslav republics settled down by the end of the 1990s (Lukić & Nikitović, 2004; Nikitović & Lukić, 2010).

The Belgrade region was the only one with a positive rate of population change in the country between the last two census years – 2002 and 2011. This was exclusively a result of a positive balance of internal migration induced by the attractiveness of the Belgrade metropolitan area (Nikitović et al., 2015). However, the intra-regional divergences across municipalities in this region, particularly between the central and peripheral ones, are also evident (Fig. 3b). Indeed, a closer inspection at the subregional level of the country points to only several "islands" that experienced an increase in total population between the census years of 2002 and 2011. Those are the largest cities in the country, which are the centres of the NUTS 2 regions,[10] the municipalities in the southwest, predominantly populated by Bosniaks – one of the few ethnic groups in the country whose total fertility rate (TFR)[11] is still well above the replacement level (Rašević 2015), and a municipality with the largest share of internally displaced persons from the region of Kosovo[12] and Metohija (Nikitović et al., 2015). The highest growth (above 10 percent) refers to the municipalities of the Belgrade region, the centre of the Vojvodina region (Novi Sad), and Novi Pazar, the largest municipality of the Bosniaks' ethnic community (Fig. 3b). The cities of Belgrade and Novi Sad are home to the country's major universities. Moreover, the two cities are financial, administrative, economic and cultural centres, which have been coupling in the country's unique fast-growing metropolitan area (see Antonić, 2021)

The continuous internal migration from the highlands to the lowlands, or from the south to the north, during the last seven decades also induced a sex imbalance of the population at the prime reproductive ages at settlement level of the country. Generally, regions having more men than women aged 20-39 years are poor, agrarian, mountainous and mainly border, while areas populated by more women than men of the same age group are predominantly urban and lowland (Nikitović, 2016a).

1.2 Population ageing

Like almost all the European countries, Serbia is experiencing population ageing as a result of below replacement fertility and increasing life expectancy (Kupiszewski et al., 2012). This process has been recently supported by an increasing trend of emigration coupled with returning of retired baby boomers from abroad (Nikitović, 2019). The rise in the median age of the population is a long-term trend that began several decades ago and is manifested in the growing trend of the older (aged 65 and over) and an declining trend of the working-age population. According to the common indicators of population ageing, Serbia is about or slightly above the EU-27 average in 2019, with a median age of 43.4 years, ageing index[13] of 1.11 and a share of people (65+) of 21.4 per cent in total population. It is not among the demographically oldest countries in Europe due to the lower share of the older (65+) and particularly the oldest (80+) population than in countries of similarly low shares of the young (0-19), such as Germany or the Mediterranean states – Italy, Greece, Portugal and Spain. In that respect, it is the most similar to its neighbours – Croatia and Bulgaria.

	1991			2019		
	Total	Men	Women	Total	Men	Women
Age group — share of total population (%)						
0-19	25.4	26.5	24.3	19.4	20.5	18.3
20-64	62.6	63.3	62.0	59.2	60.7	57.8
65 and over	12.0	10.1	13.7	21.4	18.9	23.9
80 and over	2.1	1.7	2.4	4.7	3.7	5.7
Indicators of population ageing						
Median age	37.7	36.6	38.8	43.4	42.0	44.8
Ageing index	0.47	0.38	0.56	1.11	0.92	1.30
Old-age dependency ratio[14]	0.19	0.16	0.22	0.36	0.31	0.41

Table 1. Major age groups and indicators of population ageing in Serbia in 1991 and 2019

Source: SORS (2021a); own calculation for 2019 (the official estimate adjusted for the 2011-2019 net emigration)

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[10] NUTS – Nomenclature of territorial units for statistics.

[11] Total fertility rate in a specific year is defined as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years and give birth to children in alignment with the prevailing age-specific fertility rates.

[12] References to Kosovo shall be understood to be in the context of Security Council Resolution 1244 (1999).

[13] Ageing index – population 65 and over to population aged 0-19 years.

[14] Old age-dependency ratio – population aged 65 and over to population aged 20-64.

Table 1 illustrates the continuous population ageing of Serbia between the census year of 1991 (coincided with the dissolution of the former Yugoslavia) and 2019, with the share of the older population that surpassed the share of the young in 2019. Expectedly, female population is older than male population due to the higher life expectancy particularly at older ages, which is typical for developed world regions (Devedžić & Stojilković, 2012).

Of the four regions in Serbia, the region of South and East Serbia has the highest median age of 44.1 years, while its oldest district (Zaječar) reached 47.8 years in 2019 (SORS, 2021a). It has resulted from the two factors – this region has experienced the country's biggest plunge in total fertility rate, with some of its districts were being particularly hit by the the first post-war wave of emigration of 'guest workers' to the West Europe between the late 1960s and 1980s. This early emigration wave consisting of of baby-boomers once more impacts the current age structure of population in traditional emigration areas through its retired returnees. Generally, those areas are typically rural and less developed compared to others in the country (Penev & Predojević-Despić, 2012; Nikitović et al., 2015).

1.3 Birth crisis

The birth crisis in Serbia is reflected in the decades-long sub-replacement fertility which is induced by the postponement of the first birth until increasingly older age, the low share of higher birth orders, the increasing share of childless women across all reproductive ages including permanent childlessness, and the very high total induced abortion rate.

The period of below-replacement fertility in Serbia began in the late 1950s after a much shorter post-war baby boom than in most European countries in spite of the same common drivers of fertility decline, such as the adoption of new norms and values and growing shares of the female labour force (Kupiszewski et al., 2012). The TFR was lower by 15 per cent than the replacement level already by 1971. The interaction of several groups of factors produced such a distinctive fertility pattern during the period of Yugoslavia. They refer to early liberalisation of the women's right to abortion, fast secularisation and industrialisation of predominantly rural Serbian society, and early diffusion of the individualism as a western way of life in fast-growing towns comparing to the Eastern bloc countries (Nikitović et al., 2019).

The subsequent sharp fall in the period TFR in Serbia began in the late 1980s (Nikitović, 2016b). Although a steeper fall could have been expected due to the wars and the institutional crisis during the 1990s, the total fertility rate in Serbia did not experience the lowest levels as was the case with most former socialist states in Europe after 1990. Moreover, the war setting could be a reason that contributed to prolonged consistency of traditional values associated with family and childbearing (Sardon, 2001; Rašević, 2004; Petrović, 2011).

The total fertility rate in Serbia has been oscillating between 1.4 and 1.5 since 2005. On the other hand, most states that belonged to the lowest-low fertility group have recently experienced a rise in TFR (e.g. Slovenia, Latvia, and Hungary have exceeded 1.5, and Czechia even reached 1.7), which could be explained by the expected slowdown in the pace of the 'postponement transition', i.e. the transition from early to late childbearing ages as suggested by Goldstein et al. (2009). Although this transition in Serbia started almost at the same time as in the lowest-low-fertility countries, its current pace is lagging behind them, according to the mean age at first birth, thus suggesting the period TFR might start increasing once the postponement slows. Nevertheless, the completed cohort fertility rate is likely to decline as a result of later childbearing (Kohler et al., 2002). The 2011 census indicated that a long period in which this indicator was stable in Serbia came to an end, as the average number of live births given by the cohorts of women who were approaching the end of their reproductive age in 2011 substantially dropped – from 1.80 to 1.55 (Rašević & Galjak, 2022).

Since the late 1980s, the fertility rates of women younger than 25 began to decline sharply in Serbia, while those of women older than 30 started to increase, though at a slower pace (Nikitović et al., 2019). Consequently, the average age of childbearing increased from 25.9 to 30.1 years, and the same indicator at first birth from 23.9 to 28.8 between 1991 and 2020. Also, the 30-34 age group has currently the highest fertility rate for the first time in the last 60 years, though on account of only two largest districts whose centres are the biggest cities in the country (Belgrade and Novi Sad).

The postponement of the first birth has been a significant factor in the low fertility rate, which is nowadays a concern for many European countries (Schmidt et al., 2012). The change in cumulative fertility by age in Serbia was considerably more affected by the increasing share of women who did not give birth than by the reproductive pattern of those who did (Penev & Stanković, 2021). The increase in childlessness is mostly caused by the delay in the birth of the first child, but also by the increase in the permanent childlessness of women in the late pro-creative years (Rašević, 2015). The general childlessness rate[15] was relatively stable in Serbia until 1991 (30.1%), when it began to increase intensely, reaching 41.6% in 2011 and 43.4% in 2020. The already high share of childless women aged 30–34 according to the 2011 census (30.6%) increased by 20% until 2020 (36.5%). This indicator rose by as much as 30% in the group aged 45-49, indicating currently the 13.8% of permanently childless women (Penev & Stanković, 2021).

Unemployment, prolonged education, housing issues, low standard of living, childcare-related problems, as well as the sense of insecurity and social anomie undoubtedly play a major role in the decision to postpone parenthood in Serbia (Rašević & Galjak, 2022, see Antonić, 2021).

The decades-long phenomenon of sub-replacement fertility is the major cause of the shrinking and ageing population of Serbia. It also affects these processes indirectly by decreasing the female population in fertile ages, especially the one in the ages of optimum fertility. Thus, the number of women aged 20–44 in Serbia decreased from 1,185,982 to 1,057,035 (by 11%), and those aged 20–34 from 702,107 to 578,863 (by 17.5%) in just the nine-year period - between 2011 and 2020 (SORS, 2021a).

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[15] The share of women without live births in the total female population aged 15-49.

1.4 Low survival rates

Comparatively low life expectancy of its population puts Serbia just below the very top of the demographically oldest countries in Europe. Low life expectancy at older ages, but also high mortality rates of relatively younger people, smaller improvements in life expectancy of women than men, and high amenable and preventable mortality, as looked from European context, are the distinct features of this demographic challenge in Serbia.

The population of Serbia has experienced a marked increase in life expectancy at birth (e0)[16] since 1961 due to improvements in the public health care system that helped limit the mortality at younger ages, particularly that of infants and the under-fives. Yet, e0 in Serbia was characterised by periods of stagnation or small improvements after 1970. If we exclude the pandemic year of 2020, the most recent e0 of 75.7 years (2019) for both sexes in Serbia places the country among those with the lowest e0 in Europe, including its neighbours Hungary, Romania and Bulgaria , while globally it puts it in the group of middle-income countries (SORS, 2021a; Eurostat, 2021a; UN, 2019b).

The difference in e0 between Serbia and the EU-27 average amounted to 5.7 years for women and 5.4 for men in 2019. However, the differences are considerably greater if one makes a comparison with the countries that have achieved the best results in decreasing mortality. e0 for men was over 82 years in Switzerland, and over 81 in Iceland, Sweden, Italy and Norway, and for women exceeded 86 years in Spain, and 85 in France, Switzerland and Italy in 2019 (Eurostat, 2021a). Nevertheless, the life expectancy of men in Serbia is higher than in most countries of Eastern Europe and close to the one observed in Slovakia and Poland. As for the life expectancy for women, there are only a few countries (Russia, Ukraine, Belarus, and Moldova) lagging behind Serbia (United Nations, 2019b).

Infant mortality rate (IMR)[17] in Serbia was double the average rate for Europe in the period 1960-1965 (SORS, 2021a; United Nations, 2019b). Despite the outstanding results achieved in the last sixty years, the current IMR of 4.8 deaths per 1,000 live births in Serbia implies slower socio-economic development than in many European countries and is far from the EU-27 average of 3.4 in 2019 (Eurostat, 2021a).

Serbia's crude death rate of 14.7 is among the top three highest in Europe according to the 2017-2019 average (Eurostat, 2021a). It is only partially resulted from the high share of older people, while the other cause is closely associated with the quality and availability of timely and effective healthcare, which especially affects those relatively young (Galjak, 2018). It is not surprising that the life expectancy at 65 had been stagnating for three decades in Serbia (Devedžić & Stojilković, 2012), thus reaching only 16.2 years in 2019. This indicator of population's longevity places the country at the very bottom of the European ranking, and far from the EU-27 average of 20.2 years (Eurostat, 2021a).

Given the known correlation between the mortality levels and GDP/c, Rašević and Galjak (2022) suggest that today's mortality patterns in Serbia reflect the unique combination of factors from the three different periods – the period of Communism, the 1990s period of wars and the dissolution of former Yugoslavia, and the recent period in which the healthcare system has not been adjusted to serve a much bigger population of older people compared to the time of its establishing. Serbia has yet to fully transition from high to low cardiovascular mortality, which is currently very high even among middle-aged people (Marinković, 2012). That makes this group of causes of death the main contributor to avoidable mortality, while lung cancer is the single biggest cause of death among all avoidable causes of death in Serbia (Galjak, 2018). Areas of the country with high amenable and preventable mortality, mostly pronounced in Eastern Serbia, coincide with the areas distinguished by a higher share of older population, which are typically rural, remote, and hilly, with poor infrastructure, thus strongly affecting the timeliness of effective healthcare. Future gains in tackling premature mortality will be achieved with further economic development. However, recent economic stagnation means that catching up and converging with the most developed European countries will be difficult. Improving the quality of the healthcare system and changing unhealthy habits in the general population does follow economic growth, but much can be achieved with clever policy and special programmes, especially in tackling the long-term problem of preventable death (Rašević & Galjak, 2022; see Stamenković, 2021).

1.5 Steady out-migration abroad and internal imbalance in migration flows

1.5.1 International migration

Serbia is a typical emigration country[18] with a negligible inflow of foreign nationals. The international migration balance essentially boils down to the difference between emigrants and returnees, in both cases, of Serbian nationals. A certain share of current returnees includes retired 'guest workers' from the first big wave of emigration that began in the mid-1960s (Lukić, et al., 2013).

Even if the emigration stock of Serbian citizens or, in a broader sense, Serbian diaspora is spread all over the world (Stanković, 2014; Bauranov & Lin, 2021), the EU is by far the most important destination for our nationals, particularly in recent period. Yet, estimates of the emigration stock size vary greatly depending on definitions and research methods but also on quality of data sources used. The last available census of population (2011) captured only 313 thousand Serbian citizens who were absent from the country for more than a year (Stanković, 2014). On the other hand, the most recent alternative-type

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[16] Life expectancy at birth reflects the overall mortality level of a population. It summarises the mortality pattern that prevails across all age groups - children and adolescents, adults and the older people. Average number of years that a new-born is expected to live if current mortality rates continue to apply.

[17] Infant mortality rate is the probability of a child born in a specific year or period dying before reaching the age of one, if subject to age-specific mortality rates of that period. Infant mortality rate is a probability of death derived from a life table and expressed as rate per 1,000 live births.

[18] The only recent period of intense immigration refers to the forced migration in the 1990s, when about 618 thousand people from the former Yugoslav republics, mostly ethnic Serbs from Bosnia and Herzegovina and Croatia, found refuge in Serbia by 1996, of whom about 380 thousand settled down in the country by 2002 (Nikitović & Lukić, 2010).

estimate, based on the advanced analysis of social networks usage, revealed that more than 850 thousand of Serbian ex-pats are spread over 82 world countries in 2020 (Bauranov &Lin, 2021). This value is much closer to the estimate by the United Nations, that points to about one million of Serbian citizens residing abroad in the mid-2020 (United Nations, 2020). We believe the real size of emigrant stock originating from Serbia is closer to this upper bound given the known limitations of census methodology[19] in this aspect (Reynaud, Nikitović & Tucci, 2017).

There are only a few studies that have offered an estimate of the annual migration inflows and outflows to/from Serbia according to the definitions of the United Nations (UN) and the EC Regulation No 862-2007 (Kupiszewski et al., 2012; Lukić, et al., 2013; UNFPA Serbia, 2019; Nikitović, 2019). These are based on the migration statistics of the countries that are main destinations of the Serbian citizens. The basic limitation of such estimates is methodological in its nature. In practice, it is not possible to collect statistically relevant data from all destination countries either because they are not available, or their quality is debatable. The latter is common in the case of countries where Serbian citizens make up a very small share of immigrants. Additionally, longer time series on migration flows related to the citizens of Serbia are not available due to frequent changes of its borders in the period 1991-2008.

The result is a data series shorter than a decade, which strongly affects the quality of conclusions about the trends in international migration flows from/to the present-day territory of Serbia. Finally, it is a well-known fact that the numbers on deregistered immigrants are often highly underestimated across the reports of statistical offices, particularly those in the most popular destination countries. This factor is becoming increasingly important as the share of short-term migration flows in the total migration rises.

Given the listed limitations of the migration flow statistics, we have relied on a single source as the best possible approximation of the net migration flows between Serbia and the most important destination countries – the annual 'snapshot' (on 31 December of each year) of administratively based statistics of valid residence permits with duration of at least 12 months issued to Serbian citizens in the EU and EFTA countries (Eurostat, 2021a). The recent report on the estimate of net international migration for Serbia, produced by the Statistical Office of the Republic of Serbia and UNFPA Serbia (2019), served to adjust and correct figures from diverse data sets on foreigners available from different national sources including migration of our citizens to large countries outside the EU. The total net emigration in the period between 30 Sep 2011 (the Census Day) and 31 Dec 2020, in accordance with the concept of usually resident population applied in the 2011 Census, was estimated to –46,612 people. This suggests that net emigration from Serbia is fairly lower than is typically reported in the media, particularly due to the rising share of short-term temporary and circular migration in the recent period even in the traditional emigration countries, such as Germany (for more details on method-

ology used to estimate the balance of international migration of Serbia in this report, see Arandarenko, 2021).

1.5.2 Internal migration

Frequent changes of political borders in the region of former Yugoslavia since 1991 affected the availability and quality not only of the statistics on international but also on internal migration in Serbia. Also, about 200 thousand of internally displaced persons who fled from the region of Kosovo and Metohija during and after the NATO military campaign in 1999 (Commissariat for Refugees and Migration, 2021) were inconsistently treated between the 2002 and 2011 censuses, from a methodological viewpoint (Nikitović et al., 2015). It was one of the reasons that limited our analysis of previous trends on internal migration to the period after the census 2011. However, those trends from the past decades have induced strong sub(regional) differences in sex and age composition of the current population, which will also have notable implications in the future demographic trends. Directions and intensity of internal migration are determined by regional and sub-regional differences, and especially the growing gap between major urban centres and the rest of the country in terms of economic development, diversification and supply of jobs, housing, health care, overall quality of life, but also subjective perception of opportunities to achieving personal life goals. The fast-growing metropolitan area of Belgrade and Novi Sad, the two largest cities in Serbia, represents the central focal point of the country for internal migration inflows. Most other districts in the country have been characterised by migration outflows for years, especially those in the border and mountain areas of the South and East Serbia region and the region of Šumadija and West Serbia. This pattern of internal migration is deeply rooted in the previous periods, but also intensified by the process of population shrinking and ageing since the 1990s (Nikitović et al., 2015).

The average age of internal migrants in Serbia is almost 10 years lower than the average age of the country's total population (Lukić, 2022), with the group of the 20-34-olds as traditionally the most mobile (Nikitović et al. 2015). For decades, women tend to change their residency more often than men in general, and when it comes to longer distances, they are more prone to settling in the regional and district centres (Nikitović et al. 2015). The main direction of internal migration flows in the country – from the mountainous and hilly districts to those in the lowlands, could also be labelled as the south to north migration. It had been established already at the time of the foundation of the modern Serbian state two centuries ago but intensified during the period of socialist Yugoslavia (1945–1991). In the beginning of this process, the strongest migration outflows were from villages, particularly from those in mountains, to nearby towns while in the recent period, when demographic capacities of hinterland have subsided, the biggest outflows are from small- and middle-sized towns to the largest centres in the country. Given the selectivity of migrants by sex and age, internal migration in Serbia contributed to the further depopulation, gender composition imbalance, declining and ageing of the workforce as well as human capital loss in the hilly and border districts, and particularly

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[19] Recent censuses in Serbia have significantly underestimated the number of Serbian emigrants as their focus were not on those residing abroad for more than a year but on the population usually residing in the country. Emigrants were not interviewed directly, thus a lot of them could not be covered only by interviewing their relatives or neighbours residing in the country.

in their rural areas. The gender imbalance is specifically relevant for the population of prime reproductive ages (20-39). As the process of masculinisation of this age group has progressed across the country in this century, especially in the former fast-growing towns, there are more women than men in this age bracket only in the most populated districts whose centres are the largest cities (Nikitović 2016a). Such a spatial distribution could be a severe challenge to policies stimulating higher birth numbers and in general to sustainable development of most districts, especially the border ones, in the two southern regions in Serbia. The long-term implications of the subregional differences in the sex distribution of the population in the vital reproductive ages can be fully perceived in the third section of this chapter presenting population projections at district level up to 2100.

The most recent three-year average of the net migration rate (2018–2020) according to the official statistics was positive in only 4 out of 25 districts in Serbia. The centres of those districts are the largest cities in the country, where the most prestigious Serbian universities are located in. However, with the exception of the districts of Belgrade

and South Bačka (Novi Sad), their net migration rate was below 1 per 1,000 population. On the other hand, the highest out-migration rates were recorded in the three border districts of which one is in the East, one in the west, and one in the south along the administrative border with the region of Kosovo and Metohija.

1.6 COVID-19 crisis — first insights

The population of Serbia has been experiencing very strong *impact of the COVID-19 pandemic in terms of mortality*. Four waves of the pandemic impact on mortality can be recognised by the end of 2021, similar to other European countries. However, the first one lagged by approximately three months when compared to the most exposed countries at the onset of the pandemic (Figure 4), probably as a reaction to a sudden termination of all measures of the two-month lockdown – one of the strictest in Europe at the time. In relation to the 2016-2019 average, total excess deaths[20] in Serbia reached 12,521
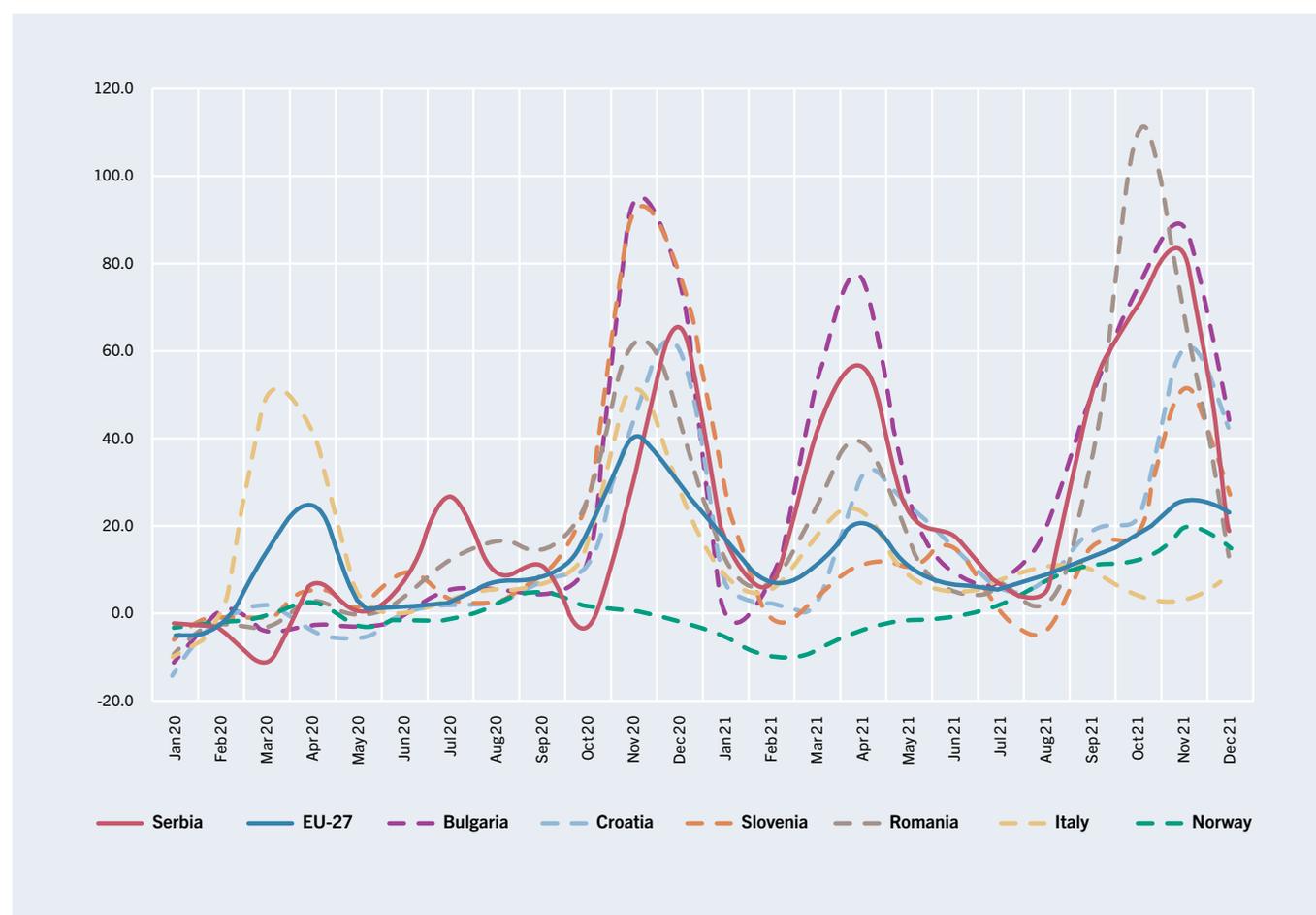
Figure 4. Excess deaths (%) during the COVID-19 pandemic in relation to the 2016-2019 average in Serbia and selected countries

Source: Eurostat (2022), SORS (2022).

[20] Excess deaths are typically defined as the number of deaths from all causes during a crisis compared with the expected number of deaths during a certain period in the past.

(12.2%) and 33,468 (32.7%) in 2020 and 2021, respectively, according to the preliminary data by SORS (2022). The highest peaks of excess deaths were in December 2020 (65.6%) and November 2021 (82.1%). Except for the first wave, it is noticeable that the discrepancy in excess mortality between Serbia and the average for the EU-27 has been rising, so that Serbia is among the countries with the highest excess mortality in the continent, most of which being its neighbors. It is notable that the rise in this discrepancy coincides with the period when the vaccination became widely available (after the second wave). Unfortunately, the very low vaccination rate in Serbia during that period compared to most of the EU might be one of the reasons for that.

Expectedly, the age and sex pattern of excess mortality in Serbia in 2020-2021 resembles those in European countries indicating that men and older population are more affected by the pandemic (Marinković & Galjak, 2021). Yet, the much higher intensity of this indicator in Serbia suggests that, apart from the low vaccination rate, such an outcome is most probably closely associated with poor health status of the population and the obsolete public health care system when compared to most of the EU, as discussed previously in the sub-section on low survival rates of the Serbian population. Anyway, the COVID-19 pandemic should only have a short-term effect on the trends of mortality as it is not an endogenous, structural-type of factor. Relatively rapid recovery of the survival rates should follow upon

the end of the pandemic, which is also taken into account in the next section presenting a long-term projection of the Serbian population.

On the other hand, *the impact of the pandemic on birth numbers* could not be assessed as straightforwardly as in the case of deaths. However, the pandemic certainly has not induced either a baby-boom, as some speculated given the long and strict lockdown at the beginning, nor a decline in total birth numbers that could be designated as a sort of the pandemic specific baby-bust. In that way, Serbia is much closer to the countries of Southern Europe that were among those that have experienced the strongest negative effect of the pandemic. Sobotka et al. (2021) point that it seems as if the birth trends move in cycles of busts and recoveries in most of Europe, similar to the cycles of the COVID-19 pandemic, suggesting it might be the pattern of births throughout the whole pandemic duration, albeit with lower amplitudes as the pandemic gets closer to its end. Yet, the busts appear to be higher than the recoveries in Serbia so far (Figure 5). This is not surprising as the factors researchers usually associate with lower birth numbers during the pandemic generally refer to higher uncertainty about the future, which is one of well-known determinants of low fertility in Serbia, now only amplified.

Mobility of the the population across Europe was severely affected *in the first months of the pandemic*. It particularly *impacted migrants from*
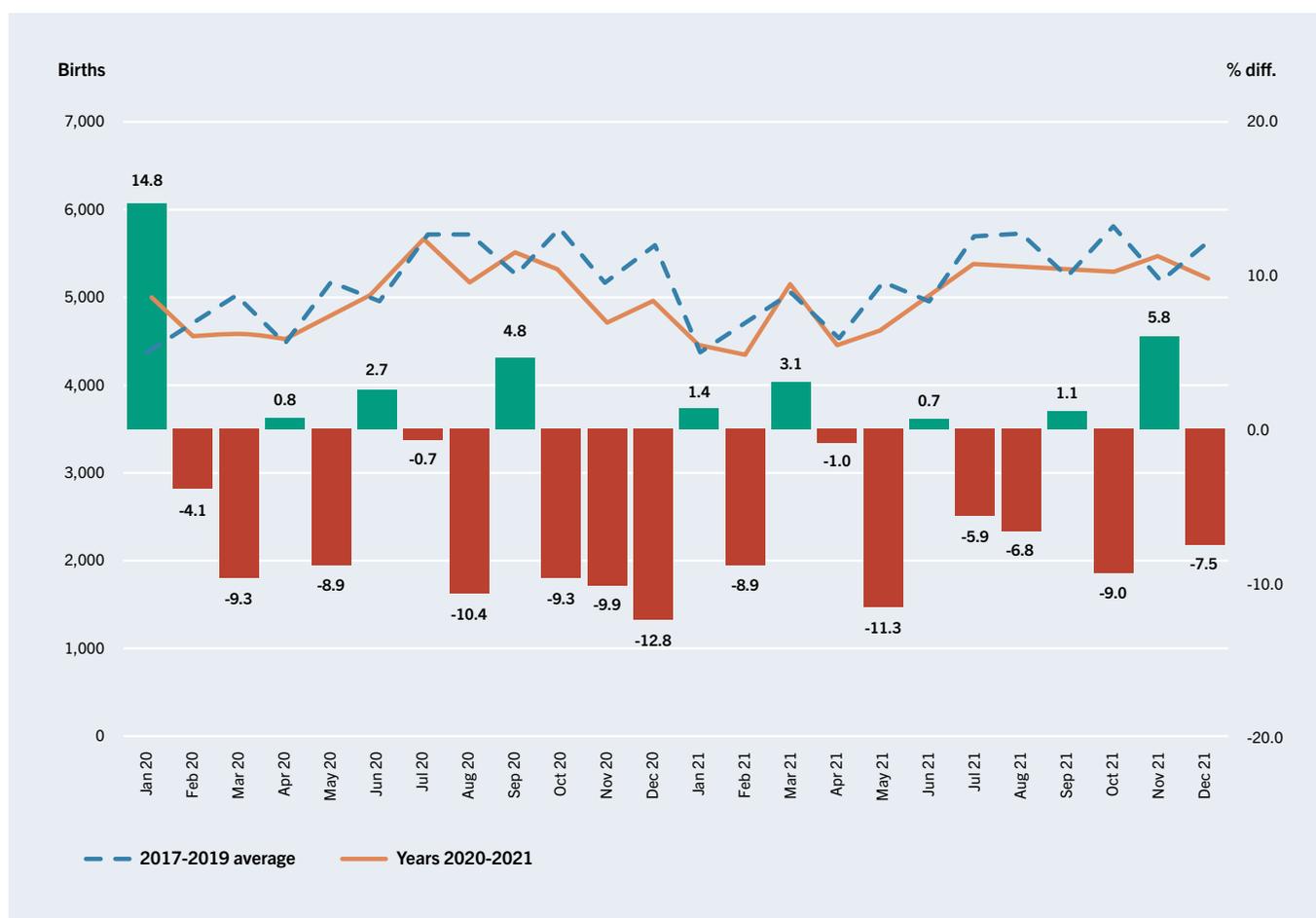
Figure 5. Livebirths in 2020-2021 versus the 3-year average (2017-19) in Serbia

Source: SORS (2022).

Serbia and other typical emigration countries in the region, mainly the emigrants having short-term or no regular job contracts in the most popular destination countries. Due to the lockdown rules and a downturn in economic activity, probably a significant share of emigrants from Serbia returned home at the beginning of the pandemic albeit there is no relevant estimate on that. Generally, migration flows between Serbia and the EU were reduced by at least a quarter according to the statistics of the first-time residence permits issued to Serbian citizens in 2020 (Eurostat 2022). However, the flows obviously recovered after a year of decline that stopped around mid-2021 as suggested by the analysis of the change in the number of Serbian emigrants based on the alternative data sources (Bauranov & Lin, 2021). A recent slight increase of the population of our citizens residing abroad according to this source indicates that the pre-pandemic trends in migration flows are likely to continue after the initial shock caused by abrupt border closures at the end of the first quarter of 2020.

1.7 Human capital – strong subnational differences

A demographic profile of any modern society has been long since beyond the simple narrative of the population size and its sex and age structure. However, policy makers and general public in countries facing depopulation and long periods of sub-replacement fertility, as is the case with Serbia, are still more focused on raw population numbers and crude demographic rates despite increasing research evidence suggesting that specific characteristics of population, such as educational attainment, skills, good health, and financial wellbeing, might play a decisive role in shaping demographic patterns in the long run. This is where the concept of human capital could help in better understanding the complex nature of the current demographic challenges in Serbia, especially when it comes to subnational differentials.

1.7.1 Education structure of the population

Educational attainment is a simple but informative proxy for the human capital level indicating the skills and adaptability of a population. If three broad groups of educational attainment – low, medium, and high[21] – are considered, Serbia ranks among European countries with the lowest share of population aged 15-64 with high education (20.6%), as only several of them scoring lower share. On the other hand, the shares of those with low (22.1%) and medium (57.3%) education are comparably way better, as the former puts Serbia in the middle of the European table, and the latter even in the upper half (Eurostat, 2021a). Despite notable improvements in the education structure of Serbia's population in this century as suggested in Table 2, it seems that the biggest challenge in the coming period remains the underwhelming portion of highly educated people and still relatively high share of low-educated population.[22]

Most of the working age population had medium level of education regardless of the region they lived in according to the last available data at subnational level. Achieved advances in educational attainment of population between 2002 and 2011 has not alleviated regional differences. The region of the capital (Belgrade) is still distinguished by the best education structure, with almost 30% of working age people having tertiary education (Table 2). That was close to the national average of the top-ranked countries at the time of the 2011 census.

1.7.2 Subnational Human Development Index

Human Development Index (HDI) is a commonly accepted proxy for the overall improvement in education, health and living standard level of population. Although Serbia's current HDI (0.806) places it in the group of countries with very high human development according to the UNDP's HDI world ranking, its rank is just a bit above the thresh-

Country/Region	2002 Census			2011 Census			2019 estimate		
Education level	Low	Medium	High	Low	Medium	High	Low	Medium	High
Republic of Serbia	38.1	47.6	11.8	26.8	55.1	17.8	22.1	57.3	20.6
Belgrade r.	23.0	54.6	20.4	14.5	55.5	29.6			
Vojvodina r.	38.6	50.2	10.2	27.8	56.6	15.4			
Šumadija & West Serbia r.	43.4	45.8	8.9	31.9	54.8	12.9			
South & East Serbia r.	45.3	40.2	9.0	32.5	53.0	14.1			

Table 2. Population of Serbia aged 15 to 64 by highest level of education attained (%) in Serbia, 2002 2011, 2019

Source: SORS (2013, 2021a) za popisne godine; Eurostat (2021a) za procenu za 2019. godinu.

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[21] *Low education* includes less than primary, primary and lower secondary education (levels 0-2), *medium* includes upper secondary and post-secondary non-tertiary education (levels 3 and 4), and *high* refers to tertiary education (levels 5-8 according to the ISCED 2011 classification or 5-6 according to the ISCED 1997).

[22] More detailed interpretations of education issues are contained in the chapter devoted to education.

old (0.800) delimiting the two groups – the high and the very high human development. It lags behind most European countries, including its neighbours, only ranking higher than Bosnia and Herzegovina, Albania, and North Macedonia (UNDP, 2021).

This subsection presents the subnational human development index (SHDI) for Serbia. It was calculated following the methodology underpinning the Subnational Human Development Database for 1625 regions within 161 countries in the 1990–2017 period (for details see: Smits & Permanyer, 2019). The central part of Table 3 shows the HDI in 2019 across regions and districts of Serbia including the three indices that proportionally contribute to the overall HDI level.

Apart from the outstanding position of the Belgrade region regardless of the index observed, it is clear that the higher HDI of the Vojvodina region compared to the two southern regions has not resulted from higher values of all the three indices it consists of. This is particularly obvious when the indices are examined at district level. That distribution suggests that the depopulation or ageing itself might not be the main demographic challenge in some district, but improving other dimensions of the human development, and vice versa. Despite their low rank according to the depopulation indicators, some districts are ranked high in human development terms because of a higher life expectancy (like Zlatibor district) or GNI index (like Bor district). On the other hand, the district of Braničevo is ranked low by HDI despite relatively high GNI index because of its education index which is by far the lowest in the country. In other words, the new demographic reality of shrinking and ageing populations implies that public policies aimed at improving the demographic profile of Serbia should allow each district to enhance human development dimensions which are the most relevant for it. That would be a big step forward from the current one-dimensional, (sub)regionally insensitive policy approach, with no clear demographic effects in sight for most districts in the country.[23]

If we exclude the region of the capital (Belgrade), the country's HDI (0.767) would match that of Latin America and the Caribbean (0.766). Moreover, the HDI of most districts lies between the average HDI for East Asia and the Pacific (0.747) and the average HDI for Latin America and the Caribbean (0.766). Of 25 districts in the country, 8 would fit the bottom half of the group of high human development. Belgrade district is the only one close to an EU member country (Poland), while other districts are developed similarly to the neighbouring West Balkan EU candidate countries – Albania, Bosnia & Herzegovina and Montenegro, or to the countries of Central and South America, the Near East and North Africa.

Strong (sub)regional differences in terms of human capital in Serbia, above all between the capital and the rest of the country, have to be taken into due consideration of any policy aimed at addressing depopulation challenge. Expected improvements in reducing the subnational HDI differentials represented the core of the hypothesis on migration, especially that on internal flows, presented in the next section on future population dynamics of Serbia. The starting point for that calculation, but also for the subnational analysis in other chapters of this report was the following classification of districts according to their current HDI.

We distributed 25 districts of Serbia into 4 clusters pursuing the same system of fixed cut-off points for the four categories of human development achievements as in the HDR 2020 report (UNDP, 2021), albeit with the cut-off points and names of the clusters adjusted to the range that HDI covers across districts in Serbia. The cluster of *very high human development* (above 0.800) includes the two most populated districts representing the country's unique fast-growing metropolitan area. The cluster of *upper-high human development* (0.780-0.799) includes districts whose centres are the cities of the next lower size rank, most of which are located in the region of Vojvodina, and only one is in the region of South and East Serbia. The cluster of *mid-high human development* (0.750-0.779) includes most districts whose centres are middle-sized towns across the country. The cluster of *lower-high human development* (below 0.750) mainly consists of districts of traditional emigration, all but one located in the region of South and East Serbia.

Territory	Life expectancy index	Education index	GNI index	HDI	World rank	Country peer
Republic of Serbia	0.855	0.782	0.777	0.806	64	
Belgrade region*	0.872	0.902	0.858	0.877	35	Poland
Vojvodina region	0.843	0.779	0.777	0.799	67	Seychelles
Šumad. & West Serbia r.	0.859	0.730	0.714	0.765	84	Brazil
South & East Serbia r.	0.847	0.723	0.709	0.757	88	Azerbaijan
Very high human development						
Belgrade district	0.872	0.902	0.858	0.877	35	Poland
South Bačka district	0.858	0.829	0.807	0.831	48	Montenegro

[24] It would also be consistent with the logic of the EU regional and cohesion funds aimed to "address the problems of disadvantaged areas, in particular rural areas and areas which suffer from severe and permanent natural or demographic handicaps, including demographic decline, ... and to pay particular attention to the specific difficulties of areas at NUTS level 3 and local administrative unit level" (Regulation EU, 2021, p. 45).

Upper-high human development						
Nišava district	0.864	0.795	0.725	0.793	69	Albania
Srem district	0.845	0.756	0.774	0.791	69	Albania
Šumadija district	0.863	0.778	0.734	0.790	69	Albania
Moravica district	0.866	0.752	0.755	0.790	69	Albania
North Bačka district	0.838	0.771	0.761	0.789	70	Cuba
South Banat district	0.843	0.755	0.764	0.786	70	Cuba
Central Banat district	0.832	0.758	0.757	0.781	73	Bosnia & Herz.
Mid-high human development						
Zlatibor district	0.867	0.730	0.729	0.773	82	N. Macedonia
West Bačka district	0.832	0.759	0.731	0.773	82	N. Macedonia
Bor district	0.833	0.687	0.803	0.772	82	N. Macedonia
Pirot district	0.850	0.724	0.746	0.771	82	N. Macedonia
North Banat district	0.817	0.734	0.743	0.764	84	Brazil
Kolubara district	0.859	0.697	0.728	0.758	86	Ecuador
Rasina district	0.862	0.716	0.701	0.756	88	Azerbaijan
Raška district	0.858	0.742	0.671	0.753	88	Azerbaijan
Lower-high human development						
Mačva district	0.844	0.709	0.700	0.748	91	Algeria
Pomoravlje district	0.854	0.696	0.696	0.745	92	Lebanon
Podunavlje district	0.835	0.732	0.674	0.744	92	Lebanon
Braničevo district	0.843	0.647	0.739	0.739	95	Tunisia
Pčinja district	0.845	0.718	0.658	0.737	99	Mongolia
Toplica district	0.841	0.699	0.679	0.736	99	Mongolia
Zaječar district	0.844	0.690	0.673	0.732	101	Jamaica
Jablanica district	0.843	0.704	0.656	0.730	102	Jordan

Table 3. Regions and districts of Serbia ranked by the Human Development Index in the context of the UNDP's HDI world ranking (2019)

Source: Own calculations based on SORS (2013, 2021a, 2021b); UNDP (2021). The values for the subnational levels are normalised to match the UNDP's HDI indices for Serbia in 2019.
* The region of Belgrade coincides with the district of Belgrade according to the administrative organisation of spatial units in Serbia.

2 Scenarios of Population Dynamics – Future Fertility, Mortality, and Migration

Depopulation in terms of the shrinking and ageing population of Serbia is commonly interpreted at the national level with no or little effort to be appropriately considered from the sub-national perspective. However, *depopulation is a much more regional and sub-regional demographic challenge than a national-level issue.* Yet, it is often overlooked or incorrectly addressed in relevant strategic and policy papers. The aim of this part of the chapter is to underline the importance of tailoring policies tackling depopulation challenge to subnational demographic specificities by means of interpreting the projections of population at the district level of Serbia.

In this section, we have present *long-term* scenario-wise *population projections* in disaggregation by sex and age at the level of the district addressing different demographic perspectives depending on potentially different trajectories of the main components of population dynamics (fertility, mortality and migration). The level of districts in Serbia corresponds to NUTS 3, denoted as the level of "small regions for specific diagnoses" according to the NUTS classification (Eurostat, 2021c). It proved to be the country's most stable spatial unit in terms of time variability, which also makes it the lowest spatial level for producing reliable population forecasts. The projection time horizon covers the long-term period – 2020-2100, similarly to the current country-level projections of the world and the EU population (UN, 2019a; Eurostat, 2021b). This time horizon approximately matches the average lifetime span of people in Southern Europe, which allows a comparison of two almost completely different populations – the one that consists of ancestors of the projected cohorts, reflecting the past trends in population dynamics and the other consisting almost completely of their descendants resulting from the projection assumptions applied to current population pyramid. In this way, it is possible to fully perceive the effects of fertility change, which is the crucial long-term factor of population change.

Official estimates of the Serbia's population by sex and single age groups at the district level as of 31 December 2020 were taken as the basis for calculating the initial age and sex population structure in the projection (SORS, 2021a). These estimates are based on the 2011 census and the subsequent changes of the population structure that have been induced by births, deaths and internal migration between the census day and the end of 2020. Given that the estimates thus obtained did not include the impact of international migration, which is particularly important for high emigration areas, it was necessary to correct them by including the previously stated assessment of the balance of international migration between 30 September 2011 (the Census Day) and 31 December 2020.

The three scenarios of future population dynamics in Serbia are as follows: a) *baseline scenario* – the most probable future excluding any consideration of specific policy impacts; b) *high fertility scenario* – reflecting a fully successful implementation of policies aimed at increasing birth numbers; c) *zero migration scenario* – an imaginary future of zero net migration as a reference case for assessing the migration effect (Table 4). All three scenarios share the same assumption on future mortality because of the relatively stable change in this component,[24] and because of the focus of this chapter on the depopulation in Serbia – largely caused by a long period of low fertility and net emigration. This allows to assess the effects of fertility and migration independently of each other by comparing the b) and c) scenario with the baseline one.

Scenario	Fertility	Mortality	Migration
Baseline	Baseline	Baseline	Baseline
High fertility	*High fertility*	Baseline	Baseline
Zero migration	Baseline	Baseline	*Zero migration*

Table 4. Assumptions in the population dynamic scenarios in Serbia, 2020-2100

2.1 Baseline scenario

The baseline scenario assumes a relatively small increase in future fertility and slowly improving survival rates. When formulating assumptions on the natural components of population change, we relied on the probabilistic models used to produce the current *World Population Prospects* by the United Nations' Population Division (hereinafter: the UN model)[25] (United Nations, 2019a), thus avoiding subjective judgment typical for the scenario approach. The future paths of total fertility rate in the baseline scenario and life expectancy at birth in all scenarios represent the most likely trajectories from their prediction intervals derived by running the UN model. Given the limited quality and availability of time series on migration and far greater uncertainty about their future trends, especially at the sub-national level and in the longer term, compared to the natural components of population change (births and deaths), only one pathway of future migration is

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[24] The short-term effect of the COVID-19 pandemic has been considered (see 2.1.2).

[25] Non-commercial software was used for all projection-related calculations. Probabilistic simulations of trajectories of TFR and *e0*, as a tool for formulating the baseline fertility and mortality scenarios, were performed using *R* and its packages *bayesTFR* (Ševčíková et al. 2015) and *bayesLife* (Ševčíková and Raftery 2015). Projections of the population by age and sex at the district level in Serbia were calculated using Spectrum.

formulated. A theoretical concept called "migration cycle model", as a specific interpretation of the "push and pull" migration theory (Fassmann & Reeger, 2012), has been used to develop the long-term hypothesis of international migration, while the assumption of internal migration has been grounded in the analysis of the urbanisation process in Serbia (see Antonić, 2021).

2.1.1 Baseline fertility assumption

Fertility assumption in the baseline scenario has been resulted from the application of the UN model. Recent research based on the Human Development Index suggests that a well-known negative correlation between economic development and fertility, typical of the entire twentieth century, may be reversed. This means that the economic progress can lead to higher birth rates in the richest societies and thus become a development guideline for all other low fertility populations societies (Myrskylä, Kohler & Billari, 2009; Luci-Greulich & Thévenon, 2014). It seems that the mechanism of the UN model could be interpreted in that way as it allows each country to reach the target total fertility rate that is based on both its own and the experience of other low-fertility countries that have experienced fertility recovery. Consequently, the model would result in target TFR of 1.53 by 2050 and 1.67 by 2100 in Southern Europe region (United Nations, 2019b).

As the current UN model recognises only the territory of Serbia including the region of Kosovo and Metohija, it was necessary to model TFR for the territory of Serbia without data for this region. The model was adjusted to lower territorial levels (regions and districts) in accordance with the available historic data sets. For each district, a median of the prediction interval resulting from the UN model was taken as the forecast TFR over the projection horizon. In general, the target TFR in 2100 for districts with a current TFR below 1.50 would be between 1.55 and 1.60, and for those with current TFR above 1.50, it would be between 1.70 and 1.80. The UN model has shown that districts in eastern Serbia represent the nucleus of low TFR in the country, i.e. that the potential for a positive change in this indicator is the weakest in this area. A slightly higher forecast of TFR would characterise the surrounding districts in the region of Southern and Eastern Serbia and certain districts of Vojvodina. According to the UN model, the maximum target TFR was projected for western and southwestern districts in the region of Šumadija and West Serbia. These findings were supported by the results of the spatial autocorrelation analysis with respect to change in TFR between 2002 and 2011 at the municipal level in Serbia, which suggested that differences in economic, historical, and cultural development between sub-regions of the country have strongly affected the spatial patterns of fertility change (Nikitović et al., 2019).

2.1.2 Baseline mortality assumption

Mortality assumption in the baseline scenario has also resulted from the application of the UN model. The same procedure as in the case of the hypothesis on fertility was applied. Adjustments were made to the input data regarding the coverage of the territory and the chosen level of its administrative division (districts), while for each district a median of the prediction interval that resulted from the UN model was taken as the baseline scenario of life expectancy at birth (e0) over the projection horizon. In the initial projection period, the short-term effect of the COVID-19 pandemic was taken into account. If expressed through e0, first, there was a decrease in this indicator compared to the previous period, followed by its relatively rapid recovery immediately after the pandemic ends in accordance with the nature of the influence of exogenous factors. An observed decrease in e0 was an average 1.55 years during 2020, with an assumed maximum decline of 2.5 years during the expected time-span of the pandemic (about 3 years).

Depending on the current e0, an increase in this indicator for women from the end of the pandemic to 2100 would be between 0.99 years per decade in the northern districts of the Vojvodina region and eastern parts of the region of East and Southeast Serbia up to 1.06 years per decade in the region of Belgrade, in most districts in the region of Šumadija and West Serbia, and in the central district in the region of East and Southeast Serbia (Niš).

In the case of men, an increase in e0 by the end of the projection period would be between 1.22 years per decade in most districts of the region of Vojvodina (excluding the district whose centre is Novi Sad) and eastern parts of the region of East and Southeast Serbia up to 1.37 years per decade in most of the region of Šumadija and West Serbia, in the region of Belgrade, and in the central district of the region of South and East Serbia (Niš).

2.1.3 Baseline migration assumption

Assumption on international migration covers two different patterns during the projection horizon. The first one assumes the continuation of trend in net out-migration from Serbia in the next 15 years (2020-2035) due to the rising high demand for labour force from this region in the EU labour market and slow advance in the living standard of Serbian citizens. The gradual transformation of the country's net emigration profile to the net immigration one is assumed afterwards, which is in accordance with expected change based on recent empirical evidence and the migration cycle concept as suggested by Fassmann and Reeger (2012).

Despite the known issue of underestimation of the number of Serbian citizens abroad by the population census, it is the only source of data that allows analysis of previous trends in international migration at the district level in Serbia. We used the distribution of emigrants by district of origin according to the 1991-2011 census results as a starting point for the estimate of current unknown distribution of emigrants. We assumed that the share of the oldest emigration zone in Eastern Serbia in the current total negative migration balance of the country has decreased by 25-30% depending on the district. This took place not only due to the increasing share of other non-traditional areas of emigration in the southwest and the southeast of the country (Penev & Predojević-Despić, 2012) and new emigration waves from major city centres across the country, but also because of the reduced demographic potential of this zone (Nikitović et al., 2015).

From the perspective of the projection horizon in this chapter (2020-2100), the stages of migration transition, according to the migration

cycle model by Fassmann and Reeger (2012), have been interpreted in relation to the symbolic turning point in the transition process in Serbia (2030-35). Afterwards, a transition phase should follow during which immigration gradually outweighs emigration, which coincides with the migration assumption in the current EUROPOP 2019 projections (2019-2100) for EU Member States (Eurostat, 2021b). However, in the period up to 2030-35, the hypothesis was formulated by analogy with recent evidence on emigration from most states of the Eastern enlargement and Croatia immediately after their joining to the EU (Draženović et al. 2018). In addition, the current relaxation of immigration policies towards Serbia by the major destination countries, such as Germany, indicates that increased emigration is also possible in the immediate pre-accession period. In other words, the hypothesis of net emigration in the next 10-15 years could be hardly avoided even in a scenario of Serbia's 'non-EU' future. That would be valid as long as there is a marked gap in living standard between Serbia and the most popular European destinations, and the growing demand for labour in these countries due to the intensification of population ageing.

Given the above reasoning, as well as the expected decrease in Serbia's migration potential due to population ageing, we assumed that the increase in the average annual net emigration would be at maximum 10%. This means that the current net emigration of −0.7 per 1,000 population or −5,029 people annually would reach −0.8 in 2030 or −5,535. Such a forecast is the result of a previously formulated assumption about the regional distribution of the country's total migration balance. Numerically, the negative net migration rate will increase by 15% compared to the average for 2018-2020 in all districts not recognised as traditional emigration zones, while the migration balance of 'hot zones of emigration' as labelled by Penev and Predojević-Despić (2012) will remain unchanged until 2030.

In line with the gradual transformation of the country's international migration profile after 2030-35, we assumed that the net international migration of the country would turn positive by 2050 and amount to 0.5 per 1,000 population or 3,745 people annually, and to 1.4 per 1,000 population or 9,364 people in 2100. The benchmarks for defining the target values were EUROPOP 2019 projections (Eurostat, 2021b), which implicitly see the EU as an immigration zone including the countries such as Croatia and Bulgaria that are currently experiencing the emigration pattern similar to the Serbian. The projected rates resulted from the hypothesis at the subregional level, which implies that all districts should reach at least zero migration balance by 2050, i.e. enter the transition phase according to the migration cycle model. The highest rate of positive migration balance, 1.1-1.2 per 1,000 population in 2050, and 2-2.5 in 2100, would be in districts with the largest university centres, in line with the strategic national goals for sustainable population development and the guidelines for balanced spatial development of Serbia (Antonić, 2021).

The rate of net internal migration is projected to gradually decrease throughout the projection horizon in all districts where negative internal migration balance is currently observed according to the only migration scenario (baseline). At the same time, the share of the metropolitan area of Belgrade and Novi Sad, as the most prominent zone of in-migration, in the country's positive balance of internal migration flows would gradually decrease. This would happen at the expense of the increase in attractive power of other districts in line with the recommendations for development of urban centres in Serbia presented in chapter on urbanisation. This hypothesis is the result of two factors. The first relates to the successful implementation of policies aiming at more regionally balanced development of the country, which is one of the strategic goals of Serbia's sustainable development (GoS, 2008). The second factor is an estimate of the expected decline in the share of the most active age groups in migration flows in line with the trend observed at the beginning of this century, caused by shrinking and ageing of the population (Nikitović et al., 2015).

In order to meet the assumed dynamics of the migration hypothesis, three reference points were set in the projection period – 2030, 2050 and 2100. For each point, the net migration rate for each district was expressed as the net migration per 1,000 population in 2020 and was calculated on the basis of previously projected rates of internal and international migration. The rate changes linearly between the reference points, resulting in 8 districts with positive net migration rate in 2050 and 13 in 2100 compared to only 3 in 2020, whereas no district is expected to exceed the net emigration rate of −3 in 2050 and −1.9 in 2100.

2.2 High fertility scenario

High fertility scenario reflects an ideal future of the full realisation of the goals presented in the current *Birth Promoting Strategy*, which implies a relatively fast increase in total fertility rate in Serbia by 2050 given the empirical evidence and expectation on future fertility change in the European context (Eurostat, 2021b). The highest increase in TFR was predicted for the first 15 years of the projection. Although the scenario implies that policy measures will last even beyond the horizon of the current strategic document, experiences from countries with a long tradition of population policy implementation indicate that the effects on birth rates are generally strongest in the initial period of the implementation (Frejka & Gietel-Basten, 2016).

The *Birth Promoting Strategy* disregarded subnational diversities described in the previous section by assuming that the same policy measures may successfully apply to different spatial levels and settlement types in the country. We tried to overcome that by accounting for the subregional differences. The forecast increase in TFR across districts would be 20-40% by 2035, and 10-15% in each of the two following periods – 2035 to 2050 and 2050 to 2100, depending on the pre-projection TFR of each district. Consequently, the range of the target TFR across districts would be 1.70–1.85 in 2035, 1.9–2.1 in 2050, and 2.1–2.2 in 2100. This is adjusted to the national target TFR of 1.85 after 15 years of implementation of the *Birth Promotion Strategy*, and with the potential level of 2.1 in the long run (GoS, 2018: 16). However, there is no evidence to support the assumed TFR of 2.1 by the mid-century in all districts. This is a conclusion based on the recognised spatial patterns of demographic trends in Serbia over the past half-century, in accordance with the theory of diffusion of social innovations (Nikitović, Bajat & Blagojević, 2016), as well as on

recent findings on the link between fertility and economic development at sub-national level in the European context (Fox et al., 2019). Therefore, as in the baseline scenario, the lowest target value (TFR = 1.9) in 2050 is set for districts of traditionally lower fertility in the region of South and East Serbia, whilst that level would be reached already in 2035 in higher fertility areas in the west and southwest of the country.

The probability of materialisation of the high fertility hypothesis was assessed by the UN probabilistic model used to formulate the fertility assumption in the *baseline scenario*. Consequently, the probabilities of materialisation of the high fertility hypothesis are: 3–5% in 2050 and 2.5% in 2100 in the case of districts with lower current TFR, and up to 2.5% in 2050 and below 1% in 2100 in the districts with higher current TFR.

3 Long-Term Overview of the Key Demographic Indicators - the Framework for Policy Actions

3.1 Baseline scenario — the most probable future

The current population size of Serbia (6.82 million) would shrink by 1.4 million or by 21% until 2050 according to the *baseline scenario*. This puts Serbia in the group of top ten world countries (including its neighbours Croatia, Bulgaria and Romania) expecting to see their populations decline by more than 15 per cent by 2050 according to the most recent UN *World Population Prospects* (United Nations, 2019b). The decrease would continue afterwards, though, at a slightly slower pace – the total population size would drop to 4.14 million in 2100, due to the transition in the country's migration profile from net emigration to net immigration, and a slight increase in fertility rates.

While the decrease of the total population in the region of Belgrade would be just 3.8% by 2050, and in the region of Vojvodina slightly less than the national average (19.4%), the region of South and East Serbia would lose the third of their population (33.4%), and the region of Šumadija and Western Serbia somewhat less than that (28.5%). The most dramatic loss of population – above 40% compared to their present population size – is projected for districts characterised either by traditional emigration or the highest share of older citizens or both, all of them located in Southeast Serbia (Table 5). Apart from the district of Belgrade, reductions below the national average were forecast only in four districts. Three of them would benefit from the assumed positive balance of internal migration during the projection horizon due to the attractive power of their large city centres – Novi Sad (reduced by 7%), Niš (18%), and Subotica (19.4%), while the district of Raška (15.5%) differs by much younger age structure and higher fertility rates compared to all other districts.

When it comes to population ageing, which is usually perceived as one side of the depopulation coin with the shrinking of population size as the other, the projected trends are not folding out throughout the projection horizon as straightforward as those of total population. Age dependency ratios are commonly used indicators of population ageing that in a simple but clear way present changes in relations between broad age groups of total population – the young (0-19 years), the working-age (20-64) and the older (65 and above). Dependency ratios provide an information on the demographic dimension of the ratio between inactive (young and old) and active (working-age) population. We examined the three ratios – ageing index (the ratio between the old and the young), old-age dependency ratio (the ratio between the old and the working-age), and total dependency ratio (the ratio between the two inactive groups and the working-age population).

Regardless of the dependency ratio considered, after the increase forecast by 2050, its value at the national level is expected to decrease by 2100. There are two reasons responsible for that outcome – current age structure and forecast smooth transition of the country's migration profile from net emigration to net immigration after 2030-2035. The former is reflected in the impact of large baby-boom generations on the number of people aged 65 and above, which will gradually disappear once this group reaches its century's maximum in 2025. However, there would be another rise in the number of the older people between 2045 and 2055, but of a temporary character as the echo of the baby-boom generations, which would result in their size being close to the current one. It is worth noting that even those two increases in the number of the older people are exclusively driven by the rise in the two biggest cities in the country (Belgrade and Novi Sad) that are expected to continue attracting migrants, and by the two areas at the southwest and southeast that are characterised by currently much younger population if compared to other parts of the country. The continuous in-migration would also influence the rise in the number of the young population in the two biggest cities in the second half of the century despite the fact that total fertility rate will reach only 1.7 by 2100. This is the best proof that the so called replacement fertility level is not essential for rejuvenating the population if there is a continuous inflow of migrants. At the same time, it is expected that the district of Bor – one of the forerunners of the first demographic transition in the country (Nikitović et al., 2016) and the core of the traditional emigration zone (Penev & Predojević Despić, 2012), would lose its entire young population by 2100.

Territory	2020	2035	2050	2075	2100
Republic of Serbia	6,824,935	6,038,158	5,389,485	4,570,716	4,139,863
Vojvodina region	1,826,225	1,633,211	1,471,822	1,274,904	1,158,835
Šumadija & West Serbia region	1,867,543	1,583,343	1,334,408	1,013,196	816,646
South & East Serbia region	1,450,033	1,184,769	966,233	687,741	505,500
Belgrade region/district	1,681,134	1,636,835	1,617,022	1,594,875	1,658,882
West Bačka district	167,279	135,385	108,065	74,316	51,309
South Banat district	272,975	239,511	211,965	175,836	148,954
South Bačka district	614,460	590,240	571,238	545,449	543,175
North Banat district	132,740	110,783	92,485	71,806	58,472
North Bačka district	175,424	156,687	141,428	124,684	114,848
Central Banat district	170,551	142,059	117,091	86,718	65,048
Srem district	292,796	258,546	229,550	196,095	177,029
Zlatibor district	259,215	209,971	162,252	98,317	55,385
Kolubara district	159,266	135,861	114,384	88,440	76,832
Mačva district	271,059	224,192	180,720	126,273	88,751
Moravica district	194,978	166,123	140,344	109,056	95,611
Pomoravlje district	190,944	156,248	131,740	102,813	84,053
Rasina district	216,195	174,620	137,122	85,845	52,257
Raška district	299,696	276,000	253,321	217,575	192,245
Šumadija district	276,190	240,328	214,525	184,877	171,512
Bor district	106,339	75,854	51,759	23,317	5,966
Braničevo district	158,834	122,306	94,084	59,091	35,431
Zaječar district	102,725	77,107	59,294	39,416	29,158
Jablanica district	193,830	156,741	122,994	76,334	41,747
Nišava district	354,436	315,723	290,731	265,009	260,779
Pirot district	81,513	62,681	48,004	29,548	17,458
Podunavlje district	179,891	143,919	112,104	70,094	39,433
Pčinja district	191,397	165,781	136,301	91,646	55,740
Toplica district	81,068	64,657	50,962	33,286	19,788

Table 5. Total population of regions and districts in Serbia according to the *baseline scenario*[26]

Source: own calculations

[26] All projected numbers presented in this section refer to the population at the end of the year.

On the other hand, the forecast decreasing pattern in the dependency ratios at the national level after 2050 does not apply to all lower spatial levels. Out of 25 districts in Serbia, 9 would experience an increase in the ageing index, 12 in the share of the older population, 13 in old age dependency ratio and 14 in total dependency ratio throughout the whole century . The majority of districts with increasing ageing indicators refer to those with currently older population than in other districts and with prominent out-migration. When the whole projection period is considered, there would be only 7 districts with the ageing index lower than today by the end of this century and just

one in case of old age dependency ratio. Yet, the increase of the index would be lower than 15% in 7 districts, and higher than one third in 14 districts, of which 4 districts would experience double the current index value by 2100. Finally, 2 of 25 districts would have higher number of the older population than the working age population already by 2050, and 8 districts by 2100, all of which located in the two south regions (Table 6). This suggests that sustainability of that area would be seriously endangered, which would also contribute to further deepening of the already big gap in terms of the development level between districts.

Territory	Share of people aged 65+				Ageing index (65+/0-19)				OADR (65+/20-64)				TDR (0-19&65+/20-64)			
	2020	2035	2050	2100	2020	2035	2050	2100	2020	2035	2050	2100	2020	2035	2050	2100
Republic of Serbia	21.4	23.7	27.1	24.0	1.11	1.25	1.45	1.15	0.36	0.41	0.50	0.43	0.69	0.74	0.84	0.81
Serbia North	20.3	21.8	25.4	22.4	1.03	1.10	1.30	1.03	0.34	0.37	0.46	0.40	0.67	0.71	0.81	0.79
Serbia South	22.6	25.9	29.3	27.4	1.19	1.44	1.67	1.43	0.39	0.46	0.55	0.51	0.71	0.78	0.88	0.87
Vojvodina region	20.4	22.9	25.9	24.1	1.04	1.20	1.37	1.18	0.34	0.39	0.47	0.43	0.66	0.72	0.81	0.80
Šumadija & West Serbia r.	22.3	26.0	29.0	26.3	1.15	1.42	1.59	1.33	0.38	0.47	0.55	0.49	0.72	0.80	0.90	0.86
South & East Serbia region	23.0	25.7	29.7	29.2	1.24	1.47	1.78	1.62	0.39	0.45	0.55	0.56	0.71	0.76	0.86	0.90
Belgrade region/district	20.2	20.7	24.8	21.2	1.02	1.00	1.24	0.94	0.34	0.35	0.45	0.38	0.67	0.71	0.82	0.78
West Bačka district	22.7	26.5	30.2	30.9	1.27	1.59	1.84	1.83	0.38	0.47	0.57	0.59	0.68	0.76	0.87	0.91
South Banat district	21.2	23.5	26.4	25.6	1.09	1.27	1.41	1.32	0.36	0.41	0.48	0.47	0.68	0.72	0.82	0.82
South Bačka district	18.7	20.5	24.3	22.2	0.90	1.01	1.23	1.03	0.31	0.35	0.43	0.39	0.65	0.69	0.79	0.78
North Banat district	21.4	24.1	26.8	26.8	1.16	1.35	1.53	1.44	0.36	0.42	0.48	0.49	0.66	0.72	0.80	0.83
North Bačka district	20.4	22.7	25.6	24.0	1.07	1.19	1.36	1.18	0.34	0.39	0.46	0.43	0.65	0.72	0.80	0.79
Central Banat district	21.4	25.0	27.8	28.3	1.11	1.35	1.53	1.50	0.36	0.44	0.52	0.53	0.69	0.77	0.85	0.89
Srem district	20.9	24.4	26.5	24.0	1.09	1.31	1.40	1.17	0.35	0.43	0.49	0.43	0.67	0.76	0.83	0.80
Zlatibor district	22.8	29.4	33.2	36.2	1.19	1.64	1.91	2.29	0.39	0.56	0.67	0.75	0.72	0.90	1.02	1.08
Kolubara district	22.9	27.3	29.5	24.6	1.26	1.54	1.65	1.20	0.39	0.50	0.56	0.45	0.70	0.82	0.90	0.82
Mačva district	21.5	26.8	30.1	29.5	1.11	1.47	1.65	1.58	0.36	0.49	0.58	0.57	0.69	0.82	0.94	0.93
Moravica district	23.7	27.1	29.6	24.1	1.27	1.46	1.59	1.12	0.41	0.50	0.57	0.44	0.74	0.84	0.93	0.83
Pomoravlje district	24.9	26.6	29.0	26.5	1.41	1.61	1.72	1.40	0.43	0.47	0.53	0.49	0.74	0.76	0.85	0.83
Rasina district	24.9	28.6	33.6	34.5	1.41	1.76	2.13	2.18	0.44	0.52	0.66	0.69	0.74	0.82	0.97	1.01
Raška district	17.7	20.6	24.1	23.8	0.73	0.94	1.13	1.09	0.31	0.36	0.44	0.44	0.73	0.74	0.83	0.84
Šumadija district	22.5	24.7	27.4	23.8	1.21	1.42	1.55	1.20	0.38	0.43	0.50	0.42	0.70	0.73	0.82	0.77
Bor district	25.9	30.9	37.6	75.8	1.56	2.18	2.91	-	0.45	0.56	0.76	3.13	0.74	0.82	1.02	3.13
Braničevo district	25.3	27.3	32.3	35.0	1.44	1.71	2.14	2.28	0.44	0.48	0.61	0.71	0.75	0.76	0.90	1.02
Zaječar district	29.3	29.6	32.9	28.0	1.88	2.06	2.18	1.54	0.53	0.53	0.63	0.52	0.81	0.79	0.93	0.86
Jablanica district	22.1	26.0	30.8	38.9	1.17	1.50	1.95	2.85	0.37	0.46	0.58	0.82	0.69	0.76	0.87	1.11
Nišava district	22.8	23.5	26.4	22.6	1.24	1.25	1.43	1.08	0.39	0.41	0.48	0.40	0.70	0.73	0.81	0.77
Pirot district	26.6	29.4	33.1	35.8	1.64	1.85	2.17	2.43	0.47	0.54	0.64	0.72	0.75	0.83	0.93	1.02
Podunavlje district	22.3	25.9	31.0	37.0	1.18	1.52	1.90	2.57	0.38	0.46	0.59	0.76	0.70	0.75	0.90	1.06
Pčinja district	16.4	22.4	27.5	35.3	0.74	1.14	1.62	2.17	0.27	0.39	0.50	0.73	0.62	0.72	0.80	1.06
Toplica district	23.4	25.9	28.9	35.0	1.21	1.34	1.60	2.10	0.41	0.47	0.55	0.73	0.75	0.83	0.89	1.07

Table 6. Indicators of population ageing across regions and districts of Serbia, 2020-2100, baseline scenario

Source: own calculations

3.2 Between desirable and fictional future – *high fertility* and *zero-migration* scenarios

The distinction in terms of the forecast demographic indicators between the North and South of Serbia, which have been noticeable already according to the *baseline scenario*, is clearly pronounced in the projection results of the *high fertility scenario*. This is the only of the three presented scenarios in this chapter that forecasts an increase in total population (Figure 6), though only after 2080 on account of the decades-long period of increase in total fertility rate that in most districts would reach around 2 by 2050 and even replacement level by 2100.

Slower decreasing trend of the total population by 2050 is clearly pronounced only in districts with the largest city centres if compared to the baseline scenario. Even though the decrease would slow down in most districts after 2050 due to the decades-long period of forecast high total fertility rate (close or at the replacement level), the only two districts that would have larger population than today would be those whose centres are Belgrade (by 19.2%) and Novi Sad (11.3%). This suggests a very clear conclusion: *the unlikely future from the current demographic viewpoint, which assumes a fairly fast increase in total fertility rate in the next 30 years followed by a half-century period of stable high fertility (which allows one generation of women to be fully replaced by another) would not stop the decrease in total population at the country level but only in the areas able to attract migrants.*
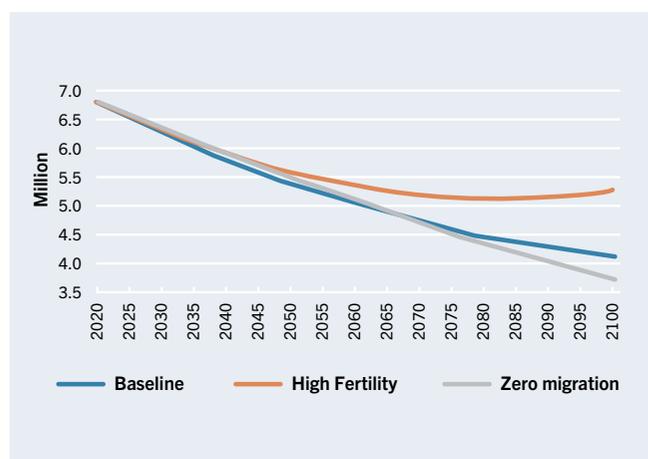
Figure 6. Total population of Serbia, 2020-2100, according to three scenarios

Source: own calculations

Moreover, the high fertility future would not make much difference compared to the baseline scenario in districts with higher share of older population and/or disturbed sex structure in the prime reproductive ages due to steady out-migration. Figure 7 simply summarises these two types of districts, presented by two extreme cases – Belgrade and Bor. On the other hand, zero migration scenario would have much stronger effect on both types of districts, but of opposite direction. When Fig. 6 and Fig. 7 are compared, a clear conclusion emerges: *The effect of migration is much more relevant for the subnational spatial units*

than for the national level. In other words, policies stimulating higher birth numbers will eventually, though after quite a long period, have effects at the national level, but at the expense of most districts which are affected by out-migration and rapidly ageing population. This also means that birth stimulating policies will have almost no effect in most areas of the country unless coupled with policies aimed at more balanced spatial development that would reduce the prominent gaps in net migration between districts.
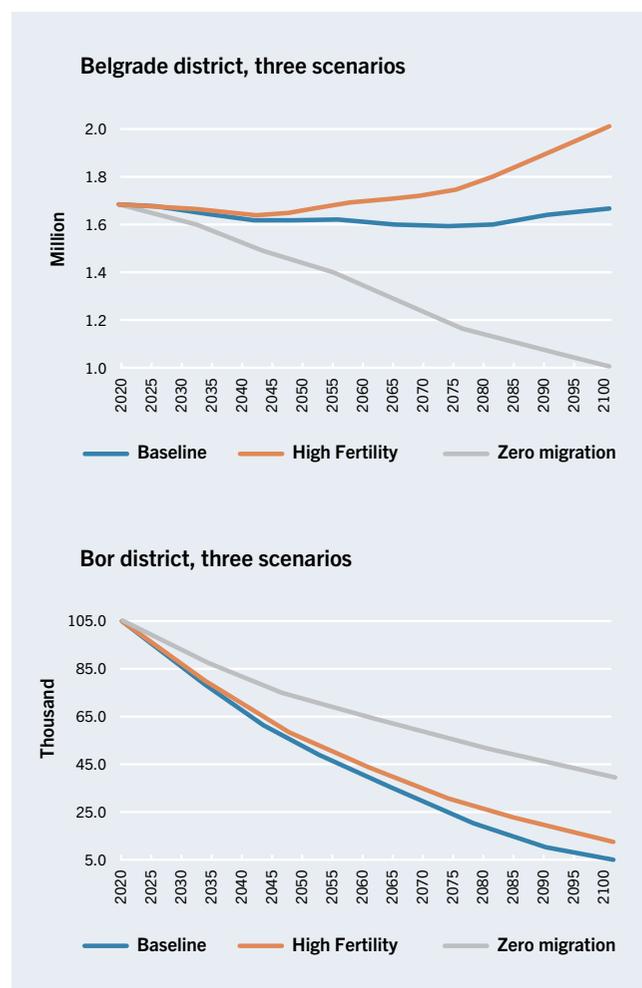
Figure 7. Total population of the districts of Belgrade and Bor, 2020-2100, according to three scenarios

Source: own calculations

When it comes to population ageing, the forecast ageing ratios report a mixed bag of news. *High fertility future* can make some benefits in comparison to the baseline scenario, but they could be visible only by 2100 and only in small number of districts due to the very nature of the fertility rise impact on the age structure. It takes at least 20 years for the first projected new-borns to enter the working-age group and start reducing the economic pressure. Until then, they themselves also contribute to the 'burden' on economically active population. Moreover, as total fertility rates are forecast to quickly grow by the-mid-century and remain high until the end of the projection, the projected new-borns' cohorts would contribute more to the steady rise or slower decrease, depending on the district, of the young

than of the working-age group. For that reason, total dependency ratio would be lower than in the baseline scenario in only a third of all districts but only by 2100. Yet, this is driven almost exclusively by the decreasing trend in the number of older people. This is confirmed by the forecasts of old-age dependency ratio and ageing index. In case of the former, all districts would have significantly lower values in the high fertility than in the baseline scenario in 2100. As for the ageing index, 9 districts would have a lower index than today in 2050, but as many as 21 of 25 districts in 2100 according to the high fertility scenario.

The zero-migration scenario would clearly result in a lower old-age dependency ratio than the high fertility or the baseline scenario by 2050 in all districts except for several having steady positive migration balance. However, the long-term impact of high fertility rates would reverse this pattern, so that 20 of 25 districts would have a lower old-age dependency ratio in 2100 (only those hit by strong out-migration would not) in case of the high-fertility future than in the zero-migration scenario. The same comparison for the total dependency ratio shows, though, that just 12 of 25 districts have lower values in 2100 in case of the high-fertility future due to the steady increase of the young population. The lowest increase of the current ageing index throughout the projection would be in districts strongly affected by out-migration according to the zero-migration scenario. Contrary to the high fertility scenario, only five districts would experience a lower index than today in 2100.

3.3 Guidelines for policy makers

It is a well-known fact that the population in Serbia is declining and that it is demographically old. Therefore, it is not surprising that one of the basic messages of this chapter is that the total population of Serbia will most likely drop by a fifth by 2050 or by two fifths by the end of the century if no public policy measures in the field of demographic development are implemented.

Another more specific message indicates the multi-layered nature of depopulation in our country: it is not only marked by low level of demographic development, but also its pronounced spatial unevenness. This is confirmed by the human development index, which in Serbia is at the level of the index for Latin America and the Caribbean, if the area of the capital is excluded, which is the only one similar to an EU member state (Poland).

Here we come to the essential messages of the chapter, and that is that depopulation in Serbia is, above all, a regional and subregional issue. It is this aspect in dealing with demographic challenges that is conspicuously neglected in the existing strategies and legal solutions. In some regions and areas, the main demographic challenge is not depopulation or ageing itself, but the advancement of other dimensions of human development, and vice versa. If this statement is taken into account, policy makers could respond to the problem of depopulation far more effectively than in the case of the usual approach based on national averages. Even an unlikely future from today's demographic point of view, which assumes a fairly rapid birth rate close to simple reproduction and its maintenance by the end of the century, would

not restore the current population at the national level, but only in areas capable of attracting migrants.

Moreover, the gap in demographic and human development indicators between the north and the south of the country is expected to widen. The group of districts in the region of the South and East Serbia would most probably lose between 40% and 50% of their population by 2050. If current trends in birth and survival rates continue (implying their slight improvements), 18 of 25 districts in Serbia would lose more than a half of their population by 2100 despite the expected transformation of the country's migration profile from the net emigration to a net immigration after 2030-35. The district of Bor would even face the end of this century with no young population, as is the case with some current settlements in that area. Even if the high-fertility scenario of the ideally implemented policies aimed at increasing birth numbers would come true, 12 of 25 districts would be more than halved by 2100.

The hot topic of net emigration is much more relevant for specific areas than for the national level. In that sense, internal migration proved to be a bigger challenge for a large majority of districts. Precisely, the high-fertility scenario could have positive effects after a very long period at the national level but at a high cost for most districts with low human capital hit by steady out-migration. That being said, districts whose centres are the largest cities in Serbia could maintain their population size, and even increase significantly, even though they would not reach the birth rates needed for generation replacement. This also means that policies stimulating higher birth numbers need to be coupled with policies aimed at reducing the prominent gaps in net migration between districts if any improvement in demographic indicators is expected in most areas of the country. Finally, this chapter suggests that the holistic strategy of addressing the demographic change implications in Serbia needs to include not only drivers of low fertility and unfavourable migration patterns, but also all three dimensions of the human capital index. From that point of view, depopulation or ageing itself may no longer be considered a major demographic challenge in most districts of the country.

Addressing the Depopulation Challenge from the Family Life Perspective — Is Fertility Rise Possible?

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Is fertility rise possible? If so, under what conditions? The history of European societies in the last 50 years indicates that after the decline in fertility, an increase was recorded in some societies.[27] At the same time, it was noted that there are significant differences in fertility rates between countries. Rates are lower in countries where family values are present (where high value is placed on family life and children) and higher in individualistic cultures. Demographers and sociologists have sought to discover the causes of this phenomenon. In short, higher fertility is associated with a higher quality of life, i.e. quality of work, quality of marriage (or partnership), and quality of institutional support for parenthood. Thus, research into the causes of increased fertility in itself implies research into the labour market, married life, structure and scope and institutional support, that is, the possibility of establishing a balance between different spheres of life and interests.

In this chapter, we will analyse the factors which we assume are associated with the decision to have children. We will try to answer the question of what it takes for individuals and couples in Serbia to have the desired number of children, that is, which factors influence the decision to have the first, and, especially, every subsequent child. The deterministic set that leads to the decision to give birth is complex and depends on structural and cultural assumptions, partner dynamics, lifestages of individuals and partners, their health conditions, and more. In the analysis, we will use the theoretical framework which provides a different focus on this topic than those that have dominated the domestic literature the work-family balance. Although it uses demographic indicators[28], this chapter is primarily written from a sociological perspective, with the aim of looking at the needs of the family within the domestic context, and presenting the widest possible range of measures that can meet personal and family needs and potentially affect an increase in fertility.

The chapter itself has certain limitations. First, due to insufficient domestic research and analysis on this topic, in most analyses, we relied on theoretical assumptions and the analyses from the research of other societies (and Europe as a whole) on this topic. We tried to always use those sources that, according to our expert opinion, have grounds to be a framework for explaining behaviour in Serbia as well. Second, policy measures in the domestic context have not been sufficiently researched, nor have their effects been evaluated, so unfortunately the consequences of their introduction and changes are not sufficiently known. Therefore, they are listed in this chapter and evaluated on the basis of our expert opinion, with suggested ways to improve them.

1 Balancing Work and Parenthood

Numerous studies show that the decision to have children is influenced by factors related to work and employment, institutional support for parents, internal marital dynamics and gender roles perceptions (Chart 1). Although there is no absolute consensus on these factors, especially given the different social contexts in which they were examined, researchers agree that if a jump in fertility rate is possible in modern societies, it is possible only through a combination of different instruments for the work-family balance.
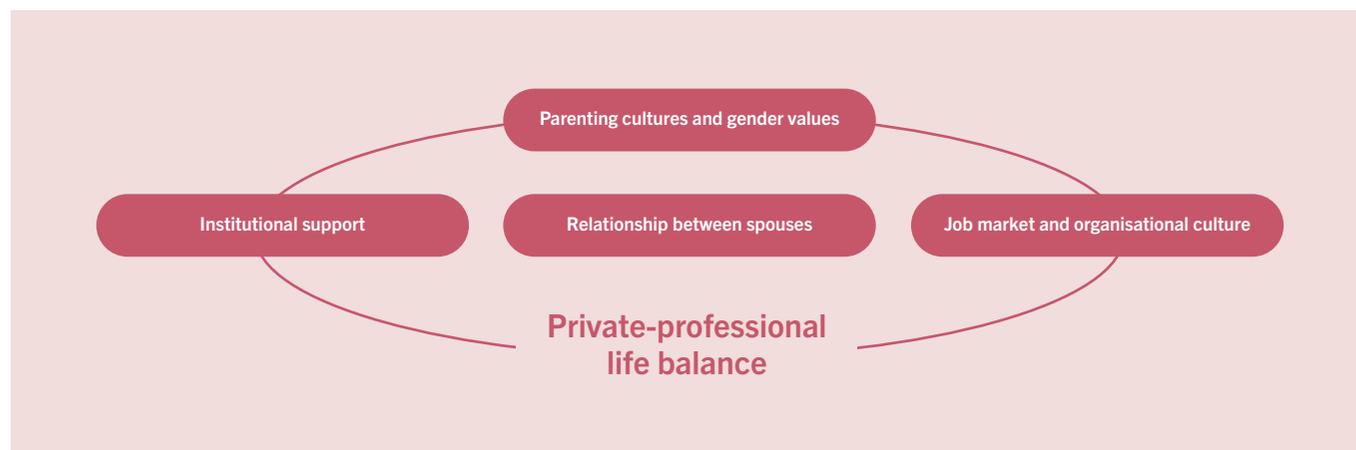
Chart 1. Factors influencing the decision to give birth and private-professional life balance

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[27] Although the last few years have seen a decline in fertility in most European countries, it is still early to take a position on this phenomenon, i.e. we are not sure whether it is a new trend or short-term fluctuation.

[28] To review domestic demographic research on this topic, readers should consult Rašević (1999, 2006a, 2006b, 2015, 2017), Rašević, Sedlecki (2016), Rašević, Vasić (2017), Rašević et al., (2017), Rašević, Galjak (2022), Penev, Stanković (2018, 2021), Nikitović (2019) and others.

We have divided the factors influencing the possibility of such a balance into four groups: 1. *The labour market*, which includes employment, unemployment, inactivity, job security (type of contract), income level; and *organisational culture,* which includes types of work arrangements which are (are not) conducive to balancing work and parenting, values and practices within the work organisation, and the level of exposure to discrimination in employment and work faced by (future) parents; 2. *Institutional support* to parenthood, which includes financial incentives — one-off and continuous payments, and services — parental leave, etc.; 3. *Marital dynamics* consisting of: a) degree of marital satisfaction, b) degree of marital stability, c) harmonisation of gender roles and expectations — division of domestic work and division of parental care; 4. *Dominant gender roles values* related to the roles of men and women in the public and private spheres.

1.1 Deciding on giving birth

The decision to have a child is one of the longest-term decisions an individual or couple can make, and therefore implies a certain predictability of future life, that is, security and harmonisation of marital roles (Thomson, Henz 2005), income certainty, and security of parental support (institutional and informal). When there is a high degree of freedom in deciding with whom, when and how many children to have, and when there are enough resources available to achieve the optimum for their children, family and themselves, there is a chance that people will have the desired number of children. This decision in Serbia is largely influenced by the familistic norm (Tomanović, et al. 2016). [29] Young people affirm that they are exposed to a certain pressure from the environment, parents and friends regarding the time for having a child and the desired number of children. In addition, they feel that they do not have adequate institutional support and sufficient personal resources to facilitate the family transition. Despite that, the majority of the Serbian population highly values family life, marriage and children, and parenthood is a very important part of personal identity (Rašević, 2006; Rašević 1999; Tomanović Ignjatović, 2004; Pešić Jenaćković, Marković Krstić, 2021).

The decrease in fertility, which characterises the second half of the 20th century, is associated with delaying childbirth for later years, and is associated with structural and cultural factors. The structure of the labour market is especially important because today we record higher fertility rates in highly developed countries where there are high female employment rates and where jobs are (highly) secure (Thenevon, 2015). Another important factor is the institutional context which can stimulate the establishment of an appropriate work-parenting balance, primarily through a developed and accessible system of preschool institutions and long-term financial support to parents with children.

In the domestic context, the direct effects of the crisis on the delay and potential abandonment of childbirth during the 1990s have already been detected, so that social, economic, and political turbulence is not a suitable ground for family planning (Rašević, 2006; Rašević, 2015; Penev, 2010). However, the crisis in our context did not end with changes in 2000, but trends continued in the same direction, with lower fertility rates and a negative migration balance (Nikitović, et al., 2019; Rašević, Galjak, 2021; Penev, 2010). Therefore, it is necessary to develop mechanisms to mitigate or eliminate the effects of social and economic insecurities that have clear effects on the family dynamic.

Although it is generally accepted that there is a considerable gap between the desired, planned and achieved number of children, unfortunately there is not enough domestic research to analyse this relationship more precisely. The available data show that over 90% of young people (15 to 30 years of age) see themselves married and with children (Popadić and Pavlović, 2019). About one in three young people (30%) did not know how many children they would like to have, and those who did, usually stated two (52%), significantly less three (32%), and less than 5% only one child. According to older research conducted on the student population, most young people want to have a child or children, the desired number of children is 2.95, and when it comes to more realistic predictions and plans, that number drops to 2.35, while men have slightly higher expectations compared to women (Kuburović, 2003: 47–48). [30] So, as in other research, in Serbia, too, there is a discrepancy between the desired and actual number of children, indicating that individuals usually do not reach the desired number of children.

We get interesting insights based on research with women aged 15 to 49. Almost all women who do not have children want to be mothers in the future. Only one in twenty of them (5%) states that she does not want to have children, 58% expect to have their first child soon, 23% later, 5% are not sure about the time, while 6% are undecided. Women who have one child show different patterns of further family planning, where we can notice the lowering of aspirations towards a smaller number of children. More than one in three (37%) do not want more children and do not plan to expand their family, 33% would like or expect another child soon, 20% a little later, only 0.1% are not sure about the time, while 8% are undecided. With each subsequent child, the desire to have a another one decreases, so that as many as 75% of women who have two children do not want to give birth anymore ((Statistical Office of the Republic of Serbia and UNICEF, 2020: 55). The same research shows that there are significant differences in fertility rates in urban and rural areas (1.4 in urban and 1.9 in rural areas), but there are no differences among women in terms of desire to have a second child. Women in urban and rural areas equally (do not) want to give birth after the first child, but the birth of the second child still happens more often rural areas. We can assume that patriarchal patterns in rural areas are more pronounced and that women in rural areas are less likely to make the decision about having a subsequent

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[29] Familism represents the ideology of civil marriage which implies heteronormativity (heterosexuality as a normatively preferred form of marriage), monogamy, clearly divided gender spheres and roles, where the man is in charge of the public sphere (economy and politics) and has the instrumental role of breadwinner (who secures the family materially), and the woman is in charge of the private sphere (household and parental care) and has a primarily expressive role. In Serbia, this norm is more accepted in rural than in urban settings and more often among the less educated compared to those with higher education.

[30] Research conducted on the female student population shows that the desired number of children (2.56) is also considerably higher than the one achieved (Vasić, 2012).

child on their own. It is likely that with the further emancipation and maturation of new generations of women in rural areas, this pressure will ease, which will lead to the convergence of patterns of deciding about childbearing between rural and the urban areas.

The population of Serbia, like most European ones, is characterised by delayed births. Postponing parenthood brings with it two very likely scenarios — giving up childbirth (due to the inability to find an adequate partner or health risks) or having one child (Penev, Stanković, 2021). Both scenarios are more likely to increase the educational level of women, as education delays other life transitions and brings higher demands in terms of expectations from one's own life, parenthood, and what will be provided to the child (Rašević, 2015; Penev, Stanković, 2021; Penev, Stanković 2019). However, in the domestic context, demographers note one significant phenomenon where fertility rates (in the 2002-2015 period) of women with higher education became higher than of women with secondary education and were approaching women with primary education: This trend correspond to those in the economically developed countries, and they are attributed to a better position on the labour market, greater economic independence and the ability of highly educated women to balance work and parental responsibilities than those with secondary education (Rašević, Vasić, 2017; Nikitović et al., 2018).[31]

1.2   Work-family balance

The work-family balance is a useful analytical framework which connects different aspects of family and professional life and indicates in a comprehensive way the degree of harmonisation of different spheres of life. When planning and entering the family setting, couples and individuals face different requirements (normative expectations in different spheres), and the resources (individual, family and institutional) available to them will determine the 1. decision on having the first child, 2. decision on having the second and each subsequent child, and 3. quality of life. We will look at requirements and resources in the two key areas of life — work and family — to which we have added housing and finance (Voydanoff, 2005; Stanojević, et al., 2020).

The labour market should provide parents with optimal earnings, optimal time dedicated to work, and enough time for family responsibilities. This optimum can be achieved through several models: through full-time employment of both parents, through temporary resignation or reduction of working hours of one spouse, through increase in working hours (or through additional jobs) of one (or both) spouses. These possibilities will depend on the situation on the labour market, which, like the domestic one, often implies (compulsory) overtime work, work arrangements which are more insecure (work without a

Roditeljska tranzicija — zahtevi i resursi			
Work	Family	Housing	Finance
Parental transition — requirements and resources			
Employment	**Caring for children**	Independent household	Financial independence of couples
Overtime	**Domestic work**	Independent unit within the parental household	**Women's independence**
Job (in)security	**Spousal requests**		Sufficient funds for basic needs
Non-standard work schedule			Sufficient funds for leisure activities
Resources in a particular domain			
Flexible schedule and working hours	**Spousal support**	Inherited property	**Income from work**
Parental leave	Relative support	Large enough parents' unit	**Social transfers**
Enough time after work	**Gender equality values**	Enough resources for buying their own apartment	Rent
Work culture sensitised for family responsibilities	Preschool institutions	State subsidies for buying or renting real estate	Parental or kinship care

Table 1. Balancing work and parenting — domains, requirements and resources   * *topics which will be specifically addressed in this paper are bolded*

Source: Voydanoff (2005); Stanojević et al. (2020)

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[31] In addition to education, the gradual decline in the universality of marriage (through the growth of divorce rates, single life or widowhood) in the domestic context has not been accompanied by the growth of extramarital affairs and alternative partnerships, which could be legitimate alternatives to marriage. So, support to earlier financial and housing independence of young adults could help their partnering transitions as well (Penev, Stanković, 2021: 17).

contract or under temporary or fixed-term contracts), non-standard shifts and hours, but also conditioning parenting with employment, etc. (Aleksić et al. 2020). The resources which are available to varying degrees in this area are flexible working arrangements, a clear schedule and enough free time, a work culture sensitised towards parenting and legal solutions related to parenting support (especially parental leave and days off available to parents).

Two aspects are key to achieving optimum family functioning: 1. absolute requirement — enough time to perform all household tasks 2. relative requirement — harmonisation of expectations (values related to gender division of labour) and performance of household tasks between spouses. Daily tasks which need to be done in the household include housekeeping (preparing food, cleaning and home maintenance), child care (dressing, feeding, preparing food and cleaning up after the child, taking children to kindergarten, school or extracurricular activities, communication with institutions and learning support). Most of these tasks need immediate attention and require daily commitment. The distribution of the schedule dedicated to these obligations may be influenced by traditional norms where (almost) all obligations are assumed by women, and men sometimes help with them, or contemporary models in which the spouses come to mutual agreements and participate in everything equally. Spouses often have the support of their kinship network, somewhat less often the opportunity to pay a nanny and help at home, and they may have more or less available nurseries and preschool institutions. The relative requirement implies the alignment of the values of the spouses related to the gender division of labour and daily practices. If both spouses are satisfied with the involvement of the other spouse, then this optimum is achieved. The optimum may be the result of traditional norms in which both spouses agree that the division of spheres is legitimate, or under the influence of contemporary norms in which both spouses agree that there is no division to male and female tasks. The optimum is disturbed when there is an incompatibility of expectations between the spouses, that is, when one spouse expects a high-er degree of involvement of the other in daily duties, which creates dissatisfaction, stress, disagreement and, potentially, conflict.

An independent household or housing autonomy is seen as one of the important preconditions for parenting, and especially for further family expansion. The possibilities of buying real estate or renting one relatively easily at affordable prices are very important factors which young couples think about before starting a family. The type of housing unit, its size and equipment are related to decisions about childbearing (see Antonić, 2021), and in that sense they represent a resource which contributes to the achievement of the desired number of children. Resources which may be available to a couple are personal funds (or creditworthiness), parental financial assistance, inherited real estate, or a parental home (which allows more or less autonomy).

With regard to a couple's financial, that is, material autonomy, there are demands for independence from parents, sufficient income which enables the achievement of the optimum (or minimum) functioning of the family and the increasingly pronounced demands for financial autonomy of women. The available resources include employment, rent, social transfers and parental financial support. Institutional long-term cash transfers are especially important, as they provide parents with a significantly higher degree of material security compared to one-off and short-term support measures.

The paper will analyse the aspects which we believe are crucial in establishing balance and which, meanwhile, influence the childbearing decision. It is important to point out the significant limitation of this paper, which is reflected in the dominant focus on the classic family form — the nuclear heterosexual family. Although we are aware that the family should not be spoken of in the singular, and that different types of families — such as single-parent, combined (consisting of spouses with children from previous marriages), with same-sex partners/parents have certain different needs, due to the inability to cover all family forms, here we will try to find answers to some questions related to the dominant form. But we believe that these issues should be opened and work on practical solutions should begin as soon as possible.

2 Position at the Labour Market

Employment and job stability in the labour market is an important factor in making a decision on childbearing, but also achieving a desirable lifestyle for the whole family. This factor is proving to be very important among men, but even more so among women. In Europe, women with stable employment are considerably more likely to have a second child than unemployed and inactive women (Greulich et al., 2016). In Central and Eastern European countries, women who are employed, have secure jobs and have enough income to provide an optimum livelihood are more likely to start a family and have more children (Matysiak, Vignoli, 2008).This effect is more pronounced in those countries in which there is good support for parenting, particularly the availability of kindergartens, which is usually a condition for women to work at all, and then also to establish work-family balance.

In addition to (secure) employment, among women, a significant factor in family planning is the man's income stability and level. In Germany, it was noticed that among men there is a direct connection between the amount of income and the intention to have the first child, so that with higher incomes there is a higher readiness for the first child. There is also an indirect link between job satisfaction and intention to have a child, as job satisfaction implies less conflict in relationships, and thus a greater willingness for men to become parents (Berninger et al., 2012).

The situation in Serbia is not much different. Young people state that employment and income certainty, along with an independent housing unit, are key factors in deciding to start a family and have children (Tomanović, 2012) and these expectations are more prominent with

the increase in the young people's level of education (Tomanović, et al., 2016). The transition to adulthood in Serbia usually follows a standardised path, i.e. it implies a clear sequence of life events. For young men, that means finishing school, getting a job, getting married and having children. Independent housing, although it is something that is expected and desired, largely depends on resources, so those who have less resources will start their own family within the family of origin. The transition of young women generally follows the same path, but for those with the lowest education, it means first a family transition and only then possibly a work transition. Almost half of young women (46%) first have a child, and only then get a secure job, while considerably fewer men (29%) follow that path. In both cases, parental transition more often precedes secure employment for those who do not have university education (Tomanović, Stanojević, 2015). Thus, the preferred model of parental transition includes fulfilled preconditions — employment, sufficient income, and possibly an independent housing unit and occurs less frequently in women than men and in the less educated compared to the highly educated.

2.1 Labour market in Serbia

Having in mind the effects that the labour market has on achieving the work-family balance, in this chapter we will try to answer the following questions using the available data: To what extent are men and women present in the labour market? How secure are the jobs they do? Which people quit work because of family obligations? How sensitive is the work culture to parental responsibilities? Using the 2019 Labour Force Survey data we will reveal the labour market position of men and women aged 15-45 through the following dimensions: a) employment, b) job security, c) guaranteed labour rights.[32]

2.1.1 Employment

Men aged 15 to 29 have higher employment rates, significantly lower inactivity rates due to shorter time spent in the education process and slightly lower unemployment rates compared to women (Chart 2). The relation between the sexes in middle-aged people (30 to 45 years) indicates similar unemployment rates, but significantly higher employment rates for men and higher inactivity rates for women. Less activity in the labour market, with more frequent unemployment in women, indicates a gender gap and persistence of gender spheres divisions, so that work is more often perceived as the primary responsibility of men, and domestic duties and child care as the primary responsibility of women.

Data on the self-perception of one's own work status by women of the same age demonstrate a different picture, because there are fewer women who consider themselves to be employed (47%),[33] while the situation is only slightly better among women with children (58% re-
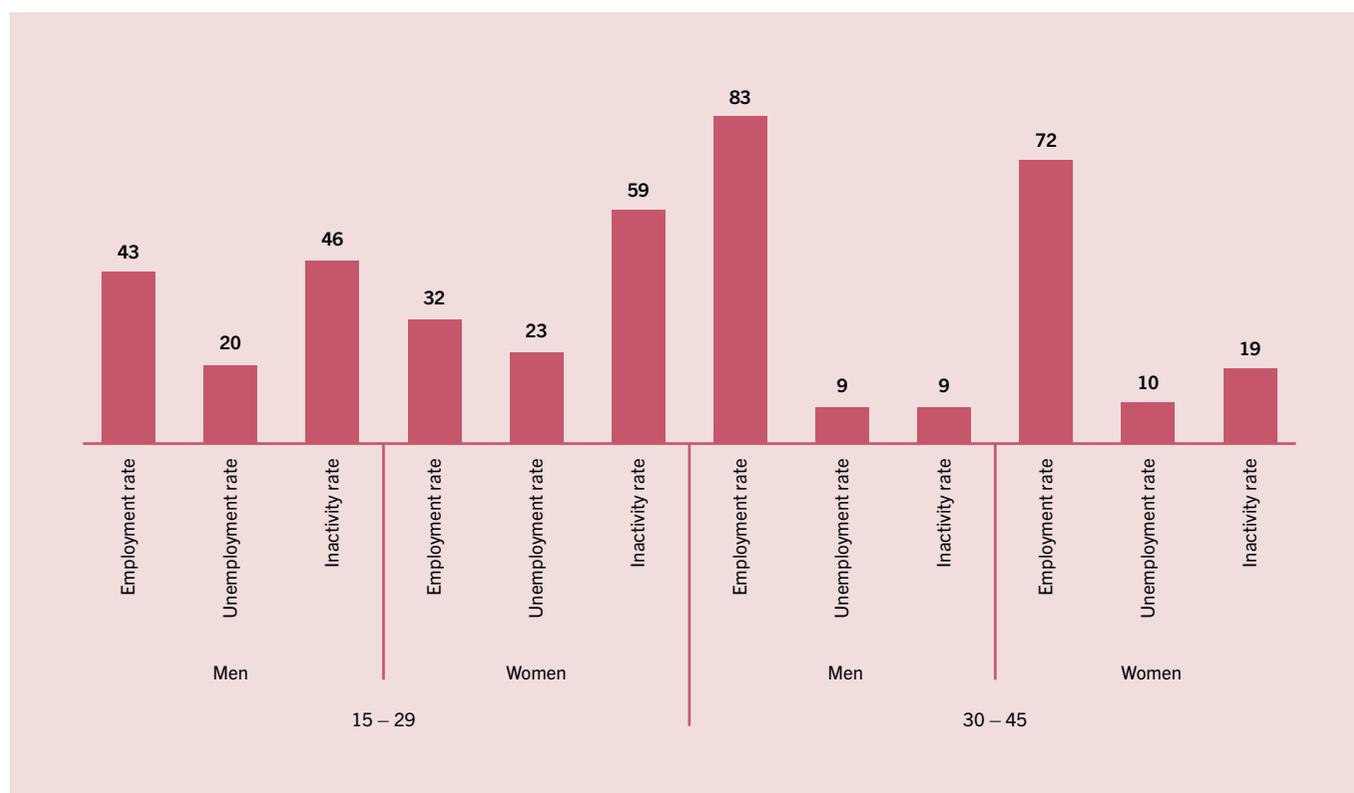
Chart 2. Position on the labour market of women and men aged 15-45

Source: LFS, 2019, author's calculations

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[32] We choose this age group, considering that the statistics shows that the largest number of women (over 95%) complete the fertile cycle in that period.

[33] As many as 30% of women consider themselves unemployed, while 5% do not work due to family and parental obligations, and the rest are inactive due to education and other reasons (EU-SILC 2018).
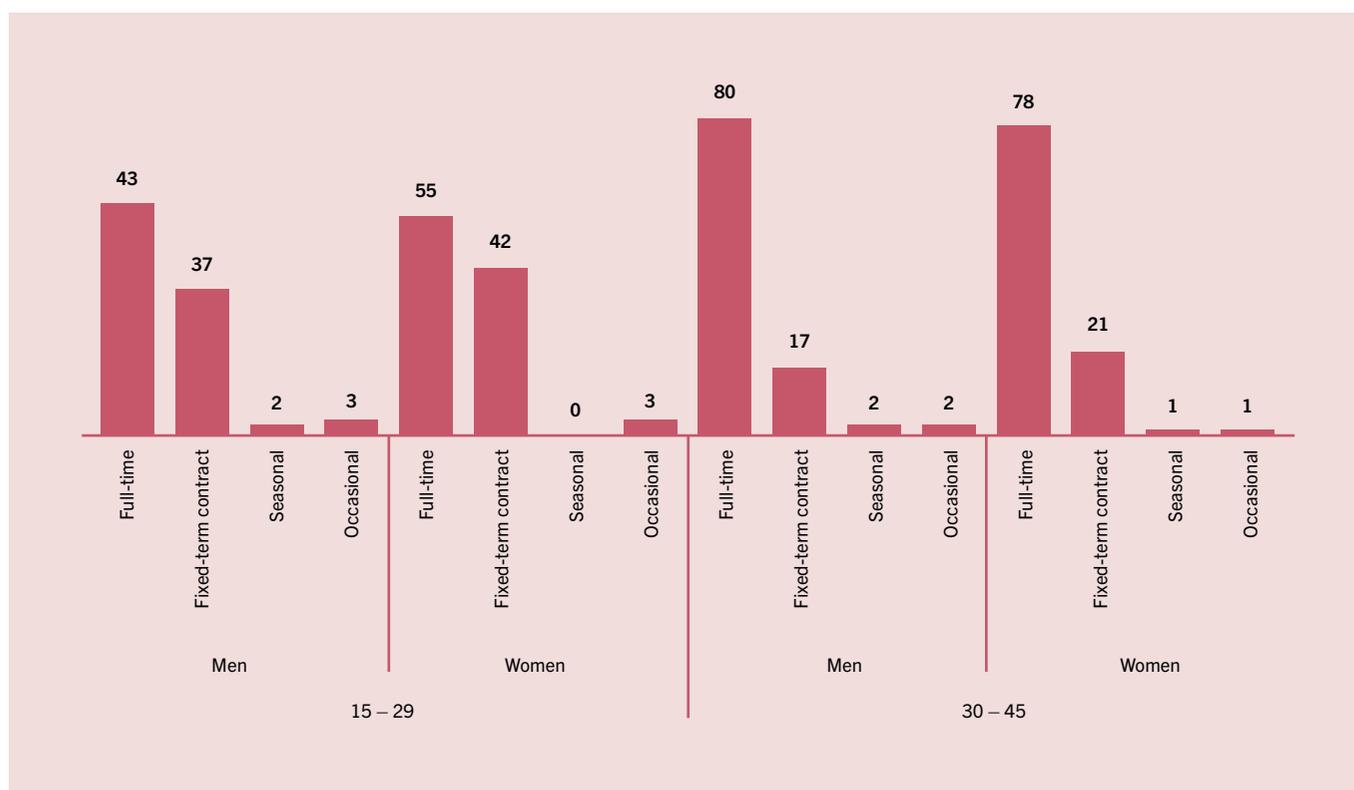
Chart 3. Type of work engagement of women and men aged 15-45 years

Source: LFS, 2019, author's calculations

port being employed).[34] Comparing the personal perception with the statistical way of defining employment shows us that although more women have the opportunity to work and earn, it does not mean that their status in the market is unambiguous, and that in addition to (occasional) earnings they also exercise other employment rights (which will be elaborated further on in the text).

These data indicate three patterns of the relationship between work and family transition in women. The first one, which implies that the work transition takes place before the family one (usually among highly educated women), the second one in which a number of women, usually those with lower education, withdraw from the labour market after graduation, that is, they first make the family, and then potentially the work transition, and the third one in which a woman gives up work, usually temporarily, when she becomes pregnant or becomes a mother (Tomanović, et al., 2016).

Women who are inactive in the labour market are in that status usually because they take care of children or adults with disabilities (63%), while one in five women states that it is a matter of personal and family reasons (ARS, 2019). Even those women who have stopped working often quote the same reasons, with 10% saying they withdrew from the market due to obligations to children or other family members, and 20% saying it was for personal or family reasons. Highly educated women are far less likely to be inactive and to a lesser extent lose

or leave their jobs. However, those who quit work or are not currently looking for work give similar reasons as women with lower-level education. Therefore, the direct reasons why women do not enter the labour market or why they are (temporarily) excluded therefrom are related to the inability to balance work and family obligations. A significant aspect of this inability lies in insufficiently flexible work options and insufficiently sensitised work culture. As we have seen, men are significantly less often inactive, but even then they are much less likely to state family reasons.

2.1.2 Job security

The domestic labour market is still dominated by permanent employment contracts (Chart 3). The structure of the type of employment is similar for men and women in both analysed age groups (15 to 29 and 30 to 45 years of age), with a slightly higher number of men performing seasonal and temporary jobs. There are fewer permanent and more temporary jobs among the younger age cohorts. The analysis of trends (Charts A1-A7 in the Annex) shows that unemployment rates have been declining since 2014 and that employment rates have been increasing (inactivity rates are more or less stable). Until 2016, the increase in employment went hand in hand with the increase in the share of part-time work among younger cohorts (15-29 years), but since 2016 we have seen a decrease in the share of part-time work and a gradual increase

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[34] Among young mothers, aged 15 to 35, there are twice as many inactive women as non-mothers (29% vs. 17%) (Stanojević, 2018). One third of them (34%) report that they are unemployed, 8% state that they do not work due to family obligations, and the rest are inactive for other reasons. Analyses also show that mothers have a slightly lower level of job satisfaction compared to women who have not given birth, as well as that they are less satisfied with their free time.

		Personal needs	Paid work	Unpaid work		Leisure time	Learning	Travel and other activities
				Total	Child care			
Men with	preschool children 0-6 years old	10 hours 7 minutes	4 hours 54 minutes	3 hours 14 minutes	1 hour 43 minutes	5 hours 32 minutes	0 minutes	12 minutes
	school age children 7-17 years old	10 hours 17 minutes	4 hours 57 minutes	2 hours 13 minutes	35 minutes	6 hours 19 minutes	0 minutes	14 minutes
Women with	preschool children 0-6 years old	9 hours 57 minutes	1 hour 41 minutes	7 hours 45 minutes	3 hours 57 minutes	4 hours 27 minutes	2 minutes	6 minutes
	school age children 7-17 years old	10 hours 17 minutes	3 hours 8 minutes	5 hours 25 minutes	1 hour 13 minutes	5 hours 2 minutes	1 minutes	8 minutes

Table 2. The budget of the time of mothers and fathers with minor children

Database source: Time use survey in RS 2015, author's calculations

in the share of permanent work. In the period from 2014 to 2020, there were no significant changes according to the type of contract for those aged 30-45. This indicates that the pattern of entry into the labour market has changed, but the later labour transition has not, as 80% of men and women aged 30 to 45 work on permanent employment contracts. The position of men in the labour market is improving (in terms of higher share of permanent contracts) in all educational categories, especially those aged 15-29. The situation is somewhat different for women, because although we have seen a small increase in the participation of women aged 15-29 with permanent contracts since 2016, this increase is almost entirely due to women with higher education, while the participation of women with secondary and primary education in the categories of permanent and temporary employment remains almost unchanged. Analyses show us that the position in the labour market is slowly improving, especially for men and highly educated women, but that it is still far from ideal. The reasons for such trends can be seen first in the shortage of labour due to emigration and pressure on employers to offer more stable positions to workers.

Data on the time budget among those active in the labour market show that men spend 7 hours and 56 minutes at work, in work activities, while women spend 7 hours and 14 minutes (SORS, 2015), which indicates relatively small differences among those who are employed, and a relatively balanced workload. However, data on those who are parents give a completely different picture and confirm that parenthood brings with it a patriarchal division of gender roles.

As the data in the table show, men who are fathers spend significantly more time on paid work compared to women who are mothers, and this difference is greater when the children are small. One part of the explanation lies in parental leave taken almost exclusively by mothers, and the other in the temporary withdrawal from the labour market of women when they give birth. As children grow, women return to the labour market, but the difference in engagement still survives in favour of men. Although men spend more time at work, it is women who do far more unpaid household activities that, when children are small, average almost as much as full-time work.

2.1.3 Employment rights

Particular challenges in the market are insufficient regulation of work and inadequate control of working conditions. In such circumstances, a significant number of employees fail to exercise their employment rights, such as the right to pension and health insurance, the right to paid sick leave and paid annual holiday (Chart 4). A significant number of employees do not exercise the right to paid sick leave or paid leave, while the share of those who do not exercise the right to pension and health insurance is somewhat smaller. Men are at a disadvantage compared to women, as well as younger workers compared to older ones. The first two indicators indicate that it is either informal employment or the inability to exercise the rights arising from the employment contract, while the other two indicators indicate informal employment.

A deeper insight into the labour market indicators shows that, in fact, no form of work guarantees full certainty and predictability and that younger workers and men are at particular risk. A very large number of those who perform occasional and seasonal jobs cannot exercise any of the mentioned rights (Table 1 in the annex). Even a significant number of those who work for a definite or even indefinite period have difficulties to ensure that they are paid their pension and health contributions, as well as the right to paid sick leave and paid annual holiday.

In any case, the data reveal that a significant number of young and middle-aged people in the labour market do not have the basic security necessary for long-term planning, and in addition, a precarious position in the labour market makes it difficult to harmonise their professional and family life. The very fact that they do not have the opportunity to exercise these rights indicates their low bargaining potential with employers when it comes to other family obligations — days off, parental leave (especially among men), sick leave for children, etc.

Trend analyses show a gradual reduction in non-compliance with workers' rights (Charts A8 and A9 in the Annex) and the risks associated with the extreme uncertainties of employees since 2016. However, there is still a significant number, especially of young people who
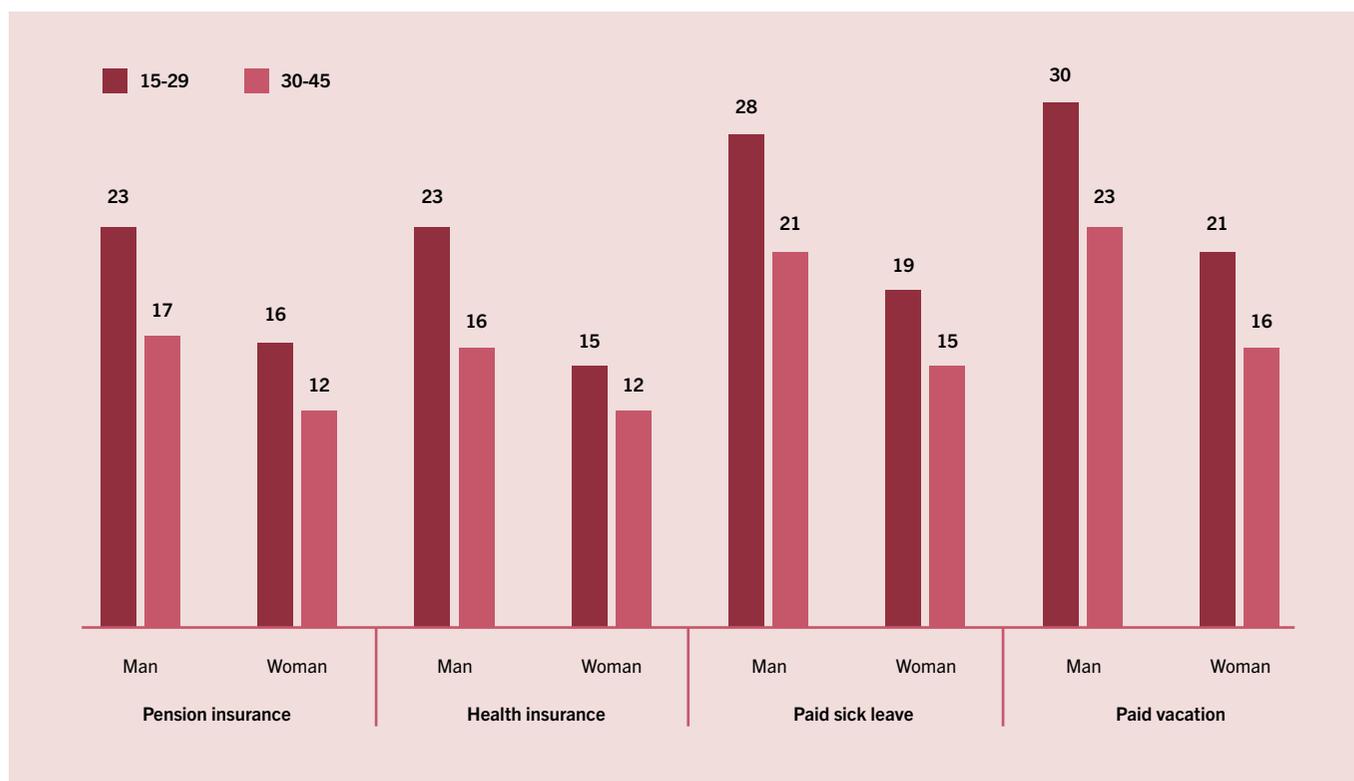
Chart 4. Share of employed people by sex and age who do not exercise the right to ...

Source: LFS, 2019, author's calculations

are just entering the sphere of work, who fail to exercise their rights and achieve the conditions for long-term planning, planning that requires certainty of income and employment.

2.2 Organisational culture

Organisational culture has two dimensions: values and organisation of work. Values in enterprises can support parental responsibilities, to a greater or lesser extent. They could interpret parental responsibilities in the traditional way, where daily care is primarily the responsibility of women, or in the modern way where men are equally involved, so employers should offer equal treatment to both parents. Organisation of work can be more or less flexible, i.e. where employees can have more or less autonomy over the work schedule and hours.

Domestic organisational culture is not sufficiently sensitised to parental responsibilities, especially the responsibilities of men as *involved parents*. Values which dominate in companies imply a distinct distance of power (hierarchical leadership and decision-making), collectivist values (Mitić et al., 2016; Mojić, 2020) and a relatively low level of acceptance of gender equality (Mojić, 2018). The transition to a market economy has further shifted value orientations towards the so-called *male values* which, as positive characteristics of employees, emphasise domination, ambition, results orientation, etc. (Hodges, Budig, 2010). Neo-liberal values which emphasise profit and efficiency have called

into question the socialist legacy aimed at special protection of women and mothers at work, and with the gradual domination of the economic sector, lowered the general sensitivity of work culture towards family obligations. Such work culture relies on the domination of patriarchal and authoritarian value orientations among the general population, which further legitimises the division of gender spheres and inequality of power (Pešić, Stanojević, 2021; Pešić, 2017; Stanojević, 2018).[35] On the other hand, the growing presence of male values, with the absence of adequate controls in the labour market, carries with it special risks of discrimination against women who want to give birth, as well as the risk that their job will not wait for them after maternity leave (Tomanović, et al., 2016).

The extent to which parents will be able to harmonise work with parenthood depends on the options available to them when organising work: type of employment, freedom of organising their working schedule, work flexibility, etc. If these options are more diverse and allow for a higher degree of individualised organisation of time, it is more likely that balance will be established, and both work tasks and family responsibilities performed better. Giving up the desired number of children in the domestic context is usually a consequence of the inability to harmonise work and parenthood. When both parents are working, they often point out that there is no one to look after the child/children, or that they do not have enough time to devote to their children to the extent they need. Overtime work, or inadequate working hours and

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[35] Although it should be added that international companies are slowly introducing the concept of family friendly policies in the domestic context, which promotes a supportive culture and balancing of family and professional life.

shifts do not leave parents enough time for family responsibilities, and reduce their aspirations to have a subsequent child. Respondents list fear of losing their jobs as an important reason for giving up childbearing, which indicates the risks which parents (especially mothers) face if they become pregnant and withdraw from work for some time, but also that for a number of (potential) parents the work-parenting relationship is an either-or relationship, rather than an and-also one. (Bjelobrk, Sagati, 2018: 13; Tomanović, et al., 2016).

Companies, and especially the state administration, are quite conservative when it comes to organisation of work and do not offer sufficiently diverse work arrangements which would help parents (Đukić-Dejanović et al., 2018). Thus, only one in three (33.3%) employers offers the possibility of redistribution of working hours, one in five (21.8%) the possibility of sliding working hours, and one in ten (10%) work from home in normal conditions.[36] Most parents work in organisations where there is no possibility to choose a work arrangement according to their needs, and employers are not ready to significantly change their practices in the future. Of all the sectors, the state administration offers the least options to employees, which is a circumstance which does not stimulate other employers, especially private companies, to introduce new work arrangements (Đukić-Dejanović et al., 2018). Bearing in mind that a significant number of workers prefer to work in public companies and state administration due to job security and a higher degree of guaranteed labour rights, it would be important for working hours to be flexible enough to enable better harmonisation of different spheres of life. In this way, the public sector would set new standards and as such be a good practice example for other employers.

Most employees believe that having more options when choosing work arrangements would help balance work and parenting. Sliding working hours are preferred by more than half of employees (54%), slightly less of them prefer redistribution of working hours (43%), and two in five employees (40%) prefer work from home. The biggest gap between the options offered for the organisation of working hours and the employees' needs is in state administration (although the gap is also present with other employers). The importance of this aspect of work is shown by the fact that the level of income is not the only condition when choosing or changing jobs because a large number of women (82%) and men (77%) state that flexible working hours would be a key factor in job change. This attitude is more pronounced with the increase in the educational level of employees, indicating that at a certain level the amount of income, and even job security, are not enough for the workers' satisfaction and organisation of life (Đukić-Dejanović et al., 2018: 37-39).[37]

In order to avoid the employees' absence due to maternity or parental leave, or to reduce the frequency of leaves due to a child's illness or family duties to which employees are entitled, some employers prefer employing women who do not have children, those who do not plan to give birth in the near future, or those whose children have already grown up. Although these practices of discrimination are clearly sanctioned under the Labour Law, the Law on Prevention of Harassment at Work and the Law on Prohibition of Discrimination, there are still no adequate protection mechanisms. In job interviews, there are employers who ask questions about family circumstances and plans, including those about having a child (Đan, Vrbaški, 2019; Tomanović et al., 2016). A number of women lose their jobs during pregnancy, especially women who are informally employed. Research also records cases of dismissal after the expiration of parental leave, but also different strategies of leading a woman to a hopeless situation so that she would quit her job (such as transferring them to harder jobs or work in shifts) (Tomanović et al., 2016). The lower the women's education level and the more insecure the employment arrangement with the employer, the higher the chance that they will experience some of these forms of discrimination at work. The scope of these practices, due to their nature, cannot be clearly assessed, but awareness of them is very present in public discourses.

2.3 Development of infrastructure for raising children

The key mechanism of institutional support to parenting is the system of preschool institutions. OECD country analyses show that when the number of kindergartens and the number of children in them is higher, the fertility rates are higher, too (Luci-Greulich and Thevenon, 2013). Parents who have access to preschool institutions do not have to choose between work and parenthood, they can more easily balance private and working time, and they decide to have another child more often. In Serbia, this support is part of the socialist legacy, where the goal was full and full-time employment of women, and socialisation of a part of the functions of raising a child. Although it developed rapidly, this infrastructure never managed to meet all the needs, and the situation is similar today, when we still note insufficient coverage (share) of children in preschool institutions. In 2019, only 17% of children under the age of three went to a nursery or kindergarten. Although the share of children in kindergartens has increased in the last few years (Table 2), it is still significantly lower than the European average of 36%. The coverage of children aged between 3 and 5 is slightly higher (61%). Although the share of children of this age is lower than the European average, during the last decade we have seen an increase in the number of children in kindergartens (Statistical Office of the Republic of Serbia and UNICEF, 2020).[38]

The coverage of children is characterised by significant territorial differences. Among the regions, Belgrade stands out for significant-

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[36] Companies offer the following options: redistribution of working hours (41.1%), sliding working hours (23.7%) and work from home (11.2%). Financial institutions offer the following: sliding working hours (52.2%), redistribution of working hours (13%) and work from home (17.4%), while local self-governments offer sliding working hours (4.5%), redistribution of working hours (12.1%) and work from home (3%) (Đukić-Dejanović et al., 2018: 36). It should be borne in mind that the research did not include the question of whether all workers have all these options at their disposal and how many of them actually use them, so the share of employees who have the above options and the share of those who use these options is certainly (far) lower.

[37] These studies were conducted before the pandemic, which led to a significant restructuring of the work sphere. Unfortunately, we still do not have enough data to give a clear picture of the extent to which these changes will improve work-life balance and for which parents (by labour sector, level of education, region, etc.).

[38] The share of children aged 3 to 5 was 50% in 2014 and 44% in 2010 (MICS4, MICS5, MICS6)

year	2014	2015	2016	2017	2018	2019
coverage	11.1	14	18.1	14.5	13.2	17.2

Table 3. Coverage of children in preschool institutions up to three years of age — % in Serbia

Source: EU-SILC, 2019.

ly better infrastructure than the other three regions, and according to the size of settlements we record a higher share in urban centres (71%) and medium-sized and small towns (76%) compared to villages (45%) (Statistical Office of the Republic of Serbia and UNICEF, 2020)[39]. The share of children from vulnerable groups is low, considering that only 10% of the poorest and 8% of Roma children attend preschool institutions (Statistical Office of the Republic of Serbia and UNICEF, 2020).

Insufficient capacities force public preschool institutions to set priorities when enrolling children, formal employment of both parents being one of them. This leads to discrimination if one or both parents are not formally employed because they cannot enrol their child in kindergarten. At the same time, it prevents parents (usually the mother) from looking for a job and starting to work, thus making them enter a vicious circle of inactivity or unemployment. That is why it is very important to recognise this problem, to find solutions which would be useful to parents who do not work. Bearing in mind that double employment dominates among highly educated parents in urban centres, and that their children use the preschool services to a disproportionately high degree, it is necessary to provide the same access to parents from lower social strata, with lower education, who work under less stable contracts (or work informally) for the purpose of including women in the labour market more intensely and of providing the opportunity to harmonise parenting and work.

2.4 Cash transfers

Comparative analyses of OECD countries show that money transfers to parents are a good mechanism for reducing the cost of raising a child and that they are positively related to fertility (D'Addio, Mira d'Ercole, 2005). A positive effect on fertility is present only when it comes to long-term financial support measures, i.e. benefits which last longer than a year (Luci-Greulich, Thevenon, 2013). In Serbia, relatively small amounts are allocated for these purposes in relation to the European average, regardless of whether we observe the GDP share or absolute allocations. Direct transfers to families and children have a constant share in the state budget, although nominal allocations have increased (Table 3).

Measures of direct financial support available to parents at the national level include the following: 1. parental allowance, 3. child allowance.

Parental allowance is one of the mechanisms of financial support to families with children. This measure is universal, which means that all parents are entitled to it, and the amount and duration of receiving it depends on the number of children in the family. For the first child, it is a fixed, one-off payment.[40] For the second child, the parents receive financial support for two years (24 equal monthly instalments of RSD 10,641.29), while for the third and the fourth child they have longer-term financial support, which lasts ten years (the monthly instalment for the third child amounts to RSD 12,769.55 and for the fourth RSD 19,154.33). New, longer-term measures began to be applied in 2018, so their effects have not yet been explored.

Child allowance is a measure aimed at parents and families who are financially vulnerable. In order to exercise this right, the family income (per household member) should be below the determined income minimum.[41] An application for this type of financial support is submitted every year, and parents exercise this right until the child reaches 19 years of age. A maximum of four children in a family can receive this type of support at the same time and the measure is conditioned by the

Year		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EURO per capita*	Serbia	43.09	48.07	50.42	50.83	50.98	52.68	56.78	58.26	58.38	60.75	63.86
	European Union — 27 countries	523.01	554.42	555.33	549.55	545.95	551.48	556.83	570.53	595.10	608.38	618.70
GDP share	Serbia	1.0	1.1	1.2	1.1	1.2	1.2	1.3	1.3	1.2	1.2	1.2
	European Union — 27 countries	2.1	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

Table 4. Cash transfers to family/children: nominal amount at constant prices in 2010, and GDP share.

* (according to constant prices 2010)
Source: EUROSTAT

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[39] At the same time, there is a noticeable trend of greater inclusion of children in villages, small and medium-sized towns, compared to 2014, indicating a gradual closing of the gap according to the settlement size (Statistical Office of the Republic of Serbia and UNICEF, 2011; 2015; 2020).

[40] In 2021, parents received a one-off amount of RSD 106,412.94 for the birth of their first child.

[41] The basic amount per child is RSD 3,192.39 while for children from single-parent families, as well as parents of children with developmental or physical disabilities, this amount has been increased.

children's regular school attendance. Entitlement to child allowance may be extended if the child has a developmental or physical disability.

Of the three mechanisms of financial support to parenting listed above, only one measure is universal and exceeds the time frame of one year — parental allowance for the second, the third and the fourth child. The effects of this measure are still not visible, given the short period of time since its introduction, as well as the effects of the COVID19 crisis on fertility, which have yet to be considered. The fundamental question is whether, in circumstances in which the key challenge is deciding to have a second child, directing financial support to the third and the fourth child can have significant effects? The Strategy for Encouraging Childbearing has already stated that the introduction of longer financial support to parents for the second child would lower the economic price of parenting and have more positive effects on the decision to have a second child. Given that having a second child in Serbia is a key challenge to increasing fertility (rather than subsequent children), the focus of policies and practical measures should be primarily on parents planning their second child (Strategy, 2018). As part of the current financial allocations, the extension of the parental allowance to the second child should be considered.

2.5 Maternity, parental and paternity leave

Parental leave is a measure which guarantees continuity of income during a woman's recovery period and the first months of a baby's life. Although this measure is generally good, research shows that, depending on the social context, a long absence can have negative consequences on deciding on the next birth and cumulatively on fertility (Hilgeman, Butts, 2009), while in some circumstances it has positive effects (D'Addio, Mira d'Ercole, 2005; Luci, Thevnenon, 2011). The advantage of a longer absence is visible in those societies which do not have a sufficiently developed infrastructure of preschool institutions, and in which a shorter absence would lead to faster exclusion of women from the sphere of work. The positive aspects are also reflected in the security that parents have in the labour market during this period. The risks are reflected in a longer period of absence from work and difficulties in returning to work, an increase in the gender pay gap and reduced opportunities for women to advance in their career compared to their male counterparts. Additionally, when the right to financial compensation during parental leave is related to employment, it is more likely that parenthood will be delayed until the right to full or optimal amount of compensation during leave is exercised.

Financial compensation during *maternity leave* (which begins at least one month before the due date and lasts until the third month of the child's life), as well as *leave for child care* (lasting up to 365 days), is only available to employed parents, i.e. those who have formally recorded income from work so that the compensation is a salary compensation. The first part of the leave is used by the woman (and only in certain cases by the father), while in the second part of the leave both parents have an equal right. Compensation for the period during *maternity*

leave is the full amount of salary if the mother has worked continuously for 18 months. If the mother has had an intermittent length of service or any form of employment, the amount to be received is obtained by summing all income in the previous 18 months divided by 18, with the lowest allowance a woman can receive being the minimum wage. During the *leave for child care*, the salary compensation is calculated according to the same principle, with no lower limit of compensation, so the monthly compensation can amount to only a few hundred dinars.[42] Given the volatile labour market, a significant number of women fail to link 18 months of service and thus earn 100% of their wages, leaving them without sufficient income during their absence.

Serbia is one of the countries with relatively long parental leave, exclusive right of use and rather inflexible options for its use (OECD, 2021).[43] Observed through the equivalent of full employment compensation before leave, only a few, mostly post-socialist countries, have a total leave of one year (OECD, 2021). The key reason for the longer absence is the insufficiently developed infrastructure of nurseries, which would enable a relatively quick return of women to work.

Such a long period for calculation affects the postponement of childbearing, i.e. the spouses wait for the woman to have enough service time to enable her to have full or optimal compensation of salary, before deciding to become parents.

The inflexibility of using this measure is reflected in the fact that the leave can be used as one-off only and without the possibility of division into several "instalments". In case the parent has to return to work, the remaining part of the leave cannot be used later. The law does not provide options for extending leave with proportionally reduced compensation. Also, the regulations are not sensitive enough for parents who have twins, since the same number of days is available to them regardless of the number of children born at the same time.

Since 2001, the *Labour Law* has been offering men the opportunity to equally use the child care leave and additional seven days after the birth of a child, but in no way obliges them to do so, nor is there a special number of days of leave reserved for fathers. Although the Law gives men the right to use parental leave, this measure has never been promoted, nor is it high on the list of priorities of practical policies. There are three reasons why it is important for men to exercise their right to this leave and spend at least a few weeks with their children as primary parents. The first reason is that initial contact and taking responsibility are important for the father's connection with the child and his continuous involvement in the later stages of growing up. The second reason is related to gender relations in the labour market. Withdrawal of men from the sphere of work for a while has an impact on the reduction of the gender asymmetry in the labour market and enables women to catch up with their male colleagues in their career paths. Bearing in mind that women withdraw from the labour market for a while due to childbirth, and that the absence in Serbia is relatively long, this exclusion puts them in an unequal position in career advancement or keeping a job. The third reason is changing the perception of gender roles in the sphere of work. Accepting that fathers can, and should be absent from work when necessary due to family obligations, not just

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[42] The upper limit is set, relatively high, at 5 average wages, which raises the question of the nature of this measure as a social measure.

[43] Only a few, mostly post-socialist countries, have a total leave of one year (OECD, 2021).

mothers, lowers the pressure on both mothers and fathers at work and contributes to a better work-family balance.

Rare data show that very few men use leave for *child care*. Due to the expectation from a man that, as a good father and husband, he should first provide for his family financially, his use of this leave is not met with approval among relatives, friends but also employers. In the labour market, which is still gender selective, men's income is most often primary, and parental leave prevents additional jobs, overtime work and additional earnings (Stanojević, 2018). Employers testify that the use of parental leave by fathers is sporadic and very underrepresented. Only 17% of employers state that in their companies there were cases of some employees taking this leave. This option is least used in public (local) government authorities, and somewhat more in the private financial sector (Đukić-Dejanović et al., 2018).

2.6 Institutional predictability

Institutional predictability of the work of institutions in charge of social protection and the exercise of parental rights can be a very important factor in family planning. When the state policy is efficient and responsible, when it delivers the services it guarantees, when it does not send contradictory messages, then there are higher odds that people will rely on such policies when planning a family. So far, it has been shown that the public administration is insufficiently inclusive in formulating certain policies, as well that it has a delayed response and almost exclusively under pressure from the public and citizens' associations. This generates mistrust in parenting support mechanisms and the perception that measures are being introduced but also abandoned quickly.

The reduction of institutional trust and the collapse of institutional predictability were also influenced by the amendments to two key laws — the Law on Financial Support to Families with Children and the Labour Law, which have been implemented in the last few years. Amendments to the Law on Financial Support to Families with Children from 2018 brought a number of positive changes. For example, the possibility of receiving salary compensation during leave on any basis of income (i.e. any form of contract, which until then was possible only on the basis of employment) was introduced; the amount

of parental allowance was increased as well the payment period, the procedures for exercising the right (especially to child allowance) have become somewhat simpler and faster, and coverage of the costs of staying in preschool institutions for children receiving material assistance has been introduced.

On the other hand, the Law passed a number of problematic innovations Due to the inability to have uninterrupted 18-month work experience, a number of mothers received lower benefits.[44] This measure was introduced in order to reduce potential abuses of exercising the right to compensation during maternity and parental leave through the so-called fictitious employment (Stanić, Matković, 2017). However, the measure proved to be restrictive for a number of users who did not intend to "cheat" the system at a time when the mainstream of state policy was moving in the direction of supporting the family and pro-natal measures. The law further prevented parents who receive compensation for the care and assistance of another person (children with disabilities) from exercising their right to child allowance. The resentment also came from parents who had relatively high incomes. The law set the upper limit of compensation at three average salaries. After heated public reactions, a lawsuit before the Constitutional Court and protests from organisations dealing with family issues, the Ministry of Labour, Employment, Veterans' and Social Affairs announced amendments to the disputed sections of the Law, which were partly corrected in 2021.[45]

The second law, the amendments of which have been awaited for a long time, is the Labour Law. Intensified flexibility of work in the EU context implies new legal solutions in the regulation of labour. That is not the case with Serbia. The Labour Law privileges employment. Although other forms of labour are recognised, they are largely unregulated and workers do not exercise almost any right from this work which is guaranteed as a right resulting from labour (for example, length of working hours, breaks, paid leave, etc.) (Reljanović, et al., 2016). Bearing in mind that the share of indefinite term labour is decreasing, inadequate regulation of other types of labour carries with it a risk for many, especially those who belong to vulnerable groups and those who are just entering the labour market — the young people. The fact that it is possible to work, be registered as an employee, and be deprived of certain labour rights, undermines trust in institutions.

Health care system — attitude towards mothers

The process of managing pregnancy and the very act of childbirth in public health institutions is deeply stressful and traumatic for a large number of women. Insufficient information to patients during the management of pregnancy and childbirth, unkind staff, poor conditions in hospitals (humidity, heat, large number of patients in the room and common areas), the need to give bribes or use connections, are some of the reasons why trauma during the first childbirth may be part of the equation when considering and making a decision about a subsequent birth (Sekulić, 2016; Stanković, 2014).

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[44] The law also included an unconstitutional solution whereby the exercise of a minimum wage during the period of maternity leave (up to 3 months of the child's life) is affected only if the woman has worked uninterruptedly for 6 months. This solution was part of a lawsuit that resulted in the amendment of the Law in favour of women and an order to retroactively pay for everything that mothers have lost.

[45] The upper limit of compensation was increased to five average salaries, the number of months included in the calculation of women farmers was reduced to 18, the minimum amount of compensation during maternity leave (but not childcare leave) was established, which cannot be lower than the minimum wage. The unconstitutional interpretation, according to which women who receive compensation for caring for a child with a disability are not entitled to compensation of salary during leave, was removed.

3 Balancing Work and Parenthood — Private Domain

The childbearing decision is usually made between spouses and depends on the quality of their relationship. Poor relations and dissatisfaction can lead to delaying parenthood, or giving up (the subsequent) birth (Rijken, Liefbroer, 2009). But what does the satisfaction depend on? Among other things, it depends on the *degree of harmonisation of gender roles* — harmonisation in the public and private domain. In archetypal traditional families, the man is expected to be the breadwinner of the family, while the woman is primarily focused on their home and children. If the spouses have expectations which are in line with this norm and if everyone meets what is expected of him/her, the level of satisfaction is high, and potentially the desire to have a subsequent child. At the other end of the continuum are expectations which belong to complete gender egalitarianism, both in the labour market and in the household. If the labour market is gender neutral (there is no gender gap) and if men and women do household work equally, we can talk about a balance between expectations and practices, which leads to a higher degree of satisfaction. Between these two poles there is a whole range of combinations of expectations and practices which can lead to a specific balance or create tension and conflict.

Everyday chores in the household and around children (cleaning, tidying up, cooking, ironing, etc.) are repetitive and as such they represent an expression of satisfaction to a small degree. Most people would leave them to someone else or, if they have the funds, they would hire someone to do them. Still, most of these tasks are done by women. There are two possible explanations in the domestic context. The first is based on the idea that there is an unequal amount of power which depends on the individuals' resources (such as income, real estate, education, etc.) (Brines, 1993: 307), so whoever has more power will be able to transfer these tasks to the spouse who has fewer of them. The second explanation starts from the fact that regardless of the amount of resources, men always have power, because it is guaranteed to them by the dominant, patriarchal culture.

Significant gender asymmetry is evident in the division of domestic work in Serbia, because most household maintenance work is performed by women (Chart 5). Among men, there are few who predominantly perform some of the household tasks, and more than two thirds of them never perform those tasks which are traditionally related to the domain of women. Younger, educated men living in urban areas are more willing to be involved in housekeeping (Stanojević, 2018).

The time budget provides us with more precise data — women older than 15 spend on average about four and a half hours in unpaid domestic work, while men spend two hours. Women spend most of their time preparing food, cleaning the household, caring for children and other members of the household, while men work around the house and go grocery shopping. Not only are women more engaged on av-
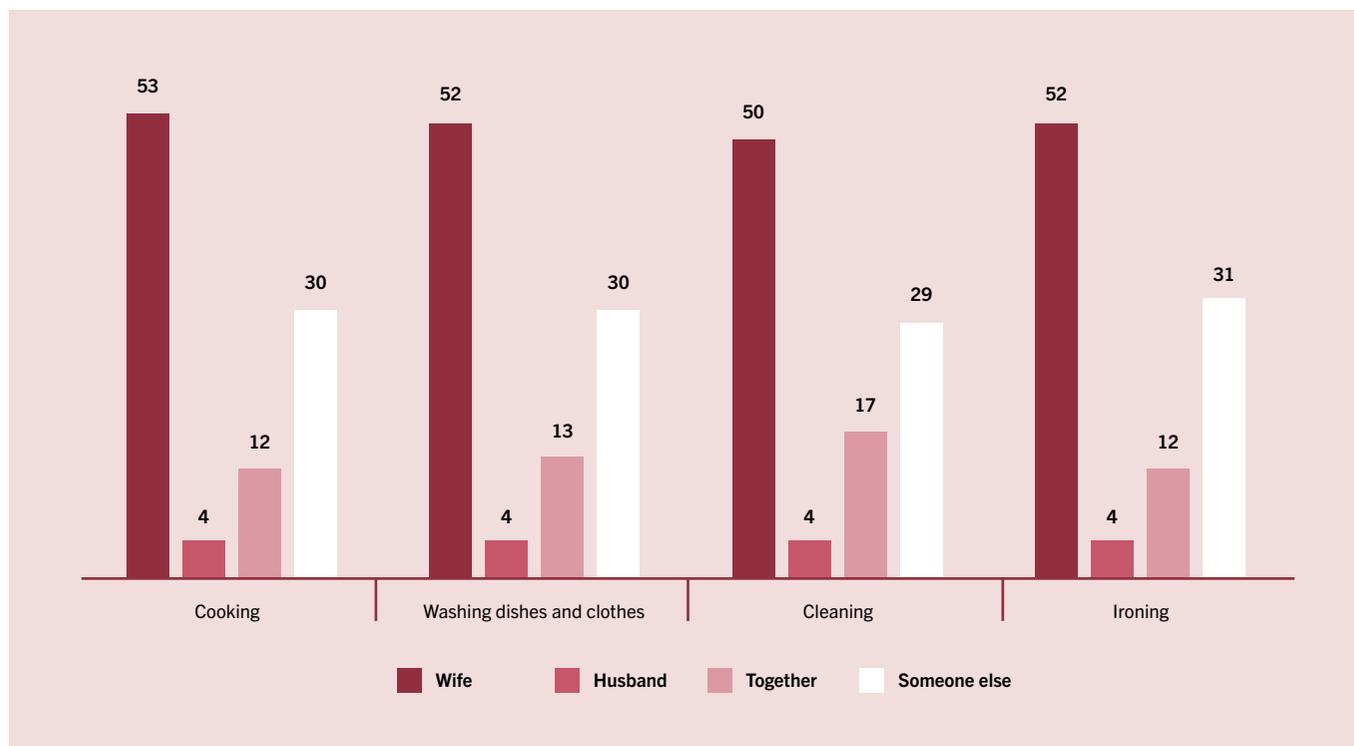
Chart 5. Division of household tasks

Source: ISI FF 2012, author's calculations

erage, but 90% of women are involved in household activities, while this is the case with 70% of men (SORS, 2015). Although men on average spend more time at work, this difference still does not level the overall work by sex, but reflects in the uneven ability to use free time. Men have an average of seven hours of free time, and women a little less than six. From these charts, it is clear that men who are fathers participate significantly less in responsibilities around children and in overall domestic work. Among fathers with preschool children, 39% do not take care of children during the day at all, while this is the case with every tenth mother (11%) (SORS, 2015)..

Analyses show that the resources that women possess are not significantly related to the degree of their engagement in household duties. This means that women, regardless of their level of education, employment or income, do domestic work to the same extent. This indicates that value patterns and the patriarchal matrix primarily shape gender roles, and that women's resources, although necessary, are not a sufficient condition for achieving equality in the private sphere (Babović, 2009).

The situation is similar when it comes to everyday parenting responsibilities (Chart 6). Women are significantly more often involved in activities which include preparing food and maintaining hygiene and tidiness of the space in which the child lives. Almost all mothers of children under the age of five state that they were involved in these activities in the previous three days, while only one in five fathers was involved in at least one (Statistical Office of the Republic of Serbia and UNICEF, 2020). These data confirm the unequal distribution of household tasks, showing that household duties and daily childcare responsibilities are primarily women's responsibilities.

Slightly more than it is the case with household tasks, men are willing to engage in interactive activities with their children, such as playing, walking, and the like. More than a third of fathers are involved in almost all observed activities relevant to the child's early development
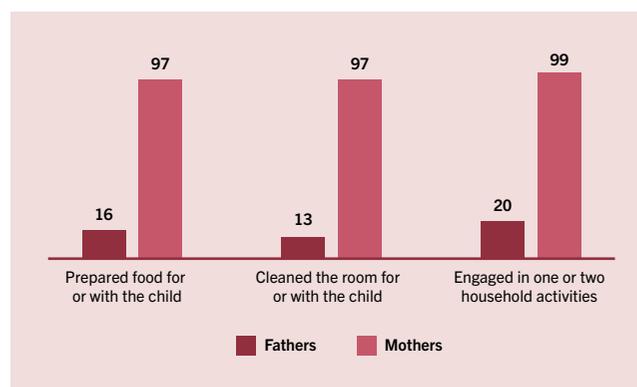
Chart 6. The degree of involvement of parents in daily activities around the child aged 1-5

Source: MICS6, author's calculations

(Charts 7 and 8). Fathers more often take the child outside and play and participate in activities that involve "easier" interaction, while less often they dedicate themselves to activities of reading, telling stories, singing or drawing, or designed and goal-oriented activities. As a child grows up, the number of activities involving fathers and mothers grows, albeit more for mothers than for fathers, which means that the gap between spouses grows over the years.

Men are more often involved in parental responsibilities if their wives are employed, if they have their own income, when they are highly educated, and if they live within the nuclear family (without direct kinship support) (Stanojević, 2018). Men are more involved also when spouses rate their relationship very highly. Unlike the division of domestic chores, the division of parental responsibilities is influenced by the resources of the wife, value orientations, and the degree of satisfaction with the relationship. Although men are to some extent
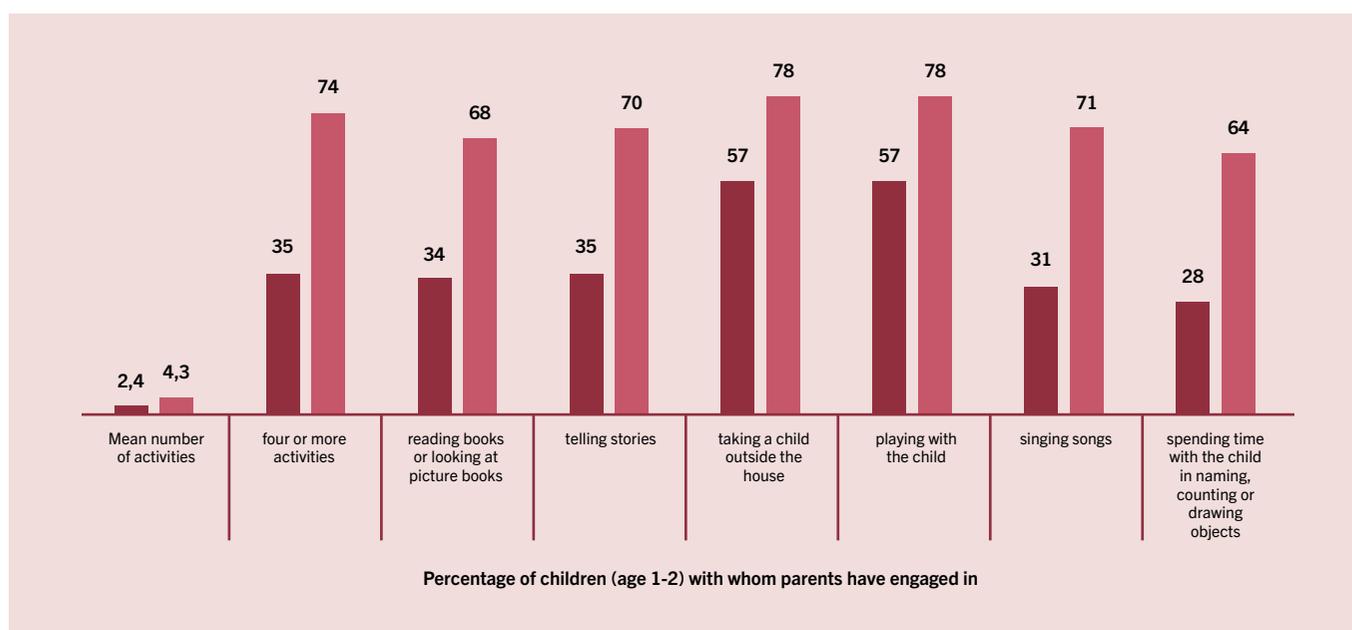
Chart 7. Degree of parental involvement in children's developmental activities, age 1-2

Source: MICS6, author's calculations

involved in parental responsibilities, only a small number of them are ready to fully equate themselves with their wives. Champions of new models of involved parenting (new fatherhood) are men with higher education, men coming from urban zones and those who believe that there should not be differences between men and women in public and domestic spheres.

The above shows us that modernisation changes within the private sphere first occur at the level of parenting practices, so that men are involved to a greater extent in child care and only then in other domestic responsibilities. The involvement of men in parenting legitimises their presence in the private sphere, and sets new standards of involvement before new generations, not only in parenting but also in other household responsibilities.[46] However, the attempt of men to enter the private sphere may be accompanied by the denial of competencies required for parenting by female family members (Stanojević, 2020; Tomanović, et al., 2016). Therefore, the partnership should be free of most stereotypes about gender-specific roles, but also of competition between parents.
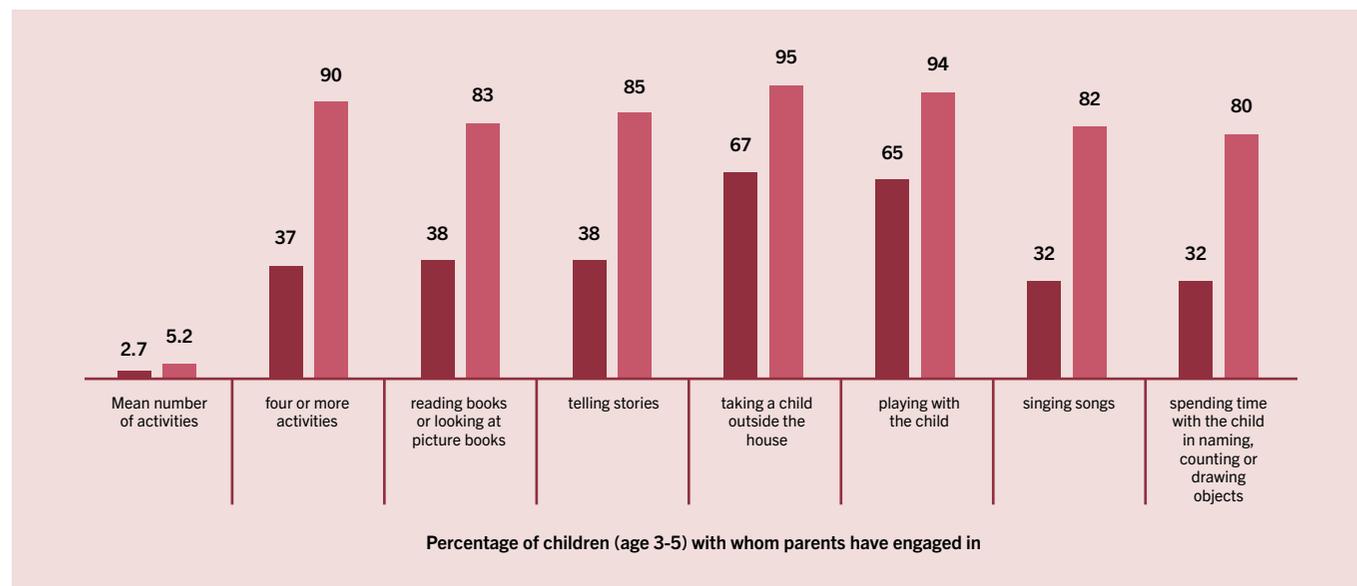
Chart 8. Degree of parental involvement in children's developmental activities, age 3-5

Source: MICS6 author's calculations

4 Dominant Values on Gender Roles

We have already stated that more economically developed European societies, have higher fertility rates and that until recently they recorded a certain surge in fertility. One dimension that explains inter-societal differences and (potential) positive trends relates to the domination of egalitarian gender value orientations (Arpino, et al, 2015, Baizan et al, 2016). The relationship between value orientations and fertile behaviour has historically taken the form of the U curve (Esping-Andersen & Billari, 2012; Arpino et al., 2015; Lappegård et al. 2021).

In traditional societies, there is a clear separation of gender spheres and dominance of patriarchal values, all accompanied by high fertility rates. The changes will start with the entry of women into the formal, monetised labour market, which is followed by the growth of egalitarian gender values in the public sphere. This process leads to a deconstruction of public patriarchy (the perception that women can work as well as men is more and more widespread), but not to a deconstruction of private patriarchy. There is a growing perception that women can do jobs just as well as men, but not that men should be equated with women in the private sphere. Women are doubly burdened with work and domestic responsibilities, which reduces the desire for children and, cumulatively, birth rates (Lappegård et al., 2021).[47] Over time, men begin to get involved in the private sphere, but due to the lack of clear models, traditional expectations of conjugal roles persist — women expect men to get involved in household

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[46] In fact, we see that men are first involved in easy interaction, then in more demanding developmental interactions, and then in all relations with the child, including tidying up and cooking with and for the child.

[47] In such circumstances, women are faced with the choice of one of three strategies: *exit, raising their voice,* and *suffering* (Gershuny, et al., 2005; Esping-Andersen & Billari, 2012). The first implies conflict (divorce, independent living), the second implies negotiating and demanding a more egalitarian division, while the third implies adherence to the traditional norm in new circumstances.
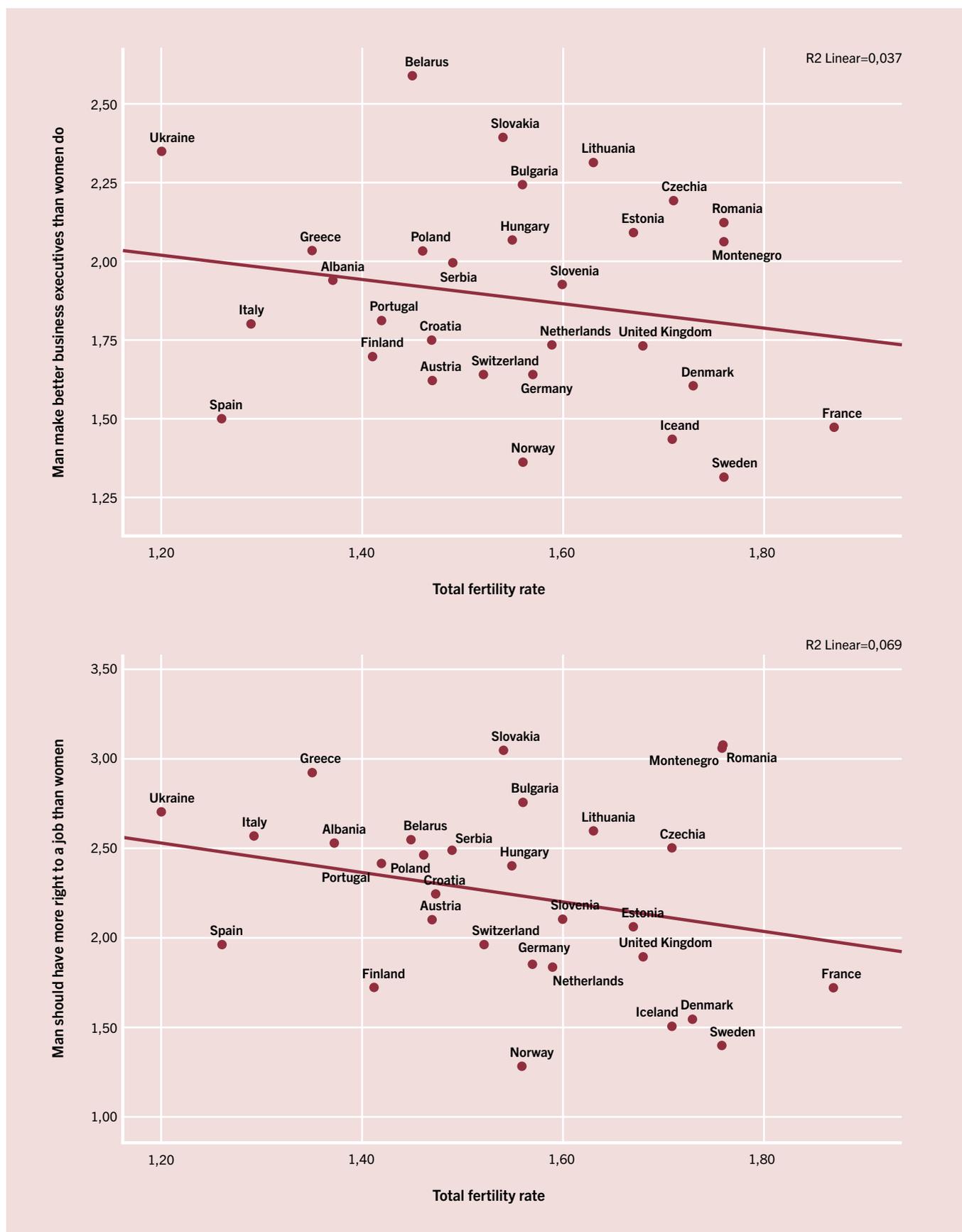
Chart 9. Relationship between patriarchal values and total fertility rates in Europe (EVS, 2018)

Source: WVS, 2018, author's calculations
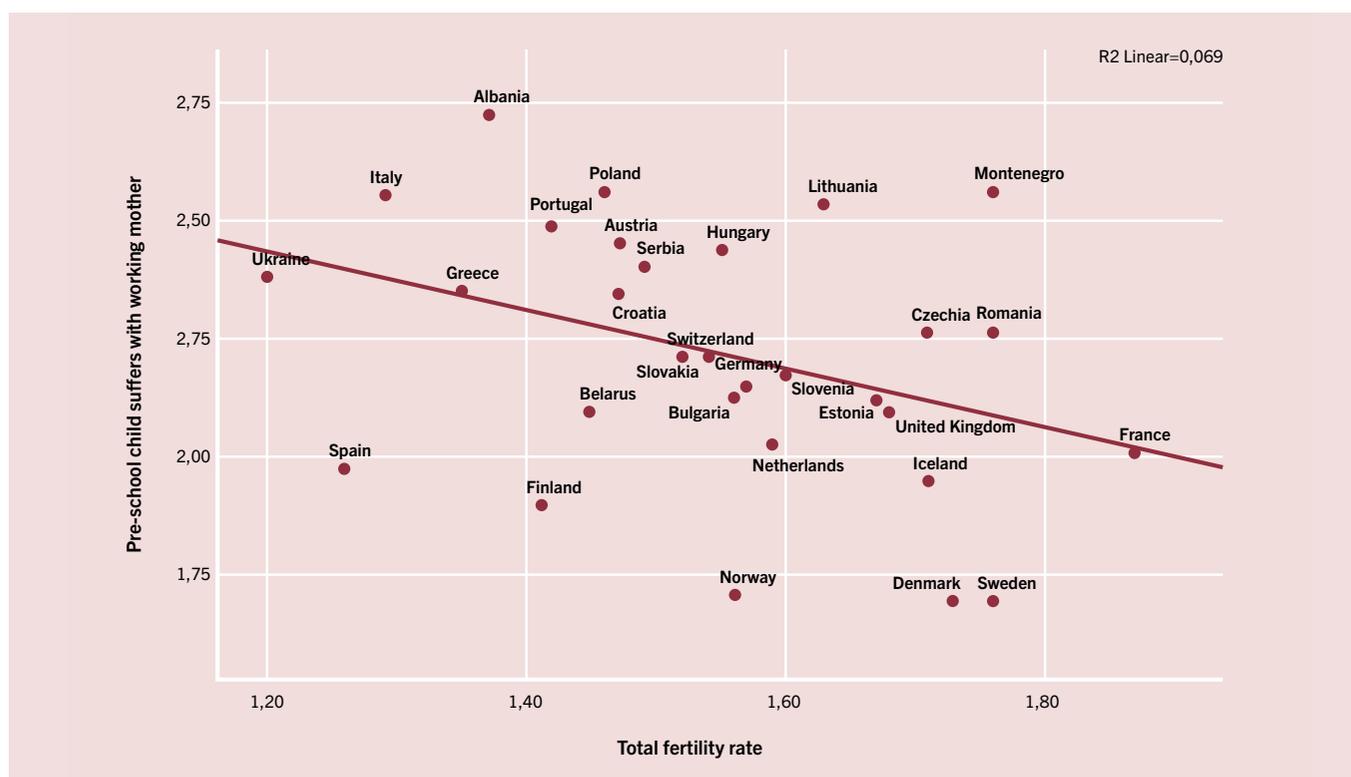
Chart 10. Relationship between patriarchal values and total fertility rates in Europe (EVS, 2018)

Source: WVS, 2018, author's calculations

tasks and care for children on an equal footing, but also to continue earning more than them, while men may expect their wives to hold most of the control over the household in addition to work. Conjugal differences in expectations produce further dissatisfaction, lower the childbearing aspirations, and, cumulatively, low fertility rates. Only when balance is achieved at a new level, the level of egalitarian gender values, balancing of the spouses' expectations with their practices, is there resurge in fertility (Lappegård et al., 2021).[48]

An illustration of these theories, as well as the relationship between value orientations and total fertility rate in Serbia and European countries, can be seen in Charts 8-10. In the first two charts, we can see that fertility rates are somewhat higher in societies in which the views that there should be no gender differences in the labour market are more accepted, i.e. that men are not better managers than women. The correlation between the fertility rate and the attitude that preschool children will not suffer if their mother works is somewhat more pronounced. At the European level, the acceptance of gender-egalitarian value orientations in both the public and private spheres correlates with higher fertility rates. In all models, Serbia ranks with the group of countries which have relatively high scores on patriarchal indicators and relatively low total fertility rates, which ranks it among countries with a gender expectations conflict.

If we look only at the population of Serbia in the last thirty years (Charts 11-13) we notice that there has been a decline in patriarchal values among both men and women.[49] The relative relationship between the sexes is more or less constant, and implies a somewhat higher degree of patriarchy of men (more on trends in patriarchal values in Pešić, Stanojević, 2021). When we observe the trends by level of education and by sex, we notice that there is a decline in patriarchy and convergence of values in women of all educational levels, while in men there is a decline in divergence according to educational level. This means that women are not only becoming less patriarchal, they also have more similar views of gender roles, while men, although they are becoming less patriarchal than before, have greater differences. Those with higher education are the least patriarchal, those with primary education the most. There was a somewhat greater convergence of attitudes among highly educated women and men, since the difference in the degree of patriarchy was the smallest among them, mostly due to a somewhat faster decline in patriarchy among men. As the educational level of men and women decreases, the degree of differences is higher.

[48] Historically, modernisation has changed the understanding of gender roles. On the one hand, there is a decline in patriarchal values and domination of the mix of traditional and modern values, which leads to a decrease in fertility, because there is a conflict of roles in both sexes (especially in women). Only after a substantial adoption of new value models, i.e. a higher degree of acceptance of gender egalitarian roles, is there a renewed increase in fertility because gender roles are in line with expectations. If this process of modernisation is faster, that is, if the gender value gap in the country decreases faster, the increase in fertility is faster. The effects of gender egalitarian values are present when they are shared by both men and women and when they are widespread in all educational groups of the population. When value diversification occurs, opposite effects on fertility are recorded (Arpino et al., 2015).

[49] The patriarchy scale consisted of a degree of agreement with four indicators: 1. If one spouse is employed in a marriage, it is more natural for that spouse to be a man, 2. Most household tasks are more inherent in women, 3. It is good that women and men are equal in marriage, but as a rule it is better for a man to have the last word and 4. Public activities are closer to men, and private activities to women. The scale range is between 4 and 20 points.
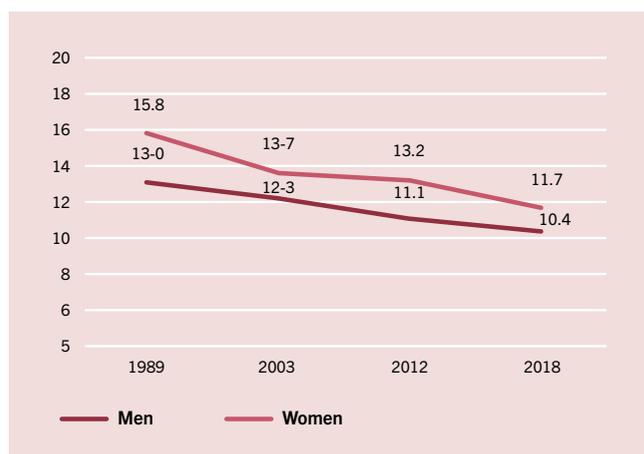
Chart 11. Patriarchal values among men and women (20-45 years) in the 1989-2018 period

Source: ISIFF 1989, 2003, 2012, 2018

Chart 12. Patriarchal values among women according to education in the 1989-2018 period

Source: ISIFF 1989, 2003, 2012, 2018

Charts 14–15. Patriarchal values among women and men in the 1989-2018 period

Source: ISIFF 1989, 2003, 2012, 2018

Chart 13. Patriarchal values among men according to education in the 1989-2018 period

Source: ISIFF 1989, 2003, 2012, 2018

The same trend is clearly visible if we look at the attitude which measures the degree of power between spouses. Men with higher education generally do not approve that men should have the final say, and are quite similar in that to highly educated women. The gap is somewhat larger among those with secondary education, and the largest among those with primary education. Therefore, patriarchal ways of perceiving gender roles persist to a certain extent among men, especially those with primary and secondary education, which significantly complicates the harmonisation of gender expectations and the implementation of family practices, since their wives usually have a different view of marriage.

Attitudes about gender roles should be reconstituted towards gender egalitarianism, targeting especially younger men. Public discourses, popular culture and the education system can offer new narratives and patterns of behaviour. However, these changes, at the level of discourse, can have an effect only if they are accompanied by changes in behaviour in the private sphere, i.e. if men really take on some duties in the household and with children, which also requires, in addition to institutional changes, changes in the labour market and the employers' organisational culture.

5 Conclusion and Recommendations For Practical Policies

Analyses carried out so far show that it is very difficult for spouses in Serbia to harmonise family and professional duties, as well as that there is still no harmonisation of expectations regarding the division of duties in the private domain.

Serbia does not belong to highly developed countries which have a problem of low fertility, but to developing countries characterised by a mix of traditional and modern values, an incompatibility between expectations and practices, which creates challenges in marital coordination and harmonisation with professional obligations. The population is characterised by the existence of significant differences in fertility behaviour between the better educated and urban population and the lower educated and rural population. Analyses indicate that the way to increase fertility is to create conditions for work-family balance, higher levels of women's employment, ensuring employment security for both parents (or income in case of job loss), optimum earnings, available and developed preschool institutions infrastructure, and supporting gender equality in the public and private spheres. Exactly due to insufficient development of institutional mechanisms, selective labour market, less and less job security, and the gender gap in values, the postponement of the first birth is probable, and the decision on the second child is less probable. People who are better educated are more sensitive to the mentioned imbalances, which leads them to give up more easily, that is, makes it more difficult for them to decide on having a second and a subsequent child if the conditions are not favourable.

The existence of evidently higher levels of fertility among the rural population, as well as among the less educated, indicates that there is a different framework for making these decisions, which is less dependent on the above factors. We assume that their decisions are made under the influence of traditional norms, where having the first child earlier and having more than one child is favoured. At the same time, we can assume that with further urbanisation and expansion, especially of higher education, the second group will keep decreasing, so the challenges of the first will become general challenges.

The gender gap in both employment and earnings still persists. It is characterised by an increased degree of insecurity of all types of jobs. More intensive measures are needed to employ women, and reduce the gap in employment, unemployment, and inactivity rates. It is especially important to develop employment measures for those with lower levels of education, i.e. with lower qualifications. The majority in this group are those who have risky work arrangements, and among them the majority are women who are temporarily excluded from the labour market. It is necessary to clearly and legally define all types of work and adapt them to new circumstances where there are fewer permanent contracts, and where new, non-standard types of work are emerging (online workers are just one example). Inspectorates should intensify their measures to monitor employers, and impose fines on those failing to respect the labour rights. A fast and secure transition from education to the labour market is a key precondition for gaining financial autonomy for young people, which enables other transitions, especially family ones.

For a large number of employees, organisational culture does not contribute to balancing work and parenthood, for both men and women. Neither men nor women are able to adequately balance professional, parenting, and personal needs. Although there are legal solutions which allow different types of flexible work engagements, they are very rarely used in practice and it is left to companies to decide when, how much and to whom they will make them available. The experience of other countries shows that if the companies are left to decide which forms of flexible work engagements to offer, most of the employees usually have a limited choice. Policies need to be developed towards a broader range of options and greater accessibility. That is why it is necessary for the initiative to come "from above", from the state institutions, where the promotion of these practices will take place in public administration and public enterprises (places where they are currently least used and where there is the greatest need). The work culture should be sensitised to gender equality, and should especially promote internal policies aimed at family people, especially fathers, who should be encouraged to take parental leave and take over part of the daily parental duties at home.

Institutional support to parenting has shown some progress in terms of a higher degree of involvement of children in preschool institutions, but coverage is still low and there is a rather selective entrance policy in preschool institutions. Therefore, it is necessary to further develop the network of preschool institutions, especially those for children under 3 years of age. It is necessary to detect the real needs of parents (especially those who would choose to work if there was a possibility of employment and the existence of a childcare facility), a more balanced regional development of this network and the involvement of vulnerable groups are needed. Work should be done on solutions which would enable parents who do not work to enrol their children in kindergarten, because only in that way can they return to the labour market.

Financial measures are short-lived and cover the initial costs of childbirth rather than long-term parenting support (for most parents). Given that increasing fertility depends on the transition towards the second child, the focus of financial measures should be on stimulating the birth of the second child. It is recommended that the measure of parental allowance for the second child be extended, at least to the extent which is now provided for the third and the fourth child.

Parental leave is relatively long, but not flexible enough. The proposal is to make it flexible (at least one part of it), which would mean 1. the possibility of using the leave for child care in parts until the child starts school, as well as its 2. extension with a proportional reduction of salary compensation (for example, instead of three months, the parent would use 6 months, and instead of 100% they would receive 50% of the salary compensation in the given period). It is recommended that

the parents of twins have twice the leave period for use for child care (that is, that this leave be individual for each child).

Men are not stimulated to use leave for child care, so special mechanisms should be devised to increase the participation of fathers. The recommendations are as follows: 1. obligatory absence of the father from seven days after the birth of the child, 2. "fathers' quotas" as part of the leave for child care, which only fathers could use and which cannot be transferred to the mother. It is recommended that the quota be between 14 and 30 days.

A regional and local approach to enabling youth housing independence is needed. The market (purchase and renting) of real estate is quite unregulated, and without the possibility of independence from parents, young people are less likely to enter into partnership and marital waters, and more likely to delay family life, especially in urban areas..

It is necessary to harmonise all state and public policies which deal with the issue of depopulation and support for the family. Strong inter-sectoral cooperation is a key precondition for harmonising priorities, goals and activities. In formulating new measures, special attention should be paid to the civil sector and parents' associations. Communication with the population should be clear, without contradictory messages.

When it comes to gender roles, it is evident that there is a gap between expectations and practice with the spouses. A huge part of domestic work and most parental responsibilities are performed by women, which is a potential source of dissatisfaction. Men should be encouraged to become more involved in the private domain. One way of doing it is the "fathers' quotas" as part of parental leave, which would enable men to have an initial relationship with the child, and legitimise their presence in the domestic sphere as competent parents.

Dominant values on gender roles relating to the roles of men and women in the public and private spheres express a mix of traditional and modern values which could lead to some confusion about what male and female roles are, and consequently to disagreements between spouses. Models of egalitarian and complementary parenting should be supported and promoted in public. Egalitarian parenting means that both women and men can be equally good parents in all aspects of their children's lives and that it is important to be involved in all spheres of children's lives. Complementary means that the spouses will agree as to which arrangement suits them best and that all arrangements are equally legitimate if the spouses see that model as the most functional. All options are legitimate, from fathers who stay at home to take care of children while mothers work (or women who stay at home), to double careers (both spouses) in which parents engage in parenting with the support of a nanny. Popular culture can offer new models, and public institutions and the civil sector can educate and support (potential) parents.

6 Dimensions and Indicators of Orientation Towards Family Needs

As one of the practical policy measures that can improve support to families and raise awareness of the importance of practical policies aimed at families at all levels of society, we have prepared a series of dimensions aimed at offering guidance for evaluating the work of institutions and companies from the perspective of children, parents and families. They serve to assess the extent to which these institutions are adapted to the needs of families and, in that sense, represent one of the mechanisms of population issues, i.e. the mechanism by which public policies and practices seem responsive to family and demographic issues.

These dimensions are preliminary, and in order to fully be put to use, it is necessary to perform testing through specially designed research. These measures should be translated into concrete indicators that would accurately measure how "family-friendly" companies and public administration and institutions are. The choice of dimensions stem from the theoretical framework of harmonising family and business obligations.

6.1 Companies and public administration

1.Flexible Working Hours

- Redistribution of hours
- Flexible working hours

- Part-time work
- Work from home
- Work from home in case of a child's illness
- % of workers who have the opportunity to choose work arrangements
- % of women who have the opportunity to choose work arrangements

2. Free Days for Parents

- Number of days above the legal minimum when a child is ill
- Number of days when the child starts school
- Number of days above the legal minimum for mothers after parental leave
- Number of days above the legal minimum for fathers after the birth of a child
- % of men who take days off after entering into a marriage
- % of men who use days off after the birth of a child
- % of men who use part of the leave for child care

3. Financial Allowances for Parents

- Continuous (6 months and more)
- One-off

4. Work Conditions

- Participation of employees with permanent contracts

- The pay gap between men and women
- Participation of women in management positions
- Is the minimum wage higher than the average consumer basket?
- Has it happened in the previous 5 years that a parent (mother or father) who returned from parental leave against his/her will was fired, got a lower position in the company, that his/her number of hours was reduced?
- All the benefits that the work organisation offers to working parents are part of the contract they sign with them.

5. Organisation of Work in the Service of Parenthood
- Breastfeeding break
- Designated place for breastfeeding
- Designated place for changing the child
- Children can visit (under certain and safe conditions) their parents at work

6. Kindergartens
- Day care centre within the workplace
- Kindergarten in the immediate vicinity of the workplace
- The work organisation has cooperation with public preschool institutions

7. Work in the Service of Parents
- Is there a survey for employees on job satisfaction and opportunities to reconcile work and parenthood?
- Is there counselling of (future) parents with HR/human resources on ways to reconcile work and parenthood?
- Is there a protocol and procedures that sanction sexual harassment at work and discrimination among employees?

6.2 Municipalities

- The capacities of preschool institutions cover at least 95% of the needs of the population in the current year. Of the number of applications, at least 95% of children are enrolled.

- Preschool education institutions monitor the work arrangements of parents — work in the second shift.

- Primary school capacities cover at least 95% of the needs for an extended stay of children in the current year.

- The municipality ensures the existence of parental benches for changing and feeding children in public areas and/or in public facilities

- The municipality provides financial or some other form of compensation for having a child.

- The municipality has a plan to address depopulation/population policy.

- The municipality finances or co-finances textbooks, teaching aids and children's nutrition in primary school.

- The municipality provides counselling and legal support services to parents.

- The municipality has special activities aimed at employing women.

- Transport network is adequate — organised transport for employees (parents).

- The municipality organises workshops, forums, and parenting schools.

7 Annex

Sex			Pension insurance	Health insurance	Paid sick leave	Paid vacation
Male	15 to 29	Full-time	6.8	6.8	8.8	9.1
		Fixed-term contract	10.5	12.5	20.2	22.7
		Seasonal	60.6	60.6	84.2	84.2
		Occasional	87.4	87.4	87.4	87.4
	30 to 45	Full-time	3.2	3.2	3.3	3.7
		Fixed-term contract	2.8	3.5	9.2	11.5
		Seasonal	78.1	78.1	81.0	81.0
		Occasional	71.5	76.2	94.5	94.5

Female	15 to 29	Full-time	4.4	4.4	5.3	5.7
		Fixed-term contract	7.6	7.6	12.4	13.9
		Seasonally	100.0	100.0	100.0	100.0
		Occasionally	71.4	71.4	93.7	93.7
	30 to 45	Full-time	1.2	1.2	1.5	1.6
		Fixed-term contract	5.0	4.6	11.1	11.6
		Seasonal	89.0	89.0	89.0	89.0
		Occasional	86.3	86.3	100.0	100.0

Table A1. Share of employed persons by sex, age and type of employment who do not exercise the right to …

Source: LFS, 2019, author's calculations
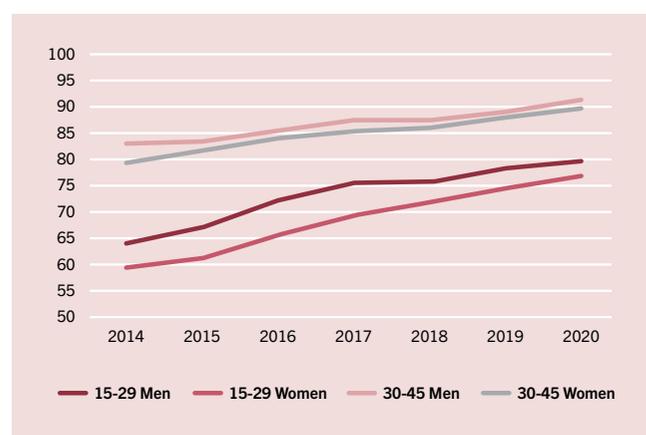
Graph A1. Employment rates of men and women 2014-2020

Source: LFS, 2014-2020, author's calculations

Graph A3. Inactivity rates of men and women 2014-2020

Source: LFS, 2014-2020, author's calculations

Graph A2. Unemployment rates of men and women 2014-2020

Source: LFS, 2014-2020, author's calculations
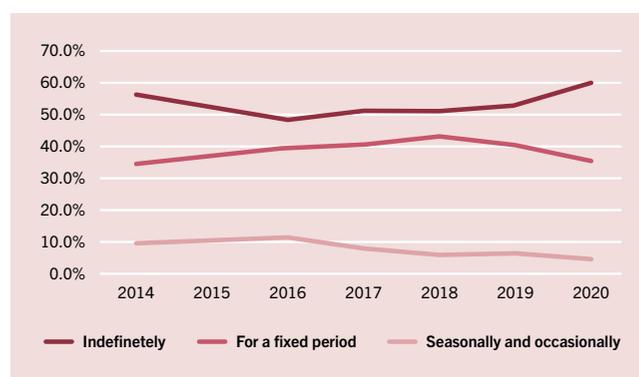
Graph A4. Type of contract at work — men 15-29

Source: LFS, 2014-2020, author's calculations
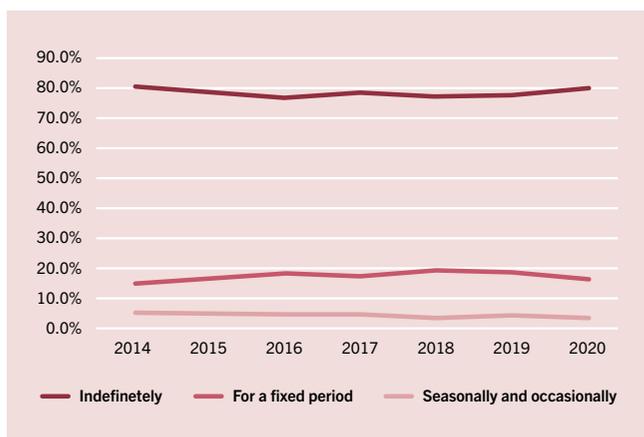
Graph A5. Type of contract at work — men 30-45

Source: LFS, 2014-2020, author's calculations
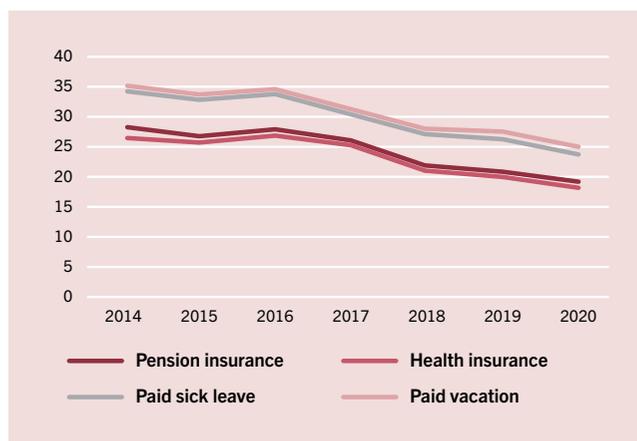
Graph A8. Share of men age 15-45 who do not exercise the right to …

Source: LFS, 2014-2020, author's calculations
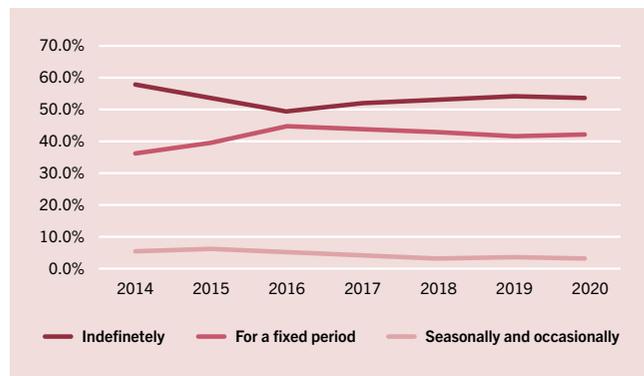
Graph A6. Type of contract at work — women 15-29

Source: LFS, 2014-2020, author's calculations
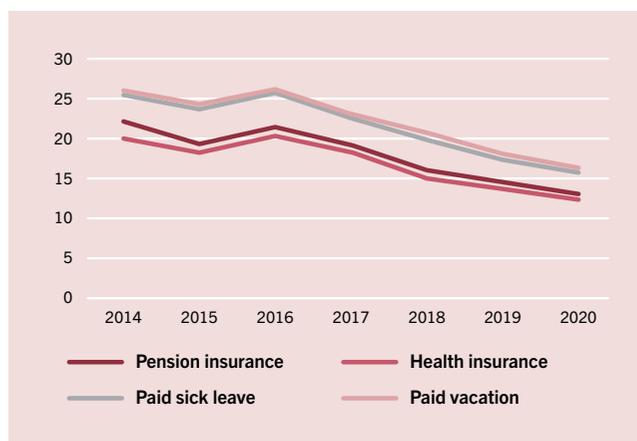
Graph A9. Share of women age 15-45 who do not exercise the right to…

Source: LFS, 2014-2020, author's calculations
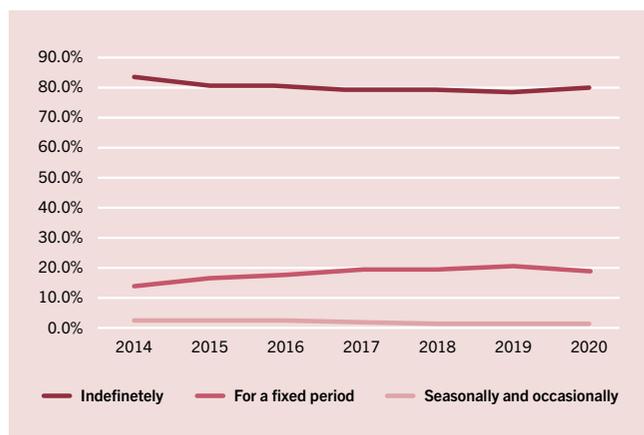
Graph A7. Type of contract at work — women 30-45

Source: LFS, 2014-2020, author's calculations
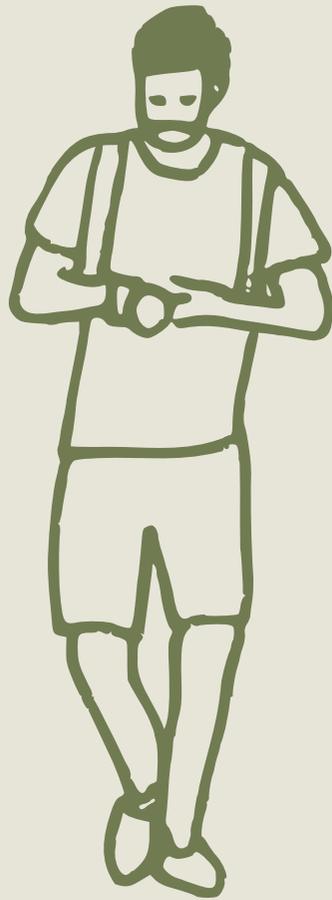
Migration, Skills And The Labor Market

Mihail Arandarenko

1 Introduction

Mass emigration from Serbia, and especially the exodus of 'best and brightest' is widely perceived as one of the most pressing problems that Serbian society and economy are facing, getting worse year by year. Alongside with the natural decline of population it is the source of deep worry for the future of the nation.

Facts and arguments most frequently used to illustrate and support this dismal perception can be stylized as follows. First, the number of Serbian residents who leave the country is very high relative to the population and is rapidly increasing. For example, it is claimed, based on the OECD statistics, that in the past 15 years some 650,000 people, mostly young and well educated, left Serbia. Another common claim is that those who leave are better educated and more talented than those who stay. Global Competitiveness Index of the World Economic Forum traditionally ranks Serbia among the countries with the least capacity to retain talents in the world. For example, on the scale of 1 to 7 (1= all talented people leaving the country; 7= all talented people staying in the country), Serbia scored 1.8 in 2013 and 2.31 in 2019, far below median values for this indicator and far below Serbia's general ranking in GCI and its gross national income level. Third, migration intentions surveys show that majority – two thirds or more - of students and young people want to leave the country. Fourth, there are well publicized estimates that emigration outflows cost Serbia around a billion dollars in terms of money spent on emigrants' education and lost GDP – each year! Fifth, by making demographic decline worse and depriving the country of mostly young, educated and entrepreneurial people, emigration undermines the chances to escape the 'middle income trap' (World Bank, 2019).

While almost none of the above points are technically untrue, some of them are in essence half-truths. This is what will be shown in this chapter. The quoted number of people who left Serbia refers to gross emigration; the majority of these emigrants returned to Serbia after relatively short spells abroad; they might go again, be counted again as emigrants, and return again. Also, estimates of immigration are ignored in these statements. Furthermore, the reported educational structure of emigrant stock and flows is actually very similar to that of resident population of Serbia. Surveys of migration intentions are very useful in understanding sources of frustration, but are of little use in predicting actual emigration rates. Finally, the calculation of costs of education of people leaving Serbia (deeply erroneous in its own right) is the most disturbing of all because it treats new emigrants as if they are already dead, as if many of them would not be unemployed or underemployed if they remained at home, and as if most of them would not take care of their families while working abroad and return, most with some new skills.

Thus, the presented distorted pieces of information or pure anecdotal impressions (often reflecting urban upper-middle class bias) have been turned into widely shared 'common knowledge' by self-reinforcing repetition.

This dominantly alarmist tone has also significantly influenced the government's policies toward migration. Catastrophic discourse eventually translates into policy thinking that something radical has to be done fast, before it is too late. For example, in 2019 first draft version of Strategy on economic migration (adopted eventually in 2020 as a more balanced document) focused almost entirely on ways to prevent and revert the brain drain – without really establishing the facts on its size and characteristics. In late 2019, even before the adoption of the Strategy, specific measures were legislated providing very generous tax reductions for high-skilled high-earning returnees. In the same fashion, a new measure of waiving the payment of Annual Personal Income Tax (levied at very modest rates on some 1% of top income earners) for those under the age of 40 was marketed as a brain drain prevention measure.

Most of the pieces of migration diagnostics floating in the public sphere are superficial and often misleading. This does not mean that there is no reason to worry about emigration. But it is important to get the facts right, and as one digs more into migration statistics, murky and incomplete as it is, a more ambiguous and extremely complex picture gradually emerges. This chapter in the first place attempts to make sense of the data.

We focus on the analysis of emigrant stocks and (gross) outflows from Serbia, with the descriptive quantitative analysis covering primarily European destination countries for which there is available harmonized Eurostat statistics. They comprise at least two thirds of total Serbian emigration and are by far the most important source of remittances.

However, our analysis only starts with statistical exercise. By using some simple concepts, instruments and various eclectic and sometimes innovative sources, we try to answer substantial questions on the nature of Serbian emigration and whether it has substantially changed in recent period. The two main direct diagnostic questions arising from the data and descriptive quantitative analysis are the following:

1. Are most Serbian emigrants permanent (settlement) or temporary (short-term or circular) migrants?

2. Are leavers significantly better educated than stayers? In other words, is there (technically defined) brain drain from Serbia and how severe is it?

These questions are dealt with in Sections 3 and 4, respectively. In Section 5, the imbalances of Serbian labour market are discussed as push factors for emigration. In Section 6 we conclude and provide some cautious recommendations.

2 Migration Trends

2.1 Measuring emigrant stocks and flows

Most discussions on migration start with numbers. Producing reliable numbers, however, is an extremely complex task; understanding and interpreting these numbers is often even more difficult. Definitions, concepts and administrative and survey practices related to migrant stocks and flows vary across countries in ways that make full international harmonization impossible. Because we live in the world of sovereign states, it is easier for a country to account for immigrants residing within its borders than for own current or former citizens beyond its reach. Thus, sending countries face more difficulties in tracking their emigrants than destination countries in counting their immigrants. To make things worse, statistical capacity in typically low or middle income emigration countries is lower than in high income countries where most immigrants go. For these reasons, the best strategy for an emigration country is to collect data on its own emigrants from the immigration statistics of destination countries. Unfortu-

nately, due to historical factors and its geographical position, Serbia is among the countries with the highest dispersion of its emigrants, which complicates the task of assembling the data from all important destination countries.

Countries use different concepts, definitions and data collection methodologies to compile statistics on migration flows. Definitions of who counts as an international migrant vary over time in the same country and across countries. The United Nations Recommendations on Statistics of International Migration defines an 'international migrants' as any person who has changed his or her country of usual residence (UN DESA, 2012), distinguishing between 'short-term migrants' (those who have changed their countries of usual residence for at least three months, but less than one year) and 'long-term migrants' (those who have done so for at least one year). However, some countries use different criteria to identify international migrants. Differences in concepts and definitions, as well as data collection methodologies, hinder full international comparability. An implicit assumption is that they do not systematically change over time.

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[51] UN DESA (Odeljenje Ujedinjenih nacija za ekonomska i socijalna pitanja), 2012.

In contrast to estimates of migration stocks data[50], estimates on migration inflows and outflows by country of destination or origin are not available at the global level. Countries may calculate migration flows based on information from administrative sources, such as data derived from issuance of temporary or permanent residence permits and population registries, or they may use sample survey data. OECD and Eurostat data on migration inflows allow to distinguish between different types of migration flows including work, family reunion, education, humanitarian migration (refugees, asylum seekers and the like) and other (such as retirees).

2.2 Evolution of emigration from Serbia

Serbia has traditionally been an emigration country. After the World War II, it has gone through several waves of intensified emigration. The first significant wave of emigration mainly for economic reasons started in the 1960s, with intensive emigration of mostly unskilled temporary workers to Western Germany regulated by a bilateral agreement, soon to be followed by significant but still somewhat less intensive emigration to other Western European countries. This early wave of emigration also remains very relevant for the present migration outcome, through two main mechanisms. The first one is the establishment of long standing diaspora networks that tend to cluster the members of Serbian diaspora around certain centers in destination countries. The diaspora networks are potentially self-sustainable dynamic mechanisms which over a certain period facilitate permanent or temporary migration.

The second mechanism is in a way the mirror image of the first one. Some regions in Serbia traditionally maintained high levels of emigration following the early 'guest worker' wave, in particular Eastern Serbia. At some later point, Eastern Serbia was joined by another relatively poor region in South-Western Serbia - Sandžak (Penev and Predojević-Despić, 2012) To this day, this early wave of emigration has a considerable impact on the flows of returnees - pensioners, and on the stability of part of remittances (more precisely, personal transfers) stemming from pensions in foreign currency.

The political and economic factors of disintegration of the former Yugoslavia, trigerred the next large wave of emigration. This emigration wave included a shift toward long-distance overseas destinations, primarily Anglo-Saxon countries, from Canada to Australia and New Zealand, whose immigration rules favoured admission of highly educated immigrants. On the other hand, Serbia's overall migration balance remained relatively stable during the 1990s due to an equally intensive inflow of ethnic Serb population from other parts of the former Yugoslavia.

Political changes in the early 2000s brought about a promise of the country's economic and political integration into the European Union and temporarily slowed down emigration. Demand factors also played the role – at that time, the EU was concerned with the impact of Eastern Enlargement and hesitated even with the visa liberalisation for Serbia. Still, emigration flows continued into the first decade of the 21st century and intensified with the post-2008-crisis recovery of the EU, particularly between 2015 and 2019. The Covid-19 lockdowns in 2020 suspended emigration flows abruptly, although not completely, and partly reversed the net emigration flows through the return (or inability to leave Serbia) of many short-term or temporary migrants.

As a result of multiple waves and geographic dispersion of migration from Serbia, members of the Serbian diaspora can be found all over the world. Serbian diaspora in the broadest sense is made up of different generations of migrants with different levels of ties with the kin-country.

According to the estimates of the United Nations, the total number of Serbian emigrants in 2019 was around 950,000[51], which accounts for about 14% of the resident population in the country (excluding Kosovo[52] and Metohija). In addition, one should bear in mind that, technically, in order for someone residing outside Serbia to be deemed a Serbian emigrant, they must be born in Serbia. An alternative criterion (in countries that do not keep statistics on residents by country of birth) is that emigrants must have Serbian citizenship. Since many Serbian-born citizens take the citizenship of the country they had emigrated to, the number of Serbian-born emigrants exceeds the number of Serbian citizens residing outside Serbia. We further discuss this issue in the following section.

2.3 Measuring emigration from Serbia — issues and purpose

In most domestic analyses, until recently, standard approach to presenting data on emigration from Serbia was to use Population Census as the main source or at least the starting point (e.g. Stanković 2014). As already explained, the origin-country statistics on emigrant stock are incomplete by definition and they always underestimate true absolute number of emigrants. Moreover, such censuses distort relative distribution of emigrants across destination countries. Administrative annual outflow data (based on de-registration of residents) are even less helpful, since they heavily underestimate the true number of emigrants. The same is valid for return migration – if people do not de-register as residents, there is no need to re-register.

On the other hand, immigration is subject to much stricter regulations, with the process invariably involving residency visa application and registration with authorities in the destination country. Thus, a much better strategy is to look at the immigration statistics of desti-

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[50] https://www.migrationdataportal.org/themes/international-migrant-stocks

[51] These estimates nominally include the emigrants from Kosovo and Metohija, since this province is treated as part of Serbia in the UN statistics. Most likely, the estimates only partially cover the international migrants originating from the Autonomous Province of Kosovo and Metohija, since all major destination countries treat Kosovo as a separate entity in their migration statistics. In any case, the estimate of 14% of Serbian citizens or natives abroad should be taken as an upper bound of 'true' share, since the denominator used is for the resident population in the territory of Serbia without Kosovo and Metohija.

[52] References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

nation countries and to look there for Serbian-born persons or Serbian nationals[53].

Applied to Serbia, throughout this chapter we define *emigrant stock* flexibly as 'the total number of Serbian migrants present outside of Serbia at a particular point in time'. 'Serbian migrants' might refer to either Serbian citizens or Serbian-born emigrants, depending on the available data in destination countries, but it excludes people of Serbian descent (either territorial or ethnic) who never held Serbian citizenship and were not born in Serbia. On the other hand, migration flows refer to the number of Serbian migrants entering or leaving a given country during a defined period of time.

Additional complications in measurement of migration, especially changes in emigrant stocks over time, are related to changing status of Serbia as a polity undergoing four status changes between 1991 and 2006, and is still in an unresolved dispute over its sovereignty of its autonomous province of Kosovo and Metohija. Further complications arise from Serbian policy on dual citizenship. As some other countries with a lot of people of their ethnicity outside its borders, Serbia as a rule allows dual citizenship. This is used mostly by Serbs from Bosnia and Herzegovina, Croatia and Montenegro – and they might reside either in their countries of origin, in Serbia, or elsewhere as immigrants. When people holding dual citizenship emigrate from Serbia, they might opt to register as immigrants from their countries of origin, which is particularly the case with Serbs born in Croatia and holding Croatian citizenship, who enjoy the privileges of the EU citizenship in their access to work within the EU countries. For that reason, the destination countries' statistics on emigration of Serbian citizens might underestimate the true size of emigration of resident nationals. On the other hand, although it is apparently far less frequent phenomenon, some Kosovo Albanians take Serbian citizenship in order to travel and work in the European Union with less restrictions.

There is no easy fix for all these practical problems in capturing emigrant stock and migration flows, nor there could be. However, by combining various sources and pieces of information, we believe that it is still possible to get a reasonably accurate idea on the scope and trends in emigration from and immigration into Serbia.

2.4 Serbian emigrant stocks during the past decade

In this sub-section we look at the Eurostat data on the total number of residing Serbian citizens on December 31 each year by countries of destination. We use two concepts of emigrant stock – Concept 1 is simply the stock data by country as they are reported. By definition, Serbian citizens' immigrant stock in a destination country at the end of period t is equal to stock in the previous period t-1 increased by the new mechanical inflows in period t and newly born Serbian citizens in the destination country, and decreased by the outflows in period t that include admission into citizenship of the destination country (naturalization), returns to Serbia, migration to 3rd countries and deaths.

Concept 2 adds another component to inflows – Serbian citizens naturalized in period t. Note that Concept 2 is not the full stock of Serbian-born immigrants in a destination country, because Serbian-born emigrants naturalized before the period t remain unaccounted for. Instead, Concept 2 simply subtracts naturalized Serbian citizens in period t from the outflow component, realistically assuming that these people stay in their adopted country. What remains are returns to Serbia, migration to 3rd countries and deaths. For simplicity, one can assume that new births, migration to 3rd countries and deaths are all zero or nullifying each other. Thus, we can treat the difference between stocks in two periods as the billateral net migration balance.

Table 1 presents data on stocks of Serbian emigrants in 'Eurostat-Europe' at two end points of our analysis, 2010 and 2019 (or somewhat shorter period for 4 countries).[54]

Emigration stocks by countries of destination

Concept 1: Serbian citizens' immigrant stock at the end of year *t* = stock at the end of year / period *t-1* + inflows in year / period *t* (immigration proxied by first time residence permits + new births) − outflows (returns to Serbia + migration to 3rd country + deaths)

Concept 2: Serbian citizens' immigrant stock at the end of year / period *t* = stock at the end of year *t-1* + inflows in year / period *t* (immigration proxied by first time residence permits + new births + naturalized Serbian citizens) − outflows (returns to Serbia + migration to 3rd country + deaths)

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[53] While annual publication of the Commissariat for Refugees and Migration 'Migration profile of the Republic of Serbia' presents such data, they are incomplete and overall inadequate. The consistent reliance on destination data to assess emigration size and flows was recently adopted by SORS, 2019, Arandarenko and Aleksić 2020, and Arandarenko, 2021.

[54] The data are all taken from the Eurostat database (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Migration_and_migrant_population_statistics).

	2010	2019 (Concept 1 — recorded citizen stock)	2019 (Concept 2 — recorded stock + naturalization 2010-2019)	Emigrant stock balance 2010-19 Concept 1	Emigrant stock balance 2010-19 Concept 2
Germany	290,092	231,120	260,186	58,972	29,906
Italy	61,027	37,123	55,040	23,904	5,987
France	35,141	27,149	43,659	7,992	-8,518
Sweden	12,090	9,272	19,959	2,818	-7,869
Austria	111,708	107,369	114,522	4,339	-2,814
Slovenia	8,273	20,374	22,112	-12,101	-13,839
Belgium	3,270	4,433	6,358	-1,163	-3,088
Luxembourg	2,033	2,055	3,159	-22	-1,126
Netherlands	454	3,499	5,069	-3,045	-4,615
Hungary	18,080	9,349	14,002	8,731	4,078
Spain	2,848	3,274	3,791	-426	-943
Bulgaria	466	2,243	2,855	-1,777	-2,389
Malta	502	6,481	6,732	-5,979	-6,230
Greece	3,771	3,720	4,336	51	-565
Czech Republic	1,933	5,592	5,951	-3,659	-4,018
Finland	1,377	807	1,315	570	62
Slovakia	3,826	15,842	16,315	-12,016	-12,489
Cyprus	882	386	584	496	298
Poland	701	1,015	1,150	-314	-449
Portugal	219	219	321	0	-102
Ireland	300	359	659	-59	-359
Iceland	219	259	413	-40	-194
Estonia	12	48	48	-36	-36
Latvia	14	40	40	-26	-26
Lithuania	13	60	60	-47	-47
Romania	1,599	2,121	2,220	-522	-621
UK ('12 & '18)	1,496	1,541	4,085	-45	-2,589
	2010/2012	2019 (Concept 1)	2019 (Concept 2)	Emigrant stock balance 2010-19 Concept 1	Emigrant stock balance 2010-19 Concept 2
Norway '10	1,228	5,706	6,731	-4,478	-5,503
Switzerland '12	94,979	60,595	87,057	34,384	7,922
	2013	2019 (Concept 1)	2019 (Concept 2)	Emigrant stock balance 2010-19 Concept 1	Emigrant stock balance 2010-19 Concept 2
Croatia	1,509	10,193	12,308	-8,684	-10,799
Liechtenstein	279	236	263	43	16

Table 1. Stock of Serbian emigrants in Eurostat-Europe, 2010 and 2019, Concept 1 and Concept 2

Source: Eurostat

Table 1 offers a lot of important and interesting insights. In general, contrary to global trend, we see further deconcentration of Serbian emigrant stock in Europe, especially according to Concept 1 (without naturalization). Among only several countries in which, according to Concept 2, the number of Serbian migrants declined or remained roughly unchanged (coloured green or yellow in Table 1; while cells with an increase in Serbian migration stock are colored red) are those with the largest Serbian immigrant stock – Germany, Austria, Switzerland and Italy. On the other hand, there are some booming destinations. Among those destinations which at least doubled their stock of Serbian migrants between 2010 and 2019 or over a somewhat shorter time span are Slovenia, Slovakia, Croatia, Norway, Malta, Netherlands, United Kingdom and Czechia. However, those destinations started from much lower base and, by 2019, the stock of Serbian immigrants in Slovenia, the country with the largest stock in this fast growing group, was only 35% of Italian and 8% of German stock. These destinations are dominated by new member states, with the exception of Norway (not in the EU) and United Kingdom and Netherlands.

Cumulative naturalization rate (expressed as ratio or relative difference between Concept 2 and Concept 1 stocks in 2019) also varies widely. It is highest for the United Kingdom, Sweden, Switzerland, France, Italy, Hungary, Netherlands and Belgium. On the other hand, it is quite low or negligible in most new member states. The difference between new and old member states (OMS and NMS hereafter) in this regard can be explained by several factors. First, OMS are mature and well established migrant destinations where average duration of stay is much longer, and for individual migrants to be able to apply for citizenship, there is usually a minimum residence period requirement. Second, the bar (criteria) for naturalization set by most NMS might be generally higher than of OMS. Third, the demand of Serbian immigrants for citizenship of old and richer EU MS is stronger than for that of new and poorer EU MS (except in those MS with significant ethnic minorities in Serbia, such as Hungary). Fourth, the structure and characteristics of Serbian immigrants might systematically differ from one country to another.

The summation of cumulative net flows in the period 2010-2019 (or somewhat shorter in several cases) for all countries for which the data are available on Eurostat - EU MS excluding Denmark, but including Switzerland and Norway - yields widely different results with different signs depending on which concept is used. While according to Concept 1, the net outflow of Serbian immigrants from this 'Eurostat universe' is around 88,000, according to Concept 2 there was net immigrant inflow (that is negative net migration from Serbia) of around 41,000. Spread over 10 years, the Concept 2, estimate would imply average annual outflow to the 'Eurostat universe' of around 4,100 Serbian citizens.

Our 'Eurostat-Europe' net emigration estimates appear to be overall lower than the estimates of SORS (2019), with sometimes wide variation across individual countries.[55]

Cumulative Serbian overall net migration balance for the period 2011-2018 estimated by SORS was around -97,000, implying average annual net outflow of some 13,000 people with increasing negative trend reaching 22,000 in 2018 and projected to get close to 30,000 in 2020. According to SORS, the estimated net negative migration for countries of our 'Eurostat-Europe' in the period 2011-2018 was roughly similar to the global number, since Serbia has significant net immigration from Bosnia and Herzegovina and Montenegro, which is enough to keep in check relatively mild net outflow to the rest of the world. However, the main discrepancy between the two estimates arose from two important European destinations. The case of Croatia is interesting – according to our calculation and based on stock and naturalization data from Eurostat, there was a strong net inflow of Serbian citizens into Croatia (by over 10,000 between 2013-2019), while SORS estimates are completely different implying net immigration into Serbia of some 15,000 persons between 2011-2018. The possible reason for these opposing estimates, both based on files from the Eurostat database, lies in different citizenship regimes in two countries – while Croatia does not allow double citizenship (although informally tolerates it), Serbia does. This potentially causes overcounting and asimmetry in billateral and by extension global accounting of migration flows and stocks, and is just an illustration of the many migration statistics challenges.

On the other hand, by far the largest difference between two estimates is regarding the most important destination country – Germany. While according to harmonized Eurostat database which we used, the Concept 2 the stock of Serbians dropped by some 30,000 persons (2010-2019), according to the SORS estimates and based on German statistical data, there was net inflow into Germany of almost 50,000 people in the period 2011-2018. However, this apparent net inflow is most likely a statistical artefact as a result of gradual attrition of the categories 'former Yugoslavia' and 'Serbia and Montenegro' as countries of origin which last appeared in German stock statistics in 2016. Simply put, former Yugoslav citizens already in Germany were reclassified into Serbian citizens during this period.

Assuming that the migration balance with the rest of the world outside 'Eurostat-Europe' is about neutral, annual net outflow of Serbian citizens in the past decade would be in the range 4-13,000 persons, based on two presented estimation exercises for Eurostat-Europe. This wide band can be trimmed from both sides. If we assume that 'true' migration balance with Germany is about neutral, this would put the net outflow estimates in the past decade at somewhere between 50-70,000 persons – that is, some 5-7,000 per year. We shall further deal with these problems in the context of migration flow analysis in Section 3.

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[55] This is no surprise, since SORS used a set of varied sources depending on data availability and responses to its questionnaire aimed at national statistical offices, diverse calculation methods including modelling exercises and imputations and somewhat different definitions. The main purpose of the SORS exercise was to get the net migration balance to be used in the calculation of total population dynamics for the period 2011-2018 and population projections from 2019 onwards.

3 People or Workers?

3.1 Evolving migration flows from Serbia

Referring to the influx of guest workers into Western Europe during the 1960s and 1970s, Swiss playwright Max Frisch famously quipped through one of his characters – 'We wanted workers; but the people arrived'. Inevitably, the features of work capabilities and skills come in the package with other human dimensions, as Frisch aptly formulated. Interactions between locals and guest workers could not be limited only to workplaces and only for a defined period of time. Many foreign workers managed to stay despite formal limitations and to settle in West Germany and other Western European countries.

Workers from SFRY (including Serbia) were part and parcel of large post-war inflow of temporary migrants, many of whom remained in Western Europe throughout their work careers, until retirement and beyond.

Migration flows slowed down in 1970s and 1980s – mostly due to receiving-country restrictions imposed as a consequence of the rise in unemployment due to economic crisis and reduction in labour demand.

The 1990s brought about large turnaround in migration trends caused by the violent dissolution of SFRY. Due to economic collapse and general political insecurity there had been a large emigration of both 'workers' and 'people' throughout the decade - with often intertwined economic, family and humanitarian reasons. This wave was dominantly supply (push) driven. Wages in Serbia dropped the most for highly educated middle class urban workers. Consequently, new faraway destinations such as Canada and Australia gained in importance because their point immigration system favoured high-skilled emigrants.

At the same time, people were immigrating to Serbia in large numbers – mostly ethnic Serbs from Croatia and Bosnia and Herzegovina, where humanitarian and family reasons dominated. After 1999, many internally displaced persons from Kosovo and Metohija (especially outside of northern part) became residents of Central Serbia and Vojvodina, further balancing mechanical losses due to emigration. In 2000s emigration continued at a somewhat slower pace, driven by combination of economic and family reasons, and the EU again regained full dominance as the main destination area, while overseas Anglo-Saxon countries lost in importance. Some new minor destinations emerged, such as rich Middle Eastern countries and China, but migration data on them are scarce.

In the rest of this section, after a brief detour to economic theories of migration, which we need as a useful framework for analysis, we look closer at the most recent trends regarding the outflows of Serbian migrants to the EU.

3.2 Economic theories of migration and their operationalization

Among many, mostly complementary, theories of migration (neoclassical, new economics, mobility transition, institutional, systems and networks, segmented labour markets, world systems, conflict etc.) the first two are especially useful in providing a simple dynamic framework to understand the features and the evolution of migration from Serbia.

The neoclassical theory of migration (NTM assumes that economies and labour markets converge in the long run through trade and migration. Migrants act as rational actors driven by economic motives. They move from poorer countries where labour is abundant and wages are low, to richer countries where labour is scarce and wages are high. Within this framework, migration is implicitly seen as permanent, typically lifetime decision of an individual migrant based on pre-calculated positive net present value of migration.

Basically, NTM is the theory of human capital investment applied to migration decisions (Sjaastad, 1962). One practical consequence of interest is that the permanent migrants' ties with the home country tend to weaken with the passage of time.

The second approach is so-called new economics of labour migration (NELM) as developed by Lucas and Stark, (1985) and Stark and Bloom (1985). This approach views individual migration as part of a household utility maximization strategy and as typically temporary or circular phenomenon. The household in a way sends the migrant abroad as a part of its risk-optimization ('hedging') strategy. At around the time this theory was developed, short-haul, shorter-term migration (e.g. Mexicans to the US; Southern Europeans to Western Europe etc.) gained in importance.

In our simplified re-interpretation, the neoclassical migration theory is about the migration of people, while the new economics of labour migration is about the migration of workers. Of course, individual migrants do not have to decide and know in advance for how long they would migrate and whether they would return or not; life often takes unexpected course and would-be temporary workers become 'people' in the process, and vice versa.However, the reasons for migration are of interest for policy and variation over time in the distribution of migration by category and country may in part explain differences in Serbian emigrants' economic and social outcomes and the macroeconomic, labour market and demographic impact of emigration.

3.3 Flows

Having an idea about the ratio between the migrant stock and gross migration flows should provide some insights into which one of the

Country	Flow		Stock		Flow as % of stock	
	2010	2019	2010	2019	2010	2019
EU 28	22,818	62,190	560,631	504,143	4.1%	12.3%
Czech Republic	199	3,609	1,933	5,592	10.3%	64.5%
Germany	3,327	21,619	290,092	231,120	1.1%	9.4%
France	1,116	1,196	35,141	27,149	3.2%	4.4%
Croatia		10,644		10,193		104.4%
Italy	6,631	1,119	61,027	37,123	10.9%	3.0%
Hungary	1,226	3,162	18,080	9,349	6.8%	33.8%
Malta	86	1,840	502	6,481	17.1%	28.4%
Austria	3,577	3,764	111,708	107,369	3.2%	3.5%
Poland	114	730	701	1,015	16.3%	71.9%
Slovenia	1,040	5,105	8,273	20,374	12.6%	25.1%
Slovakia	483	4,290	3,826	15,842	12.6%	27.1%
Sweden	1,228	1,436	12,090	9,272	10.2%	15.5%
Switzerland		1,053		60,595		1.7%

Table 2. Inflows / Stocks (Concept 1) 2010-2019   *Legend: Flow as % of stock: Yellow – less than 9%; light green – 9-25%, green – 25% and more*

Source: Eurostat

two above sketched economic theories of migration could be considered to better reflect the reality and whether their relative importance in explaining migration trends have changed in the recent period.

Table 2 below compares the flow and stock data for twelve most important destination countries within the 'Eurostat-Europe' in 2010 and 2019. Six of these countries are traditional destinations (5 OMS – Germany, France, Italy, Austria, Sweden; and Switzerland), while seven are new destinations (Czech Republic, Slovakia, Croatia, Slovenia, Malta, Hungary and Poland). The full data for years 2010-2019 are presented in Annex, Table A1.

The annual gross inflows of Serbian immigrants to the EU-28 as a whole almost tripled between 2010 and 2019, while at the same time the immigrant stock decreased according to Concept 1, or remained unchanged (that is, increased by less than 10%) according to Concept 2. As a consequence, the flow-to-stock ratio exactly (Concept 1) or almost (Concept 2) tripled.

While all OMS in Table 2 have single-digit flow-to-stock ratios, and all of them, except for Germany, have the ratio below 5%, all NMS have

these ratios above 25%, and in an extreme case of Croatia the ratio is 104%, suggesting that Serbian immigrants to Croatia registered for the first time in 2019 had the expected average duration of migration spell of less than a year.

In most countries, except Italy and Switzerland, the flow to stock ratio increased between 2010 and 2019, implying the shortening of expected duration of migration spell of new migrants. However, the magnitude of change was very different. While in OMS, except for Germany, on the positive and Italy on the negative side the change was moderate, in NMS the flow to stock ratios were two to six times larger.

These trends partially reflect the maturity of destinations – old destinations have larger stocks and lower flow to stocks ratios, while the opposite is true for new destinations. However, much faster growth of flow to stock ratios in NMS (except for Germany where the ratio grew the most) suggests that the dominant reasons for migration to NMS and Germany might be different compared with OMS.

This hypothesis can be checked by looking at country statistics on the reasons for the issuance of residence permits for the first-time

Reason	2010	2015	2016	2017	2018	2019
Total	22,818	27,195	31,289	40,350	51,942	62,190
Family reunion	9,699	13,140	12,799	13,681	15,448	15,667
Education	2,129	2,384	2,381	2,478	2,477	2,340
Remunerated activities	6,719	6,496	9,358	17,333	27,383	32,639
Other	4,271	5,175	6,751	6,858	6,634	11,544

Table 3. Reasons for the issuance of first-time residence permits to Serbian nationals in the EU-28

Source: Eurostat

migrants from Serbia, available at Eurostat, as presented in Table 3.

The most dynamic growth has been recorded for the remunerated activities (Table 3). For most of the period between 2010 and 2019, family reunion was the most frequent reason (until 2017). While it constituted almost 43% of total permits given in 2010, it was reduced to 25% in 2019. Family reunion visas do not preclude migrants from working and also represent a track for possible naturalisation but they do imply lower activity rates. On the other hand, migrations for work more than tripled between 2016 and 2019 and in 2019 they represented 52.5% of all first residence permits issued (up from 29% in 2010), and were more than twice as large as first-time residence visas issued for family reunions.

Table 4 focuses on the evolution of ratios of work to family reunion reasons for issuing first-time visas by destination countries. Switzerland is also included.

The issuance of work permits is far more frequent in the NMS, while family-related residence visas are the dominant category for Serbian migrants in the OMS (Table 4). Overall, the OMS destinations show stagnating or mildly declining gross inflows and their work/family ratio is well below 1, meaning that the family reunion reasons dominate.

Germany again appears to be the single most important exception from the rule, with strong rise in the first-time work permits issued

Country	2010	2015	2016	2017	2018	2019
EU 28	0.69	0.49	0.73	1.27	1.77	2.08
Czech Republic	0.58	2.59	3.05	3.84	11.31	15.63
Germany	0.27	0.15	0.53	0.83	0.74	0.62
France	0.34	0.24	0.21	0.26	0.29	0.34
Croatia	no data	0.36	1.13	3.01	20.48	22.54
Italy	1.68	0.45	0.41	0.28	0.42	0.48
Hungary	1.82	4.26	5.64	19.4	19.56	35.81
Malta	4.25	4	5.5	9.42	7.44	8.45
Austria	0.06	0.09	0.09	0.08	0.11	0.14
Poland*	6.5	no data	39.18	76	19.13	9.14
Slovenia	2.85	3.73	4.94	5.52	6.79	5.70
Slovakia	2	2.01	2.33	9.59	9.74	12.90
Sweden	0.2	0.31	0.23	0.28	0.37	0.33
Switzerland	no data	0.17	0.21	0.24	0.26	0.00

Table 4. First-time visa issuance in EU-28 and Switzerland: Work / family reunion ratio

Family permits barely double-digit in Poland.
Source: Eurostat.

Year	Total		Number of years in Germany						
		Below 1	1-4	4-6	0 - 6	30 - 35	$35-40$	$40+$	$30+$
2019	237755	12490	31685	17555	61730	11165	6405	41830	59400
2018	231230	12190	29930	16390	58510	8375	7235	41400	57010
2017	225535	11595	29045	14075	54715	6055	8355	40825	55235
2016	223100	10990	31350	11600	53940	5545	9040	40095	54680
2015	230427	17658	32943	11456	62.057	6041	9366	39480	54887

Table 5. Serbian immigrant stock in Germany by migration spell distribution in the period 2015-2019

Based on German migration statistics

since 2015. The ratio of work to family residence permits roughly tripled between 2010 and 2017 and reached 0.83 in 2017 but then dropped to 0.62 in 2019. This rapid increase coincided with the introduction of German Western Balkan regulation, which simplified the procedure for Western Balkan migrants without professional qualifications to work in Germany. However, this ratio is still less than half the EU average of 2.08 in 2019.

With the rapidly growing flow of migrants and the largest Serbian diaspora, Germany looks susceptible as desirable settlement destination for many new migrants, even though the Serbian emigrant stock has apparently been rather stagnant or declining in the past decade. The declining stock simply might be the net effect of large groups of long-term migrants retiring and returning to Serbia and new, somewhat smaller groups of potentially permanent migrants taking their

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total	18,508	12,590	14,197	10,362	9,608	9,496	10,614	9,644	9,489	11,153
Total EU	11,157	10,179	12,585	9,156	8,944	8,801	10,776	9,109	8,778	10,353
Old EU	94.6%	77.5%	85.6%	87.9%	90.1%	92.5%	87.1%	92.9%	93.4%	93.4%
New EU*	5.4%	22.5%	14.4%	12.1%	9.9%	7.5%	12.9%	7.1%	6.6%	6.6%
Top 10 destinations										
Germany	3297	2,885	5,974	2,589	2,228	1,945	2,599	1,949	2,480	3,120
Italy	1080	1,103	1,076	1,342	2,066	2,648	2,280	1,721	2,040	2,561
Switzerland	6859	4,261	3,362	2,529	1,839	1,655	1,582	1,514	1,440	1,421
France	4517	2,110	1,162	1,327	1,328	938	1,624	1,466	894	1,144
Sweden	338	793	1,144	965	921	1,172	1,236	1,808	1,273	1,037
Austria	828	548	709	823	671	633	751	557	625	1,008
Slovenia	211	169	139	184	155	127	159	153	179	262
Belgium	164	117	188	234	141	194	184	259	202	242
Luxembourg	194	81	68	49	79	55	55	97	225	201
UK	465	523	375	320	180	129	144	120	131	157

Table 6. Acquisition of citizenship in Eurostat-Europe by Serbian citizens, 2010-2019

*Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Bulgaria, Romania and Croatia
Source: Eurostat.

place. However, a closer look at the structure of Serbian immigrants in Germany, according to the duration of stay in Table 5, reveals the stagnant stocks of those who are less than four years in Germany since 2015. Thus, the increased first-time inflows into Germany are not translating into growing stocks of short-term migrants staying for less than 4 years.

The German statistics on Serbian migrant flows contain one special type of temporary migrants – asylum seekers, who are most often very poor people attracted by otherwise meagre pocket money benefits available to migrants as well as the possibility to work informally while waiting for the processing of their asylum applications that almost invariably end up being rejected. For Serbian migrants in Germany, asylum seeking is usually the most frequent reason within the 'other reasons' heading. A paper analysing asylum migrants around 2015 found out that about 4,000 Serbian illegal asylum seekers resident in Germany at the time waited for their application to be processed for 15 months, on average. Besides, they were educationally clearly negatively selected (Guichard, 2020).

This analysis shows that rapidly increased flows in the 2016-2019 period did not translate into growing stock of recent Serbian immigrants. While the annual inflow increased from 10,263 in 2016 to 21,619 in 2019, the stock of those with residence shorter than 4 years increased by less than 2,000, or less than 10% of cumulative increase in flows over the same period. Still, the bulk of that modest increase happened between 2018 and 2019. Thus, one cannot exclude the possibility of a reversal of the relatively favourable trend of dominantly temporary migration into Germany.

Despite the manifold increase in flows and stocks during the last decade permanent migration potential of NMS remains very limited. The NMS do not actively follow the policy of permanent migration /

naturalization, except for foreign nationals who belong to their own ethnicity. Besides, the NMS are largely not recognized as desirable permanent or long-term destinations for potential Serbian migrants, with partial exception of Slovenia.

Table 6 provides empirical confirmation for these points. Overall, there has been a declining trend in acquisition of EU citizenship by Serbian citizens since 2010. Over the entire period, the NMS granted less than 10% of total citizenships granted by the EU countries to Serbians, with lion's share going to Hungary, Croatia and Slovenia. On the other hand, over the last decade, the naturalization of Serbians sharply dropped in Switzerland, France and the United Kingdom, was flat in Germany and Austria, and strongly increased in Italy and Sweden.

Different annual naturalization rates (defined as share of naturalized Serbian nationals in the total stock of Serbian nationals in the destination country) also reflect the naturalization policies of the recipient countries, especially their attitudes toward dual citizenship. The most important destinations for Serbian migrants - Germany, Austria and Switzerland - are restrictive in that regard and stick to the principle of 'avoidance of multiple nationalities'. This results in low rates of naturalization. For example, the average naturalization rate for Germany in the last decade was less than 1.5% annually. On the other hand, the average naturalization rate for Sweden is about 7%.

The data for Hungary apparently refer to resident citizenships only, since the number of citizenships granted to Serbian citizens of Hungarian ethnic extraction after 2011 when Hungary introduced a new permissive law on citizenship exceeds 90,000. As a further complication, if these Serbian residents with dual Hungarian citizenship migrate elsewhere in the EU they will invariably be recorded as Hungarians because of employment and residence privileges they enjoy as citizens of an EU member state.

4 Demand (Pull) and Supply (Push) Factors of Work Migrations

In this section, we attempt to provide reasonable explanations for the overall and structural migration outcomes in the past decade observed and presented in the previous section, by connecting them to features of the Serbian labour market and labour force that could most plausibly have influenced these outcomes.

Migration decisions are also heavily influenced by the availability of migration options in the destination countries, for potential migrants overall and for certain groups among them. Thus, we also try to infer from the available data whether the size and structure of recent emigration from Serbia was primarily influenced by the so-called push factors (the most important among them being the probability of em-

ployment and expected earnings in the origin country) or by pull factors (expected earnings and probability of employment in the potential destination country, as well as the ease of migration determined by the destination country's immigration policy).

On the demand (pull) side in receiving countries, the full recovery of the economy from the Great Recession occurred only in 2013, which after a long low tide pushed the demand for labour, most strongly in Germany as the economic engine of the EU. The recovery, facilitating the expansion demand for labour, coincided with the retirement of large baby-boom cohorts, which in turn increased the replacement demand for labour.

In January 2016, faced with critical lack of workforce, Germany introduced the so called 'Western Balkans Regulations'. It gives citizens of the Western Balkan countries, including Serbia, the chance to take up employment in Germany, provided that they have a binding job offer and the approval of the Federal Employment Agency (BA). Even before that, medical workers were coming in organized way through the 'Triple win' programme based on 2013 bilateral agreement between German and Serbian employment services. The major novelty of the new regulation was that, unlike in other third countries, there were no requirements regarding the workers' professional qualifications. This regulation, initially valid until the end of 2020, was extended to the end of 2023.

The labour market integration of those working in Germany on the basis of the Western Balkans regulation was evaluated as a success in terms of employment stability and earnings compared to both other groups of migrants and German job entrants. The proportion of those who are unemployed and those receiving benefits in Germany is lower than that of all other groups of migrants (IAB, 2020).

Great recession was felt somewhat less strongly in Central Europe. Still, with the recovery in Western Europe, work migration flows from NMS to OMS intensified again, creating severe labour shortages in sending countries. Unlike the OMS which manage to neutralize their natural population decline with positive migration balance (which through the higher fertility rate of migrants tends to additionally improve the population balance), in most NMS, natural population declines and negative emigration balance goes hand in hand.

In the second half of the past decade, more advanced NMS managed to slow down or reverse the negative migration balance, pursuing more aggressively the policy of importing temporary labour force, especially from Ukraine, but also from the Western Balkans and other low-wage regions. The crude rate of net migration (the ratio of net migration including statistical adjustment during the year to the average population in that year per 1,000 persons) for the region as a whole turned positive in 2018.

Thus, the demand for foreign labour in NMS can be in part explained by the hydraulic mechanism of labour migrations. Workers move from Central and Eastern European NMS to OMS in Western Europe; then their place is filled by third country nationals – from Ukraine, the Western Balkans, and further afield.

These movements within the EU can also help explain the growing divide between the nature of Serbian emigration into OMS (except Germany) and NMS. OMS experience slower growth and their expansion and replacement demands are mostly met by the immigrants from NMS because they face no restrictions in access to jobs. This does not mean that the doors are closed for new immigration of Serbian workers into OMS; but this is largely possible due to long-standing Serbian diaspora and thus Serbian migrants increasingly use family visa channels rather than work visas. Austria, the second most important destination for Serbian migrants among OMS, is a paradigmatic example – the total number of first-time visas issued declined from 5,288 in 2015 to 3,764 in 2019, with the share of family visas in total fist-time visas growing from 55% to 61% over the same period.

5 Remittance-Intensive Emigration

Remittances are complex phenomena often difficult to demarcate from other sources of private income. In international statistics, workers' remittance is defined as transfer made by migrants employed and resident in the compiling economy to their relatives in their country of origin. Workers' remittances include household to household transfers in cash and in kind. This narrow definition is in everyday but also in expert use in Serbia often confused with broader statistical concepts of personal and total remittances.[56]

Remittances are especially important for low-income countries and on average account for nearly 4 percent of their GDP, compared with about 1.5 percent of GDP for middle-income countries. However, as presented in Graph 1 below, the remittance inflow expressed as a percentage of GDP in Serbia, which is an upper-middle-income country, was over 8% on average during the last decade.

Unlike, for example, FDI inflow, which oscillated within the wide corridor between some 2.5% and 8% of GDP, remittance inflows showed remarkable stability during the past decade (graph 1). Even in the pandemic 2020, a steady and strong stream of remittances continued, showing strong resilience amid the unprecedented global obstacles to movement of people. The share of total remittances in GDP flowing into Serbia is more than five times the average for middle-income countries. On the other hand, the share of Serbian-born population living outside the borders of Serbia is somewhere between three and four times above the world average of 3.5%.

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[56] According to the Balance of Payments Manual (IMF 2008) 'personal remittances' include 'personal transfers' which comprise workers 'remittances' and compensation of employees, that is net income being generated through employment in other economies, either as seasonal or border worker, or as resident with non-resident entities (e.g. international institutions domiciled in the resident's home economy).
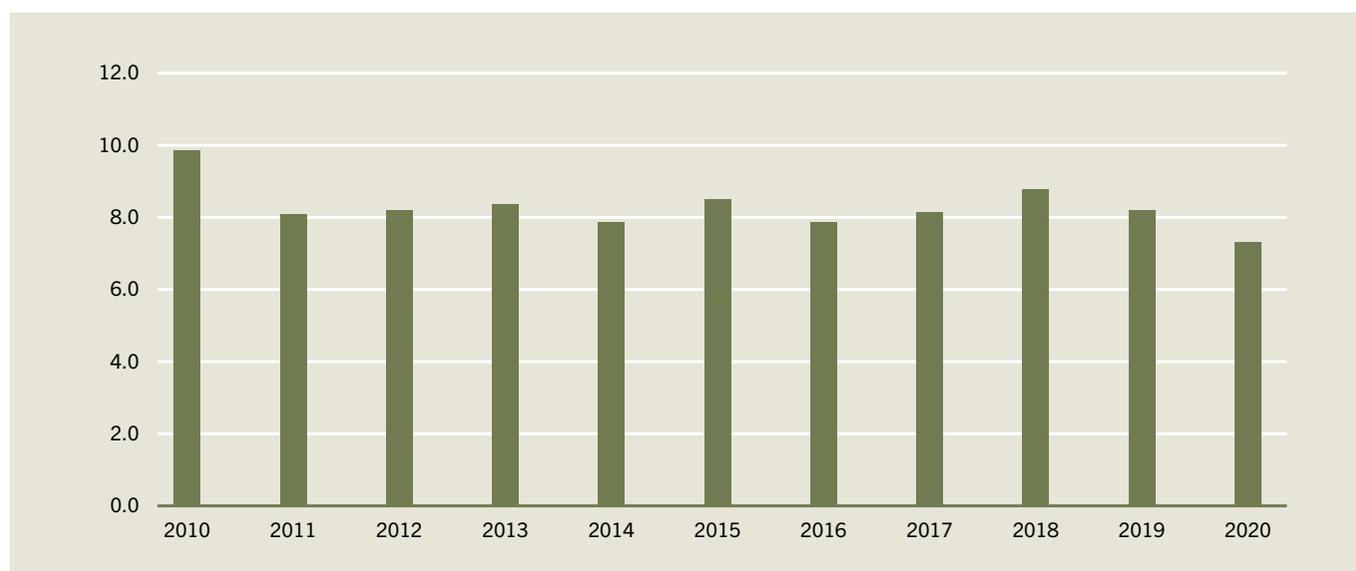
Graph 1. Volume of remittances compared with the GDP, 2010-2020

Source: World Bank

Putting the share of emigrant population in resident population in relation to the share of remittances in GDP can be interpreted intuitively as a share of local population that needs to be 'sent' abroad to get remittance inflow of 1% of GDP. We can call this compound expression the 'remittance intensity ratio'. The lower the ratio, the more efficient is migrant population in 'producing' remittances. Some of the factors influencing the remittance intensity ratio are: age structure of emigrants; their employment rate; employment-weighted earnings differentials between the destination countries and sending country; share of the resident population receiving other components of total remit-

tances such as personal income transfers and pensions, for example telemigrants and retirees. This all points in the same direction - the largest the share of work migrants (of the NELM type) and non-migrants receiving work-related total remittances is the more favourable.

The remittance intensity ratio for Serbia is below 2 and it is the most favourable among the Western Balkan countries and among the most favourable globally. This further strengthens our finding that large and growing part of Serbian emigration is of NELM-type. Serbs migrate more often as workers than as people.

6 Skill Structure of Serbian Emigrants: Dissecting the Brain Drain Narrative

The brain drain, an ugly expression that has unfortunately entered scientific jargon on migration, in conventional use, means simply the emigration of highly trained or qualified people from a particular country. More technically, the brain drain happens only if the educational structure of emigrants ('movers') is better than the educational structure of 'stayers' (inclusive of returnees and immigrants). The comparisons can be made in shares of three broad educational groups (low-skill, medium-skill and high-skill) or in average years of schooling.

However, there are no directly available data to assess what happened with these relationships for Serbian movers and stayers in the past 10 years. Standard annual statistics do not provide information on educational structure of immigrants. There is a special brain drain database created by the German Institute for Employment Research (IAB), comprising data on immigrants by nationality based on population census-

es in 20 leading OECD countries, but the latest data in it are from 2010.

In 2010, despite some modest evidence of the over-representation of high-skilled emigrants, Serbia fared better in that regard than most other sending countries in the database. The emigration rate of Serbian high-skilled workers was well below average for its size and income group (Kerr, 2016). Nevertheless, this database did not attract attention of migration researchers in Serbia even when it was up-to-date, and the adopted view of Serbia as one of the countries with the highest brain drain was never challenged on that ground.

It is possible to adopt at least two different strategies to indirectly assess what happened with the skills structure of Serbian net migration since 2010. The first is based on national labour force statistics, and the second one on international migration statistics. We draw on work of Leitner and Arandarenko to present these complementary yet methodologically
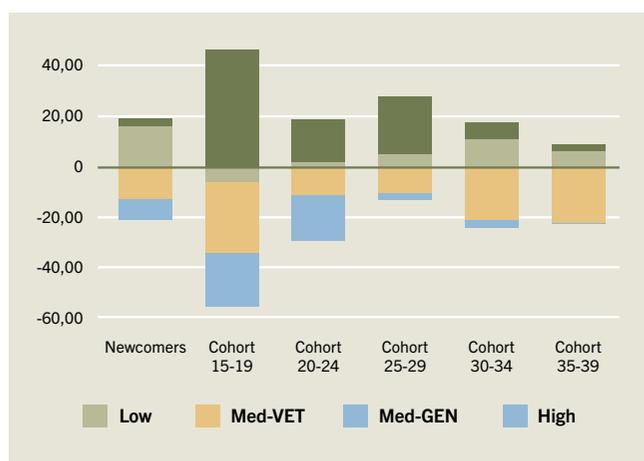
Graph 2. Cumulative net-migration flows by age cohort and educational attainment level, 2015–2019

Source: Leitner (2021), calculations based on the LFS data of Serbia (ETF-wiiw, 2021).

completely different approaches (Leitner, 2021a; Arandarenko, 2021).

The former strategy, adopted by Leitner (2021), presented also in Arandarenko (2021) involves approximating the net migration calculating the size and skill structure of age cohorts over time using the data from consecutive Serbian Labour Force Surveys. The idea is that both changes in size as well as in educational structure of the migration-prone age cohorts 15-39 years of age can be ascribed to net migration, assuming that the mortality rates for these age groups are negligible.

Leitner's analysis starts in 2015, looking at the cohorts who were 15-39 years of age in 2010, pooled in 5-year brackets to get more stable estimates. In 2015, the first year of the analysis, each cohort has already aged by 5 years and aged by another 4 years until 2019. Educational levels are divided into four categories: low (primary or lower secondary education), medium general (upper secondary general education/gymnasium), medium VET (upper secondary vocational education and training), and high (tertiary education), based on ISCED.

Expectedly, overall net migration balance for working-age people below 40 within the given time frame is negative. The net emigration is highest among the three youngest age cohorts; cohort 25-29 has high net immigration, and that reverts again into high net emigration among the two oldest age cohorts. The cumulative net emigration total between 2015 and 2019 within the 15–39 age group (as of 2010, inclusive of those reaching 15 years of age in the meantime) is estimated at -37,400 people. This estimate appears to be lower than expected but still within a plausible range.

However, the most important finding of Leitner's statistical analysis is that, contrary to intuition and widespread perceptions, over the observed period there is net immigration of the highly educated, i.e. those with college and university degrees. On the other hand, the analysis finds high net-emigration flows of those with Med-VET and Med-GEN skills. Second, as the largest country in the Western Balkans, Serbia has universities that attract a sizeable share of Serbian-speaking students from neighbouring countries, notably Bosnia

and Herzegovina and Montenegro, but also from elsewhere. It is very plausible that the retention rates of high-skilled student immigrants from Bosnia and Herzegovina and Montenegro are higher than corresponding rates for Serbian students elsewhere, with overall positive net migration balance.

Leitner found that net emigration was mainly driven by those with a medium level of education leaving the country (Graph 3), especially among Med-VETs, which is the largest group among Serbia's medium-educated, representing almost three quarters of all medium-skilled in 2018. Nevertheless, because the net emigration rates are relatively modest, in relative terms, the loss of people with Med-VET as their highest level of educational attainment was relatively small. Furthermore, there was non-negligible net emigration of Med-GENs, much smaller in absolute but sizeable in relative terms.

It is interesting to note that these skill-differentiated emigration patterns in the period 2015-2019 identified by the cohort approach outlined above are exactly the opposite to those identified on the basis of destination country statistics up to 2010 contained in the IAB's brain-drain database. This could mean that the V-pattern of Serbian emigration stock by skill levels has flattened, and together with the finding of a net immigration of high-skilled might indicate a significant improvement in comparison with the already relatively favourable skill structure of Serbian emigration in 2010.

As mentioned, another recent research (Arandarenko, 2021) also questioned this dominant narrative on brain drain as the main worrisome aspect of Serbian emigration. In this study, the main destination countries were divided into those mostly receiving high-skilled Serbian immigrants, and others, taking mostly medium- and low-skill immigrants. Assuming no major changes in relative skill structure of Serbian immigrants by countries, a more dynamic increase of stock of Serbian immigrants in 'brain-drain' countries would, due to the composition effect, suggest the worsening of skill balance of Serbian emigrants, and vice versa.

Anglo-Saxon countries are world leaders in attracting 'global talents', that is, high-skilled immigrants. They have flexible labour markets open to outsiders and high returns to education and skills. Particularly Canada and Australia actively encourage high-skill immigration with their points-based systems. Traditionally, the United States and the United Kingdom also attract many high-skilled immigrants from Serbia. Outside of that group, the Netherlands has introduced a tax-relief scheme for young talents that makes it especially attractive for young university graduates. The data from Serbian population censuses, however incomplete (e.g Stanković, 2014) and some comprehensive case studies (e.g. Despić, 2015) fully confirm that high-skill emigrants dominate or at least comprise about half of total emigrant stock in Canada and United States and certainly make an above-average percentage of Serbian emigrants in other Anglo-Saxon countries.

Data on inflows to Anglo-Saxon countries available in the OECD database or obtained by SORS via bilateral exchange reveal modest and essentially stagnant annual flows from Serbia. For example, between 2010 and 2018, the annual gross flow of Serbian migrants to Australia was between 200 and 300, and to Canada between 250 and 500, without a clear trend. Only the numbers of those migrating to the USA in-

creased – to around 1,000 annually after 2015 (SORS, 2019). Basically, neither of these countries would enter the list of top ten gross emigration flow destinations presented in Section 3. Thus, despite the natural tendency of high-skilled migrants to emigrate to Anglo-Saxon countries, and the relatively significant migrant stock there especially due to large inflow in the 1990s, it seems that Serbia has successfully kept this tendency in check for the past two decades (Arandarenko, 2021).

The recent available data on Serbian immigrants in Germany, however, need to be analysed with full attention, given that both the emigrant stock and flows to Germany make around a third of the total stock and flow of Serbian emigrant numbers in the EU. Especially, Serbian public has become very alarmed by the apparent drain of doctors and medical staff in general, as well as engineers and IT professionals.

Fortunately, some important new analyses as well as the data from German immigration statistics can be used to try and assess if the upward skill shift has really happened. The first analysis is the IAB study (Bruecker et al. 2021) on the effects of the Western Balkan Regulation.

Since this regulation eases the employment of workers without professional qualifications if they have a binding agreement with a German employer, its expected impact is not in the direction of higher share of high-skill migrants. This is confirmed by the study's main findings. For example, over 40% of those who benefitted from the regulation got the employment in the construction sector. Furthermore, the average earnings of immigrants admitted under the scheme are only some 20% higher than minimum wage. It is also indicative that German statistics identifies ten occupational groups as the most frequent among employees, only one of them high-skilled (that is, health associate professionals), six in medium-skilled, and three in low-skilled, as follows: Labourers in mining, construction, manufacturing and transport; Extraction and building trades workers; Cleaners and helpers; Health associate professionals; Sales workers; Personal and protective services workers; Drivers and mobile-plant operators; Metal, machinery and related trades workers; Personal care workers; Food preparation assistants.

Structure of all emigrants from Serbia in Germany was dominated by medium-skilled occupations both in 2015 and 2019, with some increase in share of high-skilled emigrants over that period, but it remained worse than that in Serbia. Roughly, while the structure of Serbian resident labour force in 2019 was 20% low-skill, 55% medium-skill and 25% high-skill, in Germany low-skilled workers comprised 25% and high-skilled 20% of labour force (Wiiw-ETF, 2021).

Another recent research focused on emigration of health professionals to Germany which is the most popular destination for Serbian health professionals, with Slovenia far below in second place (World Bank, 2020). According to wiiw-ETF (2021) more than 16% of health workers from WB6 in Germany are 'health professionals', mainly represented by medical doctors (by more than 70%). The rest consists of associate health professionals of which the majority is nurses. Although there has been a steady increase in the applications for health degree recognition in Germany, the success rate is only two thirds, pointing at the problems with the quality of health education in Serbia. By 2017, there were 1,236 Serbian-trained physicians in Germany, and by 2020 the number of health professionals surpassed 1,500.

Although these numbers are high and growing, and are undoubtedly a reason for concern, they should be looked at in conjunction with the data on the labour force in health sector residing in Serbia. The number of employed physicians was slightly below or around 30,000 in late 2010s, while the number of unemployed physicians hovered above 2,000 and often close to 3,000 for most of that period. The number of unemployed dropped below 1,000 only after the Covid-19 outbreak. Similar trend was recorded for nurses. In other words, up until 2020 emigration of health workers did not interfere with the (excess) availability of health workforce at home.

It is also worth reminding that the number of Serbians migrating into the EU for education reasons stagnated between 2,000 and 2,500 throughout the past decade, meaning the share of total first-time residence permits issued for this reason steadily declined. Furthermore, according to the UNESCO statistics, the total number of Serbian students abroad was around 15,000 and was pretty stable over the 2013-2018 period (Wiiw-ETF, 2021). For comparison, this number was about the same as for Bosnia and Herzegovina and Albania, despite Serbia having at least double the number of inhabitants.

7 Labour Market Outcomes and Emigration Behaviour

The concept of brain drain implies that it is good if 'best and brightest' do not leave their home country, and few would oppose that. However, if the brain drain is largely absent where it is expected, as the data discussed in Section 4 suggest, what might it tell about the Serbian labour market? If low- and medium-skilled workers are leaving Serbia in proportionally larger numbers, why is this so?

Factors on demand (pull) side are important. There is a composition effect at least, with the rapidly growing NMS destinations in need of medium-VET skills. Gravity also helps, with countries pursuing high-

skill immigration policy being mostly situated faraway in overseas destinations. The distance increases financial and psychological migration costs for potential high-skilled Serbian migrants. Still, since the immigration rules in these 'brain-importing' countries did not change significantly, apparently there have been other reasons slowing down the inflow of Serbian immigrants there soon after 2000?

Some answers were already provided in previous sections, but here we attempt to offer more explicit and coherent arguments. As already mentioned, Serbia has its migrant diaspora spread almost all over

the world, from Alaska to Australia, as the popular song line goes. Thus the question of migrant selectivity – that is, who would leave the country and who wouldn't, as well as the destination selectivity – that is, where will those who leave go, should be better answered by turning to the supply (push) side, which appears to be more interesting and salient for this type of analysis.

The Roy model applied to migration analysis is a particularly useful framework (Roy, 1951). It implies that the selectivity of migrants and their sorting across destinations depends on cross-country differences in the returns to education. Simply put, if a sending country has a lower income inequality, compressed wage distribution and low returns to education (all highly but not deterministically correlated), the emigration rates for high-skilled will be higher than for low-skilled workers, and vice versa. Those high-skilled workers who leave the country will tend to cluster in countries with high returns to skill, while the low-skilled will seek the countries with compressed wage distribution, relatively high minimum wages and more generous welfare benefits.

For a European country, Serbia has a very high income inequality. While its government, since early 2000s collects and spends well over 40% of a country's GDP, for most of that period its Gini coefficient was hovering only slightly below 40 points (Krstić, 2016). In Central European countries with similar levels of government revenue and expenditure, such as Czech Republic, Slovakia and Slovenia, the Gini coefficient has been well below 30 points. Perhaps not coincidentally, these were the three countries that did not experience mass exodus of their population after the EU accession and they were also the first to become net immigration countries among the NMS.

After 2000, comprehensive market and welfare reforms had quickly increased income inequality in Serbia. Far-reaching changes in the system of labour taxation and the reduction in welfare entitlements, part of which were realized at workplaces, directly affected low-wage and younger workers, workers with larger families, those working in labour-intensive sectors and living in poorer regions (Arandarenko and Vukojević, 2008). According to the most comprehensive calculations based on a comprehensive novel methodology developed by researchers from the Paris School of Economics using the World Inequality Database, the share of national income going to the bottom half of the population dropped from approximately 24% in 2000 to only around 15% by 2015 (Blanchet, Chancel, & Gethin, 2020).

As part of the process of transition to a market economy and the described strong pro-inequality policy turn, returns to education significantly increased compared with the 1990s. For example, the World Bank, in 2018, estimated the rate of return to additional year of education at 'healthy' 11.7%[57], while Vuksanović et al. (2018) found that this rate for youth was 9.3%, both results quite high internationally. Decompression of wage distribution was, apart from market forces, facilitated by the regressive reforms in labour taxation that included abolishment of tax-free lump-sum fringe benefits, such as meal allowance and vacation allowance, which for low-wage workers reached up to one-third of job-related earnings by late 1990s. Furthermore, instead of bringing penalty which was the case during 1990s (Jovano-

vnić and Lokshin, 2001) the employment in public sector, comprising much higher proportion of high-skilled workers than the private sector, started bringing a sizeable premium, controlling feducation level and other relevant factors (Vladisavljević, 2019).

Market reforms included the reduction in welfare entitlements. Most importantly, child benefits instead of quasi-universal became means tested, covering only around 25% of all children. In practice that means that a family of four with two children becomes ineligible for child allowance if it has the total income some 20% above the minimum wage or if it owns 2 hectares of agricultural land. The total expenditures on child allowance were reduced from 0.5% at the beginning of 2000s to some 0.3% of GDP by 2010 and remained at about that level by the end of 2010s (CLDS, 2014). Child benefits were limited to three, and later to four children per mother, as part of 'responsible parenting' policy. According to some interpretations (Drezgić, 2008) such an approach was a part of thinly veiled discriminatory population policy, attempting to discourage what was considered 'excess' fertility of certain ethnic minorities such as Albanians, Moslems (Bosniaks) and Roma.

At the lower end of the migration spectrum, temporary migration of the poorest strata of the population in search of welfare benefits as asylum seekers to Western Europe, most notably to Germany, increased by an order of magnitude by 2010 and remained elevated until recently. Diminutive amounts of social assistance and restrictions in access to child benefits have certainly been push factors for the poor, especially Roma from Southern Serbia, to engage in repeated asylum seeking migrations. This is only one aspect of miserable situation of the Roma people, who are almost invariably excluded from access to formal labour market and exposed to various forms of discrimination and general neglect. As a synthetic illustration, the Roma life expectancy shortfall was estimated at 12.4 years compared with general population (Raković, 2015). A recent research on substandard settlements documents the absence of basic services such as electricity, clean running water and sewerage (SIPRU, 2020).

It is less obvious but nonetheless straightforward from Roy's model, that thrifty child benefits in Serbia, if one is able to obtain them at all, compared with most often fully universal and far more generous child benefits in most Western European countries[58], widen the total earnings gap between staying in Serbia and leaving abroad and translate into even greater incentives to emigrate from Serbia with children, not only for Roma, but for much wider groups of low- and medium-skilled migrant workers. Furthermore, targeted child benefits in Serbia act as a deterrent to joining the formal labour force; this undesirable effect would be eliminated if child benefits were fully universal or only affluence-tested.

During the past decade, until recently, the minimum wages were kept at the level of 40-45% of average gross wage, neither low nor high in international comparisons. However, because of regressive labour taxation and excessively high tax wedge at the level of the minimum wage, its net amount was comparatively less, reducing disproportionally the take-home wage of Serbian low-wage workers, while the total labour cost of minimum wage (gross wage plus employer con-

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[57] https://www.worldbank.org/en/publication/human-capital
[58] Benefit amounts in Austria and Germany are around 100 EUR per child, without limits to the number of eligible children.

tributions) was higher, negatively impacting the competitiveness of employers in low-wage firms. This in turn discouraged investment in labour-intensive industries, creating a vicious circle in which relative position of people with lower educational attainment was further worsened because of reduced demand for their services.

What makes manufacturing jobs in countries like Slovakia, Czech, Hungary or Poland, typically paying a monthly wage of below or around EUR 1,000, so attractive to temporary, mostly medium-skilled VET migrants from Serbia? First, the average and median real-wage levels in most NMS increased steadily throughout most of this decade, while in Serbia they remained rather flat throughout the whole period. Second, as a practical example of Roy's model, while skill-adjusted public-sector wages in Serbia are much higher than those in the private sector, the opposite is true in most, if not all, NMS. While the salary of a Slovak teacher might be around 50% higher than that of their counterpart in Serbia, a worker in a Slovak car plant can make around twice as much as a similar worker in Serbia. Furthermore, the labour taxation system in Serbia, when comparing labour tax wedges, is less favourable to low- and medium-wage labour compared with these systems in the NMS.

A recent paper explored the key policy intervention designed to 'repair' the deficiencies of labour demand – generous subsidies for (mostly) foreign direct investment aiming to attract investors to low-wage sectors and low-wage regions by offering relatively generous subsidies per job created, further differentiated by offering more generous subsidies to investors located in less developed regions (Arandarenko, Aleksić and Lončar, 2021). Such policy has contributed to overall sectoral rebalancing of the labour market by increasing the demand for manufacturing jobs. It has also contributed to regional labour market rebalancing, most notably in improving the quality of employment in less developed regions and in stabilizing the shares of regional wage funds. Still, labour market, educational and infrastructure cleavages between regions remain very large.

Serbian migration dynamics in terms of gross flows and distribution of migrants by destination countries neatly fits the simple framework of Roy's model. During the 1990s, absolute wage differentials between Serbia and the rest of the world increased a lot because Serbian GDP and real wages collapsed, causing general increase in emigration flows from Serbia. However, income inequality did not increase much (Blanchet at al. 2021), and wages were further compressed, which affected more the high-skilled workers. This resulted in their higher emigration rates, further confirmed by the disproportional increase in the Serbian immigrant flows to Anglo-Saxon countries, as well as in the emergence of some new minor high-skill faraway destinations, such as United Arab Emirates, Singapore, South Africa etc.

On the supply side of labour migration, Serbia during the Great Recession experienced extremely strong labour market contraction, since the negative impact of prolonged transitional restructuring on employment coincided with the impact of the Great Recession. Between 2009 and 2012, GDP cumulatively fell by around 4%, while employment loss was over 12%. The rapidly increasing migration flows to the EU in 2015–2019 period coincided with employment and GDP growth in Serbia, however, the wages were, due to fiscal consolidation, kept stagnant and wage differentials in relation to the EU further widened.

The largest decrease in real wages was recorded in 2015 and it can be related in the first place to fiscal consolidation measures, but also to changes in Labour Law in 2014 which reduced many monetary and non-monetary rights of employees. One of fiscal consolidation measures was a 10% reduction in salaries in the public sector higher than 25,000 dinars. Given the number of employees in the public sector and the fact that wages in the public sector are higher than in the private sector, the introduction of a kind of solidarity tax has contributed to a real decline in wages of almost 2.5%. Similarly, it was estimated that reduction or abolishment of some monetary rights (such as mandatory seniority premium, shift work premium, annual number of paid days off etc.) had an additional effect of 2-3% reduction in average wage (Arandarenko and Aleksić, 2016). Furthermore, the nominal minimum wage, a very significant anchor in Serbia, was kept unchanged for three years until 2017. Thus, real wages remained depressed until 2017, at the time when they increased throughout Europe, increasing wage differentials and making new destinations, including those in Central and Eastern Europe, more attractive for Serbian workers.

Behind the fairly rapidly improving employment statistics, the problem of low-quality jobs remained throughout the period, especially outside of the public sector. As a share of total employment, informal employment stands at around 18%, and low work intensity and underemployment in various forms are widespread. There is a pronounced duality in the labour market. Large portions of the working-age population are engaged in low-paid and less protected jobs. Access to the more stable jobs in the primary labour market is limited (even more so, since the onset of fiscal consolidation programme in 2015), and long-term career-planning is hampered by the precariousness of jobs in the secondary labour market, those in the latter are eager to switch jobs and a significant proportion of these workers is migration-ready. Thus, the lack of availability of good jobs is a stronger determinant of migration readiness within the Serbian labour force members than the general unemployment rate and individuals' own employment status. While it is true that youth employment has been increasing since 2013, the average quality of youth jobs, both in terms of job security and wages, was not enough to reduce emigration impulses.

The revision of the adopted narrative of enormous emigration of highly educated 'talents' and the shift of focus to the accelerated departure of middle-educated young people are important because they point to the need to explore neglected and insufficiently illuminated sources of frustration of 'ordinary' graduates. These different sources of frustration come from one common source - the lack of intergenerational solidarity at the expense of children and young people. It is manifested in many aspects. Public expenditures on education are very low, and some important groups of poor, especially minority and rural youth do not have a fair chance for a successful start in life. The transition from education to labour market is not sufficiently supported by active labour market policy (Aleksić et al., 2020). Overly flexibilized labour legislation and employment practices direct young people to the secondary labour market and precarious jobs, leading to widespread exploitation of youth and student work. As explained, low wages face high fiscal burden, affecting more young workers. Concerning the pension insurance system, the entire burden of solidarity is shifted to intergenerational solidarity while intra-generational solidarity among retirees and old people hardly exists.

On the other hand, Serbia is emerging as the ICT hub in the region thanks to favourable tax treatment of ICT sector, generous investment and start-up subsidies, high investment in human capital in ICT and higher integration into global values chains. The annual numbers of graduates in ICT are above 2.5 thousand and Serbia has demonstrated to be quite successful at attracting and retaining ICT professionals. Young and highly educated people with university degrees in economics, design, marketing, architecture, and engineering make up the majority of digital workers in Serbia. The contribution of ICT exports is estimated at 2.5% of GDP in 2018 and in 2020 – a pandemic year - the contribution of the sector rose to 5.4 %. In the case of the ICT sector, the linkages between migration and human capital enhancement are well established and can be considered a success sto-

ry. There is a growing community of telemigrants who live in Serbia but work online for foreign clients, and this has become their primary source of income (Arandarenko, 2021).

Against this briefly sketched background, the apparent but publicly largely unrecognized success of Serbia to keep the high-skill emigration in check has its serious downside in the fact that it has been achieved not primarily as a result of a successfully coordinated economic, labour market, social and migration policy, but rather as a side result of a sub-optimal tax and transfer policy configuration that has been highly discriminatory toward low- and medium-skilled labour force members, young people, working poor, large families, people in rural and declining areas, Roma and other vulnerable and underprivileged groups.

8 Migration and Labour Market: Concluding Remarks, Prospects and Challenges Ahead

Serbia's migration balance over the past decade has been clearly negative, but far from catastrophic or excessive as often claimed. If it were not ageing and demographically declining country, Serbia could be assessed as a very efficient and successful exporter of labour. For an emigration country, the share of its citizens living abroad is relatively moderate (around 14% of resident population), while the share of remittances is a sizeable 8% of the country's national income (excluding real estate purchases via foreign accounts which are statistically registered as FDI). This 'remittance intensity ratio' is very favourable globally and is best among the Western Balkan countries. It indicates the dominance of temporary work migration motives among the migrants and their efficient choice of destinations.

From the Eurostat-Europe data on different dimensions of migration flows of Serbian citizens, we have concluded that there was a rapid increase in the gross outflow of emigrants from Serbia, especially in the second half of the past decade. This increase was manifested through two major changes in the structures and spatial distribution of emigrants from Serbia. First, migration for work has become the dominant category of migration flows. Second, this rapid growth of temporary work migrations was most pronounced towards Germany, on the one hand, and towards a larger number of new EU member states on the other - primarily Croatia, Slovakia, Slovenia, Malta, the Czech Republic, Hungary and Poland.

Serbia mostly exports workers, and much less people. The stock of Serbian emigrants in the European Union as the main destination zone was increasing only slowly, while the flows more than doubled in the 2015-2019 period. The flows of Serbs to NMS destinations multiplied, while all, but few destinations in OMS, saw absolute decline in new inflows. Germany has been the most important exception, accepting a third (over 20,000) of all first-time Serbian migrants to the EU in 2019.

By and large, the education level of movers is similar to education level of stayers, which is good news. The downside is that this technical ab-

sence of much-feared brain drain has been achieved as an unintended consequence of institutional configuration that promotes duality in the labour market and works against various vulnerable and under-privileged groups such as low- and medium-skilled workers, young people, working poor, workers with dependents and people in rural and declining areas. Thus, despite encouraging signs and relatively favourable current indicators, controlling and managing migration should be indeed among top government priorities in the decades to come.

Telemigration as a desirable substitute for physical emigration has flourished during the past decade. Telemigrants live in Serbia but work for foreign employers or one-time clients via the internet, often using online platforms like Upwork. Data provided by the Oxford Internet Institute indicate that platform work is absorbing 4.5% of the workforce, mainly in 'creative and multimedia' professions, 'software development and technology' and 'clerical and data entry'. According to rough estimates, in 2018, there were more than 20,000 tele-migrants in Serbia for whom foreign clients were their primary source of income, which placed the country at the top of the world rankings on a per capita basis and 11th in the world for absolute number of free-lancers, with 3.52 freelancers per 1,000 inhabitants.[59]

Among external threats to current unstable and sensitive balance probably the most important would be a more aggressive approach of destination countries, in the first place Germany, to selectively attract high-skilled professionals and young talents, instead of current 'blanket' approach. More generally, Serbia should engage with the European Commission to make sure that the new EU Pact on Migration and Asylum, published in September 2020, lives up to its promise of a comprehensive cooperation with partner countries to help boost mutually beneficial international mobility'.

Even if it manages to devise an optimal migration strategy, Serbia will, in the foreseeable future, remain vulnerable to the various un-

[59] https://analyticshelp.io/blog/global-internet-freelance-market-overview-2018/

desirable effects of being a labour-exporting country. The demand for foreign labour in host countries is procyclical, which means that, in good times, Serbian firms can face pronounced labour shortages across the full skills spectrum, while, in bad times, the country might lose a part of the remittance inflow just when it needs it most.

Still, if Serbia continues to record solid economic growth rates, becomes more successful in creation of good jobs and manages to reduce the wage gap with the EU, one can be reasonably optimistic in the sense that the emigration would not accelerate and become a major bottleneck for the future economic growth and demographic stabilization.

Actually, the emigration has its own 'lifecycle' (Hatton and Williamson 1994)[60], also called 'mobility transition' or 'migration hump'. These theories predict an inverted-U (bell) shape of the relationship between rising average incomes and emigration. Starting from low levels of income, rising incomes and rising rates of emigration go hand in hand. After a certain turning point, further increases in income bring

declining rates of emigration. Clemens (2020)[61] found that on average emigration rises as GDP per capita initially grows in poor countries, slows after roughly US$5,000 at purchasing power parity, and reverses past $10,000. Serbia's current GDP per capita is around US$19,000. However, it is in close proximity to the EU as one of the richest economic powerhouses in the world, and based on the experience of most NMS, it could be hypothesized that the turning point may be reached at the level of US$20-25,000 PPP, which may be achieved within only a couple of years. Again, the experience of Croatia suggests that another spike might come at the time of Serbia joining the EU due to the free movement of workers, institutional shock, however, this prospect is far from imminent. There is enough time, in any case, to devise a comprehensive strategy to cushion the accession emigration blow. While stable and solid rates of economic growth and rising incomes should remain in the center of this strategy, it should also have to include a thorough reform of tax and benefit system, as well as an overhaul in public expenditures, putting people first and thus providing higher levels of social protection and social investment.

9 Annex

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Germany	3297	2,885	5,974	2,589	2,228	1,945	2,599	1,949	2,480	3,120	29,066
Italy	1080	1,103	1,076	1,342	2,066	2,648	2,280	1,721	2,040	2,561	17,917
Switzerland	6859	4,261	3,362	2,529	1,839	1,655	1,582	1,514	1,440	1,421	26,462
France	4517	2,110	1,162	1,327	1,328	938	1,624	1,466	894	1,144	16,510
Sweden	338	793	1,144	965	921	1,172	1,236	1,808	1,273	1,037	10,687
Austria	828	548	709	823	671	633	751	557	625	1,008	7,153
Slovenia	211	169	139	184	155	127	159	153	179	262	1,738
Belgium	164	117	188	234	141	194	184	259	202	242	1,925
Luxembourg	194	81	68	49	79	55	55	97	225	201	1,104
UK	465	523	375	320	180	129	144	120	131	157	2,544
Netherlands	12	4	166	340	212	177	177	172	191	119	1,570
Croatia	225	294	175	159	107	138	734	96	76	111	2,115
Hungary	0	1,678	1,330	647	410	158	144	93	105	88	4,653
Spain	39	59	16	37	54	50	79	44	56	83	517
Bulgaria	62	46	62	44	40	88	90	53	56	71	612
Norway	24	61	75	93	174	179	124	154	85	56	1,025
Malta	8	7	21	18	16	14	38	31	45	53	251
Greece	20	73	46	66	59	42	123	86	59	42	616
Czech Rep.	1	9	9	24	55	69	76	47	30	39	359
Finland	13	26	71	103	65	59	53	60	24	34	508
Slovakia	57	53	55	9	5	8	94	124	42	26	473
Cyprus	16	9	1	10	16	36	19	38	30	23	198
Denmark	2	1	1	5	1	26	74	62	22	11	205
Poland	17	21	14	11	8	13	17	10	14	10	135
Portugal	0	19	11	15	11	6	11	13	8	8	102
Ireland	32	13	72	58	50	21	17	16	17	4	300
Iceland	27	34	27	21	7	15	13	5	2	3	154
Liechtenstein	0	0	2	1	8	1	2	8	2	3	27
Estonia	0	0	0	0	0	0	0	0	0	0	0
Latvia	0		0	0	0	0	0	0	0	0	0
Lithuania	0	0	0	0	0	0	0	0	0	0	0
Total	20,518	14,997	16,351	12,023	10,906	10,596	12,499	10,756	10,353	11,937	130,936

Table A1. Acquisition of citizenship in Europe by Serbian citizens and destination country, 2010-2019

Source: Eurostat

[60] Hatton, T. J. & Williamson, J. G. (1994). What Drove the Mass Migrations from Europe in the Late Nineteenth Century? Population and Development Review 20(3), 1-27.
[61] Clemens, M.A., 2020. The emigration life cycle: How development shapes emigration from poor countries. IZA discussion paper, Bonn.

Education and Depopulation

Dragica Pavlović Babić

1 Why Does Education Matter?

Education is the principal tool of building human capabilities, finding remunerative employment, and acquiring the competences necessary for developing individuals and societies; three objectives that are not automatically achieved once an education system is in place. Education as a public service is organized for the full coverage of children and youth, with the aim to equip them with competencies needed for a socially and economically satisfying life. Therefore, education systems and changes in the society, such as demographic changes, are interacting in complex ways: education systems have to adapt to demographic changes (passively or proactively, creatively) but can also influence them (compensate, prevent, direct or reverse trends).

The number of new-born children in Serbia has decreased from 78,101 in 2002 to 64,399 in 2019. This is almost 18% fewer new-borns in just two decades. The student cohort in primary and lower secondary school decreased by 29% from 2002. Cohorts in higher education enrollment are also declining. These trends certainly require that the school system consolidates to adjust to smaller cohorts and reduces spending in order to ensure a better targeted use of public resources. However, that is far from all – at the same time it has to enable a profound increase in human capital development, create higher competencies and higher professionalism of the teaching force. An aging population requires more and better suited possibilities for lifelong learning in order to maintain its productivity in new working contexts – a requirement the education system has to respond to with adjusting its provisions. The effectiveness of fertility increasing measures can directly depend on the scope, distribution and quality of the early education system. The decreasing share of productive population requires a new look on the education chances of each and every child, better intake and catering of vulnerable groups, and elimination of attrition, dropout, exclusion, segregation and all other barriers to the development of each child's maximum potentials.

The unfavorable demographic trends are projected to continue into the future, and create particular challenges that have a range of implications on the education system. Continued development of Serbia's human capital, in the face of ongoing demographic decline, will require many new fine-tuned policies. In this chapter we discuss the status, scope and effectiveness of these emergent policies. Firstly we address the most apparent ways the school system in Serbia adjusts to the decline of student population by consolidating infrastructure and staff. Thereafter we look into several education policy areas particularly important for developing human capital in the context of depopulation, the overall performance of the education system regarding learning outcomes, the way the education system responds to the increased needs of an aging population, the way it utilizes the benefits of early education, and the scope it includes all vulnerable groups. In all these areas we highlight the need for serious improvement. Subsequently, we address the availability and status of key resources needed for effective education change – the teaching force, digitalization and conducive finances. Finally, we outline additional challenges that the education system needs to overcome in order to increase its attractiveness and trustworthiness, and conclude with a set of broad recommendations.

2 Adjusting the EducationSystem to Demographic Decline?

In this chapter, we are addressing the two most often cited and most visible areas in which education systems can and should adjust to demographic changes: *infrastructure* (number of classes and schools) and *staffing*. In both areas, appropriate adjustments create considerable savings that can be reallocated to other, developmentally important areas. Failing to embrace these changes increases inefficiencies in the education system, and withholds necessary impetus for change at the levels of quality, equity and relevance, etc. This, in turn, affects the availability and quality of human resources in the country and general wellbeing of the population.

The demographic changes in Serbia are not fully mitigated by consolidation of school infrastructure and staff. The student decline in Serin Serbia, by around 10,000 per year, has been an acknowledged concern for more than a decade. Decreasing numbers of students are most often alleviated by infrastructure and staffing reductions – an uneasy measure that regularly creates disputes and tensions. Examples can be found in The Netherlands, Germany, Saxony, and in the US, North New England (Haartsen and Wissen, 2012; Christiaanse, 2020; Steinführer, Küpper & Tautz, 2014; NEEPPC, 2020).

This was also the case in Serbia, therefore, as a compromise, optimization focused on towns and cities, and on consolidating *the number and size of classes* in primary schools, while the number of schools and staff remained less affected. In primary education, the number of classes was reduced starting from 2009/2010 when a new regulation on max-
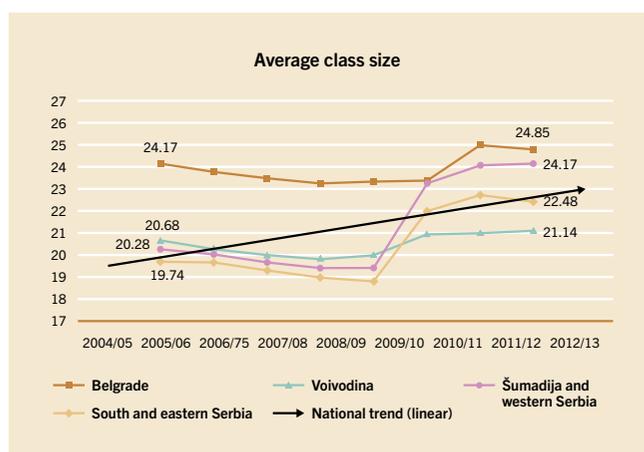
Figure 1. The effect of the new 2009/10 regulation on primary school class size in Serbia

Source: Babin i Lažetić, 2016: 7

Figure 2. Number of students and number of classes, primary schools in Serbia, 2000/01 to 2020/21

Source: Ministry of Education, Science and Technological Development

imal and minimal class size was issued.[62] Consequently, in the last 10 or more years, the number of classes is in synchronicity with the number of students. Figure 1 shows the increase in class size after 2009/10, while Figure 2 depicts how the number of students and classes converged from that point on, and the convergence has been kept since.

The *number of primary school units* (so called branch-schools) was also somewhat reduced, for example, from 3,350 in 2017/18 to 3,243 in 2020/21. However, the distribution of school units is still unclear – 1,918 school units (around 60% of school units) cater only to 4.99% of students (50 or less students each), while 2.52% or 82 school units with more than 1,000 students educate 19.57% of students. Regional

differences play out with an average of 96 students per unit in eastern and southern Serbia, and 109 in Šumadija and western Serbia, while the average in Belgrade is 453 students per school unit. The establishment and implementation of the network of schools requires cooperation between local and national government, which can engage additional time and, consequently, slow down the pace of optimization of school infrastructure. For example, by end of 2019, 35% of LSGs had not adopted such a law[63], and, in December 2021[64], discussions were still ongoing.

The *rural small school units* are prevalently scattered across mountainous areas of Serbia. These areas have underdeveloped roads and
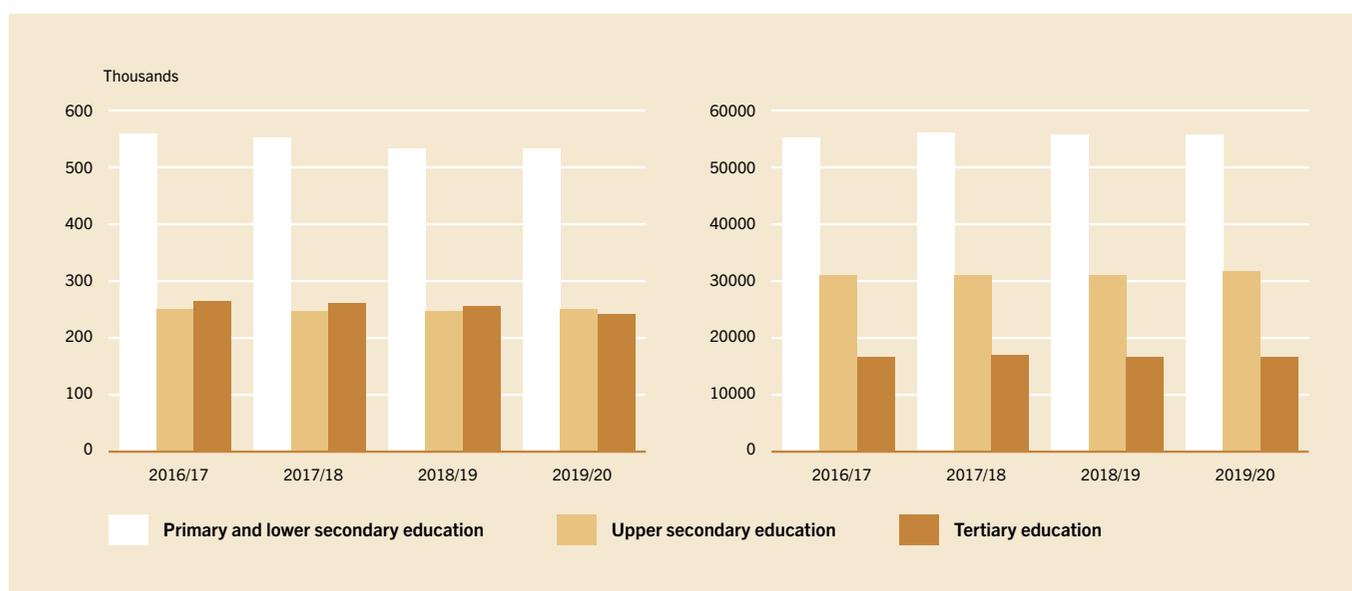
Figure 3. Number of students (left) versus number of all teaching staff (right) 2016-2020

Source: Statistical Yearbook 2021, Statistical Office of Serbia

[62] MoESTD (2009, 2010), Expert Instruction on Class Formation and Method of Financing in Primary and Secondary Schools, no. 401-00-481/1/2009-08.

[63] MoESTD 2020. Report on the implementation of SROS in the period 2019-2020.

[64] see http://www.skgo.org/vesti/detaljno/2837/odrzano-savetovanje-o-optimizaciji-i-racionalizaciji-mreza-osnovnih-skola

transportation means, so school buses are not always an easily available option. Strategic development of the road infrastructure, that uses innovative examples from other mountainous countries, such as, e.g. Austria, where the network of small freight roads (so called Guterweg) is developed in co-financing between private and public funds, should be a viable option that supports not only rural education but rural life and economy as well. Furthermore, other more sophisticated and flexible solutions should be sought that take into account pedagogical soundness, student wellbeing and community needs in parallel with economic and infrastructure arguments. Experiences from Nordic countries could be used to design digital options for rural children to participate in classwork with children from schools in towns in order to ensure high quality education; a flexible combination of occasional trips to a central school and vice versa could ensure both education and socialization outcomes; networking between rural schools could ease the burden isolated units can face; strategic rural development and tourism could enrich the work of the small school with additional activities of a community center, adult education facility, cultural meeting point, etc.

As already mentioned, the consolidation and decrease in *teaching staff* due to the declining student body is modest and, over the 2017/18 - 2019/20 period, amounts to 400-700 per year, counting all teachers working in primary schools. The decrease is more discernible for teachers on full time employment, where the yearly decline is around 1,000 of them, which is roughly half of the number retiring yearly. Figure 3 displays the trends regarding all teachers.

In *secondary education*, many aspects of the aforementioned trends are less visible and the trend has inconstant changes – the number of students also fluctuates, e.g. in 2018/19 their number increased by almost 4,000, followed by an increase of 250 in the teaching staff. A

Number of students and classrooms in secondary schools per school year
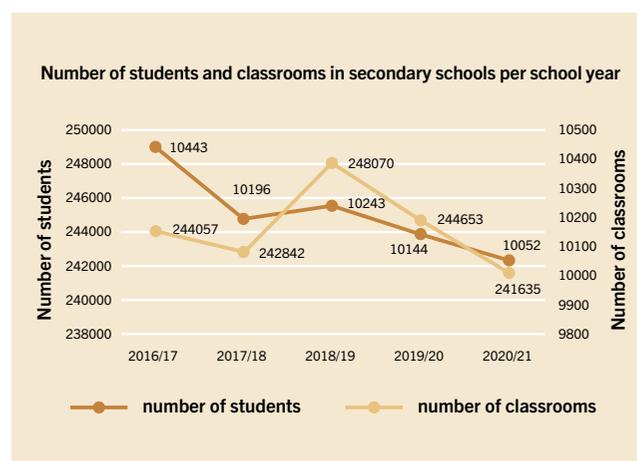
Figure 4. Number of students and number of classes, secondary schools in Serbia, 2016/17-2020/21

Source: Ministry of Education, Science and Technological Development

more stable decline is discernible only during 2019/20 and 2020/21 (Figure 4).

The demographic decline of the school-aged population is going to continue well beyond the next decade with different slopes in different areas of Serbia (Nikitović, this volume). Therefore, the education system needs to develop more flexible and sustainable mechanisms to adjust to the changes. One-off mechanisms (as the regulation of class sizes in 2008/09) will not solve the problems. International experience shows that a higher level of local autonomy and decentralization can contribute to finding the best local solutions, with creative collaboration with the national authorities.

3 Developing Human Capital in the Context of Depopulation

In countries that face a declining and aging population, concern for productivity and human capital calls for the prioritization of quality education. In such a context, demands for higher competencies and more relevant learning outcomes of students intensify. Therefore, enlarged capacities for preschool and adult education, and higher professionalism of the teaching force become education policy priorities. In this section we discuss several areas where the education system in Serbia did not fully utilize its potentials to develop human capital.

3.1 Current indicators show underperformance of the Serbian education system

Serbia relies on two sources of data on education quality: international assessments and national evaluations[65]. According to international indicators, the education system is underperforming and inadequately equipping young generations with the competencies they need for a successful professional life and constructive participation in the community, particularly in comparison with EU and the OECD countries.

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[65] Indicators of external evaluation of schools conducted by the Institute for the Evaluation of the Quality of Education.
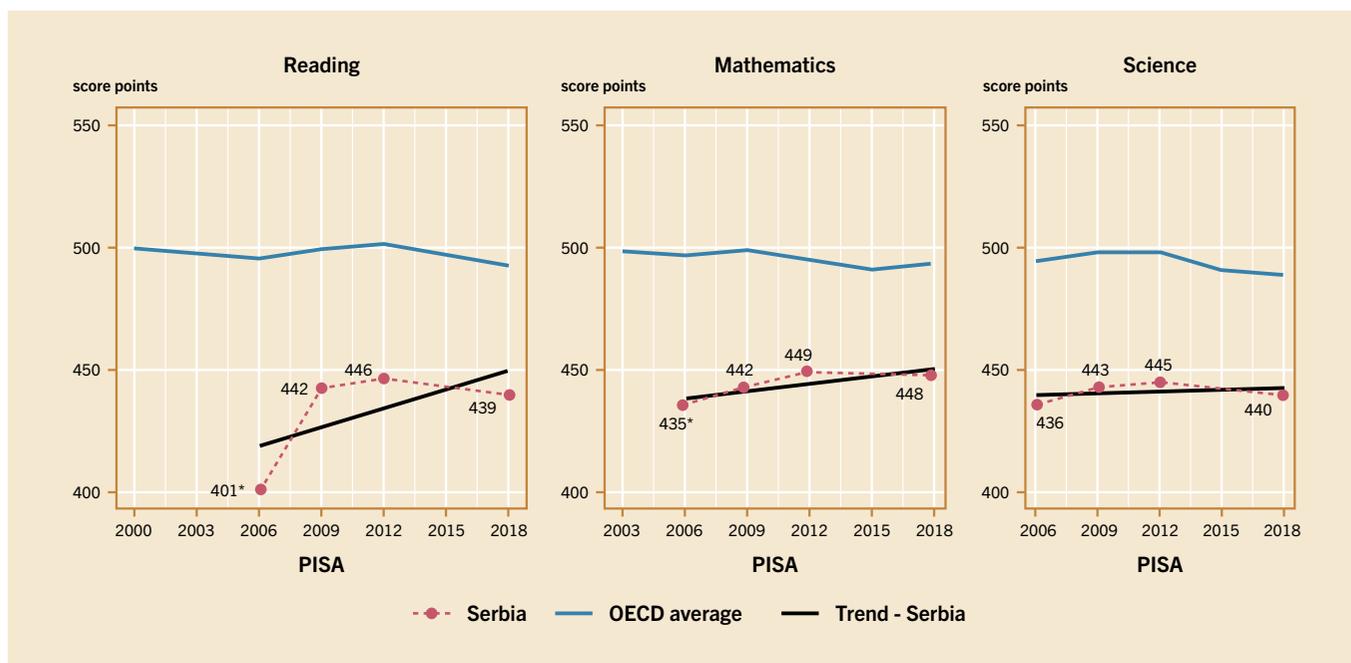
Figure 5. Average achievement and trends in achievement in three domains of OECD/PISA study

Notes: The asterisk indicates mean performance estimates that are statistically significantly above or below PISA 2018 estimates for Serbia. The blue line indicates the average mean performance across OECD countries with valid data in all PISA assessments. The red dotted line indicates mean performance in Serbia. The black line represents a trend line for Serbia (line of best fit).
Source: OECD, PISA 2018 Database, Tables I. B1.10, I. B1.11 and I. B1.12. 2003-2018

Since 2001, Serbia has been participating in IEA/TIMSS (grade 4, starting from 2011) and OECD/PISA (15 years of age) studies. During this period, the education context was characterized by content-based curricula and traditional teaching and grading methods which placed students in a passive position of written reproduction of poorly integrated facts. International assessment studies revealed that achievements were disappointingly low and statistically below the international average in all examined areas, with a high percentage of students below the level of functional literacy and a very small percentage of them on the highest proficiency levels (Pavlović Babić, 2020). The international assessment studies (PISA 2003, 2006, 2009, 2012, 2018; TIMSS 2003, 2007) consistently show that the achievements of students from Serbia have been below the international average (Figure 5) by about one and a half years of schooling in OECD countries[66], which is true across all tested areas. During this period only one increase has been noticed in reading, between 2006 and 2009.

A closer look at the distribution of achievements by levels (Figure 6) shows that the achievements of students from Serbia are concentrated at the levels of reproductive knowledge (levels 1a and 2), and national average achievement is also at level 2. At the same time, the share of students educated for achievement at higher levels (5 and 6) is below the OECD average. Reproduction is the level at which demands are placed on students, reproduction is the level at which the education system, as a whole, functions. For almost two dec-

ades, since Serbia has been participating in international assessment studies, this average level of achievement has not changed. In other words, whatever measures have been implemented across the system, they have not had a positive impact on student achievements.

This finding does not fully apply to student achievements at the end of the first cycle of education (TIMSS 2011, 2015, 2019)[67], which is at
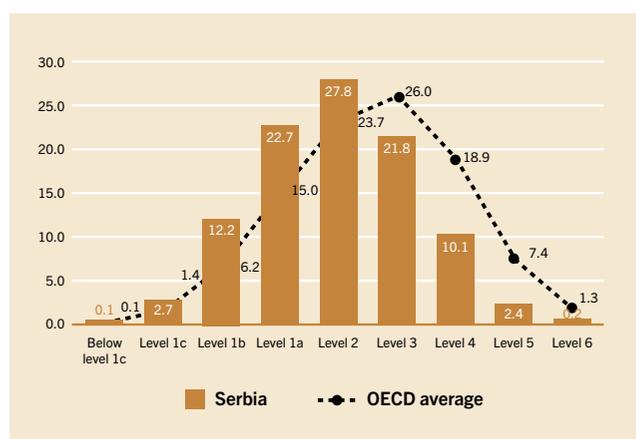
Figure 6. OECD/PISA 2018 Distribution of students by levels of achievements, comparing Serbia and OECD (Reading literacy)

Source: Pavlović Babić, Avramović, 2021: 12

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[66] I.e. half of the standard deviation.

[67] There is a slight, but statistically significant decline in achievement in the last and more recent cycle.
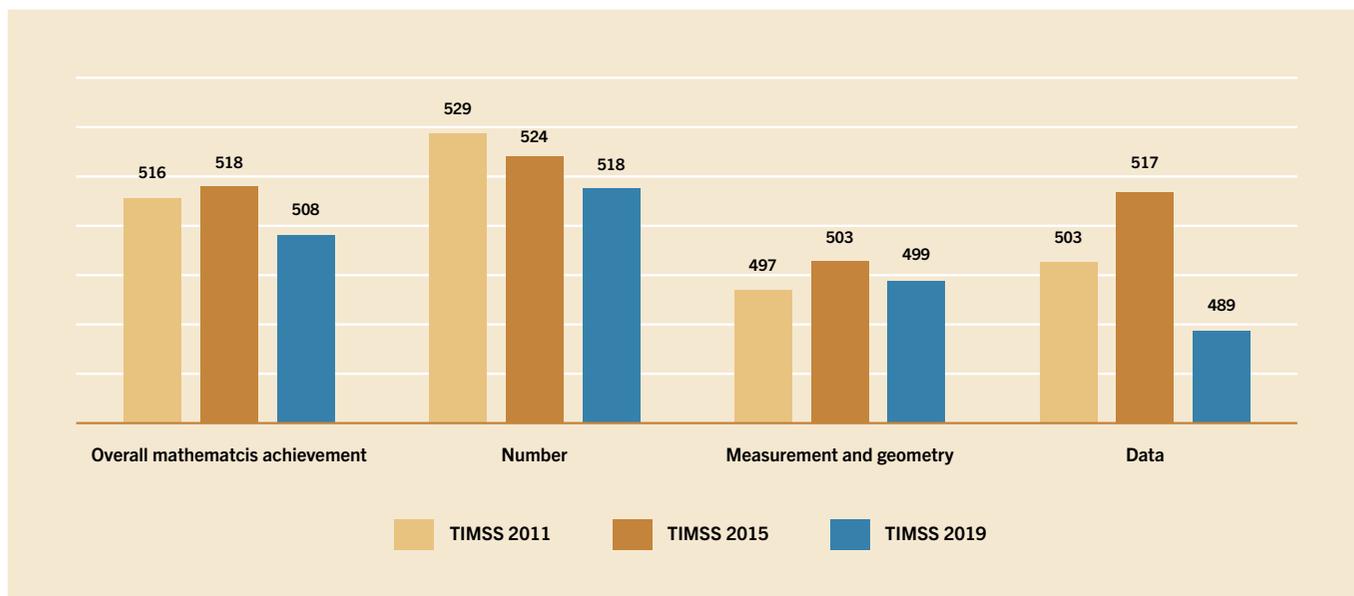
Figure 7. TIMSS Distribution of students in Serbia by levels of achievements; Trend analysis 2011, 2015, 2019: Mathematics

Source: ZVKOV, 2020.

the level of the international average (500) or slightly higher than that (Figure 7) (Đerić et al., 2020). The gap in the quality of education between the first and subsequent cycles in pre-university education is vast. It indicates a discrepancy in the quality of teacher initial education. Teachers teaching in the first educational cycle are educated at pedagogical faculties, while teachers teaching in the second and third cycle are typically educated as subject experts, with a very small share of psychological, pedagogical and methodological knowledge.

Problems with the quality of teaching and learning are detected through the external evaluation of schools, as well. This evaluation is organized in yearly cycles by the Institute for the Evaluation of the Quality of Education, and includes assessment of 30 areas of standards and 158 indicators. The evaluations conducted so far show that standards in the area of Teaching and Learning are not reached by half or more schools (Figure 8) (IEQU, 2020). Overview data summarizing the first six-year cycle[68] shows that all standards and all indicators in relation to them are, more or less, in
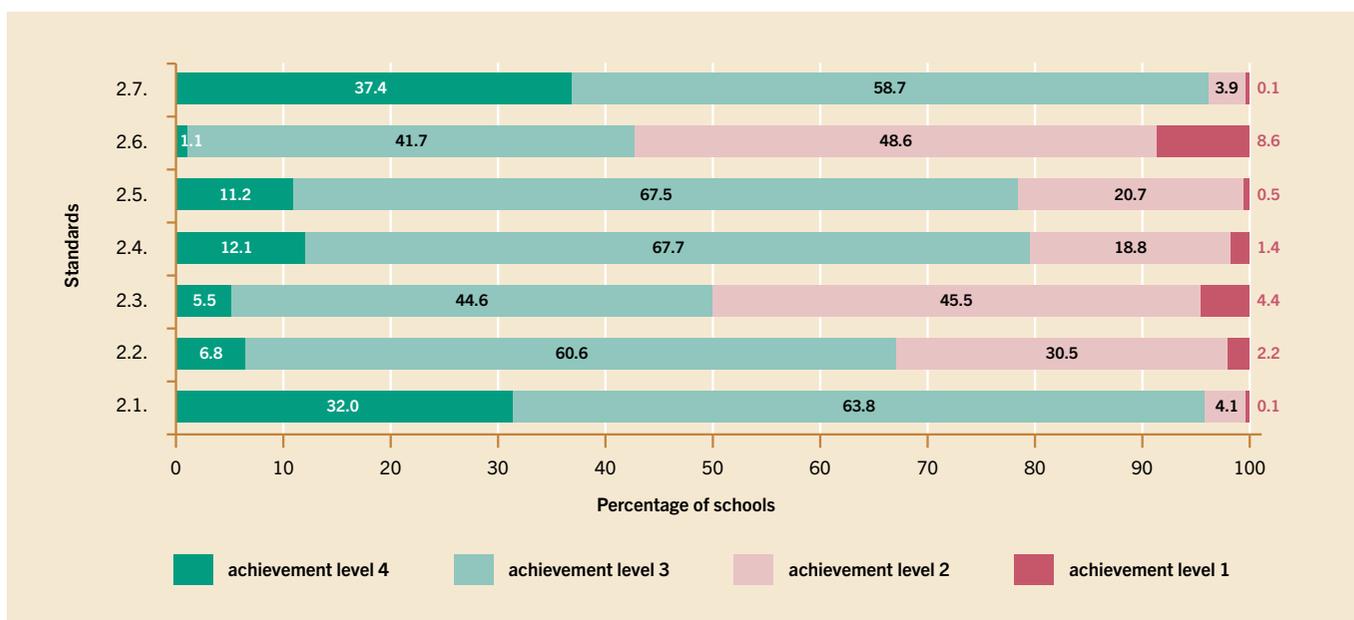
Figure 8. Achievement of the standards on teaching and learning

Source: ZVKOV, 2020.

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[68] In which external evaluation was done between 2012 and 2018.

the zone of good and positive results (green zone). The only one that dramatically deviates is the achievement of standards relating to the quality of teaching and learning;. over 50% schools failed to reach standard (2.6.): The teacher uses evaluation procedures that are in the function of further learning, is not achieved by more than 50% of schools. Also, around 50% of schools did not reach the standard (2.3.): The teacher adjusts the work in the class to the educational needs of the students (IEQU, 2020).

If we intend to mitigate the consequences of depopulation and compensate for human capital losses, discussion about educational outcomes and elements of quality of the education system needs to be at the top of policy priorities. Infrastructure and financing are supporting pillars, however, the system should also aim to avoid compromising between efficiency and quality. Evidence collected so far gives us a good idea in which areas we need to prioritize interventions. Those are, undoubtedly, the quality of teaching and teachers, relevance of our curriculum, and alleviating underachievement at all levels through comprehensive support to students. In the next section we shall be discussing the possible policy options which ought to be explored further.

3.2 How can the education system compensate for the losses incurred by demographic changes?

In this chapter we discuss the neglected education opportunities of key target groups: the growing body of adults, young children at the age when education has the highest return, students from a low socio-economic background, vulnerable groups hitherto partially excluded from education, and children living in remote rural areas that are increasingly depopulated. We analyse current trends, highlight missing links, and suggest policies and measures that have the potential for major impact and positive change.

3.3 Preschool education brings wide-ranging social and economic benefits for individuals and for society

Early years are a period of intensive neuro-psychological development of a child. Developmental delays before the age of six are difficult to compensate for later in life because early childhood is a particularly sensitive period for brain formation (Naudeau et al., 2011). Children who participated in high-quality early childhood education and care (ECEC) were better prepared for school and tended to have higher achievement at school in maths, reading and had better memory (Eurydice, 2009; Ivić & Pešikan, 2009, Havnes & Mogstad, 2009). There is a specific span of time, when the development of certain types of abilities develop particularly fast (Cook & Cook, 2009), e.g. language and

cognitive development are especially important during the first six months to three years of life and continues later in preschool settings (WHO, 2009). So, deriving from all these facts, there is a broad consensus that investing in the earliest phase of education brings the greatest economic and social returns over the lifecycle, particularly in the case of disadvantaged children. It helps to avoid later, more expensive and often less effective remedial actions (Heckman, 2015).

Expanding the access to preschool education has been a stable policy priority in Serbia from the early 2000s, the effects of which have started to yield results recently, but numbers are still far from expectations. The coverage of children in preschool education is increasing over time in all age groups, but is far from the Education and Training 2020[69] (ET 2020) or 2030 benchmark. The coverage of children from 6 months to age 3 increases to 28.1% in 2019 (Figure 9). The coverage of children from age 3 to 5.5 by preschool education also increases (Figure 10). In 2019, it was 66.4%. At the same time, the participation rate in early childhood education and care (ECEC) at EU level in 2019, for pupils from age 4 to the age of starting compulsory education at primary level was 95.7%.[70] Despite the continuous increase in the participation rate, the coverage is still far below many comparators. It is also below the target values of the 2020 Strategy for Education Development in Serbia (coverage between the ages of 4 and 6 should be doubled and full coverage by the preschool programme achieved), and EU benchmark (96% of children above age 4), and especially the new ET 2030 benchmark of 96% of 3-year-olds being included in organized early education and care programs (Eurydice, 2019; EC, 2021).

Equity remains a significant concern, as will be discussed in the next sections. Only 10.5% of children from the poorest quintile and 7% from the Roma population are enrolled in educational institutions.[71]

Preschools are open to enrolment for all children, but this applies in cases where there is sufficient accommodation capacity. If there is competition and selection, the application of this principle is not always consistent. There are major differences between the preschool institutions in terms of the share of children enrolled by priority, which may indicate that some pre-schools do not perform enrolment procedures respecting the right to priority enrolment.[72] In addition, some children in need
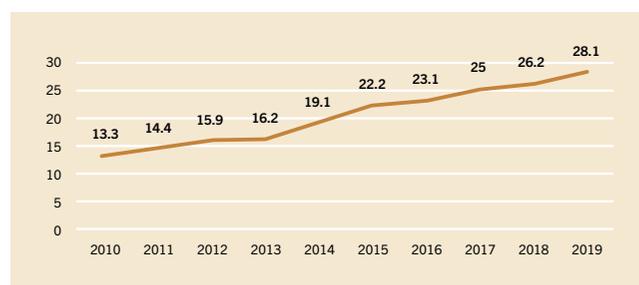
Figure 9. Preschool coverage of children from from 0 months tgo 3 years, from 2010 to 2019 (in %)

Source: SORS, DevInfo

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[69] Education and Training 2020 (ET 2020) is the strategic framework for European cooperation in education and training, the new Strategic Framework 2030 is the successor of the ET 2020 framework.

[70] Eurostat. Source: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_uoe_enra10&lang=en

[71] Public-Private Partnerships for Equitable Preschool Education in Serbia (2020).

[72] Educational Research Association of Serbia. (2020). Evaluation of preschool inclusiveness in Serbia (unpublished report).

Figure 10. Preschool coverage of children aged 3 - 5.5 years from 2010 to 2019

Source: SORS, DevInfo

of additional support remain unenrolled because the preschool cannot provide adequate support (such as a personal companion).

The Preparatory Preschool Programme was introduced as early on as 2006, as a mandatory, free of charge, 9-month-long, 4-hour daily programme for all children between the ages of 5.5-6.5. Even though available capacities are sufficient for full coverage, given that this program takes place in both preschools and primary schools, the current coverage rate is 96.4% (Figure 11). The target value of 100%, set by the 2020 Strategy for the Development of Education in Serbia, has not been reached so far. Those missing to full coverage are mainly children from vulnerable groups – Roma and lower SES families (MICS, 2019: 27).[73]

Although capacities in preschool education are gradually increasing, the existing capacities of public and private preschool institutions are not sufficient to meet requirements. In addition, the network of preschool institutions is not well-developed (Table 1). The lack of capacity is particularly pronounced in large urban areas, but also in rural and mountain areas where the nearest facilities are very far from the villages. In 2019, there were 5.2% more children included in preschool institutions over the optimal capacities. In addition, a significant number of children were waiting for their opportunity to enroll. In 2019, 6,740 children were on a so-called waiting list which amounts to 3.07% of current capacity.

Figure 11. Coverage of children by compulsory preparatory preschool programme 2010 - 2020 (in %).

Source: DevInfo

	Total	Urban area	Other
Number of enrolled children	224,563	182,640	41,923
Children enrolled over capacity	11,680	10,371	1,309
Children who were not enrolled due to overcrowding	6,902	6,454	448

Table 1. Preschool education capacity in 2019

Source: SORS (2019)

The coverage rate is the highest in the most developed municipalities and the biggest cities (Group 1 municipalities[74]). In these localities, the majority of children are enrolled in public preschool institutions. These municipalities have the highest and constantly growing number of private preschool institutions. Still, overcrowding has led to the longest waiting time and a large number of children not being enrolled. This almost never occurs in least developed areas (groups 4 and 5) where private preschool institutions are rare, while public capacities seem to be sufficient to meet the needs of families living in the vicinity of institutions. Here, the main obstacle is the availability of the preschool institutions to children living in remote, mostly rural areas.

3.3.1 Full inclusion of vulnerable groups in education

Despite anti-discriminatory legislation in education and equity-oriented policies, the education system in Serbia is not really equitable. Even with all the reform initiatives and developmental projects, several groups of children and youth are being left undereducated or even without any education whatsoever. Among them are children from lower SES and Roma families and students with disabilities.

Socio-economic status spurs differences regarding education attendance and attainment from early childhood onwards. The Multiple Indicator Cluster Survey (MICS), conducted by UNICEF, detects a huge difference in enrolment to early education programmes between the richest and poorest families (Figure 12).

The 69% gap in ECE attendance between the richest and poorest quintile is additionally exacerbating the situation of children in poverty, among whom only 48% have at least 3 books at home, compared to 90% among the richest quintile. Children from the poorest quintile are also less frequently involved in the compulsory preschool program 1 year before starting primary school (83% compared to 100% in the richest quintile) (UNICEF, 2020).

At enrolment to primary education the gap between children from the poorest and richest SES quintile decreases to only 1%, as primary

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[73] see https://www.unicef.org/serbia/media/16301/file/Serbia%20(National%20and%20Roma%20Settlements)%202019%20MICS%20Statistical%20Snapshots_English.pdf

[74] Group 1 is made up of municipalities in which the per capita GDP is above state average; group 4 is made up of the poorest municipalities where the GDP per capita is less than 60% of state average; and group 5 are devastated areas from the 4th group with less than 50% of the state average.

Percentage of children aged 3-4 years attending an early childhood education programme, by background characteristics

Figure 12. Attendance in early childhood education (ECE) in Serbia, 2019

Source: MICS 6 Rezime, 2019

education is compulsory, while in secondary education it reappears again, where 79% of the poorest versus 98% of the richest attend.

Economically better advantaged students outperformed the disadvantaged ones in reading by 73 score points in PISA 2018. Although this difference is somewhat smaller than the average difference between the two groups (89 score points) across OECD countries, it indicates a huge loss of human capital for Serbia – students from low SES families lag behind those from the highest SES quintile by almost 2 years of educational proficiency. Compared to PISA 2009, when the performance gap in Serbia related to socio- economic status was 66 score points, the gap only widened in the period between 2009 and 2018.

The impact of poverty on education outcomes profoundly enforces the circle of poverty and has lasting detrimental effects on the level of human resources in Serbia. Lower SES students will often drop out of school or choose easy to access, but low quality vocational education and training (VET) qualifications not leading to decent employability. Children in families where the head of the family has no secondary education have a 4.5 times higher chance of falling below the poverty line (Čekić Marković et al. 2021). Many students, especially disadvantaged students, hold lower ambitions than would be expected given their academic achievement. In Serbia, one in eight high-achieving disadvantaged students – but 1 in 50 high-achieving advantaged students – do not expect to complete tertiary education (OECD, 2019). This puts Serbia in danger of having a high percentage of low skilled or uneducated people who cannot contribute to economic development or satisfy their own living needs, and ensure a decent life for their families. In the search for job opportunities, they might also migrate to countries that are lacking in a lower skilled work force (Arandarenko, this volume). Although students from low SES families can be partially jeopardized in other countries as well, Serbia cannot afford to lose the human capital of these young people. Other countries can mitigate the loss through increasing immigration; in Serbia, that mechanism is not a realistic option.

The Roma population in Serbia, as in most European countries, is the youngest population and represents a demographic asset. The average age of the Roma in Serbia is 28.3 years, and it is estimated that over 50% of Roma are under the age of 25, thus creating a higher percentage of Roma in the school aged population than in the adult population (SIPRU, 2021). Informal assessments state that the school age cohort of Roma children could increase to 5,000-10,000 per cohort (FOD, 2010).[75] Therefore, a high quality of education and the development of competencies of Roma students should be seen as a priority and competent, well-educated young Roma as a comparative advantage and the country's cherished asset.

However, although serious education boosting activities have resulted in positive changes in the education trajectory of the Roma (Figure 13), the majority of this population is still undereducated.

These numbers correspond with population census data from 2011, which revealed 33.3% of Roma with completed primary school, 11.4%

Education level of Roma above 15 years
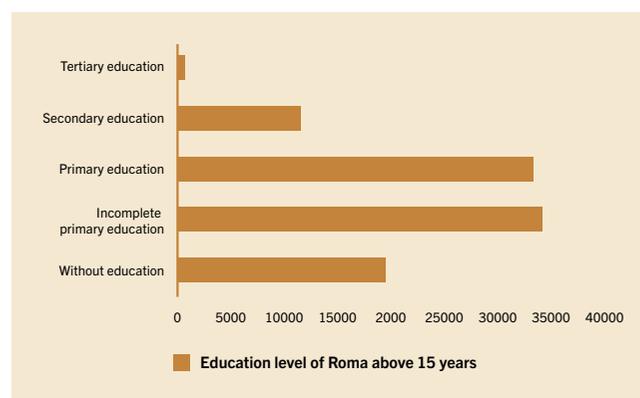
Figure 13. Education attainment of Roma in 116 municipalities in 2020 (absolute numbers)

Source: Overview of data of cities and municipalities on measures of social inclusion of Roma in 2020. (SIPRU)

[75] In Serbia, the overall cohort at school age is estimated to number around 66,00 children.

Early Childhood Education (36-59 months): 7
Participation in organized learning 1 year prior to primary school entry age: 76
Primary education: 92
Secondary education: 28

Percentages
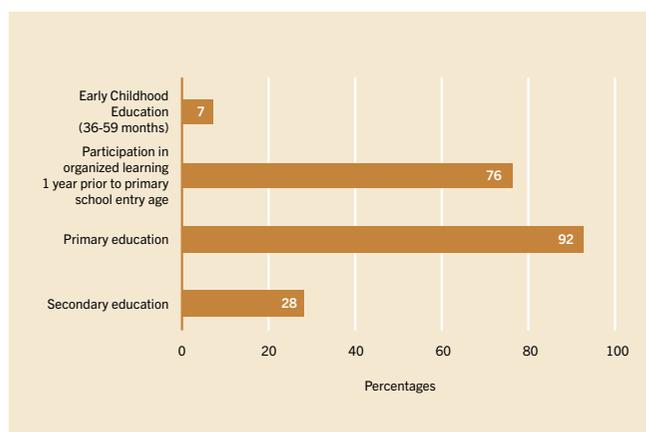
Figure 14. School net attendance rate, Roma settlements, 2019 (in %)

Source: MICS 6 Rezime, 2019

with a secondary school degree, and 1% with a high education degree. Current education indicators of Roma children and youth imply that the education system in Serbia is still not on the right track and is not integrating all Roma students (Figure 14). Roma students living in Roma settlements are in a worse position; their attendance rate is somewhat lower than for the majority population, even at the compulsory education levels, such as primary school and the preparatory preschool programme, while their attendance rate for the non-compulsory but still essential education levels (ECE and secondary education) is far below the rate in the mainstream/basic population.

Serbia has a well-developed set of policy measures regarding the integration of Roma students in mainstream/regular education. Integration policies in Serbia include the Decade of Roma Inclusion 2005-2015, the EU Strategy for Roma Integration (European Commission, 2020),[76] the work of the Roma Education Fund as of 2005[77], and two national Strategies for the social inclusion of Roma (2009-2015 and 2016-2025).

As a result of these efforts, the education indicators of Roma have increased, and numerous Roma professionals are being employed in schools and preschool institutions (e.g. 175 Roma pedagogical assistants); changing the school ethos and the school-parent communication wherever they were active, and making desegregation measures more effective (Daiute & Kovač Cerović, 2017; Kovač Cerović & Orlandić, 2016). The Government's report on the achievements of Roma integration measures is quite favourable. Nevertheless, the implementation of national level measures is often stalled, illustrating the system-wide neglect toward the Roma population.

A recent policy mapping detected additionally disturbing findings indicating that, despite the great need to integrate the Roma population into education, local level support to Roma students provided by LSGs are scarce (SIPRU, 2020b). For example, among the 116 LSGs

School year	No. of scholarships	School achievement criteria	% of girls
2015/2016	176	Excellent grade average	65%
2016/2017	150	Excellent grade average	60%
2017/2018	303	Excellent and very good grade average	63%
2018/2019	547	Excellent and very good grade average	60%
2019/2020	704	Above passing average (2.0 and more and at least grade 3 in behavior)	
Total	**1880**		

Table 2. Number of scholarships for Roma students, 2015/2016 to 2019/2020

Source: MPNTR

that contributed to the mapping (out of a total of 174), only

• 9 provided scholarships for secondary education students, and 6 for higher education students,

Around half of the analysed municipalities provided funding for primary school Roma students' transportation costs (69 LSGs) and for Roma students' school meals (54 LSGs).

The number of scholarships for Roma secondary education students from the RS Budget has increased in the last five years, owing to enrolment criteria which is being increasingly adjusted, but the actual numbers still cover only a fraction of the Roma cohort.

The major source of scholarships for Roma higher education students is the Roma Education Fund and the Roma Memorial University Scholarship Programme (RMUSP) - in 2019 alone 62 students from Serbia received the RMUSP scholarship, and 5 more received other international scholarships.[78]

Nevertheless, all these measures are far from covering the needs of Roma children and students and assisting their education to completion of the secondary or higher level. Therefore, Serbia is losing enormous human capital, and unless the integration policies are implemented with much greater care, this trend will not only continue but increase.

[76] The first EU strategic framework for Roma integration was adopted in 2011. A new strategic framework until 2030 was adopted in 2020. European Commission (2020), "Recommendation of the Council on Roma equality, inclusion and participation", Brussels 2020.

[77] Serbia was among the first of the Roma Education Fund /REF/ supported countries to have a detailed policy and situation analysis and developed framework of REF action, see: "Advancing the education of Roma in Serbia", 2007 https://www.romaeducationfund.org/publications/studies-policy-documents/country-assessments/

[78] See: https://www.romaeducationfund.org/scholarship-beneficiaries/
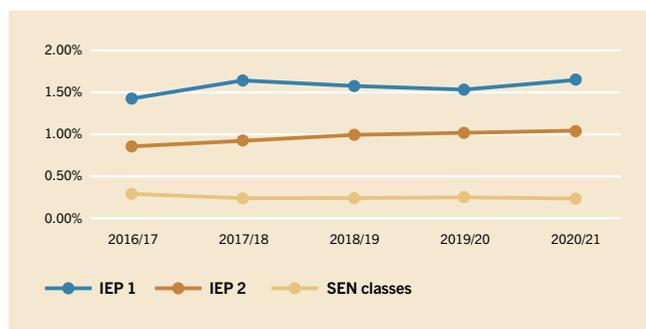
Figure 15. Trend in the share of students who need additional support in regular primary education

Source: Ministry of Education

Figure 16. Trend of the share of students needing additional support in regular secondary education

Source: Ministry of Education

3.3.2 Incomplete integration of students with disabilities and learning difficulties

The traditional orientation of educating children with disabilities and learning difficulties in special schools has left these people cut off from the community, without employment, and without the capacity for independent life. Such traditional policies burden the budget for social assistance/payments, do not respect human rights (and the rights of the child), diminish the development of human capital, and prevent the possibility of social integration and the capacity of the majority population to develop a positive attitude and acceptance of people with disabilities and learning difficulties. Therefore, even if we are referring to a small percentage of the population (2-8% according to different criteria), their integration through inclusive education and the development of their capacities to their maximum are important goals in the context of depopulation.

The aforementioned traditional orientation started to change throughout Serbia after 2009. Individual education plans (IEP) were introduced and children with disabilities and learning difficulties were integrated in regular schools. While the inclusive education policies and their implementation gave rise to public interest and debates, the inclusion policies had certain effects. Their impact, however, is still far from the required level (see figures 15 and 16). From the 2.5-3% of students who have been identified as needing additional support for their education in regular primary schools, most of them are educated according to IEP1, where changes in teaching approach have been prescribed, but not major curricular reductions, too. The trend of using IEP1 is on a mild increase in the years/ages observed, which indicates more sensitivity towards students with learning difficulties.

There is still a small share of students enrolled in regular primary schools that are educated in separate classes for children with disabilities and learning difficulties only. However, that trend is declining, and is coupled with a slight increase of children with IEP2 (major curricular changes) in regular classes. All three of these trends indicate a growing capacity of primary schools for non-restrictive inclusion of children needing additional support(Figure 15).

The share of students who need additional support for their education is much smaller in secondary than in primary education. This
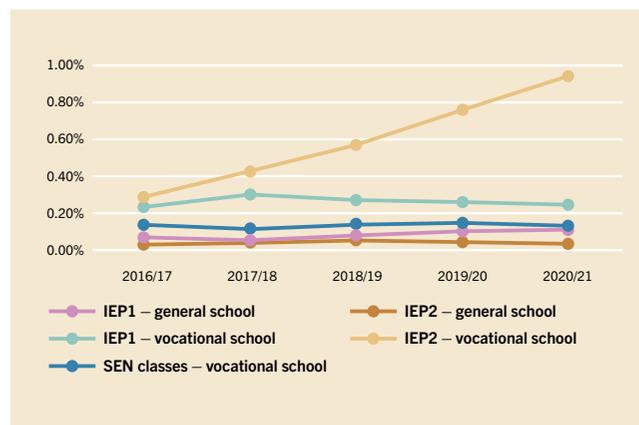
indicates a low transition rate between the two levels for these children, but also the fact that inclusive education policies have begun reaching secondary education. The share of these children in general education secondary schools (Gymnasiums) is particularly low, only modestly increasing through the years. The trend has changed in vocational schools – from less than 0.6% in 2016/17 to around 1.3% in 2020/21. There has been a particular increase in the share of students with IEP2 in vocational education (Figure 16).

More efforts are needed to fully embrace the potentials of inclusive education for the development of all potentials of students contributing to the overall development of the country's human capital.

3.3.3 Access to life-long learning (LLL)

Along with Croatia and Bulgaria, Serbia is among countries with the oldest population in the world on average (Nikitović, in this volume) with pronounced regional imbalances. It is paramount to ensure that such a population stays actively and competently in the labour market, although skills requirements have changed manyfold from the time when the older population were completing their formal education, and ever-growing mismatchings of skills are no exception. This is even more significant in the context of depopulation, when the overall work age population is shrinking and the country's human capital that should ensure productivity, innovation, and competitiveness is eroding.

The EU education and training benchmarks from the early 2000s place focus on making lifelong learning a reality. The benchmark for 2010 was set at 12% of adults (aged 25-64) who participated in education and training in the four weeks prior to the survey for 2010. Subsequently, it was raised to 15% (for 2020) and to at least 47% of adults aged 25-64 who participated in learning during the last 12 months prior to the survey (for 2025) (EC, 2021). These benchmarks are set high for many EU member states as well. For example, in 2019 fewer than one third of them reached the benchmark of 15% (Eurydice, 2021).

With 4.3% of adults engaging in lifelong education, Serbia is far below all aforementioned benchmarks (Figure 17), although adult edu-

EU27	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	HR	IT	CY	LV	LT	LU	HU	MT
10.8	8.2	2.0	8.1	25.3	8.2	20.2	12.6	3.9	10.5	19.5	3.5	8.1	5.9	7.4	7.0	19.1	5.8	11.9

NL	AT	PL	PT	RO	SI	SK	FI	SE	BA	CH	IS	LI	ME	MK	NO	RS	TR	UK
19.5	14.7	4.8	10.5	1.3	11.2	3.6	29.0	34.3	x	32.3	22.2	x	2.5	2.8	19.3	4.3	5.7	14.8
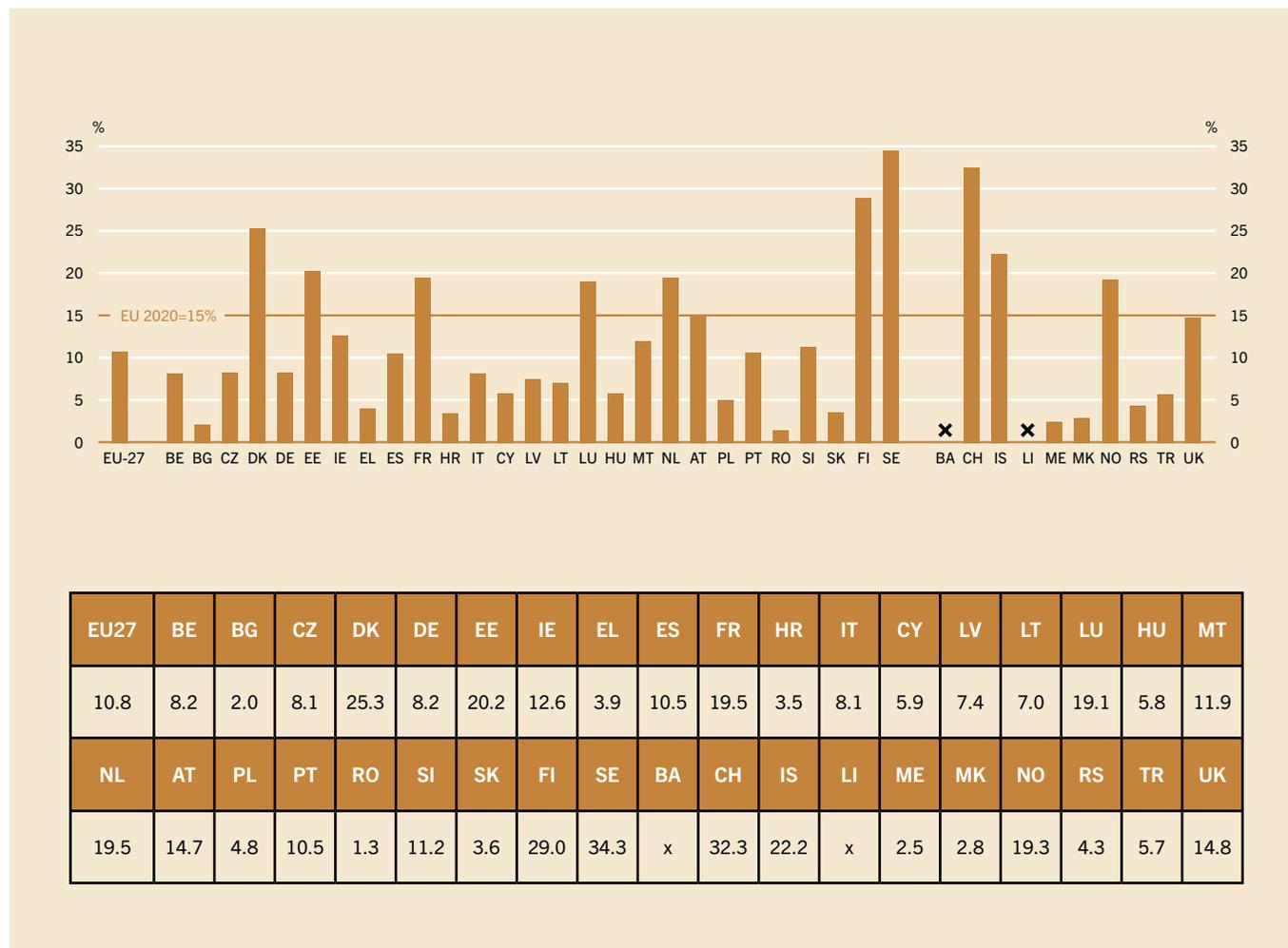
Figure 17. Adults (aged 25-64) who participated in education and training in the four weeks prior to the survey

Source: Eurostat, Survey on the European Union workforce, [tmg_lfse_01] (data published on 22 April 2021); Serbia marked as RS.

cation and lifelong learning had started to strategically develop after the early 2000s, and implementation intensified in parallel, also.[79] Participation in adult education in Serbia is lagging behind the Strategy for the Development of Education benchmark set at 7% for 2020, and there are still no regular mechanisms to monitor the participation rate of adults in organized education and training.

Currently, there are several types of adult education and training in Serbia. Basic education and upskilling is carried out through primary or secondary schools providing functional basic education with the first qualifications for adults (Formal Adult Education). Re-qualifications or further qualifications in VET are provided by VET schools acting as adult education centres. Finally, there is a wide array of different nonformal education opportunities, provided by various institutions, including:

· Publicly subsidized institutions such as: the National Employment Service (NES) with its branches in 30 towns throughout Serbia, focusing on the unemployed;

· Education Centre within the Chamber of Commerce and Industry of Serbia that offers continuous adult education in the areas of business and entrepreneurship;

· Remnants of Adult Universities – centres for the professional development of adults located in 12 towns in various parts of Serbia, now working on identifying labour market needs and educational priorities, on collaboration with local authorities, schools and other relevant institutions, and on proposals for adult education programmes and their implementation;

· National Agency for Regional Development, that provides various modes of support for start-up companies and entrepreneurship at the local level, including the professional development of adults;

· Programs of publicly recognized organizers of adult education activities (PROAEA), such as companies, civil society organizations, cultural institutions, associations, open universities, career centers, consulting and training centers, and private schools; in or-

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[79] Functional adult education began with Roma adults, though a 2005 REF grant, and grew into a widely-implemented policy with IPA support. Adult education centers were established, also with IPA support starting from 2008.

der for a programme to be recognized, it needs to be approved by the Qualifications Agency and Ministry of Education, Science and Technological Development (MoESTD).

Two other possible types of lifelong learning opportunities are markedly underdeveloped and underused in Serbia. Specialized training or liberal arts adult education is provided by higher education institutions as short, non-degree courses. Universities have started establishing centres for continuous education, but offer and demand are both still low. Informal learning that implies learning activities that occur in the family, workplace or local community, or as part of daily life, on a self-directed, family-directed or socially directed basis is also a type of learning that builds the human capital of a country. In Serbia, formal recognition of informal learning has, admittedly, been announced but it has not yet taken place.

There are substantial regional and rural-urban differences as well. Belgrade municipalities take up more than half of the total coverage (67% of all participants are involved in some form of adult education in Belgrade municipalities). Higher participation is recorded in Sombor, Leskovac, Novi Pazar, Čačak and Štrpce. However, it is clear that the distribution of adult education services in primary and secondary schools is very poor and that the majority of LSGs do not have any kind of offer.

Formal secondary adult education for those without ISCED 3 was attended by 447 adults in 2019, which is significantly less than the 2,776 places available. Out of the 23,772 places in secondary schools for programmes leading to qualifications, additional qualification and specializations in formal education, only 8,554 were filled.

An important step made in an effort to improve the quality of adult education was the adoption of the Bylaw on closer conditions for PROAEA, and the Bylaw on the pedagogical and andragogical assistant. Aside from these documents directly focused on adult education, the Law on the National Qualifications Framework was adopted and the Agency for Qualifications was established. Nevertheless, in Serbia, skills audits indicating regular evaluation of non-formal and informal learning are not yet the practice, despite the 2012 Council Recommendation on the validation of non-formal and informal learning, followed by two thirds of European countries (Eurydice, 2021).

However, problems remain and present a significant barrier to quality LLL and adult education. Low participation in Serbia is the consequence of several factors.

- Many programmes are not relevant for the labour market and there is a lack of coordination between the qualifications offered and the needs of employers[80] (SRHS&GIZ, 2019). Programmes offered by some PROAEA and NES are still not recognized or found relevant by employers, which makes them useless for participants.

Promotional campaigns planned by the NES were insufficient and did not reach all potential beneficiaries.

- Recognition of prior learning is still not regulated (it has been delegated to the Agency for Qualifications). Once this procedure is established, many could obtain qualifications of levels 2, 3 and 5 that are recognized by the National Qualifications Framework (NQF).

- Short cycle programmes, which would provide a certain number of ECTS points that would cumulate for obtaining qualifications, are not developed.

- Online education and blended learning[81] is still limited in adult education. This is a major obstacle as these programmes should be the most flexible in terms of time and place where activities are taking place. Also, the potentials of personalized learning, contextualized learning[82], and collaborative learning[83] are rarely recognized and utilized in adult education.

- Financial and organizational barriers to participation are significant. On average, across the EU-27, around one in three adults who wanted to participate (or participate more) in education and training (32.2%) reported costs among the obstacles that prevented them from doing so (Eurydice, 2021). In Serbia in 2019 FAE had 5,633 participants but only 2,930 finished (52%). Those who did not, identified high transportation costs as major barrier and the need to work part time jobs that were impossible to fit in with education.[84]

In order to support human capital development throughout an entire lifespan and adapt the education system to addressing the needs of an ageing population, Serbia will need to redevise its LLL system. That means to focus on creating a more robust system that avoids fragmentation, embraces online learning strategies and modern contextualized blended learning approaches, and, aside from expanding the offer and rendering it more equitable, speeding up the implementation of the already established policies (such as recognition of prior learning, ECTS accumulation, strengthening the connection of education and the labor market), and the development of a monitoring framework for relevant indicators in adult education.

The renewed European agenda has set priorities for the participation of older learners. In order to achieve progress, concrete objectives need to be set and the developments closely monitored. Serbia will also need to invest in broadening the scope/outreach and promotion among potential participants in adult education, and include them in career counselling and orientation services. Adult education providers should offer information, guidance and counselling services on non-formal and informal learning to help older people better understand the skills they have gained through their life-experience and to better recognize how these skills can be used.

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[80] Report on Implementation of SED 2020 Action plan for 2019-2020

[81] Blended learning is commonly used as a generic name for a variety of instructional styles, where online education is combined with face to face instruction.

[82] Contextualized teaching and learning engages students in active learning while assisting them draw out the meaning from the information they are receiving.

[83] Collaborative learning"is an umbrella term for a variety of educational approaches which imply joint intellectual effort by students, or students and teachers together. Usually, students working in groups of two (or more), mutually searching for understanding, solutions, or meanings, or creating a product.

[84] Report on Implementation of SED 2020 Action plan for 2019-2020

4 Essential Resources for Education Change in the Context of Depopulation

In this chapter we focus on key mechanisms that need to be built up in order to enable education to maximize impact in strengthening human capital and the wellbeing of the population in Serbia. More specifically, we deal with creating an effective teaching force with competence needed to respond to the challenges, using digitalization in education, creating a conducive financial and strategic framework and preventing corruption in education.

4.1 Maximizing the effectiveness of the teaching force

The status of teachers and policies regulating or developing the teaching profession are among the most controversial topics in the education realm of Serbia. Although the quality of teachers is the major contributor to the quality of students' learning outcomes (Hattie, 2008), major controversies are burdening this area in Serbia, creating serious risks for the future of the country.[85] We are listing just the most obvious ones:

4.1.1 Teacher salaries

Teacher salaries are a constant topic and their amount has, in turn, contributed to rendering teaching a non-attractive profession, and to an overall negative selection of the teaching force working on levels ISCED 2 and 3. In 2015, teacher salaries were additionally jeopardized by an overall 10% cut in order to consolidate Serbia's fiscal space. This cut has not yet been compensated for. Country level averages in

Teachers (16 years of experience with form master top-up):	90,945
Employee with qualification level 6 (education of 180-240 ECTS), Serbia:	104,875
Employee with qualification level 6 (education of 180-240 ECTS), Belgrade:	126,175
Employee with qualification level 7-8 (education of 300 ECTS and more), Serbia:	125,673
Employee with qualification level 7-8 (education of 300 ECTS and more), Belgrade:	155.604

Table 3. Average gross salaries, 2020

Source: SORS, Statistical yearbook 2021

public service are usually used as reference points for teacher salaries. The teaching profession is far more educated than the average employees in public service, therefore teacher salaries should be comparable with salaries for professions requiring higher education qualifications and/or MA degrees (240-300 ECTS). In that comparison, generally speaking, teacher salaries are below the averages for comparable qualifications overall in the country, irrespective of sector and source, and particularly so in Belgrade (Table 3).

In recent years there has been a relative decrease of teacher salaries compared to the average salaries in the country, i.e. in public administration and public sector (Figure 18). Teacher average net salaries have been lower than the average salaries in the public sector in varying degree (with values 0.7% below the average in 2018 and 6.4% in 2021) while the gap compared to public administration net salaries is even higher, between 6.4 and 9.3% .

Annual teacher net salaries as a percentage of GDP per capita, an internationally used reference point, are fluctuating below GDP per capita in the case of an average net salary to the level which is somewhat above the GDP in the case of an average annual gross salary. In comparison, a recent Eurydice overview of teacher salaries (Figure 19) depicts teachers in Serbia at the very low end of the scale, while their working hours are the highest among European countries (24 teaching hours weekly in lower and upper secondary education – compared to e.g. 17 teaching hours in Germany, 14-17 in Finland, 18 in Norway and Italy).
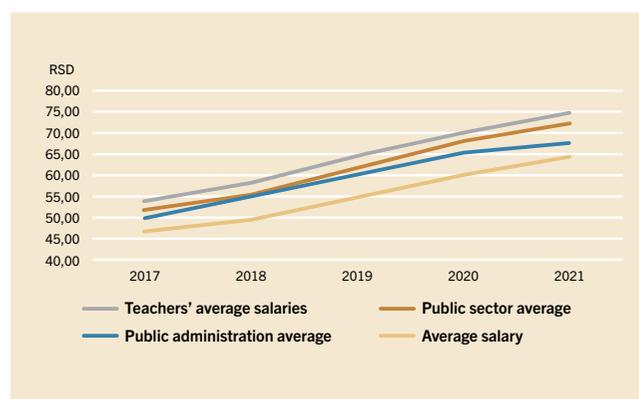
Figure 18. Comparison of average net teacher salaries with public sector, public administration and overall net salaries, 2017-2021

Source: Data from the Statistical Office of the Republic of Serbia. For calculating teacher average salaries coefficients for 16 years of work was used and the top-up for class home teacher. These calculated salaries are higher than the average salary in education, by 6-8%

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[85] Paraphrasing the title of the famous US study on the teaching force "A nation at risk.
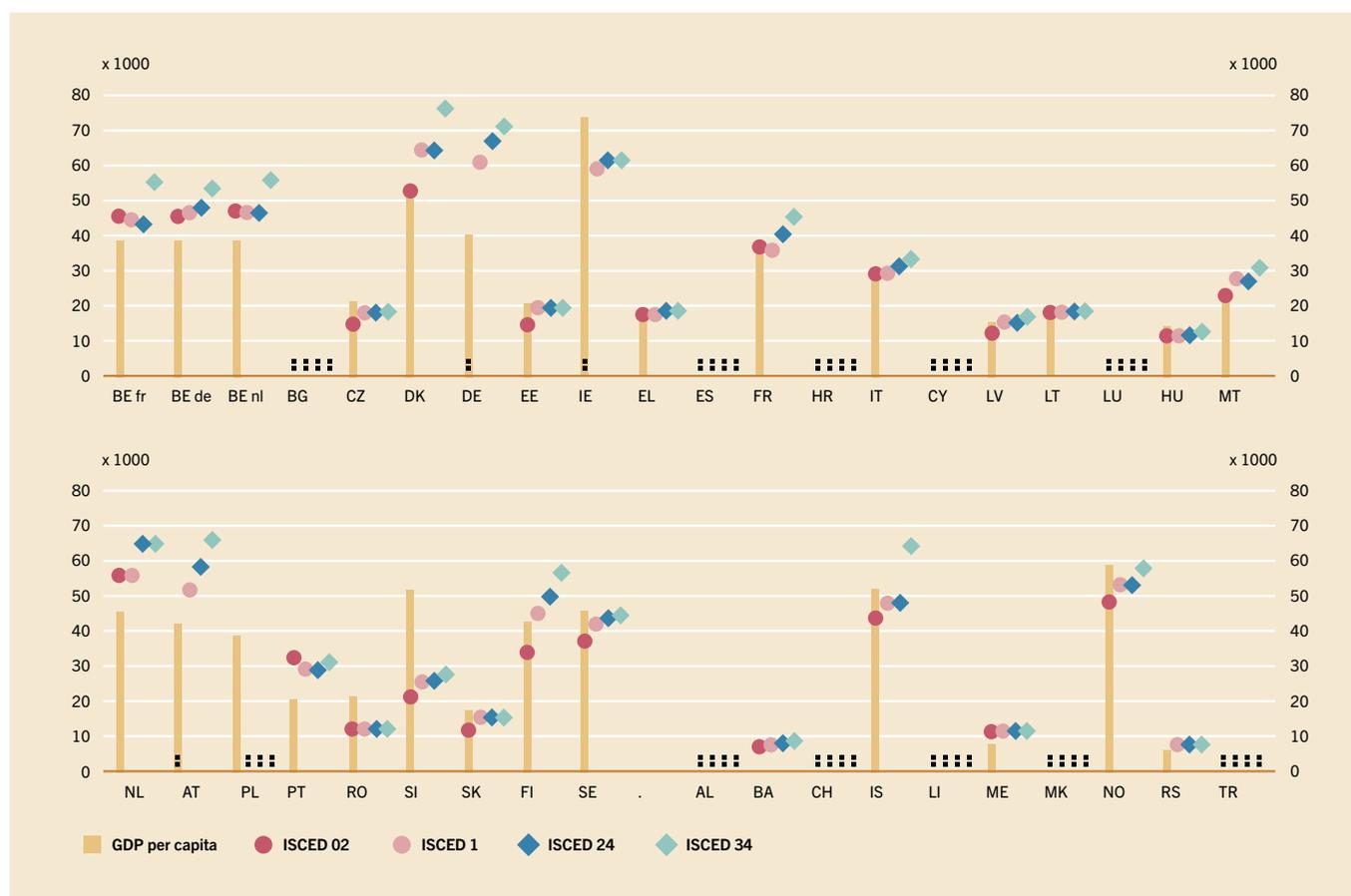
Figure 19. Average actual gross salaries for teachers aged 25-64 in public schools, compared to GDP per capita, in 2019/20 (in Euros)

Serbia is referred to as RS
Source: Eurydice, 2021

The aforementioned data directly spotlight the sources of negative selection in the teaching profession in Serbia, and underpin the strategy used by students of various academic disciplines to mostly seek out other careers, and resort to the teaching profession only if they do not succeed in their search.

These data also indirectly indicate that the consolidation of classes exercised hitherto did not have a positive impact on teacher salaries, contrary to expectations in the education sector. Leaving teacher salaries at the current level will jeopardize the effectiveness of all future development policies and investments in the development of education, and contribute to new problems in the quality and equity of education, eventually enlarging the negative impact of depopulation on human capital in Serbia.

There are several mechanisms for increasing teacher salaries. Salary increase can be connected to top-ups for additional engagements or unfavourable working conditions, or to years of experience in order to make the teaching profession more attractive to novice teachers. Tying salary increases to additional qualifications in critical competency areas (such as digital education or inclusive education) can motivate

teachers to engage in implementing new policies. Increase can also be linked to system of career advancement that includes professional development and innovation activities. Furthermore, of course, an overall increase of certain percentage should be planned within the budget.

Serbia currently uses only the first mechanism – salaries increase with seniority and as top-ups with additional engagements in school activities such as form master duties, holding additional classes above the norm, and working in remote areas with multigrade classes. The incentive value of this mechanism is very low – years of service are accumulated irrespective of quality, and the top ups are not a stable increase, allocation of such possibilities are negotiated between teachers and the principal on a yearly basis and can depend on interpersonal and intragroup processes not related to the quality of the teachers' pedagogical work.

A new incentive mechanism was established in the early 2000's and additionally specified several times since[86] – career advancement through 4 levels, connected to relevant professional development, innovation, quality assessments and coupled with salary increase. This system has, however, not been fully implemented, and only a small percentage of

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[86] Rules on permanent advanced professional training and advancement into the positions of school teacher, educator and research assistant, RS Official Gazette, no. 109/2021.

teachers have acquired higher titles to date. This system, however, has not been fully implemented, and only a small percentage of teachers have acquired higher titles to date. Those who have, still have not received salary increases, as the current fiscal legislation does not recognize the career ladder in education as relevant (Eurydice, 2018).

Establishing an effective and relevant incentive structure that mobilizes teachers for developing their practice is paramount for an effective education system, therefore neglecting this area should not be an option. As a rule, a more developed economy can create teacher shortages, as teachers have new, better options of employment, and vice versa, economic downfall increases the teaching force, as professionals from closing businesses seek a teaching career. In the next section, human resources management in education is discussed.

4.1.2 Planning and management of teachers is not well developed and teachers' wellbeing is jeopardized.

Serbia is among those rare countries that do not use any planning modalities regarding the teacher workforce, either at national or municipal level (Eurydice, 2018). Data on the teaching force is unclear, especially in respect of full time and part time teachers as well as teachers with temporary or tenure contracts. Moreover, the data are not readily retrievable for any policy, research or intervention purposes. The fact that teachers are employed by schools and not by LSGs or regional or national authorities contributes to the fragmentation in the teachers' data. Therefore, qualification mismatches, shortages and oversupplies of the teaching force are present, that create both teacher dissatisfaction and lost investments in the area of teacher education. Serbia is among a small number of European countries (with Portugal and Lithuania) that face both teacher shortages and oversupply, as well as shortages of students in initial teacher education (Eurydice, 2018).

Teacher wellbeing, including stress levels, working conditions, teaching and administrative workload, their self-esteem and self-efficacy and collegial atmosphere in schools, is a new policy area in the EU Member States, as it is a key factor for enhancing the attractiveness of the profession. It is argued that "the wellbeing of teachers and trainers influences their job satisfaction and enthusiasm for their work, and has an impact on the attractiveness of their profession, and subsequently on their retention in the profession. It is an important factor in quality and performance, correlating with their own motivation and with the motivation and achievements of their learners" (Eurydice, 2018).

Teacher working conditions in Serbia are affected by the lack of HR planning, with many teachers working in several schools and loosing time on commuting and having fragmented working hours. The number of required teaching hours is higher for teachers in Serbia than that of most of their European peers (table 4). The law stipulates 24 hours weekly, while in most EU Member States it is between 15 and 20. A smaller teaching load allows far more time for teachers to prepare, teamwork, communicate with parents and students, individualize their approach, and engage in professional development.

Moreover, the teachers in Serbia are overburdened by administrative tasks, as well, and do not have much autonomy in curricular decisions either. Both of these conditions are high stress factors for teachers Europe-wide (Eurydice, 2018). Teacher professionalism, needed for the development of high competencies in students, subsumes reflection, autonomy in designing the school curriculum and selecting teaching methods, innovation, and collaboration with fellow teachers, team teaching, and lots of support, including also assistants taking over administrative and easier tasks (Hagreaves & Fullan, 2015; Moursher, Chijioke & Barber, 2010). In countries where education outcomes are high measured by international assessments, this is the case. In Serbia it is not, creating additional barriers to a fully effective teaching force needed for high quality human capital development.

		BE fr	BE de	BE nl	BG	CZ	DK	DE	EE	IE	EL	ES	FR	HR	IT	CY	LV	LT	LU	HU	MT	NL	AT
A						40	37	40	35		30	38	35	40			40	36	40	40		40	40
B				40							30	30				31	30		24	32	27		
C	min.	18	18	18	16	17		17		22	23	18	15	14	18	18		21	22	22	17	20	17
C	max.	18	20	19	19	17		17		22	23	21	20	17	18	18		21	22	26	17	20	18

		PL	PT	RO	SI	SK	FI	SE	UK-ENG	UK-WLS	UK-NIR	UK-SCT	AL	BA	CH	IS	LI	ME	MK	NO	RS	TR
A		40	35	40	40	38		40				35	30	40	42	40	42	40	40	38	40	
B			24				21	35	32	32	32	28			23		25		31			
C	min.	14	22	18	16	17	14					23		24	21	17	21	15	15	18	24	12
C	max.	14	22	18	17	17	17					23		24	21	17	21	15	17	18	24	16

A - Overall working hours   **B** - Hours of availability at school   **C** - Teaching hours

Table 4. Average working hours of lower secondary teachers in Europe

Serbia is presented in Table 4 as RS.
Source: Eurydice, 2018

4.1.3 Serious shortcomings in teacher education and development

High quality teacher education is essential for high quality teaching (Bucherberger et al. 2000). The education of teachers is a continuous process, encompassing initial education, induction, licensing, continuous professional development and carrier advancement (Beara & Petrović, 2020), aiming to facilitate the development of teacher competencies formulated in teacher competency frameworks (TCFs). While all listed elements exist in Serbia, all have certain glitches, and their quality, relevance and effectiveness need to be under heightened scrutiny if the country expects that teachers perform at their highest capacity and have positive impact on the country's human resources in the future.

Initial teacher education (ITE) is an education policy area marked by slow development but long term impact. Modernizing ITE has not been a very successful process in Serbia until now. Two major changes that align ITE to dominant practices in the member states of the EU, were introduced in 2003 and 2009. They require an MA degree from teachers[87] of a 30 ECTS module for professional studies of psychological, pedagogical and methodological disciplines coupled with a 6 ECTS practice in educational institutions, which is a modest requirement, compared to EU wide practice.[88] Both changes are very slow in their implementation, despite sizeable support from European assistance through TEMPUS and IPA projects. The Development of relevant accreditation standards is also stalled allowing for haphazard practices to mushroom, endangering the quality of teacher preparation (Kovač Cerović, Radišić & Stanković, 2016).

On the other hand, the professional development of teachers in Serbia is a well-developed policy, established during the early 2000's and widely distributed since then. Catalogues offer accredited courses of diverse providers (NGOs, faculties, institutes, businesses, teacher associations, schools), teachers select among these in as per to a self-assessment of their own competencies, and accumulate 120 hours or more of divers training on a 5-year basis. More training is linked to the career ladder, less training jeopardizes the teachers' license. The implementation of this policy is frequently endangered by lacking financial resources and the quality is hampered by a lack of monitoring, particularly the monitoring and evaluation of the impact of the trainings on the teaching process. Therefore, the effectiveness of the investments in trainings (both time and resources) might become questionable and render this, otherwise powerful and high impact measure, less useful than it could be.

A system of induction and licensing is in place in Serbia, while, as already mentioned, career advancement, although regulated by laws and bylaws is not connected to salary increase, therefore not many teachers have embarked on the complex process of acquiring higher career levels.

In summary, there is a serious need to reconsider, reform and reinvent the teaching profession in Serbia in all of its aspects – in respect of finances, work conditions and autonomy, and the quality of teacher education. Without such focused reconstruction of this field, many other reforms will be stalled, major investments in human resources lost, and the development of human capital in Serbia additionally jeopardized.

4.2 Digital transformation in and through education as a resource in human capital development in the context of depopulation

Digital technologies have changed economies and societies globally during the last 20 years. Initially, Serbia lagged behind as a consequence of the 90's, but is swiftly catching up with a vibrant IT sector. The value of Serbia's IT export grew from 0.5% of GDP in 2007 to 2.5% in 2018 (Arandarenko, 2020). Although IT professionals have an easy road to migrating to developed countries, Serbia has, to date, managed to build and retain a pool of professionals and talents in this area. In the academic year 2020/21, around 10% of all students are enrolled in higher education institutions focusing on information technologies (23,061 out of 242,550), while almost 20% of graduated students were from IT study tracks (3,174 out of 16,010) (SORS, 2021). This demonstrates both the attractiveness and high efficiency of these studies.

In the context of depopulation, it is paramount to capitalize on this trend, and further broaden and strengthen the pool of professionals in the IT sector. Reforms in the education sector, particularly if based on the EU Action Plan 2021-2027 are major vehicles for further developing the digital competencies of the population. Lessons learned from the worldwide and Serbian experiences with the COVID-19 emergency distance education can substantially contribute to these reforms, as well.

The area of digitalization in education in Serbia is addressed in three recent partly overlapping strategies: the Strategy for the Development of Artificial Intelligence 2020-2025, Strategy for the Development of Digital Skills 2020-2024, and the Strategy for the Development of Education to 2030. These strategies are based on the EU Digital Education Action Plan, and the first experiences with COVID 19 lockdown in Serbia, and provide for digitalization in education as an important objective. The strategies encompass, in somewhat fragmented fashion, several broad measures, that are, however, more oriented towards informatics as an education subject or education track, and on preparing the system for providing online or hybrid education for compensatory or emergency purposes (for certain target groups such as rural children, dropout prevention, education of children abroad or sick children, etc., as well as in emergency situations, such as partial or total school lockdown), than towards equipping all students with IT skills to be used in all subject areas in order to foster learning focused on IT, teamwork and innovation.

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[87] In 2018, approximately 55% of teachers in Europe held an MA degree, while in several countries this percentage was above 75%, i.e. in Finland, Czech Republic, Portugal, etc. (TALIS, 2018).

[88] Among countries which have national legislation on school practice, only in Romania is the amount lower (5 ECTS), whereas in other countries, it is 30 or more. Expert studies in most countries comprise 60-120 ECTS (Eurydice, 2021).

% of students in schools whose principal agreed od strongly agreed with the following statements:

- - - - WB6 average   - - - - OECD average

| An effective online learning support platform is available | The number of digital devices for instruction is suffcient | Teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction |

ALB BIH MNE MKD SRB KOS[a]

[a] References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

Figure 20. PISA 2018 data on the possibility of home/based learning for Western Balkans countries and territories[89]

Source: OECD, 2021

It is indicative that Serbia is not monitoring teacher digital competencies and student performance, and is not yet participating in the International Computer and Information Literacy Survey (ICLIS), conducted on a 5-year basis.

4.2.1 Providing appropriate infrastructure — hardware and connectivity

Infrastructure, in terms of hardware and especially connectivity, has advanced in the period from 2012, from 55.2 % of households possessing a PC in 2012 to 74.3% in 2020. In 2012, broadband internet was available only to 38% of households, while it is now accessible to 80.8% of them. Laptops are less frequently found in households – 52.1% of households in Serbia have laptops. Nevertheless, the average percentage covers sizable regional differences, Belgrade being above 90% on both key indicators, while all other regions except Northern Serbia are at around 70-77% on both indicators.

Connectivity of schools is supported by the Ministry of commerce, tourism and telecommunication that has equipped most of the existing schools with broadband free of charge internet access, and it is expected that all schools will be connected. However, this applies only to the main building of schools and not the satellite units, that are often in remote rural areas and for which having access to broadband internet would be a game changer. An online survey, conducted in 2020 with more than 50.000 teachers, showed that 56.5% complained about the lack of computers and unstable internet connectivity of their schools, while 42.6% pointed to the unavailability of technologies for teachers, indicating that the process of equipping schools is far from completed (ZUOV, 2021).

4.2.2 The need for upgrading teacher digital skills and competencies

Data on teacher digital competencies is not available, but the COVID-19 school lockdown showed that the vast majority of teachers had serious competency gaps and was unable to use synchronous learning platforms for conducting instruction. Only 15.6% of teachers reported substantial experience in using digital technologies for teaching, while one third of them listed the lack of digital competences in their self-assessment as the main problem during distance education due to the emergency situation (ZUOV, 2021).

However, the IT competency gap in the teaching profession is of such scope that it requires thoughtful, sustained and well-supported, monitored and evaluated interventions. The interventions should encompass all segments of continued professional development, including initial teacher education, licensing, mentoring, and blended learning courses with digital teamwork, contextualized learning tasks and whole school engagement.

4.2.3 Use of digital technology for teaching and learning

The COVID-19 emergency situation distance education painfully witnessed how moving from contact instruction to distance education is not simply "moving" learning from one place to another. In order to produce quality learning outcomes, distance education requires not only technical readiness in terms of equipment and skills, but also curriculum readiness (i.e. appropriate digital content prepared for teachers and ready to use), pedagogical readiness (i.e.

[89] OECD. (2021). The COVID-19 crisis in the Western Balkans Economic impact, policy solutions and short-term sustainable solutions. https://www.oecd.org/south-east-europe/COVID-19-Crisis-Response-Western-Balkans.pdf

mastering a wide range of digital interactive pedagogical tools) and assessment readiness (using assessment formats that maximize students initiative and exploration of digitally available knowledge) (ZUOV, 2021). Without fully observing these four types of readiness, distance education easily runs a great risk of becoming monotone and boring – and of being an undue burden on students; it requires higher motivation and self-regulation. Research shows that student motivation and student self-regulation become critical aspects of distance education worldwide.[90]

Appraisals of the possible worldwide impact of COVID-19 related school lockdown are predicting learning losses of various proportions, depending on various factors. The length of school closure and preparedness of the education system for switching to digital education are major determinants of learning losses. The loss is expected to correspond to 0.3-0.9 years of a usual year's schooling attainment, or a high percentage of the yearly learning gain (63-68% in reading and 37-50% in maths), or even 1.5 years' worth of learning, if taken cumulatively.[91] The reduced learning time during a school day can be another loss factor (Garcia & Weiss, 2020).

Empirical research on the impact of the COVID-19 crises on learning performance in the Western Balkans is not yet available. Therefore, it is imperative to use the current academic year to conduct standardized learning assessments in order to assess the impact and design appropriate remedial measures. However, predictions for the Western Balkan countries based on PISA 2018 data (Figure 20) on the possibility of home-based instruction, indicate towards the prospect of more pronounced learning losses than are found in highly developed countries.

It is expected that the PISA score might drop by 16 points, and that the percentage of students below basic proficiency in reading may increase from the current 53% to 61%, which would have a drastic negative impact on human resource development (WB, 2021).[92]

4.3 Designated education financing

A decrease in the student population could also affect changes in financing, and ensure savings that could be reallocated to areas with developmental needs in education. On the other hand, future changes in the system of education financing, and the overall level of education expenditure, could contribute to more effective consolidation, but also to increased opportunities for the development of human capital.
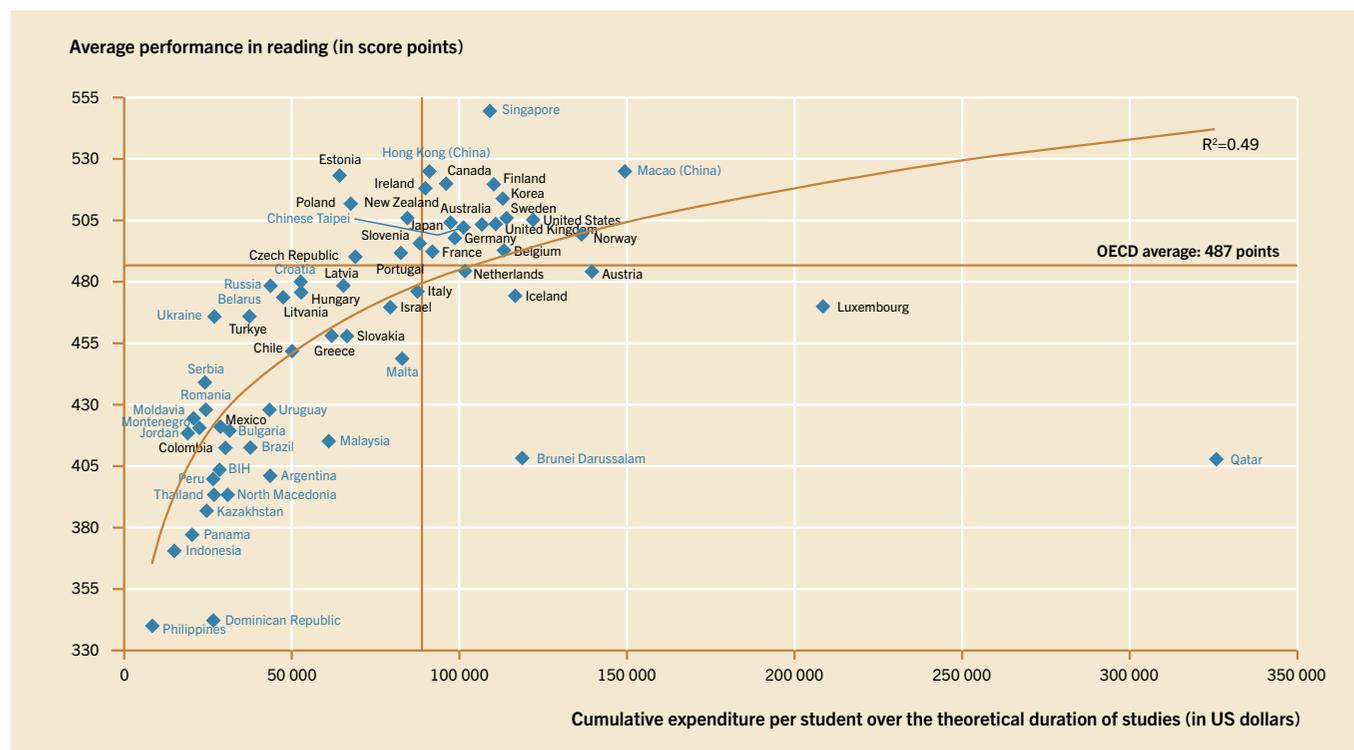
Chart 21. Spending on education and reading performance

Source: OECD, PISA 2018 Database, Tables I.B1.4 and Figure; 1.4.4

[90] For a good overview on motivation and self-regulation see Pelikan et al. 2021.

[91] For an overview of prediction methodologies see Maldonado & De Witte, 2020.

[92] This estimation is based on the following facts: (a) accessibility of high speed internet, essential for online instruction, is generally low in the Western Balkans; (b) availability of home computers will be limited in the scenario of competing demands for using the home computer for support for the schooling of siblings, and parental home office; (c) availability and quality of digital content are questionable; (d) teachers lack digital competencies; (e) parents are not prepared to cope with distance learning and home schooling, and might not even have the time to assist their children, (e) the already short instruction time in the Western Balkans countries will additionally shrink during distance education; (f) protracted school lock-downs are likely to push up school leaving.

4.3.1 Low investment in education, compared to other countries

Serbia's level of public expenditure on education has always been an issue as it was always at around 4-5% of GDP (4% of GDP in 2015, and it remains under the OECD average of 5.3%) (Maghnoui et al., 2020). The strategic goal from SED 2020 of increasing investments in education from 4.5% of GDP to 6% was not achieved (MoESTD, 2020).[93] Investment in education is still lower than in countries with the same income (4.7%) but also comparing to the countries in the region (4.6%) (Figure 21).

The level of resources each school receives has been similar for years because there are very limited financial incentives to consolidate and adapt school networks, and also a lot of political and social pressure to keep the existing structure, despite Serbia's demographic decline.

4.3.2 The ineffectiveness of the current education financing system

Teacher salaries take up the largest share of the Serbian education budget. More than 90% of the ministry's budget goes towards teacher salaries (the notable surplus of teachers partially contributes to this – the latest list of redundancies goes up to 1,076 redundant teachers[94]) leaving only a fraction of the education spending for investments and development, while the international standard is to use not more than 80% of education budget for salaries (Maghnoui et al. 2020). In the 2021 budget this trend will increase even more (95%), leaving the schools virtually without funds to cover running and investment costs. Infrastructure modernization will take up 2.8% of the budget, while only 0,03% is intended for professional development of both preschool and primary school teachers.

Such an allocation plan will actually halt every development-oriented activity. To corroborate this prediction, the financial justification of SED 2030 states that, for 2022 and 2023, there will be no need for increasing the educational budget for development. All additional costs will be covered from international grants and loans, and an increase of the GDP share allocated for education is not planned. SED 2030 only mentions that the aim should be not do decrease it even more.

4.3.3 Non-implementation of discussed and prepared new financing

The school education system is financed in a traditional way – based on the calculation of approved school classes and teachers. Innovations in terms of introducing a per capita student funding scheme and financing formula that would allocate a higher coefficient for schools in remote areas, and for students from vulnerable groups, have never materialized although all calculations and piloting was prepared during the first decade of the 2000's, although this was provided for by the 2009 Law on the Foundations of the Education System and implementation planned to start from 2013. After several initiatives and projects, the funding formula still remains the same. Also, grant schemes for innovations are implemented only as part of donor projects or loans, never from the budget.

SED 2030 provides for a feasibility study for the intersectoral financing of inclusive education and a new model of higher education financing. This new model of higher education financing, as described, should be focused on increasing quality through incentives for excellent students, scholarships for low SES students and more funds for HEI infrastructure.

4.4 Increasing education integrity

All measures aiming to maximize their impact on education can easily collapse in a context where corruption and integrity violations occur. Corruption in education is not merely a governance issue – it directly or indirectly affects the effectiveness of adopted policies and quality of learning outcomes. It also threatens the equity of education, trust of stakeholders in education, and their motivation to engage in education (OECD, 2012). Education is rarely at the forefront in big corruption cases, but illicit and illegal activities, corruptive practice, bribery, favouritism, nepotism, conflict of interest are frequent and common phenomena that seriously jeopardize the integrity of education (Hallak & Poisson, 2007). Occasionally, there are cases of major fraud, such as the purchasing of diplomas or certificates, as well as plagiarism at high level, which bring greater public attention. Corruptive practices usually become part of informal policy and are used to bypass or compensate some systemic shortcomings or lack of resources. Often unrecognized, they mask the real problems in the education system's functioning, and cause the collapse of all resource investments (financial, human, infrastructural, etc.). Therefore, in the context of the challenges created by depopulation, it is essential to take corruption in education into account. This can contain several warnings, pointing to factors ranging from diminishing the effects of the efforts for human capital development, through reducing the quality and equity of education, to having an impact on mobility, i.e. instigating the emigration of better educated professionals.

Serbia has strengthened its anti-corruption systems by signing the UN Convention against Corruption. However, progress is slow and the implementation of existing legislation, policies and oversight by relevant public bodies remains weak. Serbia's position according to the Transparency International's Corruption Perceptions Index is repeatedly weak, and further declining in recent years. In 2021 Serbia ranked lowest to date, as 96th out of 180 countries and territories, with a score of 38 out of 100, and was placed in the company of Brazil, Ethiopia, Kazakhstan, Peru, Shri Lanka, Suriname and Tanzania, far below OECD countries, as well as those in the region, except Kosovo[95], Bosnia and Herzegovina and North Macedonia[96].

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[93] According to the DevInfo database in 2018 3.1%, i.e. 3.7% according to new the Strategy of Education Development 2030.

[94] Available at: http://liste.mpn.gov.rs/tehnoloski_viskovi_15.11.2021.xlsx

[95] References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

[96] See: https://www.transparency.org/en/countries/serbia"

The education system in Serbia has been part of several integrity assessments. Since the first review of the education system's integrity, conducted by the OECD in 2011 (OECD, 2012) and followed by a review by the Council of Europe in 2017 (CoE, 2017), several national reports (BCPB, 2018), and the latest report conducted for the EU project The fight against corruption[97] certain areas of major corruption risk in education have been continuously highlighted. One area of concern is the functioning of the municipal-level education inspection, which is understaffed, undertrained, and dependent on the LSG management at the local level. Conflict of interest is also a major concern and the system can be easily influenced by different stakeholder interests. The lack of a trustworthy law enforcement mechanism is often coined (cesto prati sprovodjenje politike)to the implementation of policies relating to human resources (hiring/firing of teachers, appointing of principals, etc.), and has direct effects in terms of eroding the quality of the education delivered in schools. Public procurement and renting out of school facilities is another area of concern. Cash flows are not fully transparent at local level and it is hard to monitor the spending of funds allocated for education institutions, support to students or professional development of teachers. Untimely assessment of learning outcomes, private tutoring, illicit entry into preschool or higher education levels, preferred school or educational profile are commonly found in the assessments.

The total capacity of the education system to identify and prevent corruption risks is also found to be insufficient (OECD, 2012). The delay in implementing the information system in education leaves the education system without a critical tool for overall monitoring, but also for identifying corruption risks.

4.5 Conclusions and main points

The education system in Serbia, as it is now, is not equipped to address the complex nested problems entailed in the depopulation processes in the country. Education is not furnishing young generations with competencies well enough even for the current needs of the economy and active social life, and certainly cannot respond to the increased needs of boosting human capital.

Serbia is falling behind OECD countries on PISA, teaching and learning is not vibrant and innovative, and the education system is troubled by the influx of numerous integrity problems. The education and training system is failing to provide attractive and relevant opportunities and motivation for upskilling and further education for the increasing body of adult and older population, whereby disabling the economy with a growing number of employees who do not possess the required skills. Early and preschool education is still underdeveloped and leaves approximately one third of children without appropriate support for a successful start in school. The schools and the system in Serbia are not ensuring that every child has the chance of developing, learning, and entering into a profession that will ensure his/her decent employment and income, and are, thereby, contributing to the perpetuation of poverty cycles and to erosion of human capital in Serbia.

The education system, although influenced by emergency distance education, and fairly equipped with information and communication technologies,, connectivity and education opportunities for the gifted students, has not yet fully embraced digitalization in education as a comprehensive cross-curricular developmental focus, and is losing time instead of helping the country to catch up with the international digital agendas in ways that could partially compensate for the declining human capital. The Serbian education system is not utilizing the readily available levers and resources that could help the system in achieving better results. In general terms, Serbia has a neglected, pauperized and disregarded teaching force that will not be able to carry out major developments needed for boosting human capital in the country, unless its financial, social and educational status is swiftly improved. The financing of education is not sufficient even for the current education situation, let alone for supporting the vigorous changes needed in education in order to help the country cope with depopulation and human capital losses – overall financing is low, the distribution of running costs is unreasonable, and innovative schemes are blocked. Serbia has not manage to handle the consolidations in education infrastructure and staffing in a constructive way which would ensure better funding for quality and equity development. Finally, schools and preschools are not attractive places which would provide young parents with their children developing values, knowledge and skills, staying safe and happy, while the parents are working.

Education systems are huge and very resilient to change, and education goals are usually considered an objective to be reached in 10 to 20 years' time. Among other reasons, that is why education sometimes fails in achieving a priority status in national development policies, and, as a consequence, contributes to countries failing in their long-term development. Education systems are also complex, interdependent systems of divers stakeholders, involving multi-layer legal, administrative, human resources and institutional structures, all in theory focused on facilitating such fragile processes as human learning, development and wellbeing, but can easily drift away from their original purpose. Education policies, evidence-based and problem-focused, need to concentrate their attention on critical areas of education, especially in times of social change and crisis.

4.6 Recommendations

4.6.1 Effective consolidation of the school network

The optimization of the school network is not yet satisfactory - in order to optimize resources, the number of staff, school units and schools themselves needs to be aligned with the declining number of students. More effective cooperation between national and local governments is needed, and flexible solutions cooperatively designed and implemented.

A new concept of revitalized rural education has to be developed and implemented, that combines infrastructure and community develop-

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[97] See: https://www.protivkorupcije.rs/srb/Novosti.php?pg=3 (unpublished report)

ment work with education provision, and uses a wide range of effective mechanisms, from digital and blended education and teaching (where appropriate), to developing community education and cultural centres in existing school facilities.

4.6.2 Enhancing the quality of education and high competencies for all

Outcome oriented and flexible curriculum that nurtures not only subjects-specific but also cross-curricular competencies, creativity, innovation and critical thinking, teaching methodologies that facilitate knowledge construction instead of reproductive learning, school atmosphere oriented to teamwork, authentic assessment, constructive use of ICT for independent exploration and information selection are all ingredients of a high quality, motivating education that develops competencies and high learning outcomes. In order to provide the expected outcomes , the education system in Serbia needs to utilize all of these ingredients. Much of them are already developed but not yet fully implemented, some call for further reform, but all require a highly committed and quality oriented high level leadership in the government.

4.6.3 Making adult education and lifelong learning a reality in Serbia

For optimizing the benefits of LLL, key failings need to be removed. The difficulties of integrating the adult population, due to unfamiliarity with basic skills for lifelong learning and lack of access to services, needs to be overcome. Increasing the attractiveness of on-going programmes and improving the methods and organization of this training (cost, location, programmes, effectiveness) would be paramount. More programmes should target older adults and be provided, not only in person, but utilizing the possibilities of distance learning, also. The gap between the skills that adult learners acquire through training and those required by employers needs to be bridged, which can be accomplished only in cooperation between the two sectors.

Recognition of prior and informal learning is a long-standing goal and appropriate mechanisms need to be put in place. During a pilot self-assessment that involved more than 20 VET schools, exam methodologies and instruments were designed based on the learning outcomes of qualification standards, but are still not part of the system.96 This also requires making educational paths flexible and facilitating movement through education and training, changing qualifications, etc. The system of career guidance and counselling should be accessible to adult learners and adapted to their needs, within and outside of formal education.

Improving access to and the quality of lifelong learning, especially adult education (formal and non-formal), requires rethinking financing schemes. Financial constraints are likely to be particularly acute for low-income individuals. Funding mechanisms in which

adult learning expenses are co-funded by firms and adult learners, or which allow individuals greater choice, can raise the efficiency of service provision. Other options are tax deductions for companies organizing trainings. Individual learning and subsidies, such as vouchers and allowances, can also be a good tool, as long as schemes are appropriately targeted (OECD, 2005).

4.7 Further increase of coverage of children in all preschool education groups

The existing capacities of state-run and private preschool institutions are insufficient to meet coverage requirements, so measures need to be directed at improving capacities, as well as at the development of a network of preschool facilities in order to enable easier access ("Kindergarten on the doorstep"), especially for children living in remote areas.

Preschool education needs to take into account the needs of children from vulnerable groups.Further diversification of educational support and increasing investment in compensatory and social protection measures could help children from vulnerable families to enter and stay in the education system.

4.7.1 Full inclusion of vulnerable groups

Measures directed at full educational inclusion of all vulnerable groups should be one of the priorities in Serbia, especially because, in a situation of demographic decline, the groups traditionally excluded can compensate for the loss of human capital. The birth rate among the Roma population, and among the poorer population is higher than that of the mainstream population, and cohorts of Roma and poor children have a growth trend in parallel with the decrease of the mainstream population cohorts.

Sector strategies (SROS), legislation (starting from the 2009 ground Law on the Foundations of the Education System) and thematic policies (Roma inclusion, children with special needs in education, dropout prevention), as well as international or EU accession instruments (such as SDG4, or accession chapter 23) already contain a rich set of such measures and their implementation is usually weak.

The most important groups of measures from these, which need to be accelerated, financed, facilitated, monitored, and periodically revised, are the following:

- Additional human resources to support integration of vulnerable groups: more pedagogical assistants, better functioning of inter-sectoral committees, mobile support teams;

- Institutional reorganizations to prevent segregation (accelerating the transformation or closure of special schools, desegregation of Roma schools);

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98 http://noks.mpn.gov.rs/en/2021/02/on-the-road-to-recognition-of-prior-learning-workshop-for-the-development-of-training-programs-based-on-the-qualification-standard/

- Support to students (transportation, meals, free textbooks and other learning materials);

- Dropout prevention, early warning system, and modernized and quality remedial classes need to be an integral part of every school's regular work, and they need to be planned, monitored, reported on, and evaluated.[99]

In addition to this, a serious reconsideration of the tuitions, scholarships, and student loans is needed, which implies their wider scope, Analysis demonstrates that all these investments have a high return. (UNICEF, 2014)

4.7.2 Essential resources: the teaching profession, digitalization, financing, and integrity

In order to ensure high quality learning outcomes, a far more advanced teacher policy has to be developed. This policy should address the needs of teachers for higher salaries, stronger developmental incentives, higher status, wellbeing and attractiveness of the profession, better initial education and more effective professional development coined to career advancement options, in parallel with student needs for higher quality education.

As a prerequisite, a full and updated database of teachers is necessary. The new legislation on pay grades should provide sufficient flexibility in order to establish the link between career advancement and salary coefficients, and thereby render the teaching profession more attractive. Also, other areas of benefits for teachers need to be explored and implemented, such as targeted tax reductions, a reduced teaching load, etc.

Teacher salaries need to be increased overall, as well as the GDP share devoted to education. The education budget needs to have a higher percentage for developmental costs, and innovative financing mechanisms need to be explored.

Digital equipment, competencies, platforms, the curriculum, pedagogy and assessment modalities well-suited to the development of student competencies in a digitalized education context, should be prioritized. Lessons learned from the COVID-19 crisis in education need to be analysed and used for the introduction of new elements. Digitalization in education is an important crisis management and resilience-building policy, but also a lasting asset for education development. Hybrid models will be increasingly used for mitigating many challenges, from rural education in remote areas, through catch up and enrichment activities, and as part of regular schoolwork that builds broadly defined student digital competencies.

The integrity of the education system is both a matter of appropriate policies and enforcement mechanisms, and a matter of the willingness of participants in the education system to comply. The improvement of policies and enforcement mechanisms is highly dependent on the availability of monitoring tools and analytical capacities in governing institutions. Therefore, an effective Education Management Information System is a crucial tool for providing data, and raising human capacities in inspection and analytics departments should be a developmental priority within the MESTD and other institutions. Compliance of participants can be ensured by regaining trust in the education services by providing quality and ensuring equity, and incriminating all practices that are by nature violations of integrity, but seen as the grey area of informal practices. The education inspection should be trained to recognize potential integrity risks within their jurisdiction but, also, pedagogical advisors need to work with schools on recognizing, understanding and removing current malpractices or integrity risks that have become part of everyday practice.

4.7.3 Recommendations to increase school attractiveness

The education system and education institutions need to become more responsive to the evolving needs of children, parents and communities, in order to play a role in helping young parents decide to stay in the country for the benefit and wellbeing of their children, and to facilitate learning that leads to high-quality human resources. That is currently not the case. In Serbia, schools are often places of anxiety, fear of failure,[100] rudeness, and, occasionally, peer violence (Popadić, 2009). Students often lack self-confidence, have low motivation, and almost half of students hold a fixed growth mind-set - they do not believe that intelligence and competencies can be developed, and that commitment and engagement are important for their own development (OECD, 2021b).

The school ethos oriented towards student wellbeing and student learning needs to be developed across the entire education system. In addition to the relevant curriculum, challenging learning tasks, authentic assessment and constructivist pedagogy, the school should focus on supporting the social and emotional development and wellbeing of its students. Active, meaningful student participation in all matters that concern their learning and wellbeing, should become the dominant practice, across all curricular areas. Positive, caring and respectful student–peer, student–teacher, teacher–parent and teacher–teacher relationships need to be fostered and maintained. The social and emotional learning of teachers (and educators) should be a must in order for teachers to knowledgeably manage social interactions and support the social and emotional development of their students. School leaders should play an active role in building a positive learning environment where the whole school community feels included, connected, safe and respected, and where trust and partnership dominate. Schools such as those will not only ensure higher learning outcomes but also provide a trustworthy basis for student social development, and respond to the parents' need for leaving their children in a safe, stimulative and encouraging environment.

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[99] Although prescribed by law, this has not become widespread in practice. Good examples do exist though, such as the dropout prevention system piloted and promoted by the Centre for Education.
[100] PISA 2018 Database.

4.7.4 Increasing education attractiveness and relevance

In order to be relevant, education should take into account the national context and the EU area of education and training, as Serbia has committed to becoming a part thereof. In its Economic Reform Programme for the period 2021-2023, Serbia has committed to developing digital skills, lifelong learning, and qualifications in line with labour market needs, and to improving school-to-work transition through work-based learning. In addition to the overall reform efforts to be undertaken, the focus needs to be on digital education training and apprenticeships - all in partnership between public and private actors. Sector Skills Councils /SSC/ are the main instrument for identifying qualification needs, and are a cooperation platform for employers and education. The priority in building institutional capacity should be to raise the competencies of SSC members, which has already begun to unfold through certain trainings that included two main areas: profiles and qualifications. We are advocating that more time should also be devoted to different methodologies for skills forecasting, especially those taking into account demographic changes as a variable. Focusing only on secondary education, as mentioned in previous Chapters, Serbia spends the least portion of the budget on secondary education. The mostly theoretical nature of Serbia's VET programmes can help explain the low per-student spending, whereas these programmes tend to be more costly across OECD countries, because of the need to adapt infrastructure and materials for practical learning (ETF, 2020). In order for VET programmes in Serbia to become more relevant, changes in financing need to ensure sufficient funds for improving practical teaching, investing in new technologies, and raising teacher capacities in VET (especially of practical subjects). Moreover, postsecondary and short-cycle courses at higher skills levels are in demand by employers and individuals, but these offers are insufficiently developed in the Serbian VET system. Expanding the VET system with postsecondary and short-cycle courses should be a priority, especially having in mind the grave needs of the economy in the context of depopulation.

CHAPTER 6

Depopulation and Public Health

Željka Stamenković

Depopulation is a social phenomenon relating to a reduction in the population of a country, with drivers behind it being simple, comprising low fertility rates, external and internal migrations and high mortality rates.

From the public health perspective, the increase in fertility rates and high mortality rates are intercorrelated and joint measures are necessary to overcome the current situation. All three driving forces of depopulation (fertility, migration, and mortality) result from human decisions - when to have children and how many, where to live, and a series of decisions over a life course affecting how long we live - and reflect the full complexity of human decision-making. This includes a web of interlinked personal resources (such as knowledge and skills, personal ties, socioeconomic status, etc.) and the spatial and social structures influencing access to opportunities (including culture, infrastructure, governance, or the environment).

One of the main causes leading to a low fertility rate is infertility99 as a global problem that happens in one out of five couples. Lifestyle factors, the rise in obesity and environmental factors in relation to urbanization are also affecting fertility and leading to a rise in male and female subfertility100 .

Couples and women are postponing childbirth and this has led to a true drop in their fertility level due to ovarian ageing and related reasons leading to reduced outlooks for conception. Postponement of childbirth is becoming one of the key determinants of negative trends in fertility and overall demographic development. There are various causes behind the postponement. One of them is extended education. More and more women are focused on acquiring higher levels of education. Consequently, the time of childbirth is postponed until the woman completes her education. Based on recent research, a direct relationship has been established between the increase in the age at which women give birth to their first child, which is a ubiquitous trend in many European countries, and a higher level of educa-

tion of women and the higher portion of their participation in paid jobs (Veljović, 2017).

General instability in social, intimate and business relationships is also strongly reflected in adapting to the everyday life context, especially when it comes to major life decision such as childbirth (Conger et al., 2010). On the other hand, delaying in family planning as a complex social phenomenon could be associated with the absence of enough formally educated and trained resources to care for older people, when younger are burdened with an additional financial and emotional burden, but also with the time they have to dedicate to the older people which lead to their decision to postpone the childbearing (Rijken, 2009).

High mortality rates caused by a higher prevalence of risk factors for chronic non-communicable diseases (NCDs), availability of healthcare services and other factors, directly contribute to a decrease in population size. Also, the rising share of the older population (persons aged 65 or over) contributes to the high mortality rate due to the poor health of this population and associated diseases that can lead to lethal outcomes. Wider health determinants that influence health, such as socioeconomic status, lifestyle, health services, should be aimed at improving the health of the population and, consequently, decrease the mortality rate. In order to prevent depopulation, we need to seriously address and reduce the incidence of NCDs.

Given that the overall goal of public health is to prevent disease, promote health and improve the quality of life, in this chapter we will review what can be done in the existing context in order to change the current picture of the depopulation trend. This chapter will speak about the basic characteristics of the health care system in Serbia, the main causes of low fertility and high mortality rates, health indicators of the elderly population, as well as the health consequences of the current COVID-19 pandemic. The chapter ends with policy recommendations on how to adjust public policies to the new demographic reality.

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[101] Infertility is defined as the inability to conceive after 12 months or more of regular unprotected intercourse.

[102] Subfertility is a reduced reproductive capacity in a woman or man.

1 Health System of the Republic of Serbia

The health system of the Republic of Serbia is mostly centralized with the Ministry of Health as the main decision maker, which closely cooperates with the Republic Health Insurance Fund (RHIF) and the Institute of Public Health of Serbia "Dr Milan Jovanovic Batut" (IPH). The Republic Health Insurance Fund (RHIF) represents the state agency for the fiscal distribution of funds collected through social security contributions.

Provision of health care services. In terms of accessibility, Serbia has a comprehensive universal health system with free access to health services at the primary level, but there are inequalities in the use of health services, with the most vulnerable, uninsured and Roma having more problems accessing health care. Financial constraints are the main reason for unmet needs for health care, which are more common among people with lower levels of education and among the poorest sections of the population. In addition, a survey of catastrophic direct payments among the population showed 2.3% of the population was affected, with a higher incidence rate in rural areas, numerous households, the poorest households, and those with a chronic illness (WHO, 2019).

State-owned health facilities form a wide network at the primary, secondary and tertiary levels, and are overseen by the Ministry of Health. The first level of contact with the health care system is realized in primary health care institutions that are established for the territory of the city, i.e. one or more municipalities in accordance with the Decree on the Plan of the Health Institutions' Network (2020). From this level, users, i.e. patients are referred to higher levels, primarily to the level of secondary health care - specialist-consultative and hospital, where more complex health services are provided. When the health problem exceeds the hospital capacity, patients are referred to the tertiary level of health care (Law on Health Care, 2019).

Services provided in the private sector are paid for out of pocket or through additional private health insurance (Law on Health Insurance, 2019).

The state or autonomous province provides the funds for the construction and equipment of state health institutions, which includes: capital investments, investments for maintenance of premises, procurement of medical and other equipment necessary for the operation of the health institutions and transportation means, procurement of equipment for the development of an integrated health information system, as well as for other obligations determined by law and the founding act.

At the national level, the Ministry of Health develops a plan for the number of health workers in health institutions based on the Decree on the Plan of the Health Institutions' Network (2020), which includes employees covered by individual health plans of health institutions. The public sector is the main employer of health workers in Serbia.

Funds for the functioning of the health system are provided through contributions for compulsory health insurance, general taxation, out-of-pocket payments, voluntary health insurance premiums, and international donation-based financing initiatives. The main source of income for financing health care in Serbia are contributions for compulsory health insurance that come from the salaries of employees and the profit of the employer. The Law on Contributions for Compulsory Social Insurance (Official Gazette, 2022) defines the contribution rate including the rate for compulsory pension and disability insurance (26%), for compulsory health insurance (10.3%) and for unemployment insurance (0.75%). Contributions for compulsory pension and disability insurance and unemployment insurance also go partly into the RHIF, through contributions from the Republic Pension and Disability Insurance Fund and the National Employment Service. In relative terms, as a percentage of its gross domestic product (GDP), Serbia spends a significant part of its funds on health care.

The Republic of Serbia allocates a higher percentage of gross domestic product (GDP) for health care compared to a number of European countries. However, in terms of absolute amount, Serbia allocates small funds for health care compared to other European countries, which is a consequence of the relatively low level of gross domestic product. According to available data, in 2018 in Serbia, total health expenditures accounted for 8.5% of GDP, more precisely 1484 USD per capita (according to purchasing power parity) (Krstic et al., 2019). Total health care expenditures grew over a ten-year period, showing a steady decline in their share of the gross domestic product (WHO, 2021). Public sources of financing in the health system have been constantly declining over the last decade, reaching 59.4% of total health expenditures in 2018. Consequently, private expenditures are a significant source of funding, accounting for 39.6% of total health care expenditures in 2018 (WHO, 2021). Out of pocket payments (OOP), in the form of co-payments and direct payments, account for the vast majority of this private spending (around 96%), while voluntary health insurance accounts for less than 1% of total health spending. Compulsory health insurance contributions from the National Health Insurance Fund, RHIF, represent the largest share in total health revenues from public sources (94%) (IPH, 2018). Currently, the system of financing social health insurance is very burdened and most of the burden of financing is placed on employees in the public sector.

2 Infertility

Infertility is defined by the International Committee for Monitoring Assisted Reproductive Technology (ICMART) and WHO as the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse (Zegers-Hochschild et al., 2009). Infertility is a global problem and it affects a significant proportion of humanity. Global infertility prevalence rates are difficult to determine, due to the presence of both male and female factors which complicate any estimate which may only address the woman and an outcome of a pregnancy diagnosis or live birth (WHO, 2022b). WHO has calculated that over 10% of women are affected – women who have tried unsuccessfully, and have remained in a stable relationship for five years or more. Estimates in women using a two-year time frame, result in prevalence values 2.5 times higher. The burden on men is unknown. The overall burden of subfertility and infertility is significant, likely underestimated, and has not displayed any decrease over the last 20 years (WHO, 2022c).[103]

According to the data of the Institute for Health Metrics and Evaluation (IHME), University of Washington, one in every four couples in developing countries was affected by infertility. A WHO study has shown that the overall burden of infertility in women from 190 countries has remained similar in estimated levels and trends from 1990 to 2010 (IHME, 2022). Unfortunately, the data on infertility is not available for the Republic of Serbia. As a result, we will rely on European estimates. Although these figures are not encouraging, the field of reproductive medicine and endocrinology is rapidly growing, with success stories that have resolved infertility and fertility problems – methods of raising fertility awareness to more advanced innovations. The availability of assisted reproduction technologies (ART) has been evolving over the years, and their application in the Republic of Serbia differs in fertility clinics which are covered by the Decree on the Plan of the Health Institutions' Network (public institutions) and those outside the Plan of the Health Institutions' Network (private institutions). Since the end of 2006, the National Health Insurance Fund (NHIF) has been financing the National Infertility Treatment Programme. In the period from 2009 to 2017, the Ministry of Health passed the Law on the Treatment of Infertility using Biomedically Assisted Fertilisation Procedures (2009) and a number of bylaws, while in 2017 the Law on Biomedical Assisted Insemination (2017) was adopted. In order for a couple, i.e. an insured person to be included in the in vitro fertilization programme at the expense of the health insurance, either in public or private health care institutions, they must meet the prescribed conditions (IPH, 2018).

According to the last available data, during 2017, the entitlement to infertility treatment using ART was provided in 16 health institutions (state and private-owned) that carried out 3,108 ART procedures, which is 22% more than in the previous year. After private health institutions were introduced into the health insurance system in 2016, there was a decrease in the total number of services provided in public institutions, while the number of services provided in private health care institutions increased significantly. One of the possible explanations could be a better quality of care in private institutions but also the question of privacy, that is, of patient anonymity.

Patients whose medical indications require any of the other technologies can access them at biomedically assisted fertilization (BAF) centres that are outside the Network Plan at their own expense.101

According to statistics from the Report of the Special Monitoring Body of the European Society for Human Reproduction and Embryology (ESHRE), which analysed the work of clinics in 2013, 15 Serbian clinics reported 2,720 cycles of in vitro fertilization and the

birth of 908 new-borns (EIM, 2017). In Serbia, the practice of ART is presented as a contribution to the birth rate despite the data which shows that the share of births resulting from successful in vitro fertilization is negligible in the total birth rate, i.e. around 1.5%

of babies in relation to the total average number of births in Serbia (about 65,000), which is a low share of participation relative to Slovenia (6%), Denmark (6.2%) or Finland (5.8%) (Kupka et al., 2016; Kričković, 2018).

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[103] World Health Organization. Infertility is a global public health issue. Available at:
https://www.who.int/reproductivehealth/topics/infertility/perspective/en/ (accessed September 15, 2021)

[104] The region of Vojvodina records a significant increase in the provision of ART services, especially in private health care institutions (IPH, 2018). The reasons underlying these regional disparities of ART service should be a subject of future research.

3 Lifestyles

Lifestyle factors refer to the behaviour and ways of life that could influence the general health and wellbeing of individuals including fertility. While many aspects of life are not modifiable, lifestyles may be changed. As fertility can be influenced by a variety of factors, one possible explanation for the declining fertility trend would be that there are different lifestyle practices that contribute to the deterioration of male and female fertility. Research shows that lifestyle factors such as nutrition, weight, exercise, sleeping, physical and psychological stress, risk behaviours e.g. smoking, alcohol consumption, substance and drug use and abuse, etc. have profound effects on health and disease. Fertility is no exception. They play a key role in determining reproductive health and can positively or negatively influence fertility in women, in men, or in both (Acharya et al., 2017; Sharma et al., 2013).

While lifestyle influences the possibility of conception, lifestyle is significantly influenced by socio-economic determinants. Poverty is one of the key factors in explaining differences in lifestyles and health outcomes. These differences are also impacted by differences in the position held in society by an individual or population group (which is also reflected in access to resources such as education, employment, housing), and the level of participation in society and control over one's own life. Higher incomes and higher social status are associated with healthier choices and better health outcomes. The greater the difference between the richest and the poorest people, the greater the difference in health. Also, a low level of education increases the likelihood that a person will choose an unhealthy lifestyle, which leads to poorer health outcomes. Better access to health services affects disease prevention and faster treatment. These socio-economic determinants strongly interact and influence lifestyle choices and health in general. Improvement in one of them can produce an improvement in health behaviour or in health outcomes among individuals but also in entire populations (WHO, 2003; WHO, 2008).

According to our information, there is no adequate data on the manner and extent to which health topics are covered by school curricula. It is known that there are no individual subjects that deal with public health issues, but that such teaching units are sporadically processed within other subjects such as biology or physical education. On the other hand, right after the home, children spend most of their time in school, which is why the school is identified as an institution where it is necessary to intervene in order to raise the awareness of children and employees about the importance of a healthy lifestyles and to stimulate them to take action. i.e. change.

Nutrition from the earliest period of life has a significant impact on health, reproductive potential and mortality. Children's nutrition status reflects their overall health. When children have access to adequate food, are not exposed to frequent illness, and are well cared for, they reach their growth potential and are considered well-nour-

ished. On the other hand, malnutrition is associated with nearly half of all child deaths worldwide. Children suffering from malnutrition are more likely to die from common childhood ailments, and those who survive fall ill more often and experience faltering/slow growth. Three-quarters of children who died from causes related to malnutrition only had mild or moderate forms of malnutrition, meaning they showed little outward sign of their vulnerability. Malnutrition is not the only aspect of nutrition that has health implications. The results of numerous studies that have dealt with nutritional status have shown that the phenomenon of obesity in childhood and adolescence is the best indicator of the burden of risk factors for the development of chronic non-communicable diseases later in life. Obesity is closely linked to other risk factors (diet and physical inactivity) (WHO, 2022d).

The results of the Multiple Indicator Cluster Survey (MICS) conducted in 2019 showed that the prevalence of child malnourishment (moderate and severe) in Serbia as a whole is relatively low. Indicators of nutrition status from 2019 show a better picture in comparison to 2014 and 2010 (Chart 2) (SORS & UNICEF, 2021).[105]

The Roma population, which is among the most vulnerable in Europe, especially in the Republic of Serbia, is often exposed to discrimination, social marginalization and poverty, which also leads to less access to health services. The nutritional status of children under the age of five living in Roma settlements shows a less favourable situation than in the general population. In 2019, 7.3% of children under the age of 5 were malnourished, 22.6% were stunted in growth, 3.4% were stunted in weight in relation to height, and 9.7% were obese. Compared to 2014 and 2010, almost all indicators of nutrition (except obesity) are favourable in this population (Chart 2), but still much less favourable than in relation to the general population.

In order to improve the nutritional status of the Roma population, both health education and the health system need to be strengthened. In the broader sense, the overall socio-economic status of Roma families' needs to be improved - by educating parents, through schooling, preventing early marriages and empowering family planning. Regular monitoring of child nutrition indicators is necessary in order to better plan initiatives intended for children. Given that the risk of obesity in the later years of childhood and adolescence is often established in the early stages of life, it is important to pay necessary attention to the obesity that occurs in early life. Combating obesity and providing better services for children require a multi-sectoral approach, in particular cooperation between the education and health systems. Malnutrition in Roma children requires additional attention outside the health system in order to resolve the issue of food availability, hygiene, and other socioeconomic determinants that affect health outcomes.

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[105] Statistical Office of the Republic of Serbia and UNICEF. 2019. Multiple Indicator Cluster Survey in the Republic of Serbia. Final Report. Belgrade, Serbia: Statistical Office of the Republic of Serbia and UNICEF.
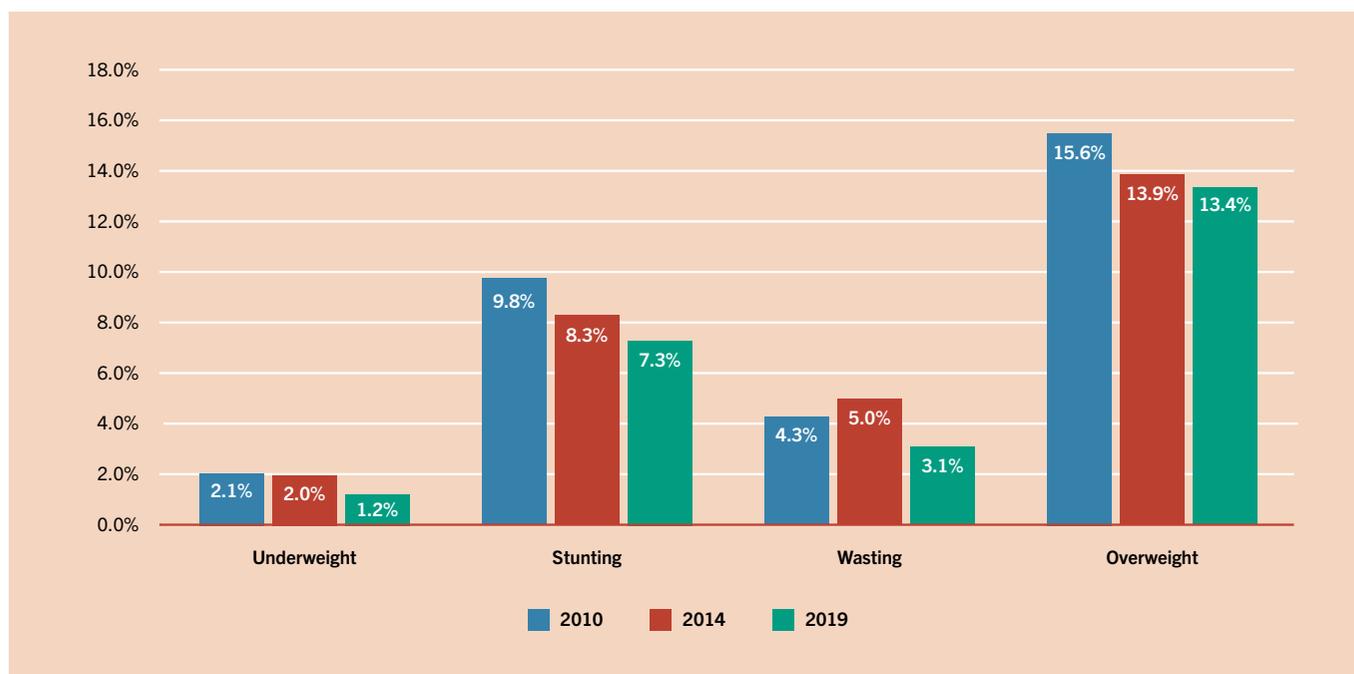
Chart 1. Nutrition status among children under the age of 5

Among adults, malnourishment and obesity, and related non-communicable diseases represent not only a health but also an economic and social burden for individuals, families, the community and society as a whole. Being overweight is associated with an increased risk of leading non-communicable diseases such as type 2 diabetes, cardiovascular diseases and malignancy (Guh et al., 2009). A higher body mass index (BMI)[106] can impact hormonal imbalances, pregnancy risks and the number of drugs needed for fertility treatments, in females and sperm numbers in males (Amiri et al., 2020).

The frequency of obesity has long had been epidemic in nature on a global level, and the WHO formally marked the obesity epidemic as early on as 1997 and pointed it out as an important public health problem (WHO, 1998). Serious health risks, shortening of life expectancy
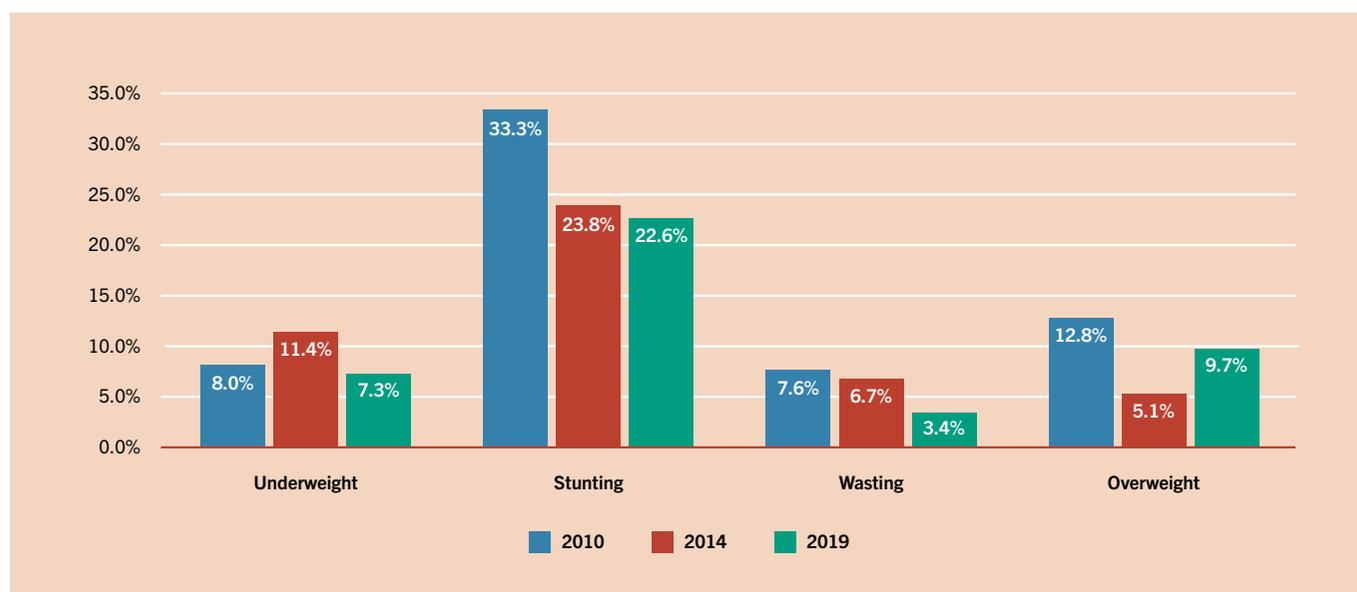
Chart 2. Nutrition of Roma children under 5, living in Roma settlements

Source: SORS and UNICEF, 2021.

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[106] Body mass index (BMI) is a measure for indicating nutritional status in adults. It is defined as a person's weight in kilograms divided by the square of the person's height in metres (kg/m2). BMI values indicate the following: BMI below 18.5: underweight; BMI 18.5-24.9: normal weight; BMI 25.0-29.9: overweight; BMI ≥ 30: obesity.
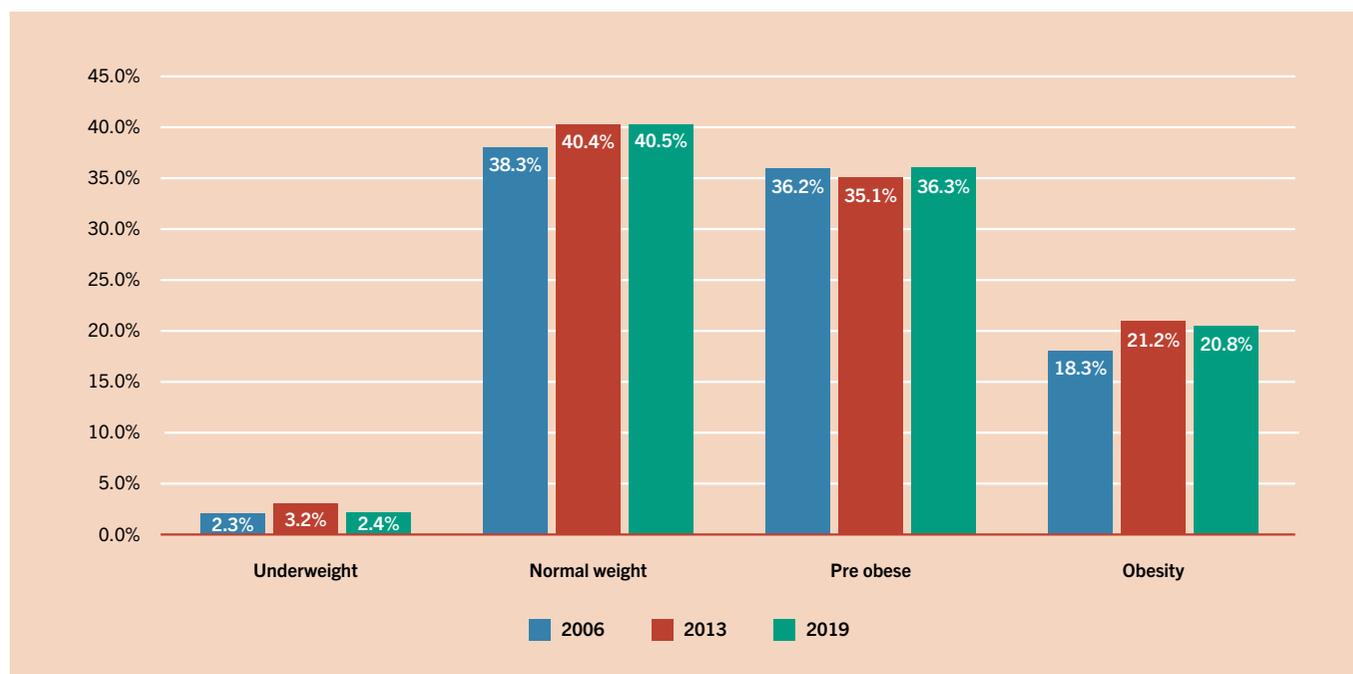
Chart 3. Nutrition status on adult population in Serbia

and enormous economic effects associated with obesity represent an additional burden, especially when it comes to chronic non-communicable diseases and disability (Gardner & Halweil, 2000).

The results of the last three health surveys (2006, 2013 and 2019) show that, in the adult population in Serbia, there are no significant changes in the nutritional categories over time (Chart 3) (Milić et al., 2021; Grozdanov et al., 2014). Nevertheless, the fact that every third person is pre-obese and every fourth is obese is alarming and demands that measures be taken to prevent obesity and reduce its impact during a life span.

With the understanding that the risk of obesity in the later childhood years and in adolescence is often established in the early stages of life, regular monitoring of child nutrition is necessary in order to better plan initiative intended for children under the age of five and school-age children. The fight against obesity and the provision of better services for children requires a multi-sectoral approach, and in particular cooperation between the education and health systems. In order to improve the nutrition status in the Serbian population, which will later have a positive impact on health outcomes, the overall socio-economic status needs to be improved. Good nutrition is also influenced by care practices and the pursuit of a healthy lifestyle.

Proper eating habits ensure optimal intake of nutrients needed to maintain good health and, among other, include a daily balanced intake of all types of food divided into several meals during the day (breakfast, lunch, dinner and two snacks). In addition to the choice of foodstuffs, the frequency of their intake is also important, i.e., the number of meals and food preparation methods. Malnutrition is one of the leading risk factors for many diseases such as diabetes, heart and blood vessel diseases, malignant and oral diseases (WHO, 2003). During a 2019 health survey (Milić et al., 2021) eating habits were examined such as daily intake of fruit and vegetables, milk and dairy

products, bread, fish, types of fats used in the diet/for food preparation, breakfast prevalence and salt consumption habits among adults above the age of 15. Results showed that 83.8% of the population of Serbia had the habit of having breakfast every day (Milić et al., 2021). Compared to 2013, progress was observed in terms of an increase in the percentage of the population having breakfast every day (78.1%) (Grozdanov et al., 2014). The daily consumption of fruit (fresh, frozen, canned, dried, excluding freshly squeezed juices) and vegetables or salad (fresh, frozen, dried, canned, excluding vegetable juices and soups) was less favourable in 2019 than 6 years earlier (39.4% of consumers compared to 45.6% ate fruit; 50.2% of consumers compared to057.1% ate vegetables). The same pattern was also observed in the daily consumption of milk and dairy products having been consumed daily by 41.8% of the population in 2019, which is a significant decline compared to 2013 when the percentage was 51.7% (Milić et al., 2021; Grozdanov et al., 2014).

In Serbia, in 2019, 86.2% of the population used bread in their diet every day. The use of animal fats for meal preparation increased in 2019 (39.2%) compared to 2013 and 2006 (25.9% and 33.6%, respectively) (Milić et al., 2021).

Based on this data, we can conclude that people in Serbia have been worsening their eating habits in recent years, especially in the intake of dairy products and fruit and vegetable consumption. The reasons are numerous and range from a faster pace of life, modernization, to availability and affordability of unhealthy. For these reasons, additional efforts are needed to raise awareness among the population of the importance of healthy eating, and of adherence to eating recommendations, which would significantly reduce the risk of chronic disease.

Regular physical activity reduces the risk of overeating, chronic non-communicable diseases such as breast and colon cancer, heart and vascular diseases, diabetes and vascular diseases, diabetes and

has positive effects on mental health and the quality of life (WHO, 2018a). Also, physical inactivity is one of the factors that significantly contribute to infertility (Foucaut et al., 2019). According to the 2019 data, half of the Serbian population (46.3%) was exposed to moderate physical exertion or walking, during their work activities (including paid and unpaid work, work at home or around the house, family care, studying), while 41.1% was exposed to light physical effort (involving mainly sitting or standing) (Milić et al., 2021). Heavy physical exertion (which implies very hard work or physically demanding activities) was recorded in 9.8% of the population, while 2.9% of the population did not perform any work activity. The majority of the Serbian population (93.8%) was performing 10 minutes of physical activity not related to work activities at least once a week was (93.2% were walking, 23.2% cycling, 13.8% practicing fitness, sports or recreation and 7.2% were doing an intense physical activity intended to increase muscle strength) (Milić et al., 2021).

Continuous walking for at least 10 minutes per day is a rather widespread practice (75.2% of respondents in 2019) and it does not differ significantly compared to 2013 (72.9%). Cycling is less popular with only 9% of the population cycling for at least 10 minutes per day. This sort of activity is somewhat more present in Voivodina (23.5%) compared to other geographical areas, probably due to the flat terrain in Voivodina and existing cycling paths (Milić et al., 2021; Grozdanov et al., 2014).

All in all, it seems that physical activity is not a priority for the Serbian Population, although it may contribute to positive health outcomes. They are less physically active compared to 6 years ago. Every fourth citizen does not walk for at least 10 minutes per day. If only young people were to turn to moderate physical activity, which can be a 30-minute walk a day 5 times a week, the risk of developing the most common chronic non-communicable diseases such as hypertension and diabetes would be significantly reduced. It is widely recognized that a supportive environment may be needed to promote and achieve an enduring increase in activity at the population level. This is particularly the case with cycling which is rare and requires the provision of cycling infrastructure.

We need to pay particular attention to the lifestyles and habits of young people who represent a special population group that mostly contributes to the rate of fertility and population growth. The results of a 2021 survey on the position and needs of young people show that only 14% are physically active and the majority (85%) would like to be more physically active. Bearing in mind the most common reasons given by young people as the cause of their inactivity (fatigue, lack of time, lack of company for exercise, lack of exercise space), it is necessary to devise a strategy that supports building an environment for physical activity so that exercise infrastructure is easily accessible to all, especially on an open space, and that the contents are promoted through modern communication channels (MoS, 2020).

Tobacco use is associated with an increased risk of illness and death from respiratory diseases, heart and blood vessel diseases, numerous malignant and other diseases (WHO, 2008a). In Serbia, the use of tobacco has been one of the most common health risk factors for many years. This is confirmed by the results of the 2019 and 2013 Population Health Surveys.

In 2019, the prevalence of habits of smoking tobacco products (daily or occasional) in the population of 15 and over was 31.9% (Milić et al., 2021). This prevalence is somewhat lower than in 2013 when it was 34.7% but still very high and requires additional efforts to reduce it (Grozdanov et al., 2014). As regards the young, 24,5% are active smokers (MoS, 2020). This is particularly important because smoking affects reproductive potential and may significantly reduce the ability for conception (Kovac et al., 2015; Levine et al., 2017). Surveys clearly indicate that the infertility rates among smokers are double than among non-smokers (American Society for Reproductive Medicine, 2022).

One step to reduce this habit in the population would be to implement evidence-based tobacco control measures, in accordance with the World Health Organization's Framework Convention on Tobacco Control (WHO, 2008b). In recent years, new tobacco and nicotine products have appeared on the market and their popularity is growing. Heated tobacco products and electronic cigarettes represent a new challenge in global efforts to protect the population from the effects of tobacco use and exposure to tobacco smoke. In 2019, electronic cigarettes or similar electronic devices (daily or occasionally) were used by 3.3% of the population.

With the ratification of the World Health Organization's Framework Convention on Tobacco Control in 2007, the Republic of Serbia, together with 139 other countries, committed herself to comprehensive action to control tobacco and adopted the Tobacco Control Strategy (2007). The state has, thereby, set tobacco control as a priority. A step forward was made in 2010, when the Law on the Protection of the Population from Exposure to Tobacco Smoke was passed. This Law regulates measures restricting the use of tobacco products in order to protect the population from exposure to tobacco smoke, control the smoking ban and supervise the implementation of this Law (Law on the Protection of the Population from Exposure to Tobacco Smoke, 2010). Various anti-smoking campaigns were conducted prior to and after the Law was enacted, but the prevalence of smoking is still very high. The results of the 2019 health survey indicate that the legislation and its implementation need to be improved in line with the WHO Framework Convention on Tobacco Control (2003) by a total ban on smoking in all workplaces and public places without exception, including a total ban on smoking in cafes and restaurants, where exposure to tobacco smoke is highest. Since almost half of the population (48.9%) over the age of 15 was exposed to tobacco smoke indoors every day (Milić et al., 2021) it is necessary to strengthen mechanisms that would have, as their ultimate goal, less non-smoker exposure to tobacco, and thereby timely reduce the risk of harmful consequences that smoking (either active or passive) has.

Alcohol abuse is a significant health, social and economic problem. Alcohol abuse is a common cause of traffic and other accidents, violence, liver disease and other chronic diseases, and is one of the leading risk factors for premature death (WHO, 2018b). The harmful use of alcohol is determined not only by the volume but also by the frequency of drinking. The volume of alcohol consumption and the pattern of drinking affect both health and social outcomes. Specifically, intoxication[107] on certain occasions is a major public health concern, as it has adverse consequences on an individual's well-being, as well as on social and mental behaviour.

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[107] Intoxication is the most common form of excessive alcohol use and is typically manifested after males consume in excess of 5 and women in excess of 4 drinks in around 2 hours.
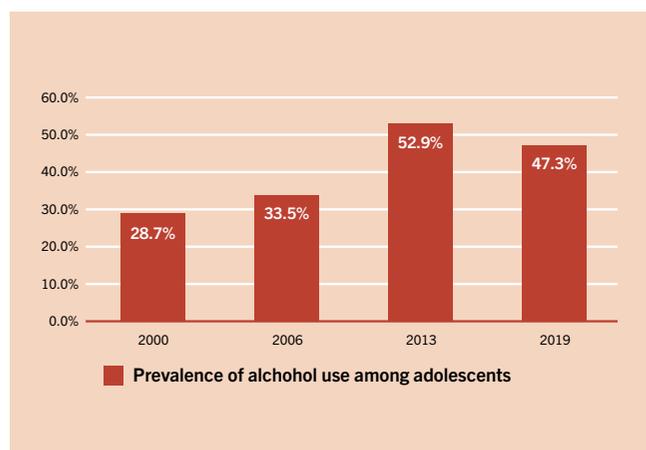
Chart 4. Prevalence of alcohol use among adolescents

Source: DevInfo, Republic of Serbia. Statistical Office of the Republic of Serbia. Electronic Database. Available at: http://devinfo.stat.gov.rs/SerbiaProfile-Launcher/

Half of the Serbian population (50.7%) does not consume alcohol (39.3% have never tried alcohol and 11.4% have not consumed alcohol in the previous 12 months). According to data from 2019, 3.1% of the population consumed alcohol on a daily basis, which is a slight drop compared to 2013 (4.7%) and 2006 (3.4%) (Milić et al., 2021).

However, the use of alcohol among adolescents in 2019 has increased by almost 60% compared to 2000 (Chart 4). There is a trend of alcohol consumption among young people called the culture of consumption instead of communication, which means that the earlier pattern of drinking "socializing with alcohol" has now been replaced by "intoxication with possible socializing" (Đorđević, 2016). This pattern of drinking is harmful because it is associated with different types of deviant and criminal behaviour including fights, quarrels, thefts or traffic violations. The largest number of violent acts – hooliganism and vandalism - were committed by young people under the influence of alcohol. This behaviour represents a global trend and it has grave consequences on physical and mental health, as well as wider social consequences.

4 Mortality Data

High mortality rates are caused by a higher prevalence of risk factors for chronic NCDs, unavailability of healthcare services and other factors, and directly contribute to a decrease in population size. Wider health determinants impacting health, such as and consequently decrease the mortality rate. The prevention of chronic NCDs must be imperative in an effort to tackle depopulation.

In this section, we will analyse mortality rates by periods of life – from infants, through the perinatal period, to maternal mortality rates. In the next section, we will analyse mortality rates by cause.

4.1 Mortality rates by period of life

The infant mortality rate[108] is a significant and delicate indicator of both the health status and health care of the population, i.e. of the overall level of socioeconomic development. In the EU in 2019, around 14,100 children died before reaching the age of one. This is equivalent to an infant mortality rate of 3.4 deaths per 1,000 live births. Over the last decade, the infant mortality rate in the EU fell from 4.2 deaths per 1,000 live births in 2009 to 3.4 deaths per 1,000 live births in 2019 (Eurostat, 2021a).

The mortality rate of new-borns in the Republic of Serbia has significantly improved; it has dropped from 6.7 infants per 1,000 live births in 2010, to 4.8 per 1,000 live births in 2019 (SORS, 2021). The infant mortality rate in Roma settlements is 8 per 1,000 live births, and it is notably higher than the national average (SORS & UNICEF, 2021). However, the infant mortality rate in 2019, in Roma settlements, shows significant progress compared to 2014 (13 per 1000 live births) and 2010 (14 per 1000 live births) (SORS, 2014; SORS, 2012).

The most common causes of infant death are premature birth, complications relating to childbirth (birth asphyxia), infections and congenital defects (WHO, 2020). In Serbia, the most common causes of death are certain conditions originating in the perinatal period, and congenital malformations, deformations and chromosomal abnormalities (IPH, 2020).

Such causes indicate the need to step-up the monitoring of the health of infants and pregnant women through mandatory examinations, counselling centres, and home-visit nurses. Also, health education should, among other, be specifically focused on the health of infants and children in order to detect, cure (if possible), and prevent infant death.

In light of the overall improvement in the infant mortality rate, the slow progress in the reduction of the perinatal mortality rate is disturbing.[109] The rate of stillbirths and deaths during the first week after birth was 8.1 per 1,000 live births in 2019 (which is a decrease compared to a rate of 9 per 1,000 in 2010). The perinatal mortality

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[108] The rate of infant mortality is the number of deceased children of up to one year of age per 1,000 live births during one calendar year.

[109] Perinatal mortality is defined as the number of fetal deaths past 22 (or 28) completed weeks of pregnancy plus the number of deaths among live-born children up to 7 completed days of life, per 1,000 total births (live births and stillbirths). From: International Encyclopedia of Public Health, 2008
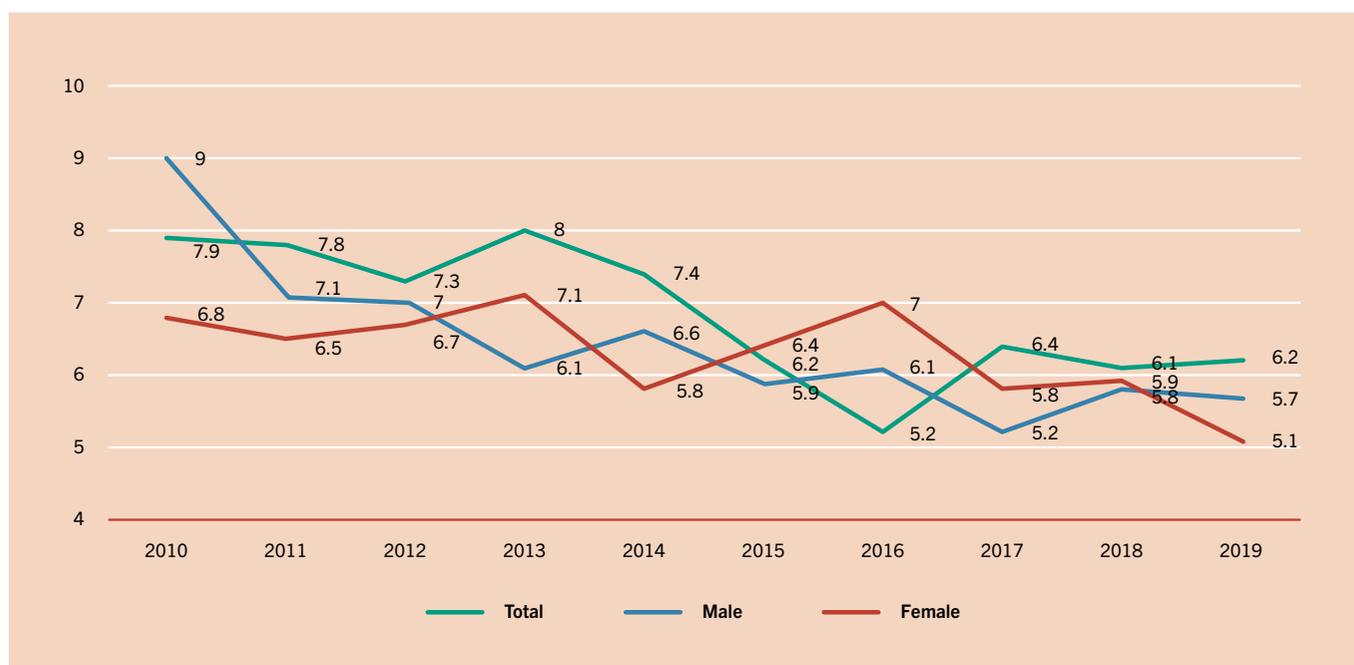
Chart 5. Mortality rate of children under the age of 5 in the Republic of Serbia, 2019, 2019

Source:

rate is relatively high compared to the EU, where the rate was 6.7 in 2015 (WHO, 2021). A necessary measure to reduce the stillbirth rate, and thereby reduce mortality in the perinatal period in Serbia, is foetal death analysis according to the methodology applied in all countries with developed perinatal and neonatal health care systems (e.g. perinatal revision). Special attention should be paid to social determinants of health. Efforts by the Ministry of Health to improve the organization of perinatal health care are underway through the strengthening of four perinatal centres (in Belgrade, Novi Sad, Niš and Kragujevac), and through improving human resources, equipment, and transportation.

In order to obtain more information on the social, economic and environmental conditions in which children live, including their health status, the mortality rate of children under the age of five is used (calculated as the deaths of children between the ages of 0 and 5, per 1,000 live births). The mortality rate of children under the age of five in the Republic of Serbia is 5.7 (IPH, 2020). Observed by sex, the under-fives mortality rate shows a gradual decline among boys, while there was significant fluctuation among girls over the last ten years (SORS, 2021). Looking at the European Union, as a reference framework where the mortality rate of children under five is 3.91 (WB, 2022), there is room in Serbia to improve practices in paediatric health care, which would, consequently, reduce the number of deceased children.

The under-fives mortality rate among Roma children is almost double compared to the general population (10 per 1,000 live births). Although this rate among Roma children in the 2019 MICS survey was almost twice as high, it is significantly lower than in previous MICS surveys (2014: 14.4 per 1,000 live births, 2010: 15 per 1,000 live births, and 2005: 28 per 1,000 live births) (SORS, 2021).

Although this rate among Roma children in the 2019 MICS survey was almost twice as high, it is significantly lower than in previous MICS surveys (2014: 14.4 per 1,000 live births, 2010: 15 per 1,000 live births, and 2005: 28 per 1,000 live births) (SORS, 2021). With the SDG target (3.2) for child mortality – on ending preventable deaths among new-borns and children under 5 years of age – the international community has retained the overarching/comprehensive goal of reducing child mortality. While the global target calls for a reduction in neonatal mortality to at least as low as 12 deaths per 1,000 live births, and the under-fives mortality to at least as low as 25 deaths per 1,000 live births, reducing child mortality continues to be one of the most important objectives in national plans and programmes in every country (UN, 2015).

The value of the maternal mortality indicator[110] for 2019 at the level of the Republic of Serbia is 6.21 (IPH, 2020), which practically does not differ from the European Union, where the maternal mortality rate is also 6 per 100,000 live births (WHO, 2022). These figures may be due to unforeseen complications such as bleeding, infection or high blood pressure, which can occur during pregnancy, childbirth or puerperium (a period of 6 weeks after delivery) and which are lethal. The maternal mortality rate has been dropping since 2012 (SORS, 2021), which is a result of the introduced recommendations and protocols during pregnancy and puerperium. These recommendations include a minimum of 4 check-ups during pregnancy, the presence of a skilled attendant at delivery and delivery in a health institution, which is a World Health Organization recommendation. These results are a signpost indicating the direction in which we should continue applying good practices in the field of women's health care during pregnancy and childbirth.

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[110] The maternal mortality rate is the number of women who had died in pregnancy, in labour or puerperium (for reasons related to these conditions) per 100,000 live-birth children. The rate of maternal deaths or death of the mother is the death of a woman during pregnancy or within 42 days of pregnancy termination, regardless of the duration and location of the pregnancy, for whatever reason which is linked to aggravated by pregnancy or its course, but not as a result of accidental or indirect causes.

4.2 Deaths by causes of death

Cardiovascular diseases, malignant tumours, diabetes, obstructive lung disease, injury and poisoning, and mental health disorders have been recognized as major chronic NCDs in our national pathology for decades. Cardiovascular diseases and malignant tumours accounted for more than two-thirds of all deaths in Serbia in 2019. More than half of all lethal outcomes (51.6%) are the consequence of dying from diseases of the circulatory system, and almost one in five persons who died (21.0%) was the victim of a malignant tumour (Table 1). This is far higher than in the EU, where 37.1 % of all deaths are the conse-

quence of cardiovascular diseases, while 25.8% are due to malignant neoplasms (Eurostat, 2021b). In the Republic of Serbia, 3% of the population died as a consequence of diabetes complications. This is somewhat more than in the EU, where over 2% of all deaths are associated with diabetes (Eurostat, 2021c).

In the 2010 to 2019 period, there was a slight increase in the overall mortality rate (3.2%) due to higher mortality from leading chronic NCDs. The highest mortality increase was associated with obstructive lung disease (6.8%), malignant diseases (6.0%), and diabetes (0.7%), while the biggest drop in mortality was associated with a drop in injury and poisoning (12.3%), and in circulatory diseases (2.7%) (Table 2).

Causes of death (ICD-10)	Total			Male			Female		
	n	%	Mortality rate*	n	%	Mortality rate*	n	%	Mortality rate*
Total	101,458	100.0	1460.8	51,309	100.0	1516.3	50,149	100.0	1408.1
Certain infectious and parasitic diseases	735	0.7	10.6	405	0.8	12.0	330	0.7	9.3
Neoplasms	21,976	21.7	316.4	12,483	24.3	368.9	9,493	18.9	266.5
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	298	0.3	4.3	120	0.2	3.5	178	0.4	5.0
Endocrine, nutritional and metabolic diseases	3,196	3.2	46.0	1,416	2.8	41.8	1,780	3.5	50.0
Mental and behavioural disorders	1,448	1.4	20.8	637	1.2	18.8	811	1.6	22.8
Diseases of the nervous system	2,586	2.5	37.2	1,135	2.2	33.5	1,451	2.9	40.7
Diseases of the eye and adnexa	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Diseases of the ear and mastoid process	1	0.0	0.0	1	0.0	0.0	0	0.0	0.0
Diseases of the circulatory system	52,330	51.6	753.5	24,112	47.0	712.6	28,218	56.3	792.3
Diseases of the respiratory system	5,504	5.4	79.2	3,220	6.3	95.2	2,284	4.6	64.1
Diseases of the digestive system	3,151	3.1	45.4	1,794	3.5	53.0	1,357	2.7	38.1
Diseases of the skin and subcutaneous tissue	129	0.1	1.9	58	0.1	1.7	71	0.1	2.0
Diseases of the musculoskeletal system and connective tissue	164	0.2	2.4	48	0.1	1.4	116	0.2	3.3
Diseases of the genitourinary system	2,310	2.3	33.3	1,258	2.5	37.2	1,052	2.1	29.5
Pregnancy, childbirth and the puerperium	4	0.0	0.1	0	0.0	0.0	4	0.0	0.1
Certain conditions originating in the perinatal period	201	0.2	2.9	114	0.2	3.4	87	0.2	2.4
Congenital malformations, deformations and chromosomal abnormalities	114	0.1	1.6	64	0.1	1.9	50	0.1	1.4
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	4,478	4.4	64.5	2,430	4.7	71.8	2,048	4.1	57.5
Injury, poisoning and certain other consequences of external causes	2,833	2.8	40.8	2,014	3.9	59.5	819	1.6	23.0

Table 1. Death by causes of death and sex in Republic of Serbia, 2019

per 100,000 people

Sources: Health-Statistical Yearbook of the Republic of Serbia 2019 Belgrade: Institute of Public Health "Milan Jovanović Batut". 2020.

As can be observed, additional efforts are needed in promoting a healthy lifestyle and in increasing knowledge and awareness of healthy habits, periodical check-ups and screening programmes that can significantly influence the decrease in the mortality rate from chronic NCDs.

Therefore, cardiovascular diseases are the leading cause of death in Serbia. Over the last decade, the mortality rates from cardiovascular diseases fell from 774.2 per 100.000 to 753.4 per 100.000 residents (Chart 6).

In 2019, 52.330 people in the Republic of Serbia died from cardiovascular diseases. Females were dying more often than males. While the mortality rate in females was 792.3 per 100,000, in males it was 712.6 per 100,000. This female/male mortality ratio is completely opposite to the EU ratio where the rate for men is 1.4 times higher than for women (1.1 times higher in Serbia) (Eurostat, 2021b). Although in Serbia women use health services and visit specialists more often than men (Milić et al., 2021), mortality from cardiovascular diseases is higher among them compared to men. It is not known why this is so, but it is certainly necessary to work on preventive activities, not only within the health sector and in health institutions (usually at the primary level of health care), but also outside health institutions (in the community) in order to reduce mortality from cardiovascular diseases (both in men and women).

Diseases and conditions	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cardiovascular diseases										
Total	774.2	764.8	763.6	744.9	757.1	766.3	738.2	764.4	754.2	753.4
Male	722.8	720.9	721.9	702.5	711.0	714.5	692.0	712.4	710.9	712.6
Female	822.8	806.4	803.2	785.2	800.8	815.5	782.0	813.8	795.4	792.3
Malignant neoplasms										
Total	289.9	289.4	295.4	294.4	299.0	301.3	305.0	305.9	309.4	307.3
Male	341.8	342.3	346.1	346.9	348.9	358.2	356.4	353.4	357.9	358.6
Female	240.8	239.3	247.4	244.6	251.6	247.2	256.1	260.7	263.4	258.5
Injuries and poisoning										
Total	46.5	45.8	45.6	44.3	43.1	43.1	40.5	42.5	40.2	40.8
Male	69.7	68.9	69.7	66.9	64.7	63.7	60.1	62.1	60.7	59.5
Female	24.4	23.9	22.8	22.7	22.6	23.5	21.9	24.0	20.7	23.0
Diabetes										
Total	43.8	43.2	41.7	39.1	35.2	42.7	44.8	49.7	45.5	44.1
Male	38.5	37.6	36.2	36.6	31.6	38.7	39.3	45.7	42.3	40.2
Female	48.9	48.5	46.9	41.5	38.73	46.4	49.9	53.5	48.6	47.8
Chronic obstructive pulmonary disease										
Total	36.6	37.3	37.5	36.0	35.0	38.3	37.8	41.6	38.8	39.1
Male	47.3	49.0	48.5	45.3	43.7	48.0	46.6	50.6	46.8	47.4
Female	26.5	26.3	27.1	27.1	26.8	29.2	29.4	33.0	31.2	31.3
All causes of death										
Total	1415.5	1418.1	1422.4	1400.0	1419.7	1461.2	1428.6	1477.3	1445.8	1460.8
Male	1466.0	1475.9	1480.7	1459.4	1468.9	1509.1	1475.1	1513.4	1499.0	1516.3
Female	1367.7	1363.3	1367.1	1343.7	1373.0	1415.7	1384.4	1443.1	1414.9	1408.1

Table 2. Mortality rates (per 100.000) from the most common non−communicable diseases by sex, Republic of Serbia, 2010−2019

Source: Health-Statistical Yearbook of the Republic of Serbia 2019 Belgrade: Institute of Public Health "Milan Jovanović Batut". 2020.
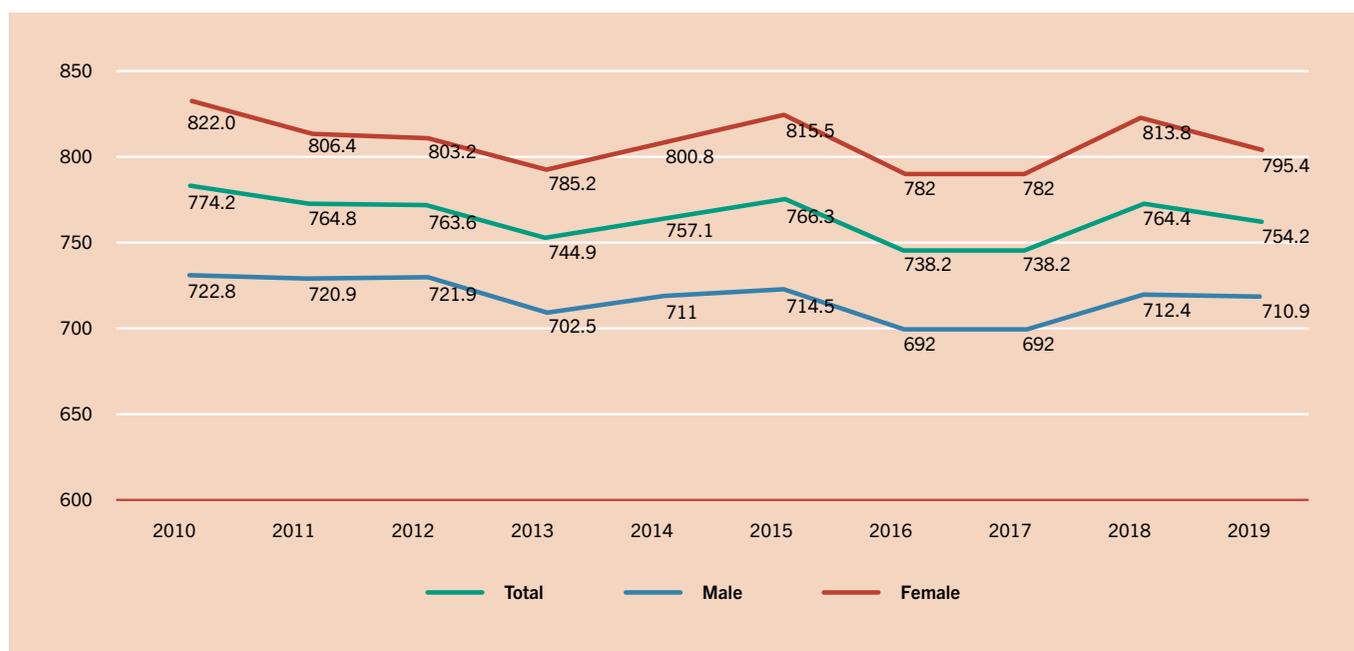
Chart 6. Mortality rates (per 100.000) from cardiovascular disease, Republic of Serbia, 2010-2019

Source: Health-Statistical Yearbook of the Republic of Serbia 2019 Belgrade: Institute of Public Health "Milan Jovanović Batut. 2020

The second important causes of death are malignant tumours. Until recently, the epidemiological situation with regard to malignant tumours in our country was monitored only based on mortality rate data (although the cancer registry was established in 1970). When the Population-Based Cancer Register in Central Serbia was reorganized in 1996, the number of recorded newly diagnosed cases has doubled. This is a huge step which is important for monitoring the situation of

the incidence rate in different regions in the Republic of Serbia. When cancer is diagnosed at an early stage, the prognosis and success of the therapy are better.

In the territory of the Republic of Serbia, in 2019, 21,340 people died of. The registered mortality rates in men were 358.6 per 100.000, and in women 258.5 per 100.000 residents (male/female ratio 1.4) (Chart
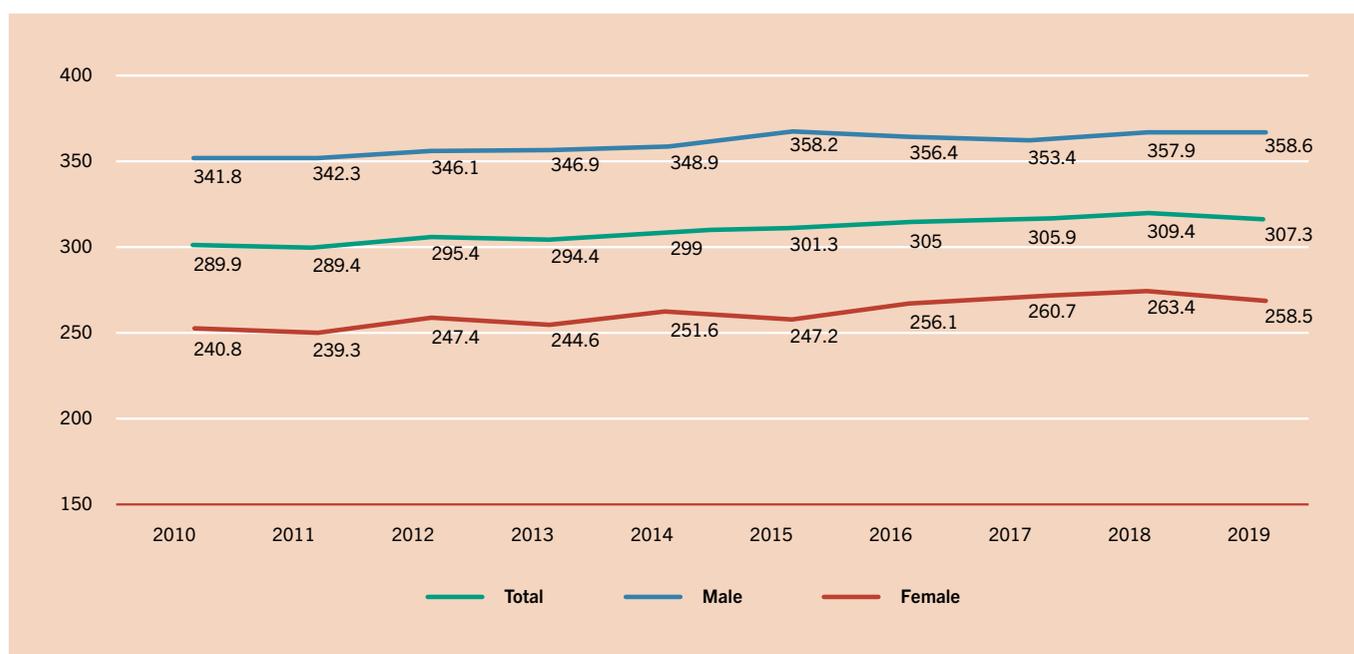
Chart 7. Mortality rates (per 100.000) from malignant neoplasms, Repubic of Serbia, 2010-2019

Source: Health-Statistical Yearbook of the Republic of Serbia 2019 Belgrade: Institute of Public Health "Milan Jovanović Batut. 2020.

7). In the EU, the standardized cancer death rate for men is 344.0 per 100 000, and for women 196.2 per 100 000, which is 75% higher, i.e. 196,2 per 100.000 (male/female ratio 1.7) (Eurostat, 2021d).

According to the Cancer Register data, men most often die of bronchial and lung cancer, colon, rectum, and prostate

cancer. In women, the most frequent sites of malignant tumours are the breasts, bronchia and lungs, colon and rectum (Table 3). High mortality rates from breast cancer and colon cancer are ambiguous having in mind that there are three existing National screening programmes (breast cancer, cervical and colon cancer). Low response rate could be caused by poor organization of the screening programmes, as well as by the low level of health literacy[111] in the population. Besides this, the low educational and socio-economic level of the population additionally contributes to the low response rate in our country, and this is also a problem on a global scale. Some research has even shown that certain life habits, such as smoking or frequent alcohol consumption, reduce the likelihood of a person responding to a screening call (Chang et al., 2017). 110 However, preventive check-ups are of crucial importance for health problems to be identified at an early stage and efficiently treated, thus reducing overall health care costs. Better organization and motivation of primary health care, with adequate political support (resources and funding), can increase the coverage of screening programmes.

In addition to cardiovascular disease and malignant tumours, diabetes is one of the most common chronic non-communicable diseas-

Male		Female	
Primary localizations	Mortality rates per 100,000	Primary localizations	Mortality rates per 100,000
Lung and bronchus	52.6	Breast	20.7
Colon and rectum	20.7	Lung and bronchus	19.6
Prostate	11.1	Colon and rectum	10.7
Urinary bladder	7.8	Pancreas	5.5
Pancreas	8.4	Ovaries	5.3
Stomach	6.4	Cervix	7.4
Oral cavity and pharynx	5.7	Stomach	3.7
Larynx	5.5	Liver	3.4
Liver	4.6	Corpus uteri	2.9
Kidney	4.8	Brain	3.7
Other localizations	37.7	Other localizations	26.0
All localizations	165.3	All localizations	108.8

Table 3. Cancer mortality rates according to the leading localizations for males and females in the Republic of Serbia, 2017

Source: Health-Statistical Yearbook of the Republic of Serbia 2019. Belgrade: Institute of Public Health "Milan Jovanović Batut". 2020.
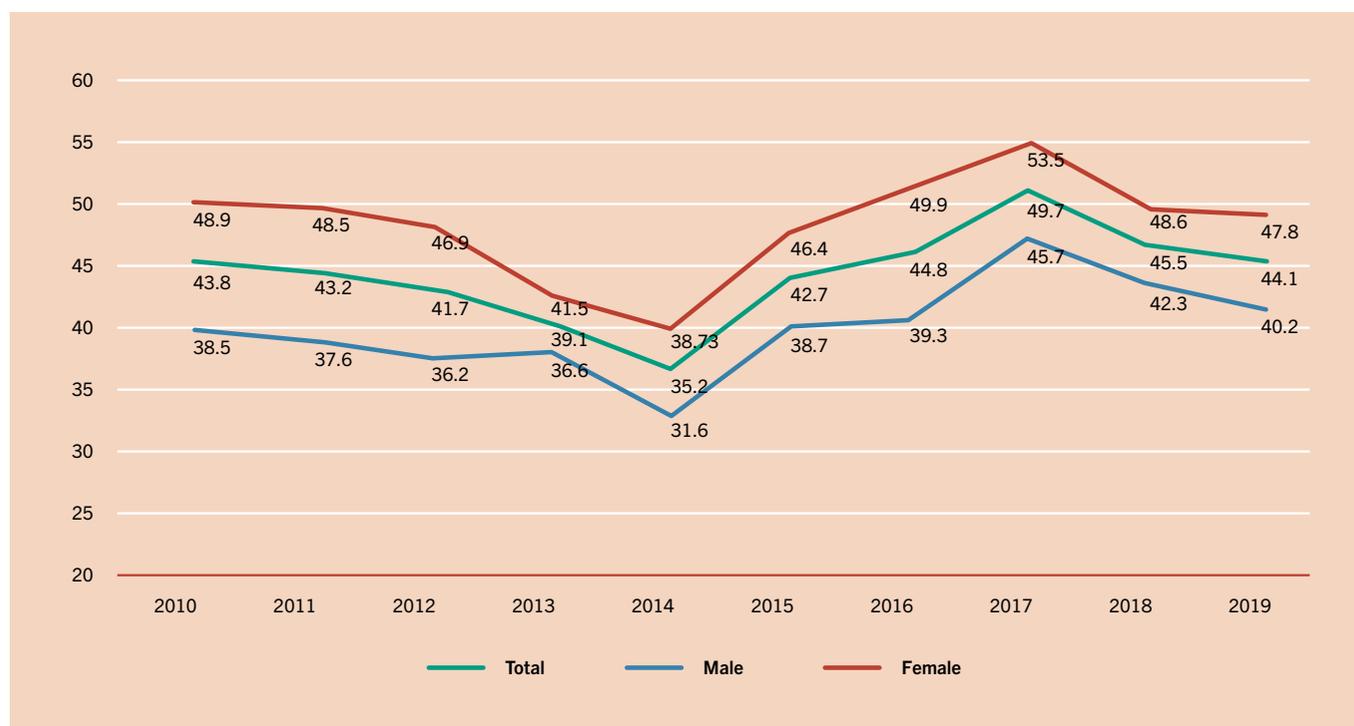
Chart 8. Mortality rates (per 100.000) from diabetes, Repubic of Serbia, 2010-2019

Source: Health-Statistical Yearbook of the Republic of Serbia 2019 Belgrade: Institute of Public Health "Milan Jovanović Batut. 2020.

[111] Health literacy is the level up to which an individual is capable of finding, understanding and using information and services in order to reach decisions and act for the benefit of his/her own health or health of another.

es. The prevalence of diabetes has been increasing for a long time, bearing in mind the global distribution of this epidemic. The World Health Organization (WHO) and the International Diabetes Federation (IDF) estimated in 2011 that 366 million people worldwide have been suffering from diabetes, and that the number of diabetics will increase up to 552 million by the year 2030 (Whiting et al., 2011).

Diabetes is the third leading cause of death in the world, while in Serbia it is the fourth leading cause of death and the fifth cause of the burden of disease. In our country, approximately 3,000 people die from diabetes annually (IPH, 2020). For the last ten years, an increasing trend of diabetes mortality has been observed in Serbia Mortality rates due to diabetes mellitus have increased from 43.8 in 2010 to 44.1 per 100.000 residents in 2019 (Chart 8). Compared to the EU, Serbia has diabetes mortality rates which are almost double (total mortality rate 23.99 per 100,000 residents, male 27.84 and female 20.88 per 100,000 residents) (Eurostat, 2021). These values are not surprising given the fact that diabetes in Serbia is often discov-

ered by chance, when the disease has progressed and complications have occurred. Almost a third of patients already have one or more late complications at the time of the diabetes diagnosis being made (IJZ, 2021). Although diabetes depends on genetic factors, a healthy balanced diet and physical activity can contribute to maintaining optimal blood sugar levels.

Preventive check-ups are important in order to identify health problems at an early stage, enable more efficient treatment and reduce overall health care costs. Measuring blood pressure, measuring blood sugar or cholesterol levels and their deviations from reference values may be the earliest indicators of cardiovascular disease or diabetes. Also, adhering to the recommendation for mandatory screenings that exist in Serbia (for breast cancer, cervical and colon cancer), and increasing the coverage of the target population with national screening programmes is crucial in order to reduce the number of deaths from certain types of cancers.

5 Health Aspects of Ageing

The main characteristics of the population in the Republic of Serbia are maintaining the low birth rate trend and aging population, with an increase in general mortality rates. These changes have brought the population to the threshold of demographic age. As life expectancy increases at birth, so does the number and share of older people in the population, or people over 65. While the share of older persons in 2002 was 16.6%, in 2011 it increased to 17.3%, while in 2020 it reached one fifth of the total population (21.1%). Projections predict an increase in the number of older persons in the future, as well as their even higher share in the total population, to as much as 24.1% (SORS, 2022; Nikitovic, 2021).

Age is one of the factors that contribute the most to low health literacy (Cutilli, 2007). There are several different age-related changes that could contribute to reduced health literacy in older people such as reduced cognitive ability that impairs an elderly person's ability to understand or recall new topics (Cornett, 2006; Kintsch, 1998). Physical impairments such as hearing and vision loss may also contribute to reduced ability to process health information (Cornett, 2006; Speros, 2009). Unfortunately, as the gap in physical and cognitive abilities between the younger generation and elderly adults widens, it can lead to feelings of shame and embarrassment that reduce effective communication channels and further complicate the health literacy

of elderly adults (Cornett, 2006; Speros, 2009). Lack of knowledge and/or skills related to health can serve as an obstacle to engaging in healthy behaviour, prevention services, and management of acute and chronic diseases (Chesser et al., 2016).

As the number of elderly people in the population increases, so does the risk of developing chronic non-communicable diseases. Data show that 34 million deaths worldwide are attributed to chronically non-communicable diseases each year, with three-quarters of them being those of persons over the age of 60 (Jones, 2016). With the increase in the number of elderly people, the pressure on the health care system is growing, as well as the treatment costs of elderly people for whom chronic non-communicable diseases are the primary reason for using health care services (Boutayeb et al., 2005).

In Serbia, the share of people with a chronic disease under the age of 65 is at the level of 20.6%, while over four fifths of the elderly (85.7%) have a long-term illness or health problem, which is an increase compared to 2013. The most common chronic disease among older persons is hypertension, i.e. high blood pressure, which is present among 63.8% of the older population. This is the most common disease in other European countries among the population aged 65 and over. The value of this parameter ranges from 29.5% in Norway to 68.4% in

Hungary in the 65 to 74 age group, while in the 75 and over age group, the lowest percentage was also recorded in Norway (33.7%) and the highest in Bulgaria (72.6%) (Eurostat, 2022). High blood pressure is followed by painful changes in the lower back (32.2%), coronary heart disease (24.7%), pain in the cervical spine (23.3%), high lipids (21.0%), diabetes 18.6%), arthrosis (18.0%) and urinary incontinence (10.4%), while others accounted for less than 10%. Observed by demographic characteristics, the frequency of all mentioned diseases is significantly higher among people aged 75 and over, compared to those aged 65-74 (Milić et al., 2021).

When it comes to elderly persons, it is important to emphasize the functional limitations that can significantly affect the ability to perform daily routine tasks, including personal hygiene, care and dressing. [112] Functional limitations also have an impact on lifestyle, as well as on participation in social activities. It is essential to evaluate and monitor functional limitations in older persons in order to provide them with timely support, therapy or appropriate assistance.

A 2019 survey of the health of the population in Serbia showed that just under one third of older people in Serbia had serious difficulties in performing daily household activities, and almost every tenth resident in performing personal care activities, which is unchanged compared to 2013. In Serbia, in 2019, almost half of the older population (44.8%) had a functional walking restriction, 40.7% had a functional limitation of vision, and 45.9% had a hearing impairment. Persons over 75 were also significantly more likely to have these functional difficulties (with walking 41.0%, vision 14.0%, and hearing 24.5%). Compared to the period 6 years ago, when every third older resident (37.1%) had difficulty walking, every ninth (10.7%) with vision, and almost every fourth (23.6%) with hearing, there was an increase in the prevalence of functional limitations in the older population (Milić et al., 2021; Grozdanov et al., 2014). In the EU, around two thirds of people over the age of 65 reported a functional (physical or sensory) limitation. While in the population over 65 years of age these values differ slightly compared to Serbia (walking restriction 44.1%, vision restriction 31.2% and hearing restriction 44.9%), in the population aged over 75 the share of people with visual impairments has almost tripled (38.9%) while with hearing this value is double (55.3%) (Eurostat, 2022). The aging trend of the population inevitably brings with it the challenge of providing resources to overcome the limitations that older people face in order to preserve and improve their health and quality of life.

Due to the presence of diseases and accompanying functional limitations, old persons are unable to perform daily activities and are therefore in a situation to use home care and assistance services provided by health workers or social services workers. Also, given the high representation of older persons living alone, often also without family support, people over the age of 65 already have and will have a greater need for home care and palliative care services in the future.

In 2019, 5.2% of older people used these services, which is significantly less than the percentage of older people who stated that they need-ed help. In the older population with difficulties in performing household activities, more than a third (37.0%) had an unmet need for help. In the population of older people with difficulties in performing personal care, almost half (44.8%) had an unmet need for help. The largest percentage of the population who cannot perform activities related to personal care without the help of another person are people aged 65 to 74 (Milić et al., 2021). Such data clearly point to the lack of capacity of health and social services to provide adequate and timely care and assistance to older persons, and to meet their needs for the use of home care and assistance services, and for palliative care.

"Palliative care is another type of health care that includes care for patients with severe, chronic diseases, most often in the terminal stages of diseases that have a progressive course (cardiovascular disease, malignant diseases, diabetes, neuromuscular, cerebrovascular diseases, HIV/AIDS, traffic injuries and others), as well as their families. The Strategy for Palliative Care (2009) adopted in 2009 included palliative care into the health system of the Republic of Serbia, and its goal was to strengthen, in respect of organization and personnel the existing home treatment and care services at the primary level of health care, establishment of home treatment and care services where they did not exist. (in 88 primary health care centres). At the secondary level, the establishment of special palliative care units within the department for extended treatment and care was envisaged, as well as an increase in bed capacity for palliative care (40 beds per 1,000,000 residents). The Decree on the plan of the network of health institutions defines the total bed fund for extended treatment and care, which includes geriatrics, palliative care, chemotherapy, physical medicine and rehabilitation, but there is no data on the exact number of beds provided for palliative care. For comparison, in the European Union, which has a very similar demographic trend, the estimated palliative care capacity is 80 beds per 1,000,000 residents (Radbruch et al., 2010).

In the absence of sufficient bed capacity for palliative care in health institutions, the care of persons in need of palliative care is taken over by the social welfare system. Due to the lack of capacity of the health system or the inability of the family to adequately care for the sick family member, the older persons mostly end up in social

care accommodation institutions (founded by the Republic of Serbia or the Autonomous Province of Voivodina, but also in private homes for the elderly). This is not an ideal solution due to insufficient health care staff and lack of standards, but it is often the only solution for both the patients and their families. Institutions for the accommodation of the older population thus unofficially become socio-health institutions, for which there is a legal basis, but standards have not yet been adopted. As the largest number of patients in these wards consists of the oldest population, and bearing in mind the percentage of the old population that is increasing from year to year, palliative health care requires additional reorganization in terms of capacity building (infrastructure, organization and staffing) to adapt to the age structure of the population.

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[112] Functional limitations represent the basis for the assessment of the population health in terms of capacity for daily functioning regardless of the reasons for the limitation (congenital limitations, limitations brought on by illness, accident, aging, etc.)

6 Health Consequences of the COVID-19 Epidemic in the Republic of Serbia

In 2020, the world faced a pandemic[113] of a new type of corona virus, SARS-CoV-2, which causes the disease COVID-19. Healthcare organizations and healthcare workers were the first to be hit by this newly discovered disease. The early response to COVID-19 in Serbia was based on the strong existing framework of the Law on Public Health (2016). Adequate emergency response and disease control systems, highly qualified teams of public health professionals at the Institute of Public Health, and a network of 24 regional public health institutes helped delay the onset and magnitude of the outbreak in Serbia.

Although the health sector has been relatively resilient to COVID-19, the outcomes have been uncertain, primarily due to a shortage of qualified medical staff who have migrated to Europe in the recent past, attracted by higher salaries. According to some estimates, over 10,000 doctors have left Serbia in the past 20 years, and the health system lacks 3,500 doctors and 8,000 nurses (Harris and AFP, 2020). While access to health care is relatively equal, people in sparsely populated areas and those with lower incomes report higher unmet health needs, and frequent evasion of health insurance contributions by employers prevents affected workers from exercising their right to health care. This deficit has significantly compromised Serbia's health response to the COVID-19 crisis (OECD iLibrary, 2022).

The first case of COVID-19 in the Republic of Serbia, in Voivodina, was confirmed on March 6, 2020. In the Republic of Serbia, a state of emergency was introduced due to the COVID-19 virus epidemic on March 15, 2020 by the Decision on declaring a state of emergency. On March 19, the Minister of Health of Serbia passed the Order on declaring the epidemic of the infectious disease COVID-19 in the territory of the entire country (2020), and the epidemic is still ongoing. COVID-19 leads to a serious acute respiratory condition that requires intensive care and hospitalization, especially in older patients and those with pre-existing chronic health problems. High-risk groups are immunosuppressed persons, persons with respiratory diseases, older persons, cancer patients, pregnant women and people with serious congenital diseases of the heart and blood vessels.

As a result of infectious diseases in 2020, 5660 people died, with a mortality rate of 82.04/100,000, which is significantly higher than in the previous year 2019 (2.64/100,000). Such a high mortality rate is a consequence of the large number of deaths associated with COVID-19. In 2020, COVID-19 is the most dominant disease in the group of infectious diseases with a total share of 78.93%. in the total affliction. In 2020, COVID-19 ranks high third in the causes of death with 8.9% (men 11% and women 6.6%). The first two places are still occupied by diseases of the circulatory system (47.3%) and tumours (18.3%) (IPH, 2021).

The percentage of deaths from COVID-19 increases significantly among the older population, and while the percentage of deaths among young people does not exceed 1%, in the population over 65 this value exceeds 15% (Table 4).

By February 21, 2022, 1,887,596 cases of COVID-19 had been confirmed in Serbia, resulting in 14,904 deaths, giving a mortality rate of 0.79% (Corona virus, 2022).

At the end of 2020, the first contingent of vaccines against COVID-19 arrived in Serbia. Currently, 5 types of different vaccines are available in the Republic of Serbia. Vaccines are free and citizens of the Republic of Serbia can choose the vaccine they want to be vaccinated with. The level of collective immunity required to successfully eliminate or control a disease depends on the epidemiological characteristics of each individual infection. According to the epidemiological characteristics of the COVID-19 disease observed so far, a collective immunity of around 80% is expected to be sufficient to successfully control a coronavirus pandemic. This does not mean that the virus and the disease will disappear, but a reduction in the frequency of the disease, sporadic occurrence or seasonal character is expected. In Serbia, unfortunately, vaccination coverage is far from the recommended 80%. 48.62% of the population was partially vaccinated while 47.39% were vaccinated with two doses of the vaccine. The percentage of the population that received a booster dose of the vaccine is 26.94% (Our World in Data, 2022).

Age category (in years)	0	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	>85	Ukupno
N	2	2	0	0	1	10	24	20	60	123	198	348	591	979	1664	1921	1548	1590	1271	10356
%	0.02	0.02	0.00	0.00	0.01	0.1.	0.23	0.19	0.58	1.19	1.19	3.36	5.71	9.45	16.07	18.55	14.95	15.35	12.27	8.86

Table 4. Number and percentage of deaths from COVID-19 by age groups, 2020

Source: Health-Statistical Yearbook of the Republic of Serbia 2020. Belgrade: Institute of Public Health "Milan Jovanović Batut". 2021.

[113] An infectious disease pandemic is the contraction of illness which transcends state borders and spreads to the majority or the entire world, endangering people in all affected areas.

One of the most serious consequences that the population has encountered more accurately and continues to face during the epidemic is the inability of residents/insured to use health care services due to lack of capacity of the health system (resource allocation, occupancy of hospital wards converted into Covid-wards, transformation of complete inpatient institutions at the secondary and tertiary level into the Covid regime). Due to the inability to use health care services in the public sector, they often had to turn to private health services, which consequently led to the services being paid for directly from the "pocket of citizens". Such expenditures are already very high for the citizens of the Republic of Serbia, and with the COVID-19 epidemic will only show the inequalities that exist in access to health care, especially for the poorest. Such outcomes for the health system require serious analysis, as the impact of the epidemic on the health system will be felt in the future. (World Bank Group, 2020),

In addition to direct allocations for health services, available information shows that standard, ongoing immunization programmes have been discontinued to some extent. Almost one in four children was in need of health services during the crisis (23%), and approximately one third (33%) did not meet such needs as specialist examinations, including vaccinations either due to lack of staff in institutions or because parents do not want to provide this service during the crisis and in light of the introduced health risks and restrictions on movement (UNICEF, 2020a). Data from UN research show that almost 27% of women and 19.9% of men had difficulty accessing health services during COVID-19 (UN WOMEN & UNFPA, 2020; UNFPA, 2020). Access to sexual and reproductive health services was problematic for 4.5% of women,

with young women reporting the most common problems in accessing these services (UNFPA, 2020). More than half of young people (54%) confirmed that they had limited access to health services due to the crisis. They stated that they were denied services such as the chosen doctor in the health centre for preventive purposes (25%), gynaecologist (14%), specialist (14%), doctor for the purpose of treatment (12%), psychological counselling (4%) and reproductive counselling (1%), while 30% stated that there were other services they could not access that did not fall into any of the given categories (UNICEF, 2020b).

The general situation regarding access to health care and other services for vulnerable persons and vulnerable groups in Serbia creates another social risk that has been exacerbated by the crisis. Persons with disabilities, Roma population, residents of shelters and care facilities, older persons, persons without health insurance, persons with chronic diseases, migrants, single parent households, economically marginalized, residents of geographically challenging areas, prisoners, among other groups face a systemic unequal access to health services that has survived and only expanded during the pandemic (United Nations human rights team in Serbia). In addition to directly affecting the health of individuals due to disruptions in health services, the disruption to economic activity is expected to seriously affect employment levels, access to education and income security, all of which affect people's ability to procure basic goods such as food, fuel and housing, which further negatively affects health outcomes, exacerbating health inequalities and disproportionately affecting people living in poverty and other vulnerable groups (UNDP, 2020).

7 Use of Digital Technologies / Telemedicine in the Era of the COVID-19 Pandemic

The COVID-19 pandemic has also affected the use of digital technologies in the daily work of health professionals and has led to the expansion of telemedicine in many other countries as well as in the Republic of Serbia (CDC, 2020). [114] The eZdravlje (eHealth) portal (also available as a mobile application) is designed to provide information and enable the use of electronic services in the Serbian healthcare system. Currently, the portal is intended for insured persons tested for the presence of coronavirus, in order to obtain feedback on test results. Also, through the application, it is possible to download the electronic confirmation of the vaccination against COVID-19 (MoH, 2022a).

At the time of the pandemic, an additional challenge is to continuously provide health care to patients who are not infected with the

SARS-CoV-2 virus. Telemedicine is used as a strategy to maintain the continuity of health care, as far as possible, in order to avoid the negative consequences of delaying preventive examinations or providing services to patients with chronic diseases. Using telemedicine, the doctor can determine when it is best for the patient to come to the health institution for an examination, all with the aim of reducing unnecessary patient visits to health institutions. Doctors can use electronic prescriptions and provide multi-month dispensing of medicines in order to further reduce the need for patients coming in to surgeries, which has been implemented in our pharmacies since 2017 MoH, 2022a. With the introduction of the state of emergency, the validity of electronic prescriptions has been extended by three months in order to minimize the risk of coronavirus transmission. This means

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[114] Telemedicine is defined as the use of information technology – tablet devices, telephones and computers – for providing health care services when the health care worker and patient are not in the same location.

that electronic prescriptions and therapy are used for a maximum of nine months, counting from the last prescription instead of the previous six months (MoH, 2020).

In addition to electronic platforms, it is important to emphasize the existence of national telephone lines for suicide prevention, for psychosocial support in the COVID-19 epidemic, for adolescents, for psychological support for women before, during and after pregnancy, for women victims of violence. All of these lines operate 24 hours a day and conversations must be confidential and may be anonymous. Also, the telephone counselling centre "Hallo baby", which has existed since 2001 within the Centre for Health Promotion of the City Institute of Public Health in Belgrade, receives calls and answers parents' questions regarding the health and development of children (Hallo baby, 2022). Some of these lines, such as the National Line for

Psychosocial Support in the COVID-19 Epidemic was established specifically during the epidemic, but others are equally important, because such telephone lines are a way to provide information, assistance and advice in crisis situations to people in need of such assistance.

It is clear, however, that in circumstances of patient conditions requiring clinical examination, radiological or laboratory examination, telemedicine cannot be used. Also, the limiting factor for the use of telemedicine can be the availability of devices or internet connections. This is especially true for patients living in rural areas and older people. The older population has acquired the habit of going to the doctor's office, and thereby a face-to-face conversation. This cultural habit, as well as the age of the patients, are factors that can significantly impact the lower use of the possibilities of telemedicine.

8 Conclusions and Policy Proposals

A healthy start to life and healthy habits later in life result in fewer fertility problems, more favourable health outcomes, a longer, more productive and better quality of life, which overall leads to later death. On the other hand, demographic changes, which are characterized by the aging of the population, require changing the existing framework of health policy and adapting to new demographic conditions, in the following directions: more and better preventive services and more health services for older persons.

All health policy measures aiming to tackle depopulation should, in essence, be preventive in nature. Preventive healthcare deals with the prevention of illness to decrease the burden of disease and associated risk factors. Preventive measures should be applied at all stages across the lifespan and along a disease spectrum, to prevent further decline over time. Prevention is described as primordial, primary, secondary, or tertiary and they often overlap.

The primordial prevention is a population health approach characterized as the actions that are taken to prevent future hazards to health and to decrease (known) risk factors. The broad determinants of health are addressed rather than individual exposure to risk factors. Primordial prevention consists of actions to modify population health determinants and inhibit the establishment of factors (environmental, economic, social, behavioural) known to increase the future risk of disease. Primordial prevention is typically the responsibility of governments. The government is expected to modify the system and factors that damage health, but also to contribute to actions that have a positive impact on health. It could include, for example, tobacco control strategies or urban planning.

Primary prevention prevents the onset of chronic disease by reducing the risk factors for its development. One type of primary prevention is reducing risks through changes in either behaviour or exposure,

e.g. reducing cardiovascular risk through lifestyle changes such as healthy eating and not smoking. Another form of primary prevention is increased resistance to exposure to illness by means of vaccination. Immunisation is particularly important in times of great epidemics or pandemics, such as the current COVID-19 pandemic.

Secondary prevention involves the detection and treatment of preclinical changes. Screening procedures are often the first step, leading to early and more cost-effective interventions. The screening process is the combined responsibility of the individual and their healthcare providers, with an emphasis on patient engagement.

Tertiary prevention focuses on improving the quality of life by reducing disability, limiting or delaying complications, and restoring functions. It helps to lessen the impact of disease on the patient's overall life. The patient has more contact with the healthcare system, and care providers in many roles and settings. Although tertiary prevention is important for patients and their families to provide a better quality of life, it cannot help as much in the prevention of depopulation.

At the level of primordial prevention, government should introduce additional taxes to producers of fatty and salty foods, restricting advertising of unhealthy products, and imposing stricter requirements for opening and expanding fast-food restaurants, especially near schools. There is no doubt about the importance of constantly reviewing the consistency in the implementation and effectiveness of existing tobacco control measures, but also the need to adopt new, more radical legal solutions. Also, a revision of current curricula in elementary and high schools should be a priority.

Educational institutions such as kindergartens and schools are crucial entry points for primary prevention measures for several reasons. Increasing the awareness and knowledge of the importance of

a healthy lifestyle (primarily on risk factors), from a very early stage of life in educational institutions, will later reflect in a healthy start in life and more control over one's own health. In the end, this will significantly improve population health. Within current educational curricula, more focus should be placed on health, public health, and the significance of a healthy lifestyle. Physical education is an integral part of the curriculum but it should be promoted more, insisting on increasing physical activity among boys and especially among girls. Promoting a higher level of physical activity in schools may contribute to a wide range of health benefits, including reduced risk of many chronic NCDs, improvement of mental health and quality of life. Physical activity also has an indirect effect on health if it promotes academic achievement, which further contributes to a higher socio-economic status of an adult.

Besides learning, it is important to translate knowledge into practice so, concerning this, healthy meals could be served in schools, where possible. When fast food is less available to children, they will turn to what is available to them and thus eat healthier. The development of healthy habits, in this case, related to diet, will significantly contribute to the higher level of awareness and, consequently, their better health outcomes both now (e.g. prevent obesity) and later in life.

It is especially important to mention the activities and efforts to learn more about ones sexual and reproductive health in order to achieve full fertility potential in the future. Interactive workshops within the curriculum and not as voluntary activities, where pupils and students can learn more on the prevention of sexually transmitted diseases, unwanted pregnancies and different types and proper use of modern methods of contraception must be imperative. These activities will result in more usage of modern contraceptives, while the level of unwanted pregnancies, abortions and health consequences will decline and protect the fertility potential of younger generations.

So far, sexual and reproductive health have been covered in the curriculum in biology and in some voluntary workshops. In order to encourage young people to use modern methods of contraception and thus prevent unwanted events such as unwanted pregnancies and sexually transmitted diseases, that can later lead to other complications (AIDS as the consequence of HIV infection or cervical cancer as a consequence of Human Papillomavirus infection), it is necessary to focus efforts on raising young people's awareness of the importance of these methods and their use. Through family conversation, through formal and informal (peer) education in schools (primary and secondary), it is necessary to remove the taboo from the topic of sexual and reproductive health and to change the cultural pattern where there is a negative attitude towards condoms.

During childhood, there are some time points when children have mandatory check-ups. They include examinations done by different specialists (paediatricians, ophthalmologists, physiatrists, dentists). These preventive examinations may indicate changes that are detected at an early stage and can be corrected and treated in time. When it comes to adults, not a huge number of them are aware of the importance of preventive check-ups. Although some institutions and companies provide preventive check-ups for their employees, a majority of employers in the Republic of Serbia do not. Therefore, one option would be the introduction of mandatory check-ups of all employees

in the public and private sector. Once a year, preventive check-ups lead to the early diagnosis, timely treatment and better outcome of the majority of diseases. A limitation with this type of examination would be the high share of workers in the informal labour market, who do not pay taxes and healthcare contributions, and therefore cannot achieve the entitlement to preventive examinations.

In addition to general health examinations, health screening programmes have an important role in health prevention. Although there are three national screening programmes (for breast cancer (Decree on the National Breast Cancer Early Detection Programme, 2013), colon cancer (Decree on the National Programme for Early Detection of Colorectal Cancer, 2013), and cervical cancer (Decree on the National Programme for Early Detection of Cervical Cancer, 2013) in the Republic of Serbia, they are not fully implemented.

The National Programme for the Early Detection of Breast Cancer is implemented by organizing mammography examinations of healthy women between the ages of 50 and 69. Detection of breast cancer at an early stage, in addition to a high chance of cure, enables the application of sparing surgical interventions, rapid recovery, reduced disability, better quality of life, and reduced treatment costs and indirect costs of the disease.

Cytological screening of the cervix every three to five years can prevent four out of five cases of cervical cancer. In countries, mostly developed, where organized screening programmes have been successfully implemented for several decades, there has been a dramatic decline in cervical cancer mortality, such as in the Republic of Finland, by as much as 80%. A cytological smear of the cervix (Papanicolaou test) is used as a screening test for early detection of changes in the cervix. European guides recommend that screening should start between 20 and 30 years of age, and last up to the age of 60-65.

Screening for colorectal cancer is conducted in the territory of the Republic of Serbia in the form of an organized, decentralized programme. The target populations are men and women aged 50 to 74, and the screening cycle is every two years.

However, the coverage of the target population with national screening programmes is very low and huge efforts are needed in order to achieve it. Evidence-based data support the fact that certain interventions can significantly increase the screening coverage of the population. These interventions are based on different approaches and can be targeted at the individual, the community, health professionals, or the health services and management themselves (Camilloni et al., 2013; Zielonke et al., 2021).

When it comes to individual interventions, an invitation letter combined with a reminder sent by mail has shown a positive effect, as well as phone calls. Different styles of invitation letters can affect participation in screening programmes. In particular, there is evidence that long, detailed letters can increase inequalities in participation, i.e. that a detailed explanation of the procedures, as well as the advantages of the test itself, can encourage people to respond, especially those with lower educational status. There is strong evidence of a positive effect of the invitation letter being signed by a physician (Toes-Zoutendijk et al. 2017; Jepson et al. 2000; Globocan, 2022).

Community interventions, such as mass media campaigns, providing publicity through different types of media, educational information through pamphlets, leaflets and other written content can also contribute to increasing the screening response rate (Clover et al., 1996; Camilloni et al., 2013).

Interventions which can facilitate a screening test are: conducting screening tests during regular examinations or consultations with a specialist, or sending self-sampling tests by mail. Sending self-sampling kits to people who have not responded to a screening call significantly increases their participation in cervical cancer screening. Also, sending a stool sample kit for an occult bleeding test could drastically reduce the burden on screening services. Interventions aimed at reducing logistical barriers, mobile mammograms, and the use of pharmacies to provide occult bleeding test samples greatly facilitate testing and may lead to a larger population undergoing screening testing (Globocan, 2022).

The linking of data from cancer and screening registries and other repositories of demographic data and causes of death is also crucial for the application of European screening standards, and thus for reducing the burden of disease on society (Anttila et al. 2015).

Pursuant to the Law on Health Insurance (2019), if the insured person does not respond to the examination invitation or does not come in for the screening examination, then such a person shall bear certain consequences in terms of paying a higher price for treatment. Although the coverage of the targeted population for all three screening programmes is far from planned, the higher share of insured persons in health care costs has not been described. Full implementation of the law or certain benefits for those responding to the screening (such as a day off from work) may have a greater impact on increasing the screening response rate.

Due to the current demographic reality and a large proportion of older persons in the population, a particular effort within health institutions should be oriented towards the allocation of funds for nursing care for older people within the department for home care and treatment service, i.e., increasing the number of staff for home visits.

Another proposal is related to human resources allocation, with the possibility of creating an environment where formal home care for older persons should replace informal care delivered mostly by family members. In this way, young people will be relieved and ready to put their effort into family planning. Formal home care includes assistance with personal care (such as dressing and bathing), homemaking (e.g., laundry and cleaning), and clinical care (e.g., wound care).

It is a global trend (evident in nations including Germany, Japan, and the U.S.) that the government reallocates more resources from residential to home care and community care, due to the benefits of aging in one's place of residence and, more importantly, the low cost-efficiency of traditional modes of residential care (nursing homes). Moreover, increased support for formal care at home can effectively reduce the burden of informal caregivers (Murphy et al., 2017). Formal caregivers tend to have more professional experience providing

care for older adults. These caregivers include licensed professionals such as social workers, registered nurses, medical doctors, occupational therapists, physiotherapists, and so forth. In addition, formal care is also provided by unlicensed direct caregivers who had received short-term training; these caregivers provide services to older people in institutions such as nursing homes, assisted living facilities, community-based facilities, and private residences (Stone et al., 2010). Whether the experience of using formal care is positive or negative may be influenced by a number of factors, such as older adults' preference to receive formal care at home instead of institutionalization, and the quality and professionalism of the care providers.

Future planning should take into account external factors such as the strong trend of a drain of medical professionals to Western European countries. If, in such a context, additional education programmes were to be introduced for nurses to specialize in areas relating to the needs of the elderly, there is a risk of them leaving the country following completion of training. Even with the risk of educated people, trained for work with the elderly, leaving the country, effort, primarily financial, but also in respect of other benefits also, needs to be invested in order to retain such staff in the country, given that the labour market demand for such a trained profile is at a high level. In addition to institutions for the elderly, they can be employed in all medical institutions where there is a geriatrics ward.

The health care system in Serbia is facing rising costs of care for the elderly, i.e. there are insufficient funds for financing all entitlements guaranteed by health insurance. This situation undoubtedly requires the implementation of the necessary health care system reforms, primarily in the field of financing, but also in the field of strengthening the institutions of voluntary health insurance. More intensive use of private health insurance services could provide more equal access to health care services for all segments of the population, which primarily refers to the release of state resources for the poorer population.

The private sector, both as a service provider and as a source of financing for health spending, is insufficiently covered in the National Health Account.[115] Therefore, data collection for the private sector and its inclusion in linked accounts is one of the important issues to which special attention should be paid in order to obtain a more accurate picture of the total health care expenditures at the national level.

The health care system also requires reorganization in the field of palliative care organization for older persons. Although palliative care is implemented by allocating a number of beds for palliative care in primary and secondary care, and providing home care services at the local level in the most remote places with older populations, this type of health care requires further reorganization in terms of capacity building (re infrastructure, organization and personnel), in order to adapt to the new demographic reality. The introduction of mobile teams that would provide palliative care and home treatment services is one of the potential solutions in the absence of adequate resources.

Today, there is growing evidence on the best management technique for complex chronic conditions in the elderly. The key issues are the coordination of care in all settings and the promotion of self-help

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[115] The National Health Account (NHR) is a framework for standardized reporting on health care costs and financing, measuring the overall - public and private and health costs of a country's population.

(where possible), the development of appropriate staff and, in particular, the optimal combination of skills, but also information support systems and funding mechanisms that encourage integration rather than fragmentation of different sectors. Increased health literacy and better access to technology, such as computers and the Internet, can help improve understanding and enable patients to become more involved in self-care (Rechel et al. 2009). Much can be achieved through relatively simple interventions, such as those that facilitate mobility through the use of assistive technology.

Insufficient knowledge of digital technologies, i.e. lack of digital literacy, as well as fear of possible misuse of data, can lead to resistance to the use of telemedicine services. Bearing in mind that not all health workers and users in the health care system are ready to accept and use telemedicine services as a means of distance communication, it is necessary to legally regulate and standardize which services can be provided by means of telemedicine and how. Thereby, firstly patients, and then the medical staff, also, will be sure that the services provided through telemedicine are legally justified. Also, the application of telemedicine will bring long-term benefits and help with everyday challenges in health systems.
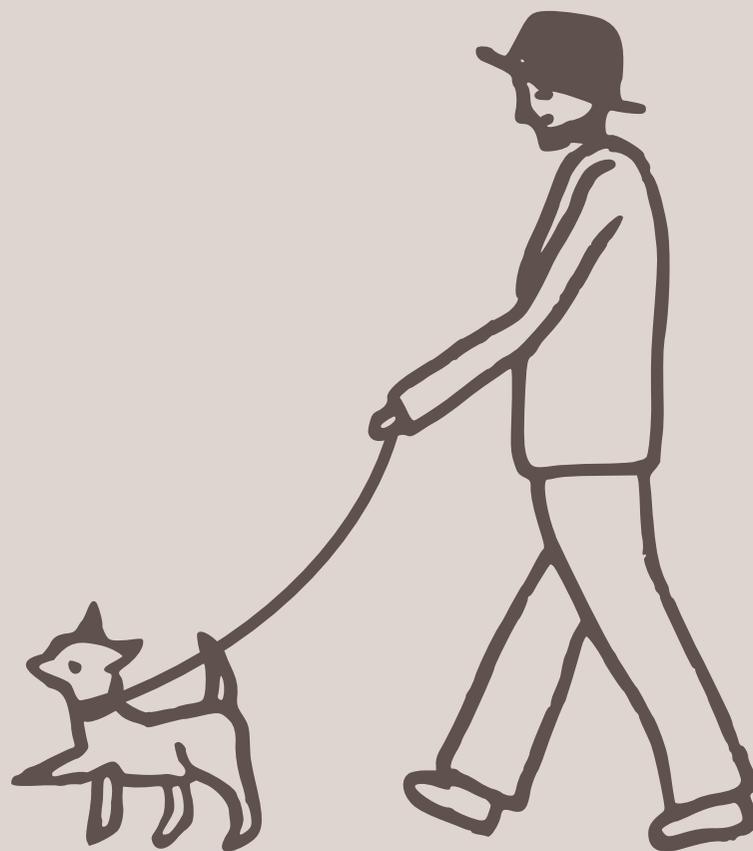
Population Ageing

Gordana Matković

1 Key Demographic and Economic Consequences of Population Ageing

Population ageing is a key demographic feature of early 21st century Serbia and one of the major challenges in the context of depopulation. Longer participation in the workforce certainly contributes to a solution assuming a sufficient supply of jobs, healthy ageing and greater investment in the skills of older persons. In the short term, tackling the risks and effects of ageing includes appropriate pension policy, developing long-term care system and reducing extreme poverty among old persons.[116]

According to 2019 data, Serbia had approximately 1.4 million people aged 65 and over (20.7%), of whom over 320 thousand were oldest-old (80+) (4.6%). The older population was dominated by women, with a share of about 60% and rising in the oldest age groups.

Population ageing is becoming increasingly pronounced over time. According to the first post-war census of 1948, the share of the older population[117] was three and a half times lower than today (5.6%). Projections show that demographic ageing is set to intensify in the future and that the ageing of the older population will continue. Under the given assumptions (medium-variant), in 2041, the share of older persons (65+) will exceed 24%, and that of the oldest-old (80+) will rise to 7.5% (Table 1). Long-term projections, until 2100, show, however, that this upward trend can be slowed down and even stopped, depending on the assumptions about the determinants of population change, especially migration.[118]

The share of older people (65+) in Serbia is slightly above the EU average, while the share of the oldest-old (80+) is below average. The lower ranking according to the latter indicator is a result of a larger difference in the oldest-old mortality compared to EU countries and the specificity of the age waves in Serbia (Stojilković Gnjatović &Devedžić, 2020).

According to 2019 estimates, the share of the older population was above the national average in two thirds of Serbia's municipalities. In fewer than ten municipalities, mainly small ones in eastern and southern Serbia, the share of older persons exceeds 30% (municipalities of Babušnica, Crna Trava, Gadžin Han, Knjaževac, Kučevo, Ražanj, Rekovac, Svrljig, Žagubica) (RZS, 2021a). All are in development tier 4, i.e. the least developed local governments in Serbia. Large differences are also noticeable at the district and regional level, which is reflected in sub-national human development index.[119]

	2002	2011	2019	2041
Median age	40.5	42.5	43.7	44.8
Older persons, 65+	1,240,505	1,247,876	1,436,930	1,644,912
Share in total population (%)	16.6	17.3	20.7	24.1
Share of women (%)	57.7	57.9	57.1	57.5
Oldest-old, 80+	145,477	252,087	321,333	511,175
Share in total population (%)	1.9	3.5	4.6	7.5
Share of women (%)	63.3	63.1	61.8	64.3
Old-age dependency ratio (3rd variant* (%)	27.3	27.4	33.9	42.3

Table 1. Serbia population ageing indicators, 2011 and 2019, and projections for 2041, medium fertility variant

Source: RZS (2021), RZS (2003), Eurostat, code demo_pjanind
Note: Old-age dependency ratio 3rd variant - population 65 years or over to population 20 to 64 years

Quite rightly, the definition of population ageing based on a fixed age threshold has been challenged in recent years. Hence, new indicators have been developed, such as the prospective proportion old and the prospective old-age dependency ratio, based on the measure of remaining life expectancy (Sanderson & Scherbov, 2008). Under this concept, old persons are those whose life expectancy is below 15 years (prospective threshold). The United Nations has also started monitoring indicators based on the prospective threshold in its publications on population ageing.[120]

If this concept were applied to Serbia's past situation, ageing would be even more pronounced (Devedžić & Stojilković, 2012), but future prospects are more optimistic. Based on Sanderson & Scherbov (2015), Serbia's proportion of older persons with a life expectancy

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[116] Among other issues outside the scope of this chapter are numerous social concerns that intensify with ageing, such as ageism, social participation of the older population, domestic violence and abuse, etc.

[117] For the purposes of this report, the older population is defined as the population aged 65 and over.

[118] For more details see Arandarenko, 2021.

[119] For more details, see Arandarenko, 2021.

[120] See, for instance, United Nations Department of Economic and Social Affairs, Population Division, 2020:15.
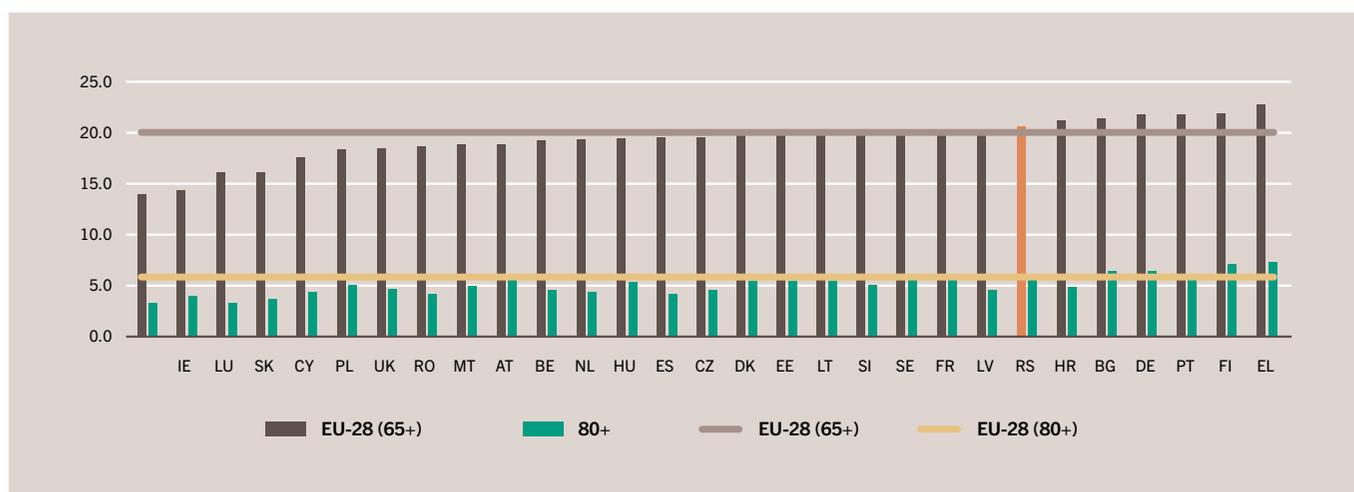
Figure 1. Share of persons aged 65+ and 80+ in total population, Serbia and EU-28, 2019

Source: Eurostat, code demo_pjanind

below 15 years can be estimated at between 19 and 21.3% in 2041, depending on the scenario.[121]

Population ageing in Serbia is primarily due to fertility decline (ageing from the population pyramid base) (Penev, 2015:139) (Devedžić & Stojilković Gnjatović 2015: 24). The total fertility rate declined from 3.13 in 1950 to only 1.52 in 2019. Unlike fertility decline, which has a long-lasting, yet temporary impact on the age structure, increase in longevity brings permanent change (Bussolo, Koettl & Sinnott, 2015).

Reduced elderly mortality, which has substantially affected the ageing process in developed countries, has been of lesser importance in Serbia in recent years. In 2019, life expectancy at 65 reached 14.8 years for men and 17.3 for women (Table 2). Unlike life expectancy at birth, which recorded a steady rise in Serbia, life expectancy at 65 virtually stagnated in the second half of 20th century (Devedžić &

Stojilković Gnjatović 2015), and reversible processes were even registered in 1990s (Radivojević, 2002).

Life expectancy of older persons in Serbia is below the EU-28 average, especially for women, who record lower values than in any EU

	2002	**2011**	**2019**
Men	12.8	13.9	14.8
Women	14.9	16.3	17.3

Table 2. Life expectancy at age 65 in Serbia, 2002, 2011 and 2019

Source: Eurostat, code demo_mlexpec

Figure 2. Life expectancy at age 65 for women and men, Serbia and EU-28, 2018

Source: Eurostat, code demo_mlexpec

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121 Sanderson & Scherbov (2015), data taken from S2 Table. Proportions Old (both sexes combined. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4398478/
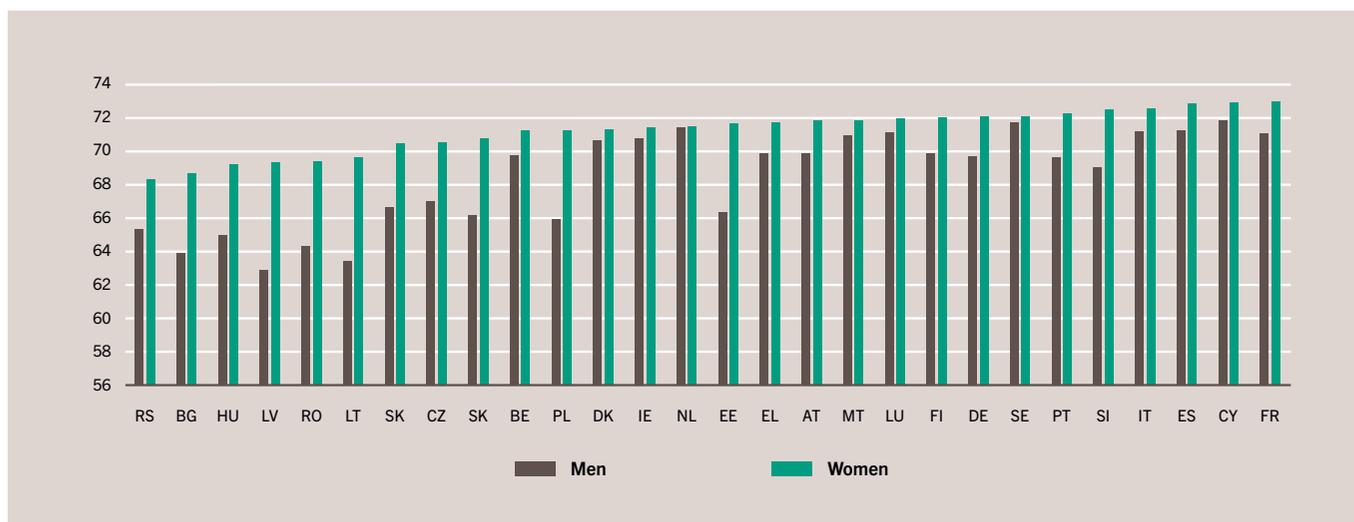
Figure 3. Healthy life expectancy (HALE) at birth (years), Serbia and EU-28, 2019.

Source: WHO Database

country. For men, values somewhat below Serbia's were recorded in 2018 in Lithuania, Bulgaria, Latvia and Hungary (between 14.1 and 14.6 years) (Figure 2). According to Eurostat data, most EU countries recorded a significant decline in life expectancy at 65 in 2020, as well as life expectancy at birth, owing to the COVID-19 pandemic (Eurostat, 2021).

Migration also contributed to population ageing in Serbia, albeit to a lesser extent (Penev, 2015) (Nikitović, 2019).[122] During the 1990s, over 320 thousand people, predominantly those younger and better educated, left the country (Penev, 2006). Emigration continued in the following years as well. According to the estimates, about 60

thousand people left between the population censuses of 2002 and 2011 (Penev, 2015:141).

Ageing is associated with extending not only healthy life years, but also life years with disability. A slower increase in health-adjusted life expectancy (HALE)[123] than an increase in life expectancy, indicating more years spent in poor health, is particularly relevant for long-term care policies and health care expenditures. According to WHO (2021) data, in Serbia in 2019, health-adjusted life expectancy at birth stood at 65 years for men and 68 for women – between 8 and 10 years below life expectancy. HALE for women is lower in Serbia than in any EU country, while for men it is among the lowest (Figure 3). Further
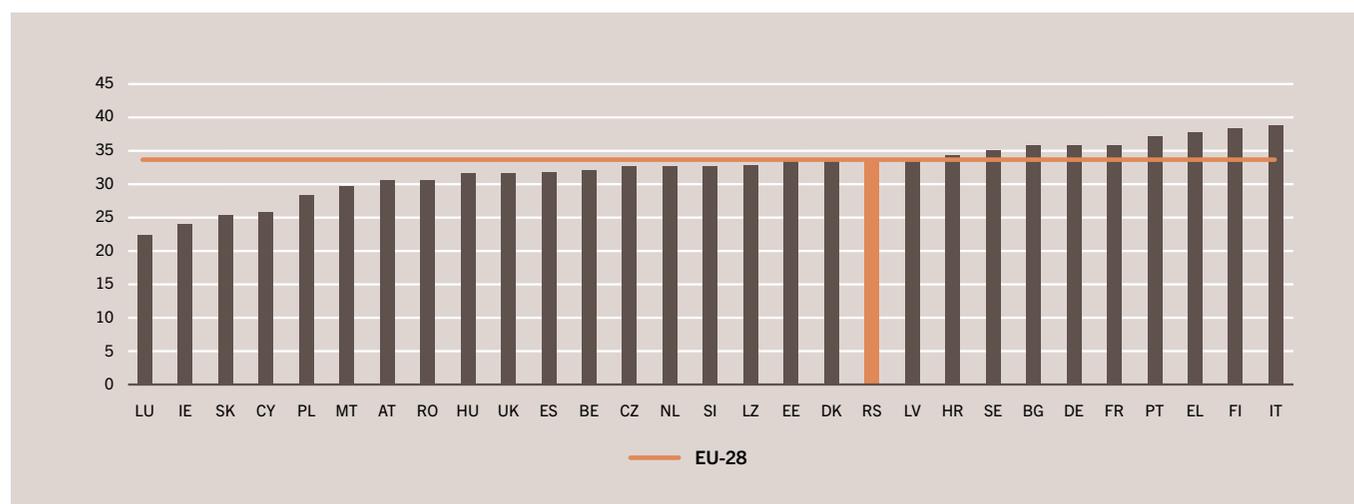
Figure 4. Old-age dependency ratio, Serbia and EU-28, 2019

Source: Eurostat, code demo_pjanind

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[122] See also Arandarenko, 2021.

[123] WHO definition: Average number of years that a person can expect to live in 'full health' by taking into account years lived in less than full health due to disease and/or injury.

increase of HALE is essential not only to ensure the sustainability of health expenditures, but also to improve the quality of life.

Ageing also led to a rise in the old-age dependency ratio, which shows the number of old people (65+) per 100 working-age people (20–64) and, in fact, indicates the country's potential to face the economic consequences of ageing. According to 2019 data, this ratio stood at 33.9% in Serbia and corresponded to the EU-28 average (33.8%) (Figure 4). The dependency ratio has grown over time and, based on population projections, is expected to reach a remarkably high 42.3% in 2041 (Table 1).

Serbia's prospective old-age dependency ratio suggests a lower 'burden' on the labour force. It is the ratio of old people with a life expectancy below 15 years to the population aged between 20 and the prospective threshold. Serbia's prospective threshold in 2041 is estimated at 68 years,[124] and the prospective old-age dependency ratio – at 31.0%.[125] This is more than 10 percentage points below the conventional old-age dependency ratio (Table 1) indicating more successful response to the consequences of population ageing.[126]

The economic consequences of ageing are analysed in the context of rising consumption and declining savings in the later stages of the life cycle, shrinking and ageing of the labour force and potential deceleration of labour productivity growth. Another area in focus is public finance sustainability.

The empirical findings on the impact of ageing on economic growth are not conclusive. Bloom et al. (2011) show that the negative 'accounting' effects of population ageing on growth owing to life-cycle differences in consumption, savings and economic activity may be compensated for by taking into account behavioural changes – longer working lifespans owing to improved health conditions, increase in savings for old age and investment in human capital. Additional emphasis is placed on policies to encourage behavioural change, as well as promotion of immigration.

Using the OLG model,[127] Bussolo, Koettl & Sinnott (2015) show that reduced fertility entails a shrinking population and smaller output, while increased longevity results in larger population and larger economy, with both scenarios having a medium-term positive impact on GDP per capita, which returns to the steady state in the long term.

Lee & Mason (2006) argue that population ageing allows space for the 'second demographic dividend', as a result of incentives to ensure substantial accumulation of assets with a view to security in old age.[128] According to some authors, if older persons rely on public transfers, the positive effect of the second demographic dividend will be negligible. This is the case in most EU countries (Prskawetz & Sambt 2014

:966). Nicholas Barr, on the other hand, points out that the issue of the sector (public versus private), and even pension design (PAYG versus funding) is not decisive. Increased output and good governance are crucial, as are human capital investment policies and increased labor supply (Barr, 2021).

In ageing populations, there is certainly a window for raising the human capital of the smaller young age groups, thus enabling a rise in productivity and welfare per capita (Bussolo, Koettl & Sinnott, 2015).

Research findings on the overall impact of ageing on labour productivity are mixed and vary by occupations and sectors, as well as country-specific circumstances (Bussolo, Koettl & Sinnott, 2015). IMF simulations indicate that between 2020 and 2050, as a result of labour force ageing, the average annual reduction in total factor productivity growth in Serbia could amount to 0.34, which corresponds to the Western European countries' average (Batog, et al., 2019).

Empirical data support the theses about a possible activity rate increase due to women's higher labour market participation, increase in older generations' employment rates and longer working lifespans. Ambitious reforms could limit Serbia's labour force decline to only a few percent by 2050 (Batog, et al., 2019).

According to IMF simulations, population ageing would have an effect of decelerating GDP per capita growth rates across the CESEE region by 0.6% per year until 2050.[129] Using the complex EEUMOD model, the report assesses that, with regard to the impact of demographic shifts on the GDP, 'South-eastern Europe and Serbia would be the least affected, as their outlooks for labor supply, TFP,[130] and fiscal balances are not as bad as those for the rest of the CESEE region'(Batog, et al., 2019:50).

Consequences in the domain of public finance sustainability are assessed in the context of the impact of ageing on public revenues, but with an even stronger focus on public expenditures. The concern that the growing share of older persons drives an unsustainable increase in demand for public services and social transfers prevails in a significant proportion of research and policy papers, starting from the notable World Bank report on averting the old-age crisis (World Bank, 1994). It is also argued that an ageing electorate can further exacerbate public finance unsustainability, although empirical research into voter preferences by age profile is limited (Bogetić, et al., 2015). Simultaneously, solutions are sought in adjusting the systems that potentially bear the brunt of ageing. Hence, consideration of reform options in the areas of pensions and long-term care, as well as old-age poverty reduction instruments, is crucial in Serbia as well.

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[124] Sanderson, WC & Scherbov, S. (2015a). Table 1 ReAging1_v2.1 from the International Institute for Applied Systems Analysis (IIASA) website.

[125] Based on the population projections of RZS (2021).

[126] Serbia's participation in longitudinal research such as the Generations & Gender Program and the Survey of Health, Aging and Retirement in Europe (SHARE) would be of particular importance for policy formulation and better understanding the consequences of aging.

[127] 'Overlapping generations (OLG) model mimic an economy in which multiple generations, at different stages of their life cycle, contribute to economic activity by supplying labor, saving, and investing and also interact with firms and government.' (Bussolo, Koettl & Sinnott, 2015: 151)

[128] See also more recent research, e.g. Lee & Mason (2010)

[129] The CESEE region includes Central, Eastern and South-Eastern European countries

[130] TFP – total factor productivity, refers to the productivity of all inputs taken together.

2 Pensions

Population ageing and high public expenditure on pensions, comprising the largest single expenditure item within the social sector, prompted numerous public pension system reforms in developed countries. Reforms are predominantly geared towards reducing pension generosity in relative terms, strengthening the link between benefit amounts and pre-retirement earnings, restricting early retirement options and promoting postponement of labour market exit as far as possible. Introducing an automatic balancing mechanism, sustainability factor, or automatic link between the retirement age and life expectancy is considered an especially relevant aspect of reforms. Although public schemes continue to provide a vast majority of pension income, there is a discernible trend towards privatisation and rising importance of providing part of pensions within the private sector. Since 2015, measures to improve pension adequacy have gained relevance in the EU (OECD, 2019; European Commission, 2018; Carone et al., 2016). During the COVID-19 crisis, the focus of interventions has been on the reduction of contributions or exemption from the payment thereof for specific insured categories, additional investments in pension funds and benefit increases, especially for the more vulnerable pensioners (Natali, 2020).

In the EU, reforms are deemed to have ensured system stabilisation, accompanied by sustaining the ratio of public pension expenditure to the GDP at the same level by 2070, partly at the expense of decreasing relative benefit amounts, which raises the issue of their adequacy, especially in some countries (EPC-SPC, 2020).

2.1 Outline of the Serbian system

The Serbian pension system comprises mandatory pay-as-you-go (PAYG) pension and disability insurance (PDI) and voluntary private pension insurance. The total number of old-age, disability and survivor pensioners in the public sector has reached almost 1.7 million, or over 24% of the total population. The ratio of pension expenditure to the GDP stood at approximately 10.1% in 2019 and was below the EU-28 average (12.4% in 2018) (Eurostat, code spr_exp_pens).

Finance for pensions and other entitlements under PDI is provided from the budget as well, to cover the deficit and fulfill the legal obligations (benefit top-up to the minimum pension level, accelerated benefits, etc.). The amount of budget funds required decreased over time and stood at 3% of the GDP in 2019, i.e. about 25% of the total revenues of the Fund (Republički fond za penzijsko i invalidsko osiguranje, 2019) (Vlada Republike Srbije, 2018). The PDI contribution rate is 25.5%, which is relatively high, but is not directly internationally comparable owing to differences in system design, in entitlements covered from these funds in different countries, and in the level of funds secured from the national budget.[131]

Pension adequacy in Serbia is on the decline. According to 2019 data, the net replacement rate stood at 61.3% (Matković & Stanić, 2020), and the aggregate replacement ratio at 42% (the respective EU-28 values exceed 63% and 57%) (OECD, 2021; Eurostat, code ilc_pnp3).[132] The number of insured persons per 100 pensioners is only 130, significantly below the EU-28 average (169) (Republički fond za penzijsko i invalidsko osiguranje, 2020) (European Commission, 2018). Such a low rate is not mainly the result of demographic aging. Compared to more developed countries, Serbia has considerable space for improving the insured-to-pensioner ratio, given the low employment rate and widespread informal economy (Vlada Republike Srbije, 2018). An IMF report places Serbia among countries with substantial scope for increasing labour force participation rate and argues that, if policies geared toward that end were implemented, the public pension expenditure would be curbed (Batog et al., 2019:20-26).

2.2 Options for further parametric changes

2.2.1 Pension and general point indexation

In Serbia, pensions are currently indexed to wages and prices according to the 'Swiss formula'.[133] Most EU countries also apply some combination of these two parameters in pension indexation, with greater weight assigned to prices (European Commission, 2018). In contribution-based pension schemes, indexation to wages is an exception, and even when applied, it is linked to sustainability factors (Hohnerlein, 2019: 253). A number of countries opt for indexation to prices only, with an additional increase if GDP growth exceeds a certain level (Hungary, Portugal). In the constant search for a balance between sustainability and adequacy, frequent changes in indexation parameters, both in Serbia and in Europe, are the rule rather than the exception.[134]

A distinctive feature of Serbia's system is equal modalities of pre-retirement earnings valorisation[135] i.e. indexation of gener-

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[131] Budget subsidies are often present, and in some countries tripartite funding is mandated by law. The data on contribution levels in EU countries are available in the European Commission's Ageing Reports (European Commission, 2018:51,61).

[132] Net replacement rate - benefit in the first year of retirement divided by pre-retirement income for a single person with a 40-year career with constant average earnings (base case). 'The aggregate replacement ratio is gross median individual pension income of the population aged 65–74 relative to gross median individual earnings from work of the population aged 50–59, excluding other social benefits' (Eurostat, 2011).

[133] 'Indexation refers to the policy for the up-rating of pensions in payment from the point of claim of the pension benefit onwards.' (OECD, 2005: 34). According to this formula, wages and prices carry equal weights – 50:50. Serbia's pension indexation modality was modified frequently in the past 20 years (Matković & Stanić, 2020).

[134] For details on the changes in the pension indexation in Serbia, see Matković and Stanić, 2020.

[135] 'Valorisation: the adjustment of past earnings to account for changes in living standards between the time when pension rights are earned and when they are claimed.' (OECD, 2005:17)

al point and pension indexation, found in only few EU countries (Germany, Croatia and Romania until 2030, among those with point systems). In general, in most countries, valorisation is predominantly or solely tied to wage growth, while pension indexation is predominantly tied to prices (European Commission, 2018). In addition, Germany includes a sustainability factor, whereby point value uprating is also dependent on the ratio of pensioners to contributors (Boulhol, 2019).

The decision not to introduce separate indexation parameters, taken in Serbia in 2003, resulted from the finding that, under the conditions of rapid wage growth, the indexation of the general point value to wages, and of pensions to prices would lead to wide disparities in pension levels for pensioners with equal work histories.[136]

The decrease of the net replacement rate in Serbia and the more regularised economy than it was the case in the initial years of transition point to the need to review this arrangement. In case of a separation whereby the valorisation formula would assign a higher weight to wages, while the pension indexation formula would assign a higher weight to prices, "new" pensioners would have higher replacement rates. Essentially, their living standard deterioration immediately upon retirement would thus be less pronounced, while later on, benefit amounts would grow more slowly, but would allow sustaining the real pension value and the standard enjoyed during their working life. It should, however, be noted that, in the recent past, Serbia's average wage growth was still high in some years (the real wage index stood at 8.4 and 7.8% in 2019 and 2020, respectively) (RZS, 2021b). The volatile nature of average wage growth calls for caution and suggests that, if implemented, the separation of valorisation and indexation parameters should not be drastic (the former to wages only, and the latter to prices only) to avoid creating wide disparities in pension levels between old and new pensioners.

An additional possibility to be considered is abandoning the average wage criterion and relying on the wage bill as a parameter, which accounts for employment development as well, thus better reflecting any impact of population ageing on the labour market. Owing to differences in contributions paid in Serbia depending on type of employment, the contributions bill may, in fact, be an even better choice. As both Serbia's wage bill and contributions bill may grow independently of productivity growth, it also makes sense to include the GDP growth rate, in particular as a trigger governing the application of one indexation parameter or the other. The GDP is currently taken into account only in terms of indicating the desirable share of pension expenditures (11%). The parameter of price index could be reviewed as well in terms of identifying a consumer basket more relevant from the aspect of pensioners' living standard. These options should be explored further, together with an assessment of their impact on both fiscal sustainability and pension adequacy.

2.2.2 Retirement age and effective retirement age

An obvious solution to ensure both adequate pensions and system sustainability in the face of population ageing is longer working lifespan. Serbia's legal retirement age, which currently stands at 65 years for men and 63 for women, is not low in comparative terms (EPC-SPC, 2020:11), especially given that life expectancy at 65 in Serbia lags behind the EU average. It should be stressed that several EU countries have already opted for further gradual increases of this threshold; however, these changes are assessed as insufficient to compensate for life expectancy gains among old persons in the long run (EPC-SPC, 2020:4).

In present-day Serbia, it is worth reflecting on retirement age provisions primarily in the context of a possible automatic link to life expectancy gains. Eight EU-28 countries have already included such provisions in their systems (EPC-SPC, 2020:13). The advantage of automatic rules stems from the fact that discretionary decisions to raise the retirement age tend to be politically unpopular. On the other hand, absence of social dialogue and even undemocratic character of such rules are inevitably highlighted as disadvantages (OECD, 2019). In the post-COVID world, the introduction of automatic links may need to be re-evaluated.

An alternative to automatic link is a strategic commitment to define indicators whose change would trigger a review of the current retirement age. Besides life expectancy gains for older persons, healthy life years, older workers' disability and health status, proportion of workers in physically demanding jobs etc. should be taken into consideration. The review should include an impact assessment of raising the retirement age on different groups of employees, in view of life expectancy differences between men and women, as well as any differences between high and low-income earners etc.[137] If an automatic rule is to be introduced, it is also necessary to specify a relationship most appropriate in our circumstances. In some countries, for each year of life expectancy gains for older persons (65), the retirement age is raised by one year, and in some – by less (e.g. 2/3 of a year).

It must, however, be emphasised that nothing is achieved by constantly raising the (statutory) retirement age if early retirement options remain available, including through accelerated or disability pensions. In Serbia, in 2019, despite reforms aimed at reducing early retirement, new old-age pensioners' average length of pensionable service stood at 32 years for men and 30 years for women, below the EU average (Republički fond za penzijsko i invalidsko osiguranje, 2019)((EPC-SPC, 2020:12). One out of seven new pensioners benefit from the early retirement option. Both sexes' effective retirement age reached 63.8 years (old-age pensions, all categories), but remained substantially lower for military pensioners, at only about 56 years.[138]

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[136] In 2008, a person with lifetime earnings three times higher than average who retired in 2003 would receive pension equal to 48,700 dinars, while a person with the same work history who retired in 2008 would receive pension equal to 77,300 RSD (Stanić, 2010:33).

[137] Raising the retirement age may be regressive if low earners live shorter lives, although these effects are not large (OECD, 2017:163). Only data on old (65) life expectancy by education level are available for Serbia, showing that there are no differences between those with highest and lowest education levels, but it is shorter for people with secondary education (Eurostat, code demo_mlexpecedu).

[138] Ministry of Labour data, 2021.

Pension benefit reduction on account of early retirement is fully justified, since, under the same conditions, individuals retiring before reaching the retirement age will, in theory, receive pensions longer. 'Penalties', however, raise the issue of fairness if those who started working at a younger age live shorter. It is also worth noting that individuals may value retirement despite penalties – 'personal discount rate may exceed the rate of actuarial adjustment' (Barr & Diamond, 2006:27). Employers may also request workers who have fulfilled at least one retirement requirement to retire owing to their lower productivity or outdated knowledge and skills in the context of implementing new technologies; the demand for older labour force may also be low, leaving workers with no other option except to retire as soon as possible. Retirement may also be due to health reasons that persist but are not severe enough to qualify for a disability pension. Under these conditions, penalties result in low pensions, which may lead to poverty in old age. It is also worth noting that raising the retirement age, as well as closing off early retirement pathways may lead to a rise in the number of disability pensioners. A certainly unacceptable arrangement in the existing system is that accelerated benefits, which constitute a major pathway to retiring (too) early, are not subject to penalties.

In the given circumstances in Serbia, it is essential to gain a better understanding of the reasons for early retirement so as to assess to what extent pension policy is even capable of affecting retirement decisions, and to what extent solutions need to be sought in other domains – employment, health and education policies. Furthermore, an insight into the differences in the length of retirement between recipients of low and high pensions would make it possible to determine whether and to what extent penalties include redistribution among pensioners according to their financial situation.

Stronger encouragement of later retirement is another option to be explored and one that is embedded in the Serbian system in a relatively modest form; however, old-age pensioners have the possibility of working, along with having their benefit amounts recalculated on those grounds.[139] EU reforms involve different arrangements, from earnings valorisation even beyond 45 years of pensionable service (Belgium), to one-off bonuses in case of later exit from the labour market (Denmark) (OECD, 2019).

2.2.3 Other parametric changes, options to be explored

Beside the above automatic mechanisms, many countries have also introduced automatic adjustment of pension levels to increased old-age life expectancy (a type of sustainability factor). This includes all countries that have shifted to notional defined contribution systems,[140] as well as a number of those with defined benefit systems[141] (Finland, Spain and partly Portugal) (OECD, 2019; Carone et al., 2016). In the context of deliberation on structural reforms and implementation of a new system, France envisages defining the point value

at cohort level, with the proviso that, beside the wage bill, its value is also informed by inter-generational life expectancy differences, which is viewed as a 'major innovation in the point system' (Boulhol, 2019: 34, 45).

To curb expenditure in Serbia, it is essential to further tighten the eligibility requirements for accelerated benefits and to explore whether the provision of specific non-contributory benefits such as personal disability would reduce the number of recipients of and expenditure on survivor and disability pensions, while extending protection to all who need it and enhancing possibilities for combining social benefits with employment.

Cost curbing and expenditure-side measures are not the only strategic option to ensure balancing the pension system in the face of population ageing. Employment and output growth, reduction of grey economy, more efficient administration and better collection of taxes and contributions are crucial in Serbia (Matković, 2016).

2.3 Shift to the notional defined contribution system

In the mid 90s, a number of countries shifted from defined benefits (DB) to notional defined contributions (NDC) in the public part of the pension system, with a view to greater individualisation, lower redistribution and strong links between contributions paid and pension level (Italy, Latvia, Poland and Sweden). In NDC schemes, which are also financed on PAYG basis, contributions are recorded in individual accounts to which a notional rate of return is applied, and pensions are adjusted to the life expectancy of the cohort.

The key advantage of NDC systems are many automatic adjustments that reduce the scope for discretionary political decisions (Holzmann, 2017); they are, hence, assessed as being the most resistant to economic and demographic shocks (Boulhol, 2019). Via the calculation formula, life expectancy gains automatically reduce pensions at the time of retirement. Incentives to retire later are explicit and substantial, which potentially drives the effective retirement age upwards and may be relevant in view of population ageing. As the notional interest rate is tied to parameters such as growth rates of the wage bill, contributions bill or GDP, the pension system is affected by changes in economic strength and labour market developments (Boulhol, 2019). Simplicity and low administrative costs are also cited as advantages (Barr, 2012), as is transparency, especially in terms of a clear distinction between the portion of old-age income funded with contributions and that provided from the budget to achieve redistribution goals (disability, child care, top-up for low pension recipients).

The most commonly cited disadvantage is difficulty of understanding the concept and the impact of design on pension levels (Holzmann, 2017). According to some authors, possible disadvantages include inflexibility, as well as absence of social dialogue, especially since au-

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[139] It is also necessary to review mandatory retirement, which has been repealed by a few countries (UK, Denmark and Poland) (OECD, 2017).

[140] Notional defined systems (NDC) will be explained in the following section.

[141] In defined benefit (DB) plans the level of pension is guaranteed and benefits are linked to length of service and earnings.

tomatic mechanisms have the sole purpose of ensuring fiscal stability, but not pension adequacy (Filgueira & Manzi, 2017). Absence of redistribution may also be a serious weakness, unless the country has other efficient instruments to reduce poverty and ensure adequate old-age income. Another challenge lies in including part-time workers, those with longer unemployment spells or working on a succession of temporary contracts in the scheme (Holzmann, 2017). If there are life expectancy disparities by socio-economic status, a formula that takes into account average remaining life expectancy is inadequate (Holzmann et al., 2019).

If this option were looked into more closely in Serbia, it should be noted that the same types of reforms are possible within all three closely related variants of earnings-related systems (OECD, 2005:72), in particular points and NDC systems (Boulhol, 2019), and that the change would be technically highly demanding and would also probably require considerable time to reach a political consensus. Hence, it is more efficient to incorporate certain properties of the NDC scheme into the existing system.

2.4 Privatisation and introduction of the second pillar

On World Bank recommendation, during the 1990s transition, most Central and Eastern European countries introduced mandatory insurance in private pension funds with the idea of pension system reliance on three pillars. The reform entailed redirecting a portion of contributions from the first pillar (PAYG) to private individual accounts (second pillar), while incurring a transitional cost. Part of this cost was covered through decelerated pension bill growth, resulting in relatively low pensions and low ratio of public expenditure on pensions in these countries (World Bank, 2005:5), and part by sovereign debt, to cover the first pillar deficit.[142] The global financial crisis turned the spotlight on financing problems, while also revealing administrative and institutional inefficiencies (OECD, 2013.:11). Pressured by the crisis, indebtedness and transition cost, most Central and Eastern European countries discontinued or significantly reduced the second pillar. In the context of some countries abandoning the second pillar, the latest OECD report on pensions even states that 'the current context of low long-term yields might call for revisiting the trade-offs between PAYG and funded components' (OECD, 2019:38). European institutions warn that reforms aimed at promoting supplementary pension saving should 'avoid substitution of public pensions' (EPC-SPC, 2020:43).

In the early 2000s, in the first wave of reforms, Serbia dismissed the introduction of the second pillar,[143] and the rationale for its introduction was subsequently analysed and substantiated in detail, with emphasis on high transition costs, estimated at between 0.6% and

1.7% of the GDP per year, during more than 40 years (Matković et al., 2009).

If it is acknowledged that the pension privatisation model involving the redirection of contributions from the first to the second pillar was a failed experiment (ILO, 2018), a crucial issue in Serbia is the proportion of the first (public PAYG) to the third (private, funded) pillar, and measures that may need to be taken to facilitate the diversification of funding sources for old-age savings. According to National Bank of Serbia data and analyses (Narodna banka Srbije, 2020), the number of active insured persons under private pension schemes is currently low; private pension funds mainly invest in government bonds, and possibilities for portfolio diversification are limited.

In many papers, Barr stresses that funding does not provide a response to demographic challenges, since it may preserve the nominal value of savings in individual accounts, but not necessarily their purchasing power (Barr, 2012:157)[144], and that demographic shocks affect all pension schemes, in both public and private sector (Barr & Diamond, 2006:21, 32-33) (Barr, 2012:166). In his latest paper, he stressed that in both PAYG and funded schemes workers are trying to secure their consumption in retirement by building claims on future production and that economic growth and good government are more important than specifics of pension design (Barr, 2021). Barr even argues that, in case of predominant investment in government bonds, funded schemes become PAYG, as the payment of current insured persons' pensions will depend on future taxpayers (Barr, 2002:9).

In strategic decision-making on the size of each pillar, it is worth noting that in private schemes 'the risks of longevity, inflation, and financial (mis)management and market volatility are all borne by the future retiree' (Hinrichs & Lynch, 2010: 366). It is also necessary to take into account expenditure on direct subsidies and revenues lost owing to tax incentives granted to encourage saving in private pension funds. EU reports warn that reforms aimed at promoting supplementary retirement savings should consider not only fiscal implications, but also redistribution effects, given the composition of private pension scheme clients, which is not gender-neutral and includes a higher proportion of males, more affluent individuals and permanent employees (EPC-SPC, 2020).

In the context of the third pillar at least three questions should be considered. First, what is the scope for supplementary savings and how can it be created in the context of high contributions and high contribution base ceiling in the first pillar (5 times the average wage)? Second, would direct subsidies instead of tax incentives also encourage lower-wage earners to invest in private pensions and how prevalent is the problem of inadequate financial literacy? And third, is the introduction of automatic enrolment in voluntary private pension schemes part of the solution and what does it, in fact, bring?[145]

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[142] Although the use of privatization revenues appeared to be an attractive option to cover transition costs it was sufficient only in part or only for a relatively short period (World bank, 2005:4).

[143] For more details, see Altiparmakov & Matković (2018).

[144] In the case when a large generation is followed by a smaller one, Barr explains how the value of the accumulation, and thus the annuity, will decrease 'Suppose that every couple has one child; thus each couple of the next generation will inherit two apartments and, other things equal, apartment values will fall' (Barr, 2012:168).

[145] This mechanism has resulted from research showing that participation in supplementary pension schemes is significantly hampered by procrastination and inertia. In the EU, automatic enrolment has been introduced in Germany, Italy, Poland, Lithuania and the UK (OECD, 2019a).

2.5 A break with Bismarck

An explicit shift from a Bismarckian social insurance to a Beveridgean basic income pension is not a common reform option. In a number of countries, however, reform processes have been found to imply a silent shift from one to the other, and similar tendencies are observed in Serbia too, given the significant increase in vertical redistribution within the system and the decline in current and perspective net replacement rates (Matković & Stanić, 2020). Consumption smoothing as a key pension system goal is thus passed on from the public to the private sector.

In the basic Beveridgean variant, full system transformation would involve providing all citizens with equal basic pensions which can vary by length of pensionable service, but are non-contributory and budget-funded, while the private sector would provide consumption smoothing (Ebbinghaus, 2021).

A break with Bismarck, both explicit and implicit, raises at least three issues. Firstly, the issue of transition cost, given that the pres-ent generations, especially older ones, who have paid contributions on a base of up to 5 times the average wage, expect to achieve the consumption smoothing goal through the public pension system (and are entitled to it). Secondly, the question which system – public or private – would ensure sustaining the relative living standard more efficiently, given the circumstances in Serbia, in particular investment opportunities, as well as state capacities to regulate and oversee the private sector. Finally, the issue of old-age income inequality, which tends to be more prevalent in systems with a more substantial presence of private pensions (Ebbinghaus, 2021), as well as redistribution towards the more affluent, in view of tax exemptions and subsidies.

Based on the data and research we have today, it seems that in Serbia it would not be effective to provide consumption smoothing predominantly through private pension schemes, and that major structural changes would not lead to improved outcomes.

3 Long-term Care

Over the past decade, long -term care (LTC) system reforms in the EU have been geared towards deinstitutionalisation and stronger development of community-based services, as well as efforts to direct support, to a greater extent, towards those who need it most and/or cannot afford it.[146] The focus is also on reviewing financing modalities, from setting up a budget fund for non-institutional services (Austria), to a dedicated LTC insurance contribution (Germany). Some countries are introducing support for family members caring for the old, and ways to ensure a sufficient supply of high-quality workforce are also sought (European Commission, 2019) (European Commission, 2018). High mortality in care homes and other consequences of the COVID-19 pandemic in residential care facilities have crystallised the arguments for deinstitutionalisation (Knapp et al., 2021).[147]

3.1 Outline of the Serbian system

In Serbia, LTC needs are traditionally met within the family. The public social protection system provides cash LTC benefit, residential care and community-based services, while palliative care and home treatment are provided within the health system.[148] These segments are within the mandates of different governance levels and do not comprise an integrated system.

The 2019 Population Health Survey shows that, in Serbia, 9.5% of old people had great difficulties with basic activities of daily living, and 31.5% – with instrumental activities of daily living (RZS i Batut, 2021). According to SILC (2019) data, 11.4% of the old (65+) perceived severe long-standing limitations in usual activities due to health problems, compared to 15.9% in EU-28 (Eurostat, code hlth_silc_12).[149] The proportion of women with severe limitations was above the average (12.7 and 17.3%, respectively).

The coverage of older persons by public LTC social protection schemes does not exceed 7% of the total population aged 65+, assuming no overlaps in uptake. According to 2020 Ministry data, the proportion of older people receiving LTC cash benefits, as the most prevalent form of assistance, is approximately 4.5%.

The total public expenditure on LTC for old persons in Serbia was assessed in earlier research at only 0.5% of the GDP, with cash benefits

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[146] Long-term care (LTC) refers to cash benefits, as well as healthcare and social services provided to persons in need of assistance in performing activities of daily living (ADL) over an extended period of time.

[147] Deinstitutionalisation – the transition from institutional to community-based services.

[148] Earlier research shows that 59.3% of primary health centres in Serbia do not have a dedicated home treatment unit. In Belgrade, the City Gerontology Institute provides palliative care to 1500 older people per day (Đukanović & Bogdanović Vasić, 2020:12).

[149] This indicator is used in developing LTC expenditure projections in the EU report on ageing (European Commission, 2018:136).

accounting for the largest proportion (almost three quarters) (Matković & Stanić, 2014:79). According to OECD data, the average ratio of total public expenditure for these purposes in 23 EU countries where data are available stands at 1.2% of the GDP. Lower expenditure is found mainly in new Member States (OECD, 2019b:239).

Looking ahead, the demand for LTC services in Serbia is expected to rise, primarily owing to the growing population of the oldest-old and increasing life expectancy with disability, heightened expectations, shifting family patterns and declining family support due to inter alia, emigration flows. Another important consideration is society's decision about the proportion of LTC that should be funded by clients themselves, and the proportion funded – from public funds. According to OECD findings, social protection is essential for ensuring LTC affordability and reducing old people's risk of poverty (Oliveira & Llena-Nozal, 2020:52).

3.2 Improving the existing system

3.2.1 Development of community-based services and deinstitutionalisation

In Serbia, community-based services are within the local government (LG) mandate. The most prevalent service is home care, which, besides personal care, includes support for instrumental activities of daily living. According to 2018 mapping data, this service covered 1.24% of the persons 65+ in 123 LGs (out of 145), and total expenditure for this purpose amounted to only 0.02% of the GDP (Matković & Stranjaković, 2020). The proportion of old persons and service provision intensity vary widely across LGs. Funding is mainly provided from local budgets (approx. 2/3) and national earmarked transfers[150] for social care services (1/4). In most LGs, no co-payment is charged to beneficiaries. Despite the introduction of earmarked transfers in 2016, home care services have not been expanded. Local governments used the funds to decrease their own investment in home care or to develop other services. Looking at a longer time frame, this service developed vigorously in the first ten years of transition or so, but no major progress in coverage or prevalence has been observed since 2012.

The coverage of older persons by residential care is also low in Serbia. According to 2019 data, approximately 1% of the old were in residential care (Republički zavod za socijalnu zaštitu, 2020). Almost half of the residents are in private care homes, whose capacities have recorded a steep rise in the past decade and whose services are entirely funded by clients. Residents and their families fund a significant portion of public sector residential care services, too. According to 2018 data, almost 40% of the residents needed the most intensive support, indicating that, in Serbia, old-age care homes largely operate as nursing homes and hospices (Republički zavod za socijalnu zaštitu, 2019:18). Serbia's public expenditure on institutional care is twice as high as that on local-level social care services (Matković & Stranjaković, 2020).

In 18 EU countries for which data are available in the OECD database, the proportion of persons aged 65+ in residential LTC facilities (excluding hospitals) is significantly higher, 3.8% on average (OECD, 2021a). The deinstitutionalisation trend is especially strong in the Nordic countries (Spasova et al., 2018:9).

Reforms in Serbia should indubitably support further development of community-based services. Reform options include reviewing home care standards to ensure appropriate service provision intensity in all LGs throughout the year and uniform eligibility criteria, to enable better targeting of people with the highest needs.[151] Although co-payment is a matter of local policy, the system-wide arrangement where beneficiaries pay for the support received in care homes indicates that a higher level of co-payment for social care services within the LG mandate makes sense, too. According to 2018 data, the co-payments covered only 5% of the total costs of the home care service in Serbia (Matković and Stranjaković, 2020: 53).

Further reforms must also support the introduction of these services in municipalities where they are not available at all, as well as encourage the development of services such as old person day care and supportive housing, which are almost non-existent. Reviewing the concept of earmarked transfers is an important prerequisite for the development of community-based services.

The area of institutional care is burdened by many outstanding issues, including prices in care homes, beneficiaries and their families' contribution towards care costs, cross-sectoral links to the health system, potential shortage of middle-level medical staff, and strategic approach to the role of this form of old-age care.[152] One proposal is to reserve institutional care only for the older persons with the highest support needs provided that community-based services are developed. Rapid private sector development, waiting lists for public care homes and comparatively low coverage of older people by this form of care indicate that now is the crucial time to elaborate the institutional care concept more thoroughly.

3.2.2 Cash benefits

Three types of cash benefits for LTC are available in Serbia. They differ in terms of grounds for eligibility, funding source (budget or insurance) and amount. The non-contributory attendance allowance is awarded to those who were not insured, the contributory LTC benefit is an insurance-based entitlement, and the augmented attendance allowance is targeting individuals with the most severe disabilities, available to recipients of both of the previous two benefits, either in the full amount or as a top-up. According to 2019 data, the contributo-

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[150] In 2016, the government adopted a decree on earmarked transfers that specifies the criteria and rules for the allocation of additional funds to local governments for social care services that are in their mandate.

[151] In this context, it is worth considering UK experiences with the introduction of national minimum eligibility criteria rather than giving local governments discretion with regard to needs assessment (European Commission, 2019: 497).

[152] Some of these issues are addressed in more detail in the draft version of Deinstitutionalization Strategy (Ministarstvo za rad, zapošljavanje, boračka i socijalna pitanja (2021).

ry LTC benefit amounted to 61% of the minimum wage (RSD 16,500 equivalent to €140),[153] and the augmented allowance – to 107% (approx. RSD 28,800 equivalent to €245). The coverage of older persons stood at approximately 4.5%, primarily under the contributory LTC benefit (approx. 57 thousand recipients, i.e. 4% of the population aged 65+). The adequacy of the augmented allowance is at an appropriate level, as this benefit is intended to cover the forgone earnings of family members who stay out of the labour market to care for a child/person with disability. Recipients may use the benefits at their discretion, without monitoring, as in most EU countries (European Commission, 2019).

One possibility in cash benefit reforms is to disconnect the LTC benefit entitlement from the pension and disability insurance system. As the level of PDI contributions is set by the law governing contributions, rather than determined in such a way as to cover all the entitlements available to recipients,[154] the question is whether the contributory LTC benefit is truly an insurance-based entitlement, or whether it is, in fact, funded from tax revenues, through budget transfers to the pension fund. The suggestion is certainly to at least review the status of current recipients who were granted the right under previous laws, among whom some groups receive very low amounts (Matković & Stanić, 2014). Their possible transfer to non-contributory part of the system would simplify the administration of top-up payments to recipients with most severe disabilities. In most EU countries, LTC benefits are budget-funded and non-means-tested (Spasova et al., 2018) (European Commission, 2019).

Reforms could also include tying benefit amounts to the intensity of individual support needed and, in the long term, widening the scale of benefit amounts. Such practice exists in several EU countries (e.g. Austria, Czech Republic, Finland, France, Germany) (European Commission, 2019). Overall, eligibility assessment should be based less on medical criteria, and more on functional ones.

It is also necessary to reflect on the link between LTC cash benefits and LTC services. The discontinuation and subsequent reinstatement of cash benefits upon admission to old-age care homes witnesses to the policy meanderings in search of system-wide solutions and highlights the need to explore them in depth. One proposal is that cash benefits should cover personal care needs, while beneficiaries themselves should cover the costs of instrumental support, and the overall system of co-payment for social care services should be designed accordingly (Matković & Stanić, 2014). If cash benefits are to be used as compensation for care for old persons in the family, it would make sense to develop individual protection plans and moni-

tor their implementation to prevent neglect. If this idea, recommended in EU documents (Spasova et al., 2018), is to be followed in Serbia, it inevitably requires significant strengthening and capacity building of centres for social work.

3.2.3 Other issues

One reform option that could reduce system fragmentation is the establishment of a dedicated government institution in charge of LTC, with a separate budget. Cross-sectoral cooperation protocols between health and social institutions could also help overcome system fragmentation. At the local level, it is essential to ensure coordination between home care and health home treatment services.

In the coming period, special attention should be given to improving control mechanisms. Another major challenge is exploring measures to retain and ensure an adequate supply of service provision staff. The straightforward part of the solution concerns training and retraining. However, high demand for these occupations in countries offering better pay and working conditions[155] may drive the emigration of precisely that segment of the labour force which is needed to introduce LTC services.

Investment in rehabilitation, prevention and innovative technologies may significantly contribute to containing costs and raising efficiency in the area of LTC (Spasova et al., 2018). Innovative technologies may mitigate workforce shortage, increase productivity, as well as improve quality of care. In the future, remote medicine, artificial intelligence, Big Data, drones and robotics will be an essential part of the answer to the challenges of caring for the old.[156] In-home technologies for older people (safety and health monitoring) and 'products such as an artificial Intelligence wheelchair, a convertible bed and body sensors for bath and bed can help older people live more independently'.[157] Simpler technologies such as smartphones, alarms, sensors and GPS monitors are already available, and experiments are under way with companionship robots or smart homes (OECD, 2020:162). Improving service providers' and clients' digital competencies inevitably becomes an important consideration for the future of the sector.

In the context of overall system reform, it is necessary to consider to what extent Serbia has financial scope, as well as capacities for support to family members caring for old persons. In a few EU countries, such support is provided through training, counselling and respite care services, introduction of formal psychosocial support, coverage of caregivers' social insurance contributions, as well as flexible working hours and sick leave for caregivers (Spasova et al., 2018).

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[153] In 2019, the minimum wage stood at RSD 27,022 (€230) per month on average.

[154] By payment of PDI contributions, insured persons become eligible for an old-age pension and health insurance in old age; in the event of death, their heirs may be eligible for a survivor pension and a one-off funeral grant; in case of disability, insured persons with only a few years of pensionable service are eligible for a disability pension, and potentially also for a physical disability benefit and LTC benefit.

[155] In its LTC plans, the UK expressly refers to improving efforts to attract immigrants in order to meet workforce needs (European Commission, 2019:498).

[156] For more details see UN specialized agency for ITCs website https://www.itu.int/hub/2020/02/from-robots-to-virtual-reality-4-ways-tech-can-improve-seniors-lives/

[157] Rosmino, C. (2019, October 29), https://www.euronews.com/next/2019/10/29/japan-leads-the-way-with-elderly-care.

3.3 Introduction of dedicated LTC insurance

The option of introducing a dedicated contribution to fund both cash benefits and LTC services would, to a substantial extent, solve the problems of fragmentation, inconsistent criteria and absence of co-ordination between the health and social sectors. Some authors argue that there is a stronger rationale for meeting the growing needs of the elderly through social insurance, and that, if tax-financed, LTC stands little chance in the competition for public funds with other sectors (Barr, 2010).

The key weakness of this option is that, in Serbia, a new contribution cannot be introduced at the expense of existing ones, in view of the shortage of funds for pensions and health care. Raising the total social contributions level is unacceptable too, as it would drive labour costs further up.

Further deliberation on the introduction of dedicated LTC insurance would certainly require an in-depth analysis of experiences from Germany and Slovenia, as well as experts' rationale for dismissing this idea in Austria (European Commission, 2019).

4 Old-age Poverty

Old-age poverty reduction is chiefly ensured within the pension system through universal pensions or the institution of minimum pension, depending on welfare state type. Further, almost all EU countries award specific social benefits to older persons outside the pension system, especially those with Bismarckian traditions (European Commission, 2021).

In recent years, new measures and instruments for more comprehensive protection of the older people have been introduced (European Commission, 2021); in the long term, there is a notable threat of growing old-age poverty, given the prevalence of atypical and non-standard jobs, part-time work, employment instability, young people's increasingly delayed labour market entry, and in some cases also widespread grey economy. According to the OECD, part of the solution lies in equal treatment of all workers in terms of coverage, contribution rates and pension entitlements, which would also reduce the incentive for employers to increase non-standard employment (OECD, 2019). Social pensions are also part of the solution.

4.1 Situation in Serbia

In Serbia, the proportion of older persons (65+) who are vulnerable ranges from 8%, according to the absolute consumption poverty indicator,[158] to 21.1%, according to the at-risk-of-poverty rate (AROP). According to the former criterion, old-age poverty is only slightly above the average (poverty incidence of 7%), while according to the latter, they fare somewhat better than the general population (AROP of 23.2%). Pensioners aged 65+ are less vulnerable (Figure 5).

Poverty rises with age. According to 2019 data, the share of persons aged 75+ that were unable to meet their basic needs was as high as 11.2%, and 24.8% were at risk of poverty.

Risk of poverty is more pronounced among women aged 75+ (27.7%). Older women are more likely to live in single-person households, putting them at a significantly higher risk of poverty (Matković & Stanić, 2020a). Further, women's pensions are lower than men's by about 20% as a result of accumulated consequences of their less favourable labour market position (RZS, 2020).

In Serbia, the risk of poverty of both the general and the old population is significantly above the EU-28 average. By this criterion, however, in a number of EU countries, older persons are more vulnerable than in Serbia.[159]

Pension coverage of the population aged 65+ stands at about 90%, with wide gender disparities (97% for men vs. 86% for women). The vulnerable old persons ineligible for a pension (approx. 136 thousand) may qualify for financial social assistance (FSA). According to administrative data, only approx. 16 thousand (1.1%) of the old population received this benefit in 2019.

Given pensioners' lower risk of poverty compared to the general population and the already fairly high redistribution towards minimum pension recipients, introducing guaranteed minimum income for older persons and designing a dedicated FSA module would constitute the key alternative policies to reduce poverty in old age.

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[158] Data taken from Tim za socijalno uključivanje i smanjenje siromaštva Vlade Republike Srbije (2020), available in an Excel spreadsheet.

[159] Although the at-risk-of-poverty rate of the total population is higher only in Romania, the at-risk-of-poverty rate of old persons (65+) is higher in 8 countries, and in Estonia and Latvia it is over 40%. (Eurostat, code ilc_li02)
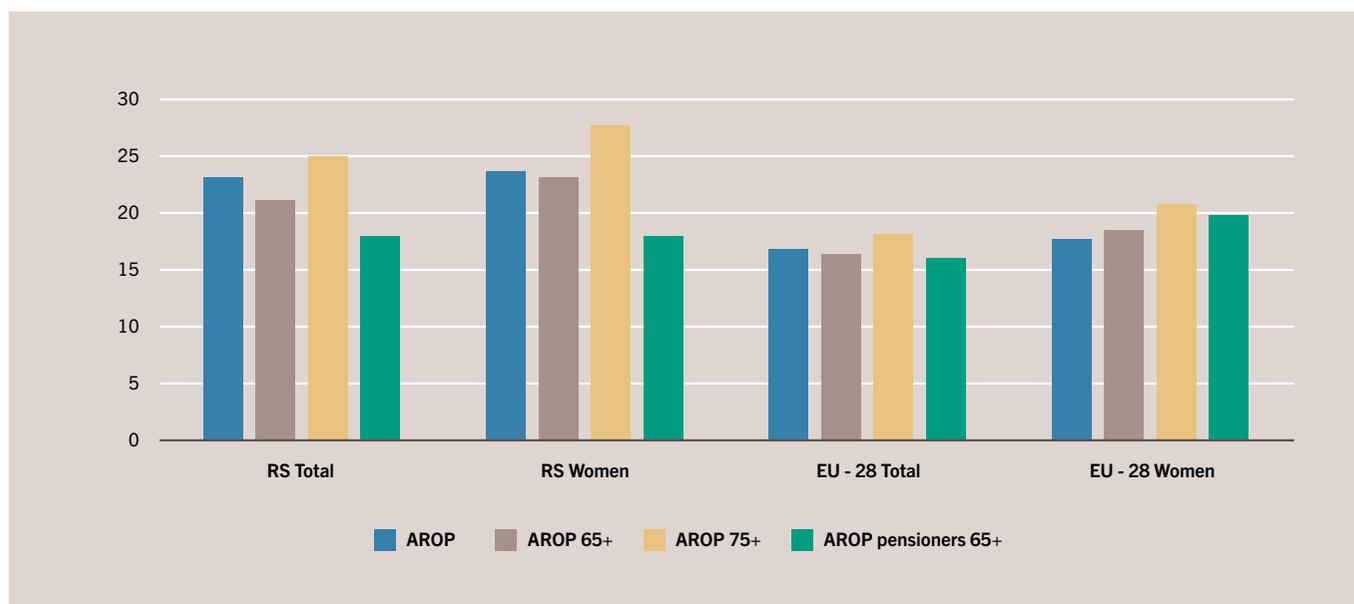
Figure 5. At-risk-of-poverty rates, Serbia and EU-28, SILC (2019)

Source: Eurostat, code ilc_li02, ilc_pns6

4.2 Introducing a guaranteed minimum income for older persons (GMIOP)

One option to reduce old-age poverty would entail introducing a social benefit awarded to the old persons ineligible for a pension and pensioners whose benefits are below the set GMIOP amount. The number of recipients and expenditure on GMIOP would be determined by the 'minimum income' level and the age eligibility threshold.

The most modest variant would involve minimum income equal to augmented FSA, which amounted to about RSD 10,000 (€85) in 2019. That year, this low benefit, below the minimum pension, was received by about 100 thousand pensioners (6.3% of the total number). Recipients of prorated pensions, who also receive foreign pensions, would certainly be ineligible for this entitlement. The other group of recipients would be people aged 65+ ineligible for a pension, about 136 thousand.[160] Unlike pensioners, who would receive a top-up to the GMI level, older persons without pension income would receive the full amount.

The other option is to tie the GMIOP to the absolute poverty line, which stood at 12.5 thousand dinars (€106) per equivalent adult in 2019 (Tim za socijalno uključivanje i smanjenje siromaštva, 2020). In this variant, the number of recipients would be considerably higher, as almost all farmer pension recipients aged 65+ would qualify. On the other hand, for most recipients in this group, the top-up amount would be low (slightly over RSD 1,000 per month).[161]

The concept may foresee that only those aged 70+ or 75+ are eligible for the new entitlement, especially in the latter variant. A higher age threshold than the retirement age would increase the motivation, especially for farmers, to stay in pension insurance. Moreover, as noted above, poverty and risk of poverty are especially high in this age group.

Based on earlier research, the costs of introducing some form of social pension following a similar model were estimated at between 0.3% and 1% of the GDP per year, depending on the age group to which such pensions would be awarded and the benefit level (Matković & Stanić, 2014:156). According to findings, the key advantage of this type of pensions is that its implementation does not require high administrative capacities. The cited weaknesses are relatively high additional expenditure for the older persons in some variants and the inclusion error since recipients may live in more affluent households.

4.3 Introducing a dedicated module in the financial social assistance (FSA) scheme

Introducing a dedicated module in the FSA scheme would be aimed at reducing poverty among the old persons based on means tested targeting.

According to earlier research, the key FSA access barriers for old persons were asset ownership criteria (especially land ownership), lack

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[160] Excluding those who are still active and those receiving a pension from abroad.

[161] According to PDI Fund data, in December 2019, over 90% of pensioners under farmers' insurance received the minimum pension or less. The minimum pension amounted to RSD 11,273 (approx. €95) for this category (Republički fond za penzijsko i invalidsko osiguranje, 2020a:12).

of awareness, complicated administrative procedures and presence of relatives with a legal duty of maintenance (Matković & Stanić, 2014).

Old-age poverty reduction efforts should, thus primarily focus on relaxing or eliminating asset ownership criteria in FSA eligibility assessment. As the first step, raising the land ownership ceiling to 2 ha for old-person households may be considered. Although the Law on Social Protection provides for the possibility of mortgaging land in order to access FSA, research shows that the poor are mainly unaware of this option, and the older population also shows resistance to such arrangements (Matković & Stanić, 2014). Eliminating all asset ownership criteria for old-person households with a maximum uptake would lead to an increase in FSA yearly expenditures by 0.2% of the GDP (Matković & Stanić, 2014:158).

For the old who live in old-person households and are out of the labour force by definition, increasing the assistance amount may be proposed as well, since disincentive to work does not pose a barrier to improving benefit adequacy. The hierarchical logic, whereby assistance should not exceed insurance-based benefits, suggests the farmer pension level as the upper limit for raising the FSA base. In households without members able to work, the weights for the second or third member may, however, be increased to 1 or at least 0.7 (from the current level of 0.5).

Earlier calculations show that reliance on an income test alone (eliminating asset ownership criteria) combined with weight increase to 0.7 for the second household member would result in additional FSA expenditure amounting to 0.26% of the GDP (Matković & Stanić, 2014:158).

Another possibility is to set the age threshold for relaxed eligibility requirements or higher assistance amounts at 5 years above the retirement age. This would reduce the moral hazard in terms of any negative impact that the introduction of a rudimentary form of social pensions might have on the payment of PDI contributions.

The key advantage of a dedicated module in the FSA scheme compared to GMIOP is the smaller inclusion error, as the eligibility criterion is household income, rather than individual income. In addition, this option would involve lower expenditure, especially in some scenarios.

Urban And Spatial Aspects Of Depopulation In Serbia

Branislav Antonić

1 Introduction: Shrinking Cities as a Key Spatial Element Of Depopulation

Depopulation at national level has become one of the main development challenges for many European countries. It has profound interrelations with the decline at all territorial levels: depopulating regions, municipalities, cities and villages. The depopulation of villages and rural regions is probably the most known as it has been present since the post-war decades. However, the phenomenon of depopulating countries in a peacetime period is more correlated to the recent urban depopulation. Most post-socialist European countries have experienced demographical shrinking with the fall of socialism, which caused the sudden and uncontrolled deindustrialisation and therefore the rapid decline of urban population. Similarly, Portugal and Greece began to demographically shrink during the economic crisis of 2008, when their service-based urban economy fell into a crisis. Bulgaria and Romania are especially indicative in this sense, as they are the poorest and most shrinking EU countries, as well as the only ones with more than 90% shrinking cities (Restrepo Cadavid et al..., 2017). These arguments clearly show that the demographic state of urban settlements, i.e., urban growth vs. urban decline, has become one of the key indicators of (de)population trends at national level.

Serbia also shows the aforementioned demographic-territorial patterns. Rural depopulation was identified in all population censuses since the 1960s, and all national spatial plans in the second half of the century have underlined this as a great challenge, but planned measures to deal with rural exodus have not had a significant impact. Post-socialist period has just propelled the problem with depopulation at new levels. Two national post-socialist population censuses, done in 2002 and 2011, showed the first signs of simultaneous demographic crisis at both national and urban levels. The last census in 2011 was the first after the overall majority of urban settlements (74%) demographically shrunk, which was in a sharp contrast to the growth of four major cities – Belgrade, Novi Sad, Niš, and Kragujevac. This can be explained by the fact that Serbia is a country with highly centralised government in major cities, where intermediate level, the administrative districts, does not exist as independent entities. Such situation leaves the district seats, Serbian middle-sized cities, without a real economical power and demographic and social potential, so they can not be an adequate interlink between major cities and rural hinterlands. As a result, the depopulation of middle-sized cities speeds up the depopulation of their districts, subordinated smaller-rural municipalities and the most of villages in their gravitation zones.

An additional problem is that Serbia does not have natural borders with highly developed European countries or worldwide tourist attractions, such as Adriatic seaside for Croatia or Prague for Czech Republic. Hence, external poles for repopulation and redevelopment do not exist and internal territorial balance seems to be critical one

for demographic development of the country. Taking in account that by these characteristics Serbia is similar to the aforementioned Bulgaria and Romania, the future demographic prospects of both country and urban settlements is questionable. In the other hand, this also implies that the improvement of the socio-economic situation of medium-sized Serbian cities can have a great positive impact on their regions, districts and rural development.

This importance of cities for general depopulation trends is not related just to Serbia or Europe – it is a consequence of the rising share of urban population worldwide. Urban population has become globally dominant since about ten years ago. The United Nations (UN) world urbanisation report underlines that 55% of the world's population resided in cities in 2018, and this share is expected to rise to 70% in 2050. Larger cities will grow the fastest (UN, 2019). All these data indirectly demonstrate that the issues of the development of cities, especially the multimillion ones, will have an increasing importance in the development of the planet. In addition, urban development is crucial for spatial development in general, for regional development and rural development, where the position of small and medium-sized cities is especially emphasised as a link between larger cities and rural hinterland. The development and vibrancy of these cities and their gravitating rural surroundings are closely dependent (UN, 2019).

According to the same report (UN, 2019), Europe as a continent is among the most urbanised parts of the Earth. Urbanisation in Europe began in the late 19th century and many cities reached their growth peak decades ago. Hence, the challenges of urban development are different here than at the level of most of the world, where urban growth is still present and accompanied by different challenges, such as unplanned construction, excessive social polarisation in cities or lagging behind in urban infrastructure development.

Today, Europe is the continent with the most evident *urban shrinkage*[162] phenomenon. Urban shrinkage is considered to be a series of mostly unfavourable and interconnected development trends at the level of one city. Depopulation, i.e. the loss of urban population, is the most important feature of this phenomenon (Pallagst, 2008). Population decline has even been crucial to establishing an appropriate research framework in recent decades – the *concept of shrinking cities*. The reason for shaping the concept is that, for the first time in urbanisation, there is a mass occurrence of the peacetime decline of cities that are losing population relatively slowly and evenly due to the decline of the local economy, and not as a result of wars, extreme political crises or natural disasters such as earthquakes, floods and droughts. According to recent data, about 20% of the world's major cities are losing population (Wolff & Wiechmann, 2018). In Europe, this is even more pronounced as, at the beginning of the third mil-

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[162] This phenomenon is common in Japan, the United States, and, more recently, in China.

lennium, almost half of the major European cities[163] were losing their population (Turok & Mykhnenko, 2007). Most of them were in its eastern half, that is, in the former socialist countries, where it has become the predominant urbanisation pattern. Thus, according to data from several years ago, about 75% of Eastern European cities lost their population, and in the case of Romania and Bulgaria, that percentage was even above 90% (Restrepo Cadavid et al., 2017).

Although a the decline of one city is easily seen through its depopulation, the very phenomenon of urban shrinkage is much more complex (Haase et al., 2014). Problems in the restructuring of the urban economy are most often quoted as the cause of urban shrinkage, while other important factors are the limitations imposed by administrative and territorial division, i.e. the impact of borders and zones of influence, changing demographic, social and environmental patterns at the local, regional or national level and accessibility and networking issues (Martinez-Fernandez et al., 2012). Since all socio-economic phenomena are reflected in the urban space, these cities are visually and functionally shrinking, their urban space is more neglected, and there are empty or half-empty buildings and unused and unmaintained urban land and infrastructure. Such an environment often encourages further depopulation. Due to this interdependence of factors, it is sometimes very difficult to distinguish what is the cause and what is the consequence of urban shrinkage.[164]

The first key question faced by decision-makers and experts in a shrinking city is what the goal of the measures is – a return to the former (demographic) growth or stabilisation of the situation in the city through adaptation to urban shrinkage (Hospers, 2014)? Although the former is usually sought at the local level, the latter has proved more certain, especially because urban shrinkage does not have to be negative *per se,* if, for example, it is accompanied by an increase in the quality of life and the environment. There are also other, somewhat

arguable strategies: the first is to consciously bypass the shrinkage topics in city administration[165], and the second is the use of the main local features of shrinkage in a way that they are used in creative ways as potentials for new development (Hospers, 2014). All given approaches had their examples in local practice through different development policies with positive and negative outcomes. Practice shows that there is no global solution to urban shrinkage, but it should be sought in a combination of international guidelines and recommendations and local and regional characteristics (Haase et al., 2014).

All the described efforts to adequately respond to urban shrinkage as a mass and complex phenomenon are important for the Republic of Serbia, where for the first time in the last census in 2011 it was noted that most of the 167 official urban settlements[166] had shrunk during the peacetime period, i.e. after the Second World War. Also, for the first time, it was noted that most of the medium-sized cities, seats of administrative districts in Serbia and those that are the key link between larger cities and rural areas, had shrunk. Despite their similar size, medium-sized cities are characterised by the different features of urban shrinkage and depopulation, as well as great diversity in a number of other features. The main goal of this chapter is to create medium-sized city clusters[167] based on the given similarities and differences of their urban shrinkage, for which sets of development policy measures would be established. The given measures would refer to several spatial levels: (1) within the (urban) settlement, (2) the city in relation to its immediate surroundings and (3) the city in relation to its broader surroundings, i.e. the surrounding cities and to larger cities in Serbia. In this way, a broader contribution is made through an innovative approach in urban policy planning in relation to depopulation, because it improves the previous urban and spatial planning in Serbia, where so far not much attention has been paid to urban shrinkage and its relation to depopulation at a broader level (municipal, district, regional and national).

2 Methodology

The analysis of the shrinkage of medium-sized cities was conducted on the basis of several criteria derived from the described factors of urban shrinkage. They have been selected so that local features of urban shrinkage can be seen through them. The criteria are:

The basic research unit is a medium-sized city in terms of an urban area as a uniquely built-up area[168]. For the analysis of urban shrink-

age, it is important to include the entire developed conurbations (Domhardt & Troeger-Weiß, 2009). This solves the issue of the so-called "flight to the suburbs", where the demographic depopulation of the central urban settlement occurs at the expense of its growing suburbs, and which as a whole zone usually does not shrink[169].

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[163] Larger cities are considered to be cities with over 100,000 inhabitants.

[164] However, according to the majority of renowned sources, a shrinking city is a densely populated urban area, i.e. a uniquely built-up area consisting of the city and its suburbs (if any), which experiences population loss for at least two years due to declining economic activity, and which had at least 10 thousand inhabitants prior to shrinkage. In practice, a time period between two 10-year censuses is usually taken.

[165] This seems to be the approach which currently prevails among Serbian cities.

[166] In line with the division of settlements into urban and rural by the Statistical Office of the Republic of Serbia.

[167] Medium-sized cities which had a demographic growth in 2011 would also be included, because according to the latest official estimates, some of them have become shrinking.

[168] This refers to the city as a central settlement and its spatially fused suburbs, if any, which are officially independent settlements, regardless of whether they are listed as rural or, less frequently, as urban.

[169] In certain economic criteria (salaries, investments, employees by occupations), data at the level of the local self-government unit will be used, because the given data are officially collected at that level, not for the settlements.

No.	ASPECT	No.	CRITERION
1.	Demo-graphic	C0	Population trends (current growth or decline)
2.		C1	Population of the city (i.e. the demographic size of the city)
3.	Economic	C2	Financial indicators (budget, investments, salaries) per capita
4.		C3	The character of the city economy according to the share of employees by economic activities, especially in industry
5.		C4	Presence of high-order city functions (higher education, high culture, scientific research institutes, etc.)
6.		C5	Position of the city in relation to the nearest higher order road, i.e. highway
7.	Administrative	C6	Position of the city in relation to the state border
8.		C7	Position of the city in relation to the country's larger cities
9.	Social	C8	Urban housing characteristics (increase in new construction and number of empty dwellings trend)

Table 1. Criteria for the analysis of urban shrinkage in Serbia's cities[170]

In Serbia, there are 24 medium-sized urban settlements which are the seats of local self-government units[171] with the status of a city (figure 1). They represent 14% of urban settlements in the country. Most of these settlements have between 30,000 and 100,000 inhabitants.[172]

Medium-sized cities are the most important units of local self-government, and a local self-government unit has been the only essential level of regional decentralisation of the state for decades (Vasiljević, 2007).[173] For the first time since the last census in 2011, most of these cities have been shrinking and this represents a new phenomenon in depopulation in Serbia, which is no longer associated exclusively with agricultural settlements, but also with settlements which are or were previously industrial and service centres, i.e. urban-type settlements.

Medium-sized cities are particularly significant, as they represent a key link between rural areas with small towns and larger cities of international and/or regional significance. Furthermore, the vast majority of these cities are also the seats of administrative districts[174] as a potentially important regional level for the (desired) decentralisation of the state, as one of the important measures for better socio-economic and, therefore, demographic balance within a broader area. Therefore, it can be seen that these cities are the most important, if not the only mean of the state's spatial development which can contribute to the balance between the four big cities registering growth – Belgrade, Novi Sad, Niš and Kragujevac – and the rest of Serbia.

The time frame of the analysis is particularly related to changes within the last inter-census period between 2002 and 2011. Where recent data existed, they were included in the analysis.

[170] Ecological criteria were included in preliminary research for available data. For example, a correlation between population density in an urban area and population growth or loss of the relevant city was examined. However, such correlations have not been noticed. This observation is otherwise in line with the international sources, which shows that these ecological conditionalities can influence both positively and negatively on the urban shrinkage. For instance, the decline of small and medium-sized cities in Finland in the late 20th century is directly linked with the risen ecological awareness and the related strengthening of environmental legislation, which has consequently hindered the development of local wood industry as the backbone of the economy of these cities.

[171] In Serbia, the division of local self-government units into cities and municipalities has been legally introduced since 2007. In terms of the current Law on Territorial Organization of the Republic of Serbia, cities are actually former larger local self-government units (i.e. former larger municipalities), mostly those where the seats of administrative districts are located. Such 'cities' include a central urban settlement (in the original sense of the word city, used in this research), but also a large number of rural settlements and vast areas under agricultural and forest land, which do not have urban characteristics. This ambiguity has led to great dilemmas in the use of terms in public life, where they are often confused.

[172] The 100,000-population threshold is taken in most global and European surveys as the line dividing a large and medium-sized city. Similarly, most countries in the eastern half of Europe have a threshold between small and medium-sized cities ranging from 25,000 to 50,000 inhabitants.

[173] The Autonomous Province of Vojvodina (as well as de jure Kosovo and Metohija / references to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999)) should be emphasised at this point, as the only part of the state with essentially obtained autonomy at regional level, with its own budget, financial transfers stipulated by the constitution, basic jurisdictions and the position of a legal entity. All mentioned elements of autonomy are nevertheless implemented through provincial government, located exclusively in Novi Sad as a provincial capital. Administrative districts in Serbia are more the elements of delegation of national or regional/Vojvodina government, which indirectly implies a gap between the fast and significant growth of Belgrade and Novi Sad as two government seats and the decline of the rest of Serbia.

[174] Three cities with the official status of a city and which are not district seats are Novi Pazar, Vršac and Loznica. Their significance is reflected in the fact that, within their districts, they are in the spatial sense opposite to the district seat (i.e. Kraljevo, Pančevo and Šabac), so they have their areas of influence which extend to the surrounding smaller municipalities. This is an important element to be included in this research.

3 Key Indicators of Urban Shrinkage of Serbian Cities

There are officially 167 urban settlements in the Republic of Serbia, which can be grouped into three sets according to their character. The majority comprises 125 settlements or 74.9% of all urban settlements in Serbia which are at the same time the seats of territorial administration units (municipalities and districts). The second set (20 or 12.0%) are urban settlements which are the suburbs of larger settlements, and the third set (22 or 13.2%) are other urban settlements, particular in terms of their specific economy, usually mining and tourist settlements. Such cities are called monostructural or mono-cities due to their economic uniformity. The process of urban shrinkage points to several key indicators:

In the 2011 census, 74.3% of urban settlements were depopulated compared to the previous 2002 census. This is a significant deterioration compared to the previous inter-census period (1991-2002), when, for the first time since the Second World War, more than 10% of cities were declining. An average city in Serbia had a 4.1% decline in the 2002-2011 period. Borča had the highest growth (+ 31.1%), while Divčibare registered the deepest decline (-40.0%). As many as 35 (21.0%) urban settlements had a large decline, over 10%.

The highest number of growing urban settlements were among the suburbs with an urban settlement status – 65.0% of them recorded growth. The third set of urban settlements (mainly mining and tourist towns) remained on the opposing end where as many as 90.9% had shrunk. Data for urban settlements that are also administrative centres were similar to the national average. In this most numerous set of urban settlements, Novi Pazar had the largest growth (+21.8%), while Majdanpek had the deepest decline (-23.6%).

According to the findings, it is easy to notice that the smaller the city, the faster it shrinks. All four settlements in Serbia with over 100,000 inhabitants recorded growth in the 2002-2011 period; out of 24 urban settlements with 30,000-100,000 inhabitants, 62.5% shrank; out of 51 urban settlements with 10,000-30,000 inhabitants 77.7% shrank, out of 41 urban settlements with 5,000-10,000 inhabitants as much as 85.4% shrank, while a slightly smaller share (72.9%) shrank in the last group of 48 urban settlements with less than 5,000 inhabitants, due to a larger presence of suburbs.[175]

At the level of NUTS2[176] regions, only the Belgrade Region recorded a positive urban population growth (+5.5%), while the Region of Southern and Eastern Serbia recorded the largest decline (-2.3%). However, the differences between cities within one region are drastically larger, so there was a big decline (>10%) in 11 (21.6%) urban settlements in Vojvodina, 10 (19.6%) in Šumadija and Western Serbia, and as many as 14 (29.8%) in Southern and Eastern Serbia. Vojvodina is the biggest surprise here, though, as the most developed part of the country after Belgrade, which indirectly speaks of the excessive centralisation of the province in Novi Sad.

4 Analysis

The analysis of the depopulation of medium-sized cities was conducted on the example of 24 cities. The selected cities are a relatively homogeneous group of settlements with several shared features: most have between 30,000 and 100,000 inhabitants, 21 cities are also the seats of administrative districts in Serbia, all cities have their areas of influence that extend beyond their own local self-government unit, that is, to the surrounding smaller municipalities, and almost all cities have certain, albeit few higher-order public functions (one to two higher education institutions, higher-order cultural institutions, scientific research institutes, etc.). The aim of this analysis is to perceive the differences among them and to put them in relation to their growth or decline in order to create clusters of cities.

4.1 Population trends

The rate of the growth or shrinkage of cities is observed for the 2002-2011 period for the entire urban area, with a subsequent assessment for 2020.

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[175] According to the 2014 Book No. 20. 'Comparative Overview of the Number of Population in 1948, 1953, 1961, 1971, 1981, 1991, 2002 and 2011: Data by Settlements' by the Statistical Office of the Republic of Serbia. Compare also: Antonić et al., 2020.

[174] Division made on the basis of level 2 of the Nomenclature of Statistical Territorial Units (internationally NUTS). De facto, there are four NUTS2 regions in Serbia: Belgrade region (16 urban settlements), Vojvodina (51), Šumadija and Western Serbia (51) and Southern and Eastern Serbia (47).

| No. | City | Included suburban settlements (U — urban settlement)[177] | Number of inhabitants | | Trend |
			2002	2002	2011−2002
1	Bor	Brestovac	42,337	36,850	-13.0%
2	Valjevo	Beloševac, Gornja Grabovica, Degurić, Petnica, Popučke, Rađevo Selo, Sedlari	69,096	67,383	-2.5%
3	Vranje	Ribince, Suvi Dol	56,099	56,255	+ 0.3%
4	Vršac	-	36,623	36,040	-1.6%
5	Zaječar	-	39,491	38,165	-3.4%
6	Zrenjanin	-	79,773	76,511	-4.1%
7	Jagodina	Bresje, Vinorača, Voljavče, Majur, Trnava	43,871	46,152	+ 5.2%
8	Kikinda	-	41,861	38,065	-9.1%
9	Kraljevo	Adrani, Grdica, Jarčujak, Konarevo, Kovanluk, Kovači, Ratina, Ribnica (U), Čibukovac	74,585	81,463	+ 9.2%
10	Kruševac	Begovo Brdo, Dedina, Kapidžija, Lazarica, Mudrakovac, Pakašnica, Parunovac, Čitluk	74,282	77,106	+ 3.8%
11	Leskovac	Bobište, Bratomilce, Gornje Stopanje, Donje Sinkovce	71,915	69,790	-3.0%
12	Loznica	Banja Koviljača (U), Baščeluci, Klupci, Krajišnici, Lozničko Polje, Ploča	44,395	41,822	-5.8%
13	Novi Pazar	Banja, Mur, Osoje, Paralovo, Pobrđe, Postenje	65,469	81,100	+ 23.9%
14	Pančevo	Starčevo (U)	84,666	83,818	-1.0%
15	Pirot	Berilovac, Gnjilan, Novi Zavoj	46,547	44,516	-4.4%
16	Požarevac	-	41,736	44,183	+ 5.9%
17	Prokuplje	Donja Stražava, Novo Selo	28,757	28,522	-0.8%
18	Smederevo	Vučak, Landol, Petrijevo, Radinac, Ralja, Udovice	75,169	77,401	+ 3.0%
19	Sombor	-	51,471	47,623	-7.5%
20	Sremska Mitrovica	Laćarak, Mačvanska Mitrovica (U)	53,873	52,262	-3.0%
21	Subotica	Palić (U)	107,726	105,681	-1.9%
22	Užice	Duboko, Sevojno (U)	63,375	60,595	-4.4%
23	Čačak	Beljina, Konjevići, Loznica, Preljina, Trbušani, Trnava	81,839	83,956	+ 2.6%
24	Šabac	Jevremovac, Jelenča, Majur, Mišar, Pocerski Pričinović	75,339	74,740	-0.8%
Total			1,450,295	1,449,999	-0.0%

Table 2. Population trends by city for the 2002/2011 period.

Source: SORS, 2014b

According to the table 2, medium-sized cities in Serbia are shrinking, but only by a total of 300 people. Still, out of 24 cities, 2/3 shrank, that is, 16 cities. If this were to be divided into growing/declining categories,[178] then the following distribution is obtained (Fig.1):

1) Large growth – 1 city: Novi Pazar.

2) Moderate growth – 3 cities: Kraljevo, Jagodina and Požarevac.

3) Small growth – 4 cities: Kruševac, Smederevo, Čačak and Vranje.

4) Small decline – as many as 12 cities: Šabac, Prokuplje, Pančevo, Vršac, Subotica, Valjevo, Leskovac, Sremska Mitrovica, Zaječar, Zrenjanin, Pirot and Užice.

5) Moderate decline – 3 cities: Loznica, Sombor and Kikinda.

6) Large decline – 1 city: Bor.

Novi Pazar had the largest growth, while Bor had the largest decline. Both cities are exceptions, while Novi Pazar differs by the ethnic composition and still has a noticeable natural population growth. Bor, as a mining centre, is the only real mono-city in the observed group, although Užice has some inherited elements of this development from the socialist era.

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[177] Suburban settlements within the scope of the urban area are, as a rule, included in the boundaries of the General Urban Plan as one of the main local strategic documents. A smaller number of these settlements are also urban, such as Palić or Sevojno, and this is specifically indicated.

[178] The ideal demographic growth between 5% and 10% on a ten-year level is taken in scientific circles as a basis for obtaining categories, as it enables the growth of the number of employees best covered by the growth of the economy. Growth of over 10% is already seen as pressure on the local economy in terms of employment.

Figure 1. Spatial distribution of medium-sized cities in Serbia according to the population growth or decline

The main conclusion is that the estimates show the unification of medium-sized cities in the direction of a somewhat slighter, but increasingly present population decline. This reduction in variability in demographic trends among cities across Serbia is also evidence of increasingly significant centralisation. It seems that local urban development is under intensive influence by higher, national and provincial levels, so it is completely constrained to make a step in the new development direction which would make an economic and demographic turnaround.[180]

| No. | City | No. inhabitants SGU 2020 (estimate) | Share of cities in local self-government unit | | | City no. inhabit. (estimate) | Trend 2020/ 2011 |
			2002	2011	2020 (estimate)		
1	Bor	44,639	75.85%	75.80%	75.75%	33,814	-8.24%
2	Valjevo	85,316	69.97%	74.61%	79.26%	67,618	+ 0.35%
3	Vranje	79,782	64.27%	67.35%	70.43%	56,194	-0.11%
4	Vršac	48,913	67.36%	69.27%	71.19%	34,819	-3.39%
5	Zaječar	53,509	59.86%	64.18%	68.51%	36,657	-3.95%
6	Zrenjanin	115,797	58.32%	62.02%	65.72%	76,102	-0.53%
7	Jagodina	68,926	61.88%	64.23%	66.58%	45,892	-0.56%
8	Kikinda	54,131	62.48%	64.03%	65.57%	35,496	-6.75%
9	Kraljevo	117,168	61.28%	64.92%	68.55%	80,320	-1.40%
10	Kruševac	120,154	56.54%	59.89%	63.23%	75,973	-1.47%
11	Leskovac	134,285	46.03%	48.40%	50.77%	68,173	-2.32%
12	Loznica	74,703	51.38%	52.72%	54.07%	40,389	-3.43%
13	Novi Pazar	107,071	76.13%	80.77%	85.41%	91,447	+ 12.76%
14	Pančevo	119,509	66.58%	67.92%	69.25%	82,761	-1.26%
15	Pirot	53,824	72.97%	76.85%	80.73%	43,450	-2.39%
16	Požarevac	71,746	55.72%	58.65%	61.58%	44,180	-0.01%
17	Prokuplje	40,748	59.29%	64.21%	69.13%	28,169	-1.24%
18	Smederevo	102,288	68.45%	71.53%	74.60%	76,311	-1.41%
19	Sombor	78,472	52.92%	55.44%	57.96%	45,480	-4.50%
20	S. Mitrovica	75,241	62.71%	65.38%	68.04%	51,193	-2.05%
21	Subotica	136,475	72.59%	74.66%	76.72%	104,709	-0.92%
22	Užice	72,940	76.34%	77.65%	78.96%	57,591	-4.96%
23	Čačak	109,568	69.90%	72.79%	75.68%	82,920	-1.23%
24	Šabac	110,148	61.30%	64.50%	67.69%	74,555	-0.25%

Table 3. Population estimate for cities in 2020

Source: SORS, 2020

As the last census was conducted in 2011, an estimate of the number of inhabitants for the analysed cities for 2020 was made, based on the published official estimates for 2020 at the level of the corresponding local self-government units. The given figures are compared with the share of the population of urban areas in the 2002 and 2011 censuses in relation to the total population of the local self-government unit (SGU).[179]

It is evident from Table 3 that this estimate gives more than 90% of the cities with shrinking populations, but it also gives smaller extremes, because, although only two cities (8.3%) are growing, the decline is not as sharp in places where it was the highest in 2011, such as Bor or Sombor. When the estimated values of the population of cities for 2020 are compared with the 2011 census, even 13 cities (54%) show worse demographic indicators and these are mostly cities which had an increase or a slight decline during the 2002-2011 period. Cities with a significant decline have similar or somewhat better outcomes, but are all, except for Valjevo, all are still assessed as cities with a demographic decline.

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[179] It is interesting to note that in the 2002-2011 period, the given share of the population of urban areas grew in all cities except Bor, regardless of whether the cities themselves lost their population or not.

[180] As the analysis for 2020 is a situation assessment, demographic data for 2011 will be used hereinafter in the research.

4.2 Number of inhabitants in a city in relation to urban depopulation

The analysis according to this criterion builds on the previous one, because it has already been determined that with the decrease in size, cities become more prone to shrinkage. This has also been tested for selected medium-sized cities. Similar to the previous one, a distribution was made into six categories corresponding to the size of the cities.

The table shows the so-called 'diagonal layout', which means that even in this relatively homogeneous group of cities, their size affects the change in population. The category of the largest cities (over 80,000 inhabitants) is the only one where most of them are grow-

ing, while in the category of the smallest ones (below 40,000 inhabitants), all cities are in decline. Similarly, Novi Pazar, which is growing the fastest, is in the first category of cities, while Bor, with the largest decline, is in the last. The biggest exceptions to the above rule can be singled out. In a negative sense, it is Subotica, because it is declining, and it is the largest among the researched cities. However, unlike most cities, Subotica has a distinct border-city character, so despite its size, it has a relatively small gravitation zone. On the other hand, there are the positive examples of Jagodina and Požarevac, cities in the fifth category, which have a growth of over 5%. Both cities are in the central part of the country and around several cities which are larger or comparable to them (Smederevo, Ćuprija and Paraćin), so a good networking influence can be assumed.

No.	City size	Large growth (>10%)	Moderate growth (5—10%)	Small growth (0—5%)	Small decline (0—5%)	Moderate decline (5—10%)	Large decline (>10%)
1	>80 thousand inhabitants	Novi Pazar	Kraljevo	Čačak	Subotica Pančevo	-	-
2	70—80 thousand inhabitants	-	-	Smederevo Kruševac	Zrenjanin Šabac	-	-
3	60—70 thousand inhabitants	-	-	-	Leskovac Valjevo Užice	-	-
4	50—60 thousand inhabitants	-	-	Vranje	Sremska Mitrovica	-	-
5	40—50 thousand inhabitants	-	Jagodina Požarevac	-	Pirot	Sombor Loznica	-
6	<40 thousand inhabitants	-	-	-	Zaječar Vršac Prokuplje	Kikinda	Bor

Table 4. Population in the city and urban depopulation for the 2002/2011 period

4.3 Financial and fiscal indicators and relation to urban depopulation

The 'financial element' of urban shrinking is an under-researched aspect within the topic of urban decline. Two questions are important here: (1) how to measure urban decline in this regard and (2) how to shape financial measures based on that? In the first case, there is no consensus among experts and a number of indicators have been proposed: the local revenue trends, the city's gross domestic product trends, the number of employees, i.e. unemployed relative to the total population, level of investment, difference between revenues and expenses or the degree of dependence of the local budget on external financial sources, such as regional or state administration (Wolff, 2010; Stryjakiewicz & Jaroszewska, 2016).

In the case of financial measures for shrinking cities, it should be said immediately that they are rarely applied separately, but are combined

with spatial measures in the broader development policy of a city. In cities with a extreme shrinkage in the United States, tax incentives and pressures are applied in order to move the population from parts of the city with larger shrinkage to other parts. In Western Europe, this approach has been changed in line with the less liberal model of urban development. For example, in cities with a large and long-lasting shrinkage in the former East Germany,[181] financial support and investments are systematically directed to city quarters where a higher concentration of users (tenants, employees, etc.) is still maintained. The goal is to transform the renovated neighbourhoods into 'magnets' for further reurbanisation. This approach is known as an 'urban archipelago' (Cepl, 2006) or 'patchwork urbanism' (Brent, 2012).

The analysis in this part is made at the local self-government unit level, because only such data are officially available. The following available indicators were selected for analysis: average salary, budget revenues and investments.[182] In a financial sense, this in a certain way looks at the present (salaries), the recent past (revenues) and the near

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[181] Many cities of the former East Germany began to shrink as early as at the end of World War II, but this process was markedly accelerated by the fall of socialism and the uncertainty of the post-socialist transition.

[182] The last two indicators were adjusted per capita for comparison. Data such as the share of employed and unemployed have proven to be very problematic for Serbia due to the still open issues of restructuring former state-owned enterprises, as well as the large share of informally unemployed.

Figure 2. Financial indicators by cities for 2019

The legend/map contains:

1 - Demoggraphic trends, 2002-2011
2 - Average month earning 2019
3 - Budget incomes per capita, 2019
4 - Investments per capita, 2019

Indicators

1
>110%
105-110%
100-105%
95-100%
90-95%
<90%

2
>100%
95-100%
90-95%
85-90%
80-85%
<80%

3
>100%
90-100%
80-90%
70-80%
60-70%
<60%

4
>100%
80-100%
60-80%
40-60%
20-40%
<20%

Legend
Rivers
Bigger cities
Smaller cities

Scale 0 25 50 75 100 km

Medium-sized cities have lower local income in relation to the average salary, which is not the case with Belgrade and Novi Sad, but also with several tourist municipalities in Serbia.[184] This indirectly implies that income earned in medium-sized cities 'spills over' in the form of consumption in larger cities and tourist places, which confirms the importance of the tertiary and quaternary economy for the local economy.[185]

In spatial considerations, the situation is deteriorating from the northeast to the southwest of Serbia according to the first two indicators, so, as a rule, cities in the north and east of the country usually have a better financial than demographic situation, while the opposite is true for cities in the south and west. The only significant anomaly is visible again near the city of Bor. In further consideration, it can be noticed that the Danube region in the northwest-southeast direction, which approximately represents the 'line' between the cities which are performing better and worse according to the selected financial indicators.

There are more spatial inconsistencies in investments, because the cities are more related to the energy sector (Bor, Pančevo and Požarevac) considerably above the national average, especially in relation to the nearby cities.

4.4 The character of urban economy in relation to urban depopulation

An important determinant of shrinking cities is the decline of industry. Manufacturing industry has been a key economic activity for the establishment of a modern city since the late 18th century and the accelerated urbanisation that emerged as a direct consequence of mass industrialisation (Eisinger, 2006). Thus, due to problems with the restructuring of local industry in the post-industrial era, this type of a shrinking city with industrial decline has been considered an ordinary one since several decades ago (Rieniets, 2009; Bontje & Musterd, 2012). The problem of declining industry especially affects small and medium-sized cities, where the tertiary sector of the economy, that is, trade and services, has been traditionally less important than industry (Restrepo Cadavid et al., 2017).

Two ways to overcome the problem of the urban economy of former industrial cities are noted. The first is a simple reindustrialisation, which is usually a 'transitional solution', because along with the post-industrial era, the profile of urban population is changing, as it becomes more educated and more specialised (Ralević et al., 2014). The long-term solution is the transition to tertiary and quaternary sectors of the economy, which has as a precondition the strengthening of higher-order urban functions in given cities.[186] This is usually done through strengthening decentralised and locally oriented education (Nelle, 2016). One such model is the creation of a network of

future (investments). Also, the data in the form of estimates available for 2019 were processed.

Based on a comparative presentation of three financial indicators[183] six categories of cities were determined for each indicator and the findings were then compared with the cities' demographic trends (Fig. 2). Medium-sized cities lag significantly behind in terms of salaries, local revenues and investments in relation to the national average, and even more in relation to the two largest cities in Serbia, Belgrade and Novi Sad. However, there is no clear link between depopulation and financial indicators for most cities. For example, Novi Pazar and Bor demonstrate exactly the opposite. Demographically endangered Bor is above the national average in all three indicators, but it has the largest demographic decline, while in Novi Pazar there is a similar gap, but between good demographic and poor financial indicators.

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[183] Annex – Table 5.

[184] For example, the municipality of Čajetina (including Zlatibor) in 2019, had income per capita that was as much as 3 times higher than the national average, and this tendency can be seen to a lesser extent in Vrnjačka Banja.

[185] Which includes trade, services, tourism, banking, highly professional services, etc.

[186] These are entities in the field of higher education, research, science, creative industries, higher public administration, etc. These are often public institutions, but many can also be in private property/private sector.

small university-student cities, which indirectly leads to the rise of the research and development sector. This model of development is not only important in economic terms, but it has been shown to have a favourable impact on urban social and environmental aspects (Nuzirab & Dewancker, 2014). In Serbian conditions, this is visible in the cases of Novi Pazar and Kosovska Mitrovica, where relatively recently established universities have preserved the vibrancy of the given cities.

The main indicator for this criterion is the growth or decline of industry at the level of the urban area during the inter-census 2002-2011 period and the degree of industrialisation according to the national average for 2011. This was examined based on the number of active inhabitants in the manufacturing sector for the level of local self-government units where cities were surveyed.

Comparative analysis[187] shows that, from 2002 to 2011, the number of employees in the (manufacturing) industry in all cities decreased
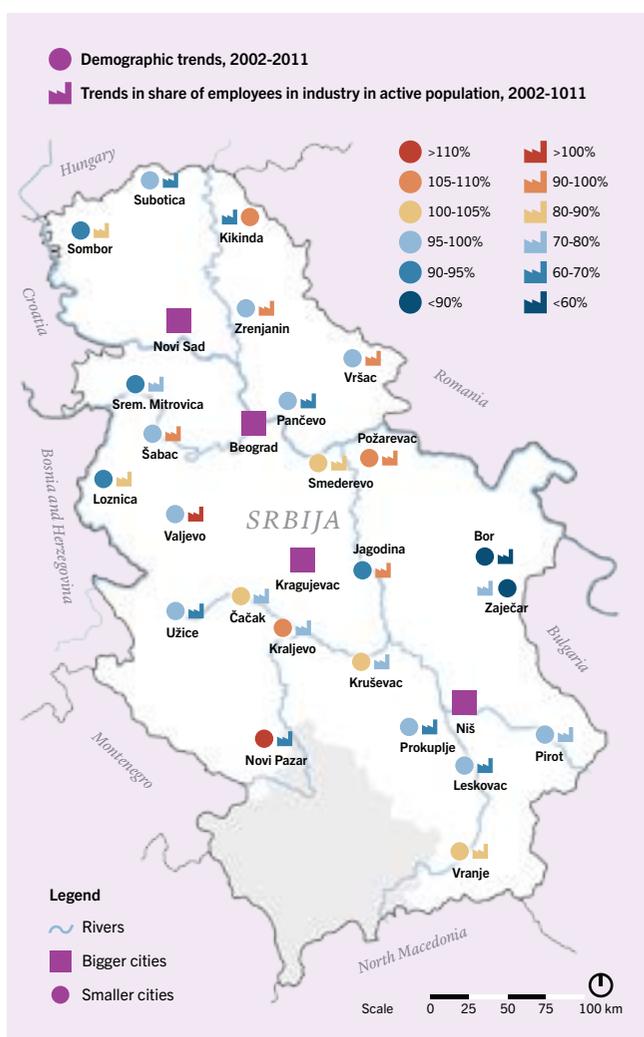
Figure 3. Growth or decline of industrial activities according to the number of employees during the 2002-2011 period and in relation to demographic trends
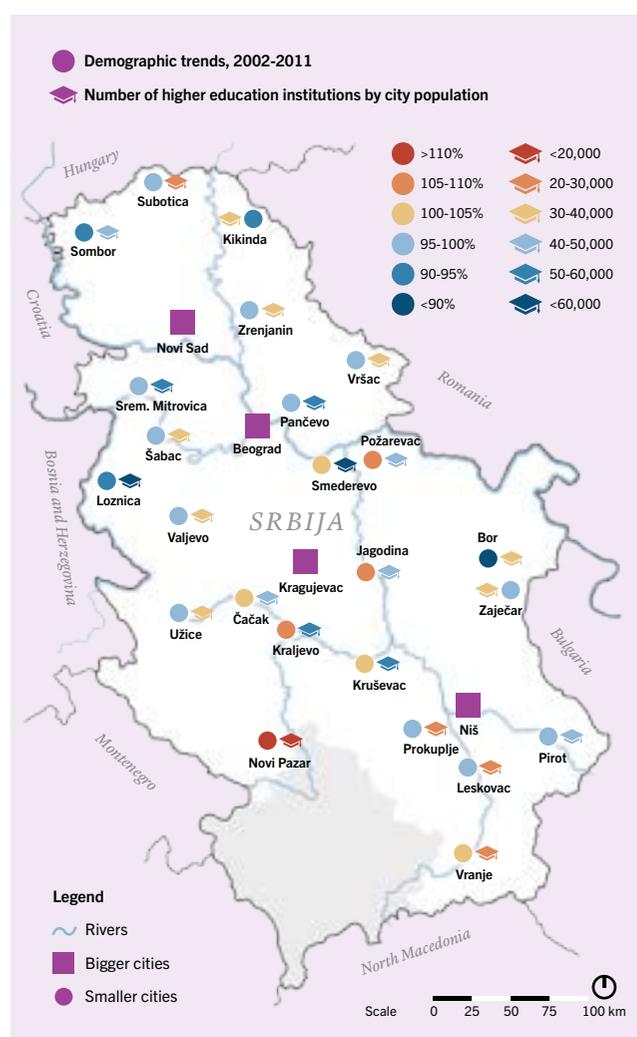
Figure 4. Concentration of higher education institutions in the researched cities according to their demographic trends

significantly, especially if the working-age population (18-65 years) is observed. As for the number of employees, the decline was smaller here, and there was even a slight increase in Valjevo. Zaječar is on the other end, where that share was halved. It is interesting to note that the share of employees in the manufacturing industry in the surveyed cities increased at the national level, from 2002 to 2011. This emphasises that medium-sized cities remain the 'bastions' of manufacturing industry in Serbia, regardless of its declining importance.

When this is presented spatially and linked to demographic trends (Fig. 3) it can be concluded that cities in the northern half of Serbia perform better than those in the southern half, with exceptions in both cases. Cities where industry is based on raw materials from the immediate vicinity, and especially those with a strong food industry, had better results. By contrast, cities with heavy and machine industries fared worse. For example, Pančevo and Sremska Mitrovica, with a relatively small share of light industry for Vojvodina, proved to be the worst at the provincial level. However, the worst results were in Bor and Zaječar in Eastern Serbia, which have a significant decline in population.

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[187] Annex - Table 6.

4.5 Higher-order urban functions and relation to urban depopulation

The concept of higher-order city urban functions is considered to include all those central functions which have significance above the local (city, municipal) level. Examples of this are: faculties, colleges, research institutes and centres, cultural institutions of regional and national importance, but also creative industry centres or large shopping centres. A type of these functions which, according to the shrinking city theories, offers the biggest opportunities for the city's renewal – higher and college education – was selected for this analysis. The importance of decentralisation of this sector has already been emphasised. It is often emphasised that successful small cities in Europe are precisely those ones that have been affected by 'studentification' (UO, 2020). Attracting students as a future higher education population is important because it has a long-term impact on the city in further attracting capital in the broadest sense (human, economic, creative, cultural). In the analysis of small and successful US shrinking cities, it was noted that they were all characterised by an above-average level of educated population in relation to other shrinking cities (Florida, 2019).

As an indicator of higher-order urban functions, the number of higher and college education institutions (universities, colleges, academies) with nationally accredited curricula was used in relation to the number of city's inhabitants. In the case of universities which are not divided into faculties, the number of divisions or departments with accredited curricula is counted.[188] The departments and university representative offices that are branches are not included in the analysis. It turned out that they usually serve to attract potential students in the city in which they are situated, that educational activities almost always take place at the headquarters of a given institution, and that the state often insists on this (Blic, 2018).

Comparative overview of cities according to this criterion indicates that Novi Pazar is in by far the best position with two universities and a total of 10 departments with accredited curricula.[189] This is in line with demographic trends, as Novi Pazar had the highest population growth during the 2002-2011 period (Fig. 4). Subotica, Leskovac and Vranje are also further away from larger cities and have a higher concentration of higher education institutions. It is obvious that due to the distance from larger cities, they can hardly rely on the capacities of their higher education institutions. On the other end are Smederevo, Pančevo and Sremska Mitrovica, which are close to Belgrade and Novi Sad, and where there are no such institutions, or there is only one. Similarly, lesser higher education capacities are also noted in spatially close medium-sized cities, such as cities along the West Morava. This means that the spatial factor is reflected in the development of higher city functions in medium-sized cities in Serbia.

4.6 Position of a city to the nearest highway in relation to urban depopulation

Transport accessibility is becoming an increasingly important factor in the research of shrinking cities. It is being increasingly studied through globalisation theories, which start from the fact that accessibility in any sense is a great advantage for a certain city, region or country (Martinez-Fernandez et al., 2012). The distance of cities from important transport corridors considerably encourages urban shrinkage and is more broadly related to the emergence of the so-called 'single cities', which are characterised by poor accessibility in the form of distance from transport corridors and from other cities, especially the larger ones (Restrepo Cadavid et al., 2017). Most of the shrinking cities today are precisely cities which are not well networked (Schlappa
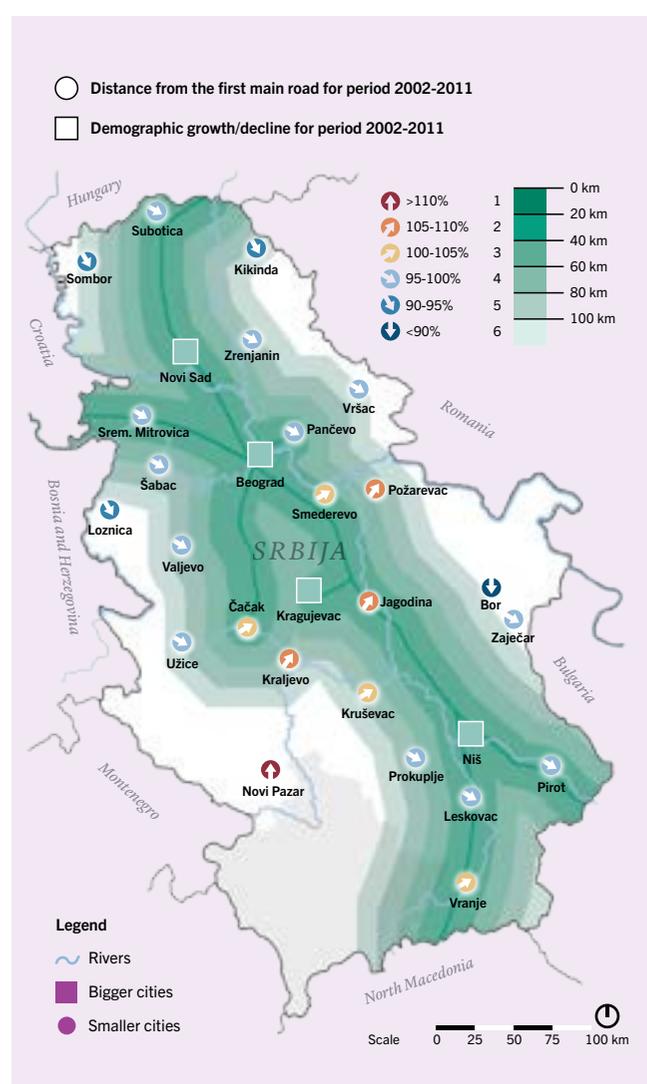
Figure 5. Distance of medium-sized cities from highways in Serbia in relation to the population decline or growth

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[188] Certain (private) universities include departments whose curricula are not accredited and where standards which contribute to the development of higher education staff cannot be clearly established.

[189] Annex – table 7.

& Neill, 2013), so investments in transport infrastructure are considered a very important measure for the redevelopment of the shrinking cities. Certain research even suggests that improving accessibility through transport development can have a much greater impact on urban development than the application of social measures (Tighe & Ganning, 2016). In doing so, the emphasis is on all aspects of accessibility, which is not only the construction of roads, but also careful planning of the transport network[190] and improving general transport logistics through better public transport, setting up intermodal nodes and support for digital platforms for simple and timely notification of users.

This analysis explores how the distance of a medium-sized city from the nearest highway or similar four-lane road is related to demographic trends. The proximity of the highway is by far the most important measure of traffic accessibility in Serbia. A network of highways built to date (2021) in Serbia is taken for the proposed analysis. Most of them have existed or been under construction for the past 10-15 years.

All cities are divided into six categories according to the criterion of distance from the highway, with the first category being all those along the highway, followed by subsequent categories every 20 kilometres.[191] Based on the overlap of this categorisation with demographic trends (Fig. 5) it is noted how the position of cities in Serbia on modern roads contributes to their vitality and development. This is even more pronounced if it is known that investments in the sector of transportation are easier to plan, both spatially and temporally, than some others, which makes them an important lever in preventing (further) urban shrinkage.

4.7 Position of a city with respect to the state border and in relation to urban depopulation

The position of the city in relation to the state border is the first criterion which investigates the governing-administrative aspect of urban decline. State border and border cities have also relatively recently become the topic of urban shrinking, probably because the first researchers of shrinking cities were usually from territorially large countries, such as the United States, Russia, or Australia, where border cities are relatively rare, or the western half of Europe, where the 'Schengen system' of permeable or soft borders has greatly reduced the development constraints of border cities and regions. Relatively rare research in this area is found for countries which have a large number of border towns, such as the Baltic States. In them, a large number of cities near the 'hard' eastern borders have development problems precisely because of this obstacle (Bruneckiene & Sinkiene, 2015). Therefore, it was observed that the level of border permeability considerably affects the development of border cities (Haase et al., 2014).

As expected, the solution for the redevelopment of shrinking border cities is to increase border permeability. The best examples are the former border cities along the former 'Iron Curtain' between Eastern and Western Europe during the Cold War. A well-known example is the distinctly border city of Trieste, which, after the expansion of the EU to the east and the 'erasure' of the hard border between Italy and Slovenia experienced redevelopment and reurbanisation (Draper, 2021). Among the examples of medium-sized cities, the example of Sopron in western Hungary is illustrative, in a 'pocket' surrounded on three sides by Austria. After a decades of stagnation and decline, this city has experienced an economic and demographic revival in recent years due to the weakening of the border effect and a new opening towards a significant Austrian market in the area (Sik, 2015). In both cases, the permeability of the borders was paired with the connection of interrupted transport links, enabling

Figure 6. Distance of medium-sized cities from the nearest state border in relation to the population decline or growth

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[190] Making the so-called 'blind' transport network termination points usually has a favourable impact only in the short term, while in the long term it contributes to the effect of 'sucking out' the potential from a given environment as dependent and unequal in the broader network.

[191] Annex – Table 8. Values are calculated as the distance of the city centre from the nearest highway junction. Cities where a highway intersects or touches an urban area have been assigned the '0' value.

the circulation of goods, as well as the establishment of common public transport lines, which significantly increases the networking on both sides of the border.

According to earlier findings, the proximity of the state border considerably affects the rate of urban decline in Serbia, so cities closer to the border are usually in considerable shrinkage (Djukić et al., 2017). This has been confirmed at the European level, where the border areas, i.e. areas up to 25 kilometres from the nearest state border, are considered more at risk in terms of development (EUSTAT, 2018). If the 25-kilometre threshold were to be applied to Serbia, almost half of Serbian cities would be borderline due to the size of the country and relatively long borders, which would not give a clear enough distinction between the cities themselves. Therefore, the categorisation was done at 12 kilometres, looking at the distance of the surveyed cities from the nearest state border.[192]

By placing the obtained categories in relation to the decline or growth of the urban population (Fig. 6), the difference in influence between the old and new borders is noted first.[193] Cities closer to the old borders, i.e. borders established after 1918 with Hungary, Romania and Bulgaria, were particularly affected by urban shrinkage. Of the four cities with a population decline of over 5%, as many as three are closest to the border tripoints with these countries: Bor (RS/BG/RO), Kikinda (RS/HU/RO) and Sombor (RS/HR/HU). Loznica, which is the only other city belonging to this group, is not close to three borders, but it is a city whose centre is closest to the state border – only 3 km from the border of Serbia with Bosnia-Herzegovina. On the other side are the cities on the Novi Sad-Belgrade-Niš central state axis and along the West Morava, further away from the border and most with demographic growth. In line with this, it can be concluded that the negative impact of the city's proximity to the state border is not only spatial, but also temporal, since the given boundary was established. The research can also indicate the favourable influence of border porosity[194] for cities closer to the borders of Serbia with Bosnia-Herzegovina, Montenegro and North Macedonia.

4.8 Position of a city with respect to larger cities and in relation to urban depopulation

Most of international research distinguishes between the shrinking of larger and smaller cities, where the demographic threshold is mostly at 100,000 inhabitants.[195] In Serbia, this coincides with the difference between the four larger cities – Belgrade, Novi Sad, Niš and Kragujevac – and medium-sized cities. These four cities are also the unofficial
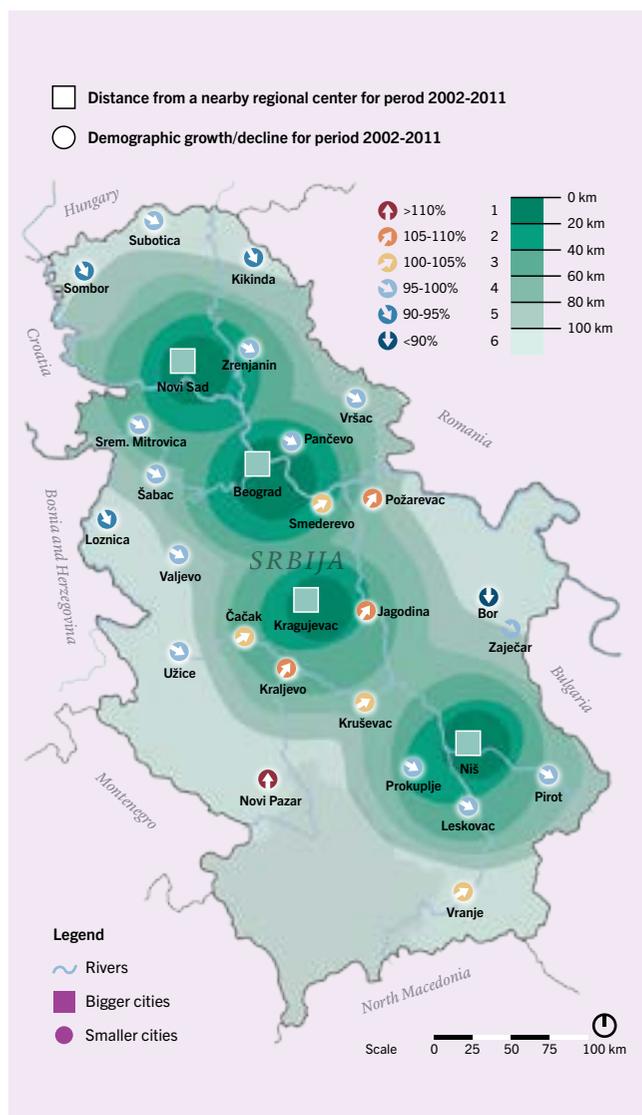
Figure 7. Distance of medium-sized cities from the nearest larger city in Serbia in relation to the population decline or growth

centres of the statistical NUTS2 regions of Serbia.[196] Medium-sized cities in this research are mostly the most important centres of the NUTS3 level.

In the former socialist states, single cities as the most susceptible to urban shrinking are, in addition to transport isolation, also cities further away from others, especially larger cities (Restrepo Cadavid et al., 2017).[197] This means that the impact of the distance of one city from its neighbouring cities, and especially from the closest cities of greater size and importance, should be reduced to a minimum. One of a series

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[192] The distance of the city boils down to the linear distance of the city centre from the nearest state border.

[193] Annex - Table 9.

[194] It is almost certain that the lack of language barriers for given countries also reduces the impact of the border.

[195] It is how most of the international surveys of shrinking cities determine the threshold between large and medium-sized cities.

[196] This nomenclature is part of the EU geocoding standard. It is also known by its French acronym NUTS (Fr. nomenclature des unités territoriales statistiques), and in Serbia the acronym NSTJ (nomenklatura statističkih teritorijalnih jedinica) is used. There are officially five NUTS2 regions in Serbia, but there are no data for the region of Kosovo and Metohija (under UN Resolution 1244).

[197] This is indirectly related to the issue of densities in spatial development, i.e. at the regional level, where the general rule is that higher population densities, as well as the higher network of cities, settlements and gathering hubs, are more favourable for development, because they help reduce distances, and, usually, also costs.

of measures to achieve this is the development of transport infrastructure, but also the strengthening of local networks of small and medium-sized cities so that they can jointly overcome their lag in relation to larger cities.[198] Cities in such networks are looking for their place, which usually entails a certain specialisation in relation to the environment. This achieves polycentric spatial development in a territory.

In this part of the analysis, the distance of the researched cities from the nearest of the four larger cities in Serbia is examined, on the basis of which a categorisation is made into six categories according to the 20 km distance.[199]

The categorisation of cities according to this criterion[200] shows that the proximity of a larger city has a twofold effect on the change in the number of inhabitants in a medium-sized city (Fig. 7). As expected, the cities furthest from larger cities are in the worst position, as this usually coincides with the already established adverse effect of proximity to the state border. However, several cities closest to the larger ones (Pančevo, Prokuplje, Sremska Mitrovica, Zrenjanin) also had a demographic decline, which indirectly indicates that their position as a district seat was diminished by the influence of the nearby larger city. Cities which are moderately distant are in the best position and most of those among them register growth or slight decline. They obviously have the best balance because they are not too far behind the development axes in the country and they are also not too close to larger cities, to be in their shadow.

4.9 Housing characteristics in relation to urban depopulation

Hosing vacancies are often considered a good indicator of urban shrinking which is easily noticed by ordinary people as well (Couch & Cocks, 2013). That is why housing vacancies are one of the biggest problems of cities with a extreme shrinkage.

In shrinking cities, various models of reuse and renewal of the housing stock are used, in addition to the already mentioned removal of unnecessary buildings and houses, more specific for extreme urban shrinkage. The first model is the conversion of the housing stock for tourism purposes in cities which are attractive for tourists. For example, there is the model of albergo diffuso (dispersed hotel) in small towns in northern Italy, where several residential units in older parts of the city are converted into a multi-building hotel. Its dispersion requires constant circulation of users, which further revives the open space of the old city (Confalonieri, 2011). Similar to this is the model of transforming central residential neighbourhoods and blocks into business and service areas with the local economy growth based on post-industrial urban development. The third model is represented in some parts of Eastern Europe, where the merging of relatively frequent small housing units in multi-family housing from the socialist era into larger dwellings, more suitable for families with children, is
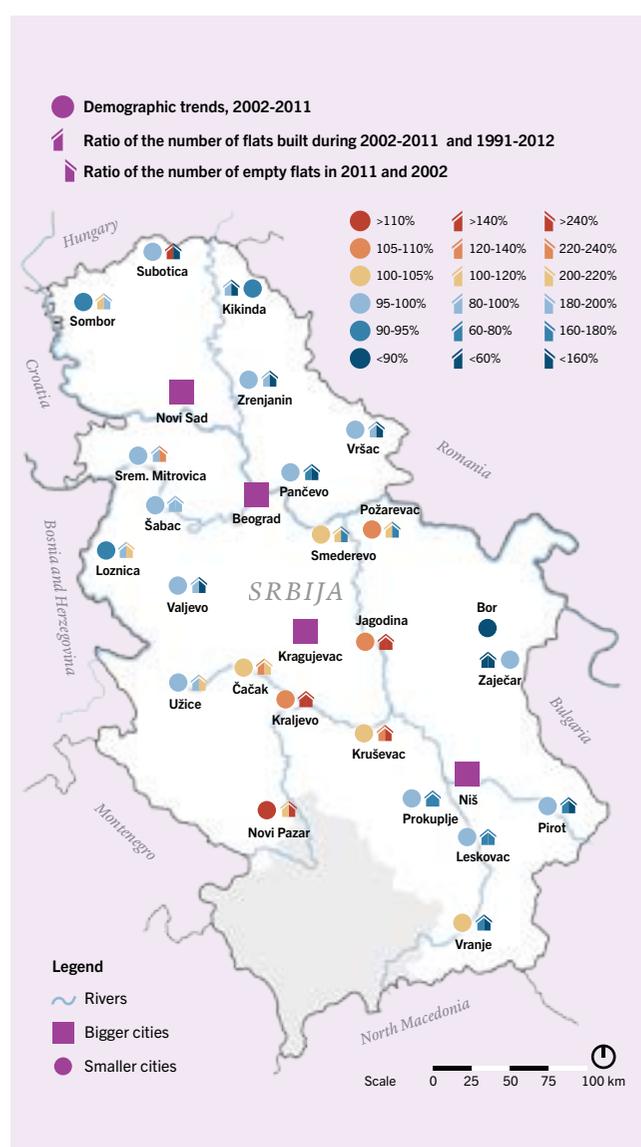
Figure 8. Trends in the number of new and empty dwelling units in relation to the population decrease or growth

encouraged. The fourth model is to incentivise housing construction even where there is no need for it, but it becomes a 'safe investment'.

The following analysis of the character of changes in the number of permanent dwellings in the 2002-2011 period, especially those that are vacant (i.e. uninhabited) and their increase or decrease in relation to the change in the number of households for the same period.

The number of dwellings in the surveyed cities increased during the 2002/2011 period, but at the same time the number of empty dwellings grew, in the case of Bor and Prokuplje, even faster than the total.[201] The number of vacant (unoccupied) dwellings grew incomparably faster than the total number of dwellings, often by over 200%. According to the share

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[198] An example of this is the proposal to strengthen the shrinking medium-sized cities in the broader Berlin region, which are not its suburbs, but are not completely independent due to the proximity of this metropolis (Zakirova, 2010).

[199] Distance is calculated as the driving distance using state roads. For the sake of balance between the obtained categories, the first category includes a distance range of 0-30 km.

[200] Annex - Table 10.

[201] Annex – Table 11.

in 2011, vacant dwellings were to be found mostly in two types of cities: shrinking cities (Prokuplje, Loznica) and in growing cities, which are also particular, because they are located in the traditionally expatriate parts of Serbia (Požarevac, Jagodina) and where their growth can be interpreted as the aforementioned 'safe investment' by local expatriates.[202]

In most cities, the development of housing at the local level is accompanied by demographic trends, so a city's shrinking was usually accompanied by an above-average growth in the number of vacant dwellings and a decrease in the volume of new housing construction (Fig. 9). The biggest deviations from this pattern are in the case of

Subotica, where ethnic characteristics influenced the start of the decline in the last decade of the socialist era (during the 1980s), so the recent rise in the number of vacant dwellings was not significant because it had been considerably higher than in other cities for decades.

Finally, it should be borne in mind that, since 2011, there has been a significant housing construction in the analysed cities, especially in multi-family housing. A considerable number of new housing units have specifically been purchased as a safe investment. Therefore, it should be assumed that in the meantime, the number of empty (new) dwellings has increased considerably.

5 Action Rationale

5.1 A new depopulation framework in Serbia from the urban shrinkage perspective

The analysis according to the criteria has implied findings. In the following sections, we will provide a comparative analysis of the results according to all criteria and the overall categorisation of cities (C).

The comparison of the categories of cities regarding the population growth or decline and their cumulative performance according to other criteria, shows that, in as many as 21 cities (88%), the given cat-

egories match or there is a difference in only one category. This confirms the suitability of the choice of criteria[203] - they generally follow demographic trends well.

Four demographically most vulnerable cities with declining populations (C0) of over 5% (Bor, Kikinda, Sombor and Loznica) are also in the category of cities which in total had the worst overall performance according to the C1-C9 criteria. On the other hand, there are only two cities in which the differences in the two categorisations are considerable (±3 and ±4), so they are worth considering. Novi Pazar has the biggest difference in favour of demographic growth. Of the cities surveyed, it grew the fastest demographically during the 2002-

No.	City	C0	C1	C2a	C2b	C2v	C3	C4	C5	C6	C7	C9a	C9b	C1-9 Total	Cat.
1	Bor	6	6	1	1	1	6	3	6	1	6	6	5	33.00	6
2	Valjevo	4	3	4	4	4	1	3	3	4	5	4	6	41.67	3
3	Vranje	3	4	5	3	5	3	2	1	5	5	5	6	27.17	4
4	Vršac	4	6	1	3	2	2	3	5	6	4	4	6	24.33	6
5	Zaječar	4	6	4	5	5	6	3	6	5	5	6	6	35.00	6
6	Zrenjanin	4	2	2	4	5	2	3	4	4	3	5	6	22.67	3
7	Jagodina	2	5	5	3	5	5	4	1	1	3	1	1	24.83	2
8	Kikinda	5	6	3	2	4	2	3	5	6	5	4	6	27.00	6
9	Kraljevo	2	1	5	4	5	4	5	3	1	3	1	1	39.83	1
10	Kruševac	3	2	5	5	3	4	5	3	1	4	2	1	31.00	2
11	Leskovac	4	3	6	5	4	5	2	2	4	2	5	5	20.67	3
12	Loznica	5	5	6	5	5	3	6	5	6	6	4	3	31.83	6
13	Novi Pazar	1	1	6	6	6	5	1	6	5	6	3	1	26.00	5
14	Pančevo	4	1	2	2	1	5	5	1	3	1	3	5	28.33	1
15	Pirot	4	5	2	4	4	4	4	1	5	4	5	6	25.00	5
16	Požarevac	2	5	1	1	1	2	4	2	5	4	3	5	33.50	2
17	Prokuplje	4	6	5	5	6	5	2	3	1	1	5	5	28.33	4
18	Smederevo	3	2	2	3	4	3	6	2	4	2	3	5	25.00	2
19	Sombor	5	5	4	3	5	3	4	4	5	5	3	4	33.50	6

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[202] This phenomenon has not been further investigated so far. The first field research shows that the local population that has recently gone abroad still has strong ties to the homeland and the cities of its origin, which is also reflected in the purchase of real estates. However, there seem to be other important reasons, such as the inability to buy real estate in a place of residence abroad, where real estate prices are often much higher. Therefore, safe investment takes place in a place where there is better availability of this type of investment, i.e. in a city in Serbia. This can be proven by the fact that in this way apartments are purchased much more than smaller houses in medium-sized cities in Serbia for similar prices, but with much lower monthly maintenance costs for apartments.

[203] The last two columns from Table 12 – The sum of criteria and categorisation based on it.

20	Sremska Mitrovica	4	4	3	3	3	5	5	1	5	3	4	2	29.00	4
21	Subotica	4	1	3	3	4	5	2	2	6	5	1	6	27.83	3
22	Užice	4	3	2	3	5	5	3	5	5	6	4	3	32.83	6
23	Čačak	3	1	4	4	5	4	4	1	2	3	2	3	20.83	1
24	Šabac	4	2	4	5	4	2	3	3	5	4	4	4	26.33	3

Table 5. Categorisation (CAT) of cities according to the analysed criteria in relation to the population growth or decline (criterion − C).

2011 period, but according to the results for other criteria, it falls under the fourth category. This shows the impact of higher education on demographic conditions at the local level because Novi Pazar differs significantly from other cities only by this criterion. On the other side is Pančevo, which has high scores according to a number of criteria, but still it lost its population in the observed period. This can be interpreted through the negative impact of the proximity of Belgrade, as the case of cities in the so-called 'outer ring' of the metropolises.

They are not too close to be their 'ordinary' growing suburbs, and, on the other hand, they are not far enough to avoid the attractive power of the metropolis. This reduces their centrality with respect to their size, which further slows down the development of these cities.

Based on the previous table, it is seen that the change in the number of inhabitants in the surveyed cities is accompanied by other unfavourable development constraints and trends, as follows:

No.	City	C0: Population change	The three most unfavourable features of the city based on C1-C9 criteria
1	Bor	large decline	Deindustrialisation, distance from larger cities and from the nearest highway
2	Valjevo	small decline	Distance from larger cities, poor financial conditions, low share of higher education institutions
3	Vranje	small growth	Distance from larger cities, border vicinity, poor financial conditions
4	Vršac	small decline	Border vicinity, small size of the city and areas of influence, distance from the nearest highway
5	Zaječar	small decline	Border vicinity, deindustrialisation and areas of influence, distance from the nearest highway
6	Zrenjanin	small decline	Distance from the nearest highway, poor financial conditions, border vicinity
7	Jagodina	moderate growth	Large spatial distribution of the city, deindustrialisation, poor financial conditions
8	Kikinda	moderate decline	Border vicinity, distance from the nearest highway and from larger cities
9	Kraljevo	moderate growth	Large spatial distribution of the city, lack of higher education, poor financial conditions
10	Kruševac	small growth	Large spatial distribution of the city, lack of higher education, poor financial conditions
11	Leskovac	small decline	Poor financial conditions, deindustrialisation, the size of the city in relation to the area of influence
12	Loznica	moderate decline	Border vicinity, distance from larger cities, poor financial conditions
13	Novi Pazar	large growth	Poor financial conditions, distance from the highway and from larger cities
14	Pančevo	small decline	Deindustrialisation, lack of higher education, large spatial distribution of the city
15	Pirot	small decline	Border vicinity, large spatial distribution of the city, small size of the city and areas of influence
16	Požarevac	moderate growth	Small size of the city, large spatial distribution of the city, lack of higher education
17	Prokuplje	small decline	Small size of the city and areas of influence, poor financial conditions, deindustrialisation
18	Smederevo	small growth	Lack of higher education, large spatial distribution of the city, deindustrialisation
19	Sombor	moderate decline	Border vicinity, distance from the nearest highway and from larger cities
20	Sremska Mitrovica	small decline	Lack of higher education, deindustrialisation, small city size and areas of influence
21	Subotica	small decline	Border vicinity, distance from larger cities, deindustrialisation
22	Užice	small decline	Distance from larger cities and from the nearest highway, deindustrialisation
23	Čačak	small growth	Large spatial distribution of the city, lack of higher education, poor financial conditions
24	Šabac	small decline	Poor financial conditions, large spatial distribution of the city, distance from larger cities

Table 6. Population change 2011-2002 and the three most unfavourable features of the researched cities

Taking everything into account, it can be concluded that the results according to criterion (C7) of the distance of the studied cities from the larger cities closest to them coincide best with the demographic growth or decline of the studied cities. Medium-sized cities in Serbia differ from four larger cities especially in not being centres of higher education, not offering many good quality jobs that require high expertise and mastering new technologies and not providing a variety of leisure content (culture, entertainment, trade, services, etc.). This

finding can emphasise that medium-sized cities especially lack the following in their further development: (1) higher education and scientific research institutions, which indirectly encourage the development of the higher education sector and highly qualified jobs, and (2) better conditions for spending free time, and (3) not (only) opening of industrial plants and related new jobs, which mainly require the secondary degree of education, as is often emphasised both by representatives of the city administration and in the media.

5.2 Action: the bigger picture

The analysis of medium-sized cities in Serbia confirms the influence of (1) deindustrialisation as a long-standing factor of urban shrinkage, (2) lack of highly qualified jobs and (3) weak transport links and net-working as previously highlighted factors. Furthermore, it reaffirms the importance of (4) higher education and (5) leisure content as important tools for the desired redevelopment of shrinking cities.

In contrast, some (unfavourable) features of the researched cities are also identified, which are not sufficiently emphasised in the discourse

No.	SDG	Sets of measures - explanation
		City − broader surroundings measures
M.01	C.10 C.16	**Strengthening district seats:** Greater administrative decentralisation or devolution of the state at the district level through education and strengthening of district authorities in their seats. Decentralisation should be thereby implemented in jurisdictions from economic and cultural fields, as critical ones for the stabilisation of local demographic circumstances, while the measure of the de-concentration of government is more applicable for social and environmental fields. This approach enables better accessibility of government, as well as the better balance of high-skilled places in the public sector across the country.
M.02	C.09 C.10	**Intersectoral development centres:**[204] Central development institutions at the district level with sectors for incentivising, strategic planning and proactive action in the field of integrated regional development. These centres would also include technology parks or business incubators as systemic support to young professionals for launching start-up projects.
M.03	C.04 C.09	**City thematisation:** Encouraging the thematisation of cities based on their economic characteristics through the development of higher education centres or research at the level of specialised and postdoctoral education, with a clear link to the local economy.
M.04	M.09	**Construction of high-speed roads**[205] towards larger cities in the area in order to create a branched traffic network, i.e. without 'blind directions' with individual cities at the end of them.
M.05	M.16	**Permeable borders:** Opening of border crossing points in the parts of the state border where they are rare, and application of measures for easier border crossing at the existing ones (integrated border crossing points, raising the importance of crossings: regional traffic > international traffic).
M.06	C.11 C.17	**Flagship projects:** Development and construction of flagship projects, but only in cities with particularly valuable and unique culture and heritage features, important for promoting the country and beyond.[206]
		City − immediate surroundings measures
M.07	M.17	**City alliances and networks:** Incentivising regional associations and city networks based on special features (historic cities, trade fair cities, industrial cities, etc.).
M.08	M.09	**Transverse connections:** Construction of rapid thoroughfares to cities in the immediate vicinity, especially those which are transverse in relation to transport routes to larger cities, in order to establish and strengthen local networking.
M.09	M.05 M.17	**Entrepreneurial associations:** Support to local and district associations of small entrepreneurs for joint action on the market and for the purposes of promotion
M.10	M.08 M.09	**Mega-business zones:** Development of strategically located and communally equipped business zones in cities with above-average unemployment and low salaries and incomes.
M.11	M.07 M.10	**Public transport:** Regulation of suburban and intercity transport to the surrounding municipalities and smaller cities through incentives and strengthening of the local network with the city as a clear hub (main transfer point).
		Measures within urban area
M.12	M.08 M.09	**Business-creative incubators:** Development of business-creative incubators through new construction or the reuse of existing space in important city spots for the purpose of promoting the preservation of highly educated staff in the private sector, with emphasis on new technologies, digitalisation and creative industries.
M.13	M.05 M.08	**Zones of new urban functions:** Transformation of planned manufacturing-industrial zones through an expanded range of possible functions (transport and logistics, business, wholesale, etc.).
M.14	M.12	**Functional renewal of city centres:** Renovation of city centres in a functional sense through planned incentivising for the construction of shopping centres and the design of shopping streets, while respecting the existing ambience values.
M.15	M.06 M.11	**Housing nodes:** Renovation of existing housing capacities in strategically important spots in the city, where there is a greater concentration of jobs and leisure content at the same time.

Table 7. Recommended measures for stabilising shrinking cities

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[204] It is important to underpin that the association and cooperation between the units of self-government (municipalities and cities) in Serbia is already possible by operative Law on Local Self-Government (Articles 88a-88d). Nevertheless, this cooperation is on a voluntary basis, which calls in question the obligation of such associations, as well as their efficiency and the duration of the results achieved through this form of collaboration.

[205] Here, in addition to highways and other four-lane roads, high-speed roads also include two-lane roads which bypass settlements and have multi-level junctions, which ensures higher speed and the easier flow of vehicles.

[206] For example, the formation of a cultural-museum district in Sombor, as a city with the best-preserved old town among medium-sized cities in Serbia, a cultural and educational centre on mining in Bor or ancient Roman archaeological sites in Sremska Mitrovica.

No.	Cluster	Cities	Priority measures	Special measures (M.06)
Two basic measures for all cities (clusters)			• M.01: Strengthening district seats • M.02: Intersectoral development centres	
1	Border towns	Vršac, Kikinda, Zaječar, Loznica, Pirot, Sombor	• M.05: Permeable borders • M.08: Transverse connections • M.13: Zones of new urban functions • M.15: Housing nodes	**Sombor:** Flagship projects (the best preserved old town)
2	Mono-structural cities	Bor, Užice	• M.07: City alliances and networks • M.10: Mega-business zones • M.11: Public transport • M.13: Zones of new urban functions	**Bor:** Flagship projects (Serbian mining centre)
3	Cities in shadow of bigger cities	Zrenjanin, Pančevo, Prokuplje, Smederevo, Sremska Mitrovica	• M.03: City thematisation • M.08: Transverse connections • M.09: Business associations • M.14: Functional renovation of city centres	**Smederevo:** Flagship projects (the largest medieval fortress in the country, industrial heritage) **Sremska Mitrovica:** Flagship projects (the most valuable ancient heritage in Serbia)
4	Axial cities[207]	Valjevo, Vranje, Jagodina, Kraljevo, Kruševac, Leskovac, Požarevac, Subotica, Čačak, Šabac	• M.03: City thematisation • M.10: Mega-business zones • M.12: Business-creative incubators • M.15: Housing nodes	**Kruševac:** Flagship projects (old capital of Serbia)
5	Cities with intensive growth	Novi Pazar	• M.04: Construction of high-speed roads • M.09: Business associations • M.10: Mega-business zones • M.12: Business-creative incubators	**Novi Pazar:** Flagship projects (extremely valuable medieval and Ottoman heritage)

Table 8. Clusters of medium-sized cities with priority measures

on urban shrinkage at the global level. For example, the impact (6) of the proximity to the state border is very pronounced in the analysed cities, which is in line with the fact that Serbia is a relatively small country with far from soft borders. In terms of financial conditions, there (7) is a much greater impact on local demographic dynamics if local incomes are lower than average salaries, because the money earned is apparently spent elsewhere, in larger cities and tourist destinations, which is not reflected in the improvement of opportunities in the analysed cities. It should be noted that (8) the degree of local investment has proven to be a fairly reliable indicator of the demographic vitality of an area, and its importance is even greater when it is known that investments indicate the future prospects rather than the current state of a city.

5.3 Action rationale

Based on the previous findings on urban shrinkage in Serbia and their understanding from the perspective of global information about the phenomenon of urban shrinkage, appropriate sets of measures are proposed for the analysed medium-sized cities, which are additionally linked with certain UN Sustainable Development Goals (SDGs). In accordance with the already emphasised importance of these cit-

ies for the balance of spatial demographic development of the state, the implementation of the proposed measures would have an indirect impact both at the regional level and on the dependent rural area.

5.4 Where to start? Initial steps

The first two sets of proposed measures – Strengthening district seats (M.01) and Intersectoral development centres (M.02) – represent the first step in implementing development according to the set of city clusters. The implementation of these measures is a precondition for the rest. The highest level of state government plays the most important role in their implementation, as by far the most organised and influential, given the high level of centralisation of the Republic of Serbia. Levels other than the provincial level are unable to take the initiative in implementing the measures in the first step. The municipal level, i.e. the level of local self-government units can only partially implement it, and then only the largest local self-government units, while for many small and underdeveloped municipalities with a lack of highly qualified staff this is impossible. The district level, as mentioned earlier, is a number of state administration branches at the regional level, and in the current system it does not have the capacity to be a significant factor in the implementation of measures.

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[207] It refers to the cities that are already located along the main development axes of the country – the main transportation corridors.

Clusters of cities

Legend

Clusters of cities
Priority measures
M.01-M.16

● Border cities
M.01, M.02, M.05, M.08, M13, M15

● Mono-structural cities
M.01, M.02, M.07, M.10, M11, M13

● Cities in shadow of bigger cities
M.01, M.02, M.03, M.08, M09, M14

● Axial cities
M.01, M.02, M.05, M.10, M12, M15

● Cities with intensive growth
M.01, M.02, M.04, M09, M10, M12

Specific measures
Flagship projects
M.06

• Bor
• Kruševac
• Novi Pazar
• Smederevo
• Sombor
• Sremska Mitrovica

Legend
∼ Rivers
■ Bigger cities
● Middle-sized cities

Scale 0 25 50 75 100 km

Figure 9. Division of medium-sized Serbian cities by clusters

However, the district level with medium-sized cities as their centres is precisely the level at which the greatest contribution can be made to balancing the spatial development of Serbia. Today, the district level is mostly related to several small bodies of regional importance, such as regional offices and agencies for economic or rural development. In this part, through the implementation of M.01 and M.02 measures, the goal is to achieve both qualitative and quantitative balance. Through the creation of intersectoral development centres, a model of integration of all sectors crucial for development into one institution is proposed for the purpose of harmonised action and development. This creates a framework for the employment of a larger number of highly educated professionals of various profiles at the level of medium-sized cities, which strengthens the staff base necessary for the current post-industrial development. Third, integrated approach and significant staff capacity indirectly enable encouraging

innovation, digitalisation and creativity, as well as the creation and management of more complex projects. A large number of municipalities in Serbia cannot achieve this on their own, and support from the national and provincial levels is usually insufficient. Fourth, a base of key future consumers of important post-industrial economy development sectors is being created, such as services, trade, entertainment, creative industries, ICT sector and the like.

The development of the district level does not call into question the importance of the national and provincial levels. The district level is strengthened so that the main measures and strategies of the higher level could be properly adjusted and developed according to local conditions and then implemented together with the municipalities from the given district.

6 How to Continue?

6.1 Next steps

The accompanying table provides a proposal of steps and their main implementing institutions and stakeholders.

No.	Step with measures	Implementing institution - level	Stakeholders
1	**City - broader surroundings measures** M.01 Strengthening district seats M.02 Intersectoral development centres	• State through ministries • Province through the secretariats	• District bodies • Cities – district centres • International level
2	**City - immediate surroundings measures** M.07 City alliances and networks M.08 Transverse connections M.09 Business associations M.10 Mega-business zones M.11 Public transport	• Newly established district intersectoral development centres • State through ministries and other bodies (agencies, administrations, public companies) • Province through the secretariats and other bodies	• Cities – district centres • Municipalities • Important representatives of the private sector • Professional associations
3	**Measures within the urban area** M.12 Business-creative incubators M.13 Zones of new urban functions M.14 Functional renewal of city centres M.15 Housing nodes	• District intersectoral development centres • Supervision and logistical support: state and provincial level	• Cities – district centres • Municipalities • Private sector • Creative sector • Professional associations • Citizens' associations
2–3	**City - broader surroundings measures** M.03 City thematisation M.04 Construction of high-speed roads M.05 Permeable borders M.06 Flagships projects	• State through ministries • Province through the secretariats • Logistics support: newly established district intersectoral development	• Cities and municipalities • Private sector • International level

Table 9. Next steps in implementing the proposed measures

This can be presented as a diagram, as follows:
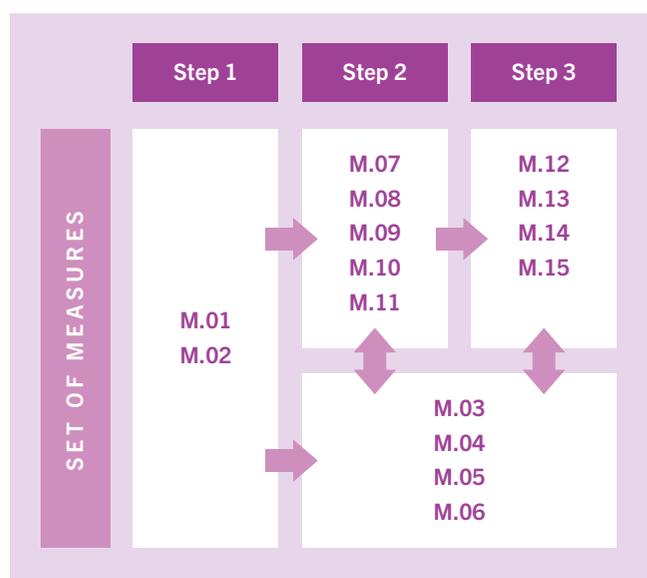
Figure 10. Diagram of steps for implementation with sets of measures

6.2 Digitalisation as a step in the future development of shrinking cities

The use of information and communication technologies (ICT) and digitalisation in its broad meaning is a special imperative in the implementation of the proposed measures for middle-sized cities in Serbia, with the ultimate aim of their development by the state-of-art model of smart cities. Furthermore, the element of 'smartness' should be taken in its broader meaning, where it implies not only the direct use of ICT tools and the mere process of digitalisation, but also the creation of an ambience where local government and communities accept and use this potential on sustainable principles for general welfare. This especially includes the use of ICT tools and digitalisation in an inclusive way (UNDP, 2021). In accordance with this conclusion, each proposed measure is further elaborated by the tools of a smart city critical for their implementation:

Measure 01 STRENGTHENING OF DISTRICT SEATS through (1) an integrated web portal at district level with links to other government levels (municipal, national, provincial); (2) a special inter-sector unit within the district government for ICT support and digitalisation for local self-governments and communities; and (3) a service centre for training of local civil servants, businessmen, entrepreneurs and citizens, aiming to the enhancement of digital literacy and the development of an information society.

Measure 02 INTERSECTORAL DEVELOPMENT CENTRES through (1) an intermunicipal web platform for support to innovations, research and development and nurturing of talent, entrepreneurship and completeness; (2) a web platform for development projects pertaining to district level – calls and competitions, technical and professional assistance, best practice and e-conferences and e-consultations; and (3) a web portal for professional incubators, start-up projects and support for entrepreneurs from vulnerable groups (in particular, young professionals, women, persons with physical disabilities, minorities, etc.).

Measure 03 THEMATISATION OF CITIES through (1) science and technology parks in smaller cities that are closely related to existing local institutions of higher and high education; and (2) the opening of postdoctoral positions in the projects which target the digitalisation and smart management of local economy.

Measure 04 CONSTRUCTION OF HIGH-SPEED ROADS through (1) the digitalisation of areas along these corridors; and (2) the better logistics of travel through ICT devices – digital navigation, real-time information, instructions for avoiding traffic jams, road works and slow sections.

Measure 05 PERMEABLE BORDERS through (1) the digitalisation of border crossing as much as possible – the digital registration of goods and commodities, online check-in and real-time reports about possible jams at border crossings.

Measure 06 FLAGSHIP PROJECTS through (1) the web presentation of the projects parallel to the implementation of physical measures; and (2) the modernisation of all projects of this type with their own web sites, created in an innovative way and regularly updated.

Measure 07 CITY ALLIANCES AND NETWORKS through (1) the networking projects in the field of digitalisation and information society.

Measure 09 ENTREPRENEUR ASSOCIATIONS through (1) a service centre for training local civil servants, businessmen, entrepreneurs and citizens, aiming to the enhancement of digital literacy and the development of an information society; and (2) the planned facilitation of the project which emphasises the strengthening of awareness about digitalisation and smart-city movement: trainings, workshops, promotions.

Measure 10 MEGA-BUSINESS ZONES through (1) the conditioning of the development of mega-zones by the creation of the environment that facilitates the development of an information society: ultra-speed internet, web presentation, user services for the whole zone, etc.

Measure 11 PUBLIC TRANSPORT through (1) the digitalisation and better ICT logistics of public transport at both district and national levels, as a means to promote the sustainable types of transport (public transport, walking, cycling).

Measure 12 BUSINESS-CREATIVE INCUBATORS through (1) the special segments of the aforementioned inter-municipal web platform for assistance to innovations, research and development, which pertain to creative industries and creative sector, including the measures related to urban space, such as creative hubs and the renewal and reuse of existing underused buildings for new creative jobs; and (2) the support to professional association and joint functioning of stakeholders in creative sector.

Measure 13 THE ZONES OF NEW URBAN FUNCTIONS through (1) the creation of web and digital bases of such locations ('location banks') and other promotional digital tools with the purpose of faster activation of these zones.

Measure 14 THE FUNCTIONAL RENEWAL OF URBAN CENTRES through (1) the digitalisation of open public space and public institutions through the new modes of communication (digital services, QR codes, augmented and virtual reality); (2) the digitalisation of local cultural and natural heritage, including also the intangible heritage of cities (old crafts, tradition, festivities, customs); and (3) upgrading of digital literacy of citizens to use of these tools through workshops, trainings and spatial actions.

Measure 15 HOUSING NODES through (1) planned support to the general digitalisation of citizens through more accessible and cheaper internet in dwelling space, (2) the upgrading of digital literacy through the enhancement and widening of the offer of digital services.

7 Annex

No.	City	Average salary (2019)		Budget revenues Per capita (2019)		Investments[208] Per capita (2019)	
		Amount in RSD	In %	Amount in RSD	In %	Amount in RSD	In %
	Serbian average	**54,919**	**100.0%**	**47,400**	**100.0%**	**133.6**	**100.0%**
1	Bor	61,031	111.1%	47,496	100.2%	222.2	166.3%
2	Valjevo	48,673	88.6%	35,363	74.6%	64.9	48.6%
3	Vranje	45,969	83.7%	38,651	81.5%	45.7	34.2%
4	Vršac	56,456	102.8%	41,281	87.1%	114.5	85.7%
5	Zaječar	48,144	87.7%	30,291	63.9%	38.5	28.8%
6	Zrenjanin	52,719	96.0%	36,998	78.1%	42.9	32.1%
7	Jagodina	44,225	80.5%	42,591	89.9%	41.6	31.1%
8	Kikinda	50,648	92.2%	47,327	99.8%	54.7	41.0%
9	Kraljevo	46,449	84.6%	33,423	70.5%	50.7	37.9%
10	Kruševac	46,616	84.9%	28,673	60.5%	98.3	73.6%
11	Leskovac	43,619	79.4%	28,826	60.8%	56.2	42.1%
12	Loznica	43,526	79.3%	28,634	60.4%	46.5	34.8%
13	Novi Pazar	41,302	75.2%	27,209	57.4%	21.0	15.7%
14	Pančevo	54,134	98.6%	43,574	91.9%	283.6	212.3%
15	Pirot	54,134	98.6%	34,652	73.1%	78.2	58.5%
16	Požarevac	57,150	104.1%	53,208	112.3%	205.8	154.0%
17	Prokuplje	45,805	83.4%	31,887	67.3%	10.5	7.9%
18	Smederevo	53,511	97.4%	38,444	81.1%	67.0	50.1%
19	Sombor	48,562	88.4%	39,064	82.4%	28.8	21.5%
20	Srem. Mitrovica	50,247	91.5%	38,913	82.1%	90.3	67.6%
21	Subotica	51,236	93.3%	40,965	86.4%	63.1	47.2%
22	Užice	52,211	95.1%	42,018	88.6%	45.8	34.3%
23	Čačak	46,794	85.2%	33,905	71.5%	48.2	36.1%
24	Šabac	48,586	88.5%	32,884	69.4%	57.3	42.9%
	Belgrade	*68,140*	*124.1%*	*70,797*	*149.4%*	*243.3*	*182.1%*
	Kragujevac	*52,453*	*95.5%*	*42,124*	*88.9%*	*74.0*	*55.4%*
	Niš	*51,009*	*92.9%*	*36,424*	*76.8%*	*41.0*	*30.7%*
	Novi Sad	*60,466*	*110.1%*	*65,483*	*138.1%*	*374.5*	*280.3%*

Table 10. Financial indicators for surveyed cities

Source: Gavrilović, 2020

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[208] Data refer to large and medium-sized legal entities.

No.	City	Employees in the manufacturing industry (MI) in relation to active population (AP) and growth/decline in their share								MI/AP
		2002 Census				2011 Census				2002/11
		AP	MI	MI/AP	In%	AP	MI	MI/AP	In%	
	Data for Serbia	2,642,987	630,129	0.238	100.0%	2,304,628	396,392	0.172	100.0%	72.1%
1	Bor	21,118	6,540	0.310	129.9%	16,362	2,879	0.176	102.3%	56.8%
2	Valjevo	37,609	7,848	0.209	87.5%	35,500	7,549	0.213	123.6%	101.9%
3	Vranje	33,736	13,320	0.395	165.6%	24,915	8,196	0.329	191.3%	83.3%
4	Vršac	18,938	5,331	0.281	118.1%	15,822	4,214	0.266	154.8%	94.6%
5	Zaječar	22,566	4,989	0.221	92.7%	17,878	1,980	0.111	64.4%	50.1%
6	Zrenjanin	46,549	11,981	0.257	108.0%	39,012	9,354	0.240	139.4%	93.2%
7	Jagodina	23,600	8,060	0.342	143.2%	22,168	4,943	0.223	129.6%	65.3%
8	Kikinda	22,970	7,695	0.335	140.5%	18,064	5,676	0.314	182.7%	93.8%
9	Kraljevo	42,022	10,411	0.248	103.9%	38,262	6,679	0.175	101.5%	70.5%
10	Kruševac	46,084	15,407	0.334	140.2%	35,880	8,643	0.241	140.1%	72.1%
11	Leskovac	53,621	12,775	0.238	99.9%	38,260	5,895	0.154	89.6%	64.7%
12	Loznica	28,752	6,947	0.242	101.3%	20,096	3,932	0.196	113.8%	81.0%
13	Novi Pazar	23,987	6,291	0.262	110.0%	19,605	3,280	0.167	97.3%	63.8%
14	Pančevo	43,291	14,086	0.325	136.5%	38,648	8,282	0.214	124.6%	65.9%
15	Pirot	22,401	10,727	0.479	200.8%	17,338	6,288	0.363	210.9%	75.7%
16	Požarevac	26,657	3,562	0.134	56.0%	23,726	2,932	0.124	71.8%	92.5%
17	Prokuplje	15,062	4,560	0.303	127.0%	11,291	2,327	0.206	119.8%	68.1%
18	Smederevo	37,936	12,384	0.326	136.9%	30,794	8,946	0.291	168.9%	89.0%
19	Sombor	32,924	7,715	0.234	98.3%	25,730	4,962	0.193	112.1%	82.3%
20	Srem. Mitrovica	29,718	7,274	0.245	102.7%	25,877	4,301	0.166	96.6%	67.9%
21	Subotica	53,728	16,575	0.308	129.4%	46,593	9,716	0.209	121.2%	67.6%
22	Užice	31,473	11,340	0.360	151.1%	28,011	6,643	0.237	137.9%	65.8%
23	Čačak	42,735	13,049	0.305	128.1%	39,367	9,113	0.231	134.6%	75.8%
24	Šabac	45,384	8,162	0.180	75.4%	38,260	6,512	0.170	99.0%	94.6%

Table 11. Degree of industrialisation of analysed cities in 2002 and 2011

Source: SORS, 2004a; SORS, 2014a

No.	City	Universities		Faculties		Colleges	Total	Population / total
		State	Private	State	Private			
1	Bor	0	0	1	0	0	1	36,850
2	Valjevo	0	0	0	1	1	2	33,692
3	Vranje	0	0	1	0	1	2	28,128
4	Vršac	0	0	0	0	1	1	36,040
5	Zaječar	0	0	0	1	0	1	38,165
6	Zrenjanin	0	0	1	0	1	2	38,256
7	Jagodina	0	0	1	0	0	1	46,152
8	Kikinda	0	0	0	0	1	1	38,065
9	Kraljevo	0	0	1	0	0	1	81,463
10	Kruševac	0	0	0	0	1	1	77,106
11	Leskovac	0	0	1	0	2	3	23,263
12	Loznica	0	0	0	0	0	0	-
13	Novi Pazar	9	1	0	0	0	10	8,110
14	Pančevo	0	0	0	1	0	1	83,818
15	Pirot	0	0	0	0	1	1	44,516
16	Požarevac	0	0	0	0	1	1	44,183
17	Prokuplje	0	0	0	0	1	1	28,522
18	Smederevo	0	0	0	0	0	0	-
19	Sombor	0	0	1	0	0	1	47,623
20	Srem. Mitrovica	0	0	0	0	1	1	52,262
21	Subotica	0	0	2	0	2	4	26,420
22	Užice	0	0	1	0	1	2	30,298
23	Čačak	0	0	1	0	1	2	41,978
24	Šabac	0	0	0	0	2	2	37,370

Table 12. Number of higher education institutions by city, as of August 2021

Source: Commission for Accreditation and Quality Assurance – source: https://www.kapk.org/sr

No.	City	Distance (in km)	Category	No.	City	Distance (in km)	Category
1	Bor	85	6	13.	Novi Pazar	128	6
2	Valjevo	24	3	14.	Pančevo	0	1
3	Vranje	0	1	15.	Pirot	0	1
4	Vršac	65	5	16.	Požarevac	18	2
5	Zaječar	85	6	17.	Prokuplje	21	3
6	Zrenjanin	44	4	18.	Smederevo	12	2
7	Jagodina	0	1	19.	Sombor	52	4
8	Kikinda	77	5	20.	Srem. Mitrovica	0	1
9	Kraljevo	34	3	21.	Subotica	8	2
10	Kruševac	24	3	22.	Užice	63	5
11	Leskovac	9	2	23.	Čačak	0	1
12	Loznica	73	5	24.	Šabac	30	3

Table 13. Categorisation of cities according to their distance from the nearest highway or similar road according to the situation in August 2021

No.	City	Distance (in km)		Category	No.	City	Distance (in km)		Category
1	Bor	BG	26	4	13.	Novi Pazar	ME	29	4
2	Valjevo	BA	33	4	14.	Pančevo	RO	55	2
3	Vranje	MK	23	5	15.	Pirot	BG	22	5
4	Vršac	RO	12	6	16.	Požarevac	RO	25	4
5	Zaječar	BG	22	5	17.	Prokuplje	BG	81	1
6	Zrenjanin	RO	33	4	18.	Smederevo	RO	38	3
7	Jagodina	BG	90	1	19.	Sombor	HR	16	5
8	Kikinda	RO	8	6	20.	Srem. Mitrovica	BA	22	5
9	Kraljevo	BA	92	1	21.	Subotica	HU	8	6
10	Kruševac	BG	86	1	22.	Užice	BA	25	4
11	Leskovac	BG	44	3	23.	Čačak	BA	61	1
12	Loznica	BA	3	6	24.	Šabac	BA	28	4

Table 14. Categorisation of cities according to their distance from the nearest state border. Categories are determined at a 12 km distance, with the last category (No. 6) for a distance of over 60 km from the nearest border.

No.	City	Distance (in km)		Category	No.	City	Distance (in km)		Category
1	Bor	NI	125	6	13.	Novi Pazar	KG	151	6
2	Valjevo	BG	93	5	14.	Pančevo	BG	19	1
3	Vranje	NI	109	5	15.	Pirot	NI	71	4
4	Vršac	BG	86	4	16.	Požarevac	BG	81	4
5	Zaječar	NI	98	5	17.	Prokuplje	NI	29	1
6	Zrenjanin	NS	54	3	18.	Smederevo	BG	48	2
7	Jagodina	KG	52	3	19.	Sombor	NS	93	5
8	Kikinda	NS	108	5	20.	Srem. Mitrovica	NS	53	3
9	Kraljevo	KG	53	3	21.	Subotica	NS	107	5
10	Kruševac	KG	72	4	22.	Užice	KG	111	6
11	Leskovac	NI	44	2	23.	Čačak	KG	54	3
12	Loznica	BG	129	6	24.	Šabac	BG	81	4

Table 15. Categorisation of cities according to their distance from the nearest larger city in Serbia: Belgrade (BG), Novi Sad (NS), Niš (NI) and Kragujevac (KG).

No.	City	The number of dwellings growth			Vacant dwellings						C-D Ratio
		1991-2002 (A)[209]	2011-2002 (B)	Difference C = B/A	2002		2011		2011/2002 (D)		
					Number	In %[210]	Number	In %	Growth	In %	
1	Bor	1,327	286	21.6%	1,411	9.9%	2,503	17.1%	1,092	177.4%	-806
2	Valjevo	4,307	3,481	80.8%	2,878	12.6%	4,420	17.8%	1,542	153.6%	1,939
3	Vranje	2,503	1,897	75.8%	2,189	11.8%	3,006	15.1%	817	137.3%	1,080
4	Vršac	2,003	1,711	85.4%	2,234	15.5%	2,861	18.8%	627	128.1%	1,084
5	Zaječar	1,304	780	59.8%	2,348	15.3%	2,890	18.3%	542	123.1%	238
6	Zrenjanin	3,371	2,297	68.1%	3,252	10.5%	4,791	14.9%	1,539	147.3%	758
7	Jagodina	2,076	4,645	223.7%	1,811	12.9%	4,426	24.8%	2,615	244.4%	2,030
8	Kikinda	1,498	1,221	81.5%	1,919	12.2%	2,441	15.4%	522	127.2%	699
9	Kraljevo	3,897	5,779	148.3%	1,718	7.6%	4,325	15.7%	2,607	251.7%	3,172
10	Kruševac	3,956	4,898	123.8%	1,799	8.8%	4,336	17.9%	2,537	241.0%	2,361
11	Leskovac	3,693	2,615	70.8%	2,240	9.6%	3,723	15.3%	1,483	166.2%	1,132
12	Loznica	3,557	3,512	98.7%	1,301	14.0%	2,618	23.1%	1,317	201.2%	2,195
13	Novi Pazar	3,653	3,690	101.0%	1,037	7.5%	2,529	14.3%	1,492	243.9%	2,198
14	Pančevo	3,918	4,508	115.1%	3,180	9.3%	5,409	14.4%	2,229	170.1%	2,279
15	Pirot	1,672	1,257	75.2%	1,634	11.6%	2,398	15.9%	764	146.8%	493
16	Požarevac	3,025	3,536	116.9%	2,891	17.2%	4,686	23.5%	1,795	162.1%	1,741
17	Prokuplje	1,242	860	69.2%	1,340	13.4%	2,280	21.0%	940	170.1%	-80
18	Smederevo	3,051	3,575	117.2%	2,557	11.0%	4,570	17.6%	2,013	178.7%	1,562
19	Sombor	2,631	2,648	100.6%	1,604	8.4%	2,921	14.6%	1,317	182.1%	1,331
20	Srem. Mitrovica	2,526	2,267	89.7%	1,011	6.6%	2,317	13.7%	1,306	229.2%	961
21	Subotica	3,777	5,463	144.6%	5,030	11.4%	7,635	16.2%	2,605	151.8%	2,858
22	Užice	2,494	2,373	95.1%	1,551	7.5%	3,320	14.0%	1,769	214.1%	604
23	Čačak	3,699	4,871	131.7%	2,092	8.1%	4,544	15.4%	2,452	217.2%	2,419
24	Šabac	5,652	5,033	89.0%	2,514	12.1%	4,817	20.1%	2,303	191.6%	2,730

Table 16. Housing characteristics according to their population density

Source: SORS, 2004b; SORS, 2014c

[209] The period of construction of new apartments.

[210] The given share is the share of unoccupied dwellings in the total number in the urban area.
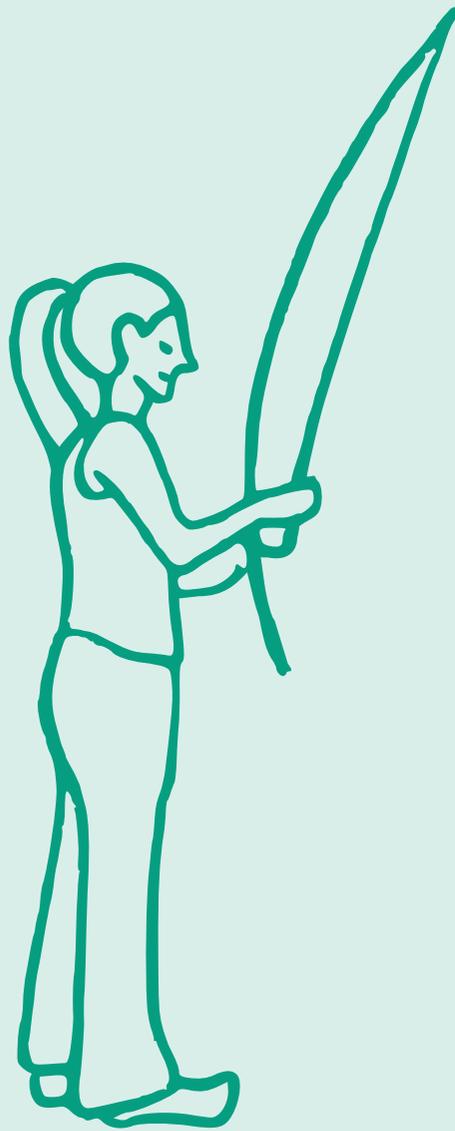
Environment, Climate Change and Depopulation in Serbia

Jelisaveta Petrović

1 Introduction

Climate change is one of the biggest societal challenges today (IPCC, 2021). Climate change in a *broader sense* is considered to be a consequence of complex abiotic and biotic processes and is reflected in statistically significant changes in climatic parameters over longer periods of time. Factors driving climate change are divided between anthropogenic (human induced) and non-anthropogenic such as astronomical, geophysical, and biotical. However, today climate change usually means changes that occur as a consequence of human activities, that is, *climate change in the narrower sense*. Article 1 of the United Nations Framework Convention on Climate Change (UN-FCCC, 1992) defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". Climate change is induced by unsustainable human practices that are deeply embedded in the existing political, social and economic systems that are also environmentally unsustainable. Therefore, climate change is natural but also a social phenomenon (Dunlap & Brulle, 2015).

Climate change *negatively affects* societies in many ways by aggravating existing social problems and creating new ones. Vulnerability of a society to climate risks depends on a plethora of factors. Some of the factors are environmental and geographical (e.g. coastal areas are at greater risk of flooding than inland areas), but the majority of them are social such as poverty, social inequalities, discrimination, marginalization, unequal economic exchange, colonial legacy, unequal access to natural resources, etc. (Cannon, 2006). The harmful consequences of climate change are not equally distributed in population, meaning they differ across social groups, intersecting with other types of social inequalities (e.g. poverty, gender, race). Climate change also asymmetrically affects different geo-political locations (e.g. developed and developing countries) and types of economies (e.g. economies based on the extraction of natural resources vs. technologically hyperdeveloped) creating climate change winners and losers (O'Brien and Leichenko, 2003). The literature on climate change and security warns of a high probability of environmental and climate change induced conflicts in the near future, both locally and internationally (Alcamo et al., 2007; Barnett & Adger, 2007; Puđak, 2019).

The *response to climate change* risks can be broadly categorized into mitigation (preventive measures) and adaptation practices. Those activities can be short-term or long-term; and they can be cursory and unidimensional or comprehensive and aiming at multiple systemic changes (Moser and Ekstrom, 2010). Developed countries are able to invest in mitigation and adaptation strategies to prepare for future risks, while developing countries usually invest in recovering from the disasters that have already occurred (Puđak, 2019). While preparation for climate change in developed countries is mostly planned and systematic, in developing countries the implementation of mitigation and adaptation mechanisms are usually sporadic, partial, bound to the local level, and typically initiated as a reaction to some catastrophic event (Mirza, 2003; Ford et al., 2011).

As the 2020 Human Development Report made clear, many inequalities in human development have been increasing and continue to do so, and climate change will only make them worse (UNDP, 2020). In countries with high environmental threats, there is also greater social vulnerability. Combined with other environmental factors (such as air, water and soil pollution), climate change is most directly related to the depopulation process. Pollution and climate change affect the fertility, morbidity, mortality of the population, and have an extremely adverse effect on the overall quality of life inducing mass migrations. Regarding the unfavourable effects on fertility (e.g. Deng et al., 2016; Wu et al., 2017) the concept of reproductive environmental justice has been introduced to emphasise that people living in polluted areas and so-called "zones of environmental sacrifice" (e.g. vicinity of mining sites, toxic industries etc.) are in an elevated risk of subfertility and infertility due to the environmental factors (Lappe et al., 2019). Additionally, a number of studies show significant impacts of pollution and climate change on public health and mortality (Orru at al., 2017). Finally, according to the Intergovernmental Panel on Climate Change (IPCC) projections, ecological (climate) migrations will be the most common form of spatial mobility of the population in the future. It is estimated that in 2018 alone, over 17 million people changed their place of residence as a result of the destruction of the natural habitat and human-built environment under the influence of climate change (Pickup, 2019).

In this chapter, our goal is to shed light on a part of the complex set of factors that affect the process of depopulation in Serbia. These are environmental and climatic factors of depopulation. In that sense, we will try to provide an answer to the question to what extent environmental and climatic factors affect fertility, mortality and migration as the basic components of the depopulation process in Serbia. At the very beginning, it should be emphasized that this is a pioneering endeavour, bearing in mind that environmental and climatic factors have only recently become recognized as influencing socio-economic and demographic trends in the world, and that relevant data (especially for Serbia) are not available in many cases. Bearing in mind the complexity of the phenomena in question - climate change and environmental problems (ranging from air, water and soil pollution, through illegal landfills, unplanned construction, lack of sanitary infrastructure, to threats to biodiversity and underdeveloped circular economy, etc.), and the complexity of the depopulation process and the impact of other factors on it (discussed in other chapters), as well as due to the unavailability of data for Serbia, in this chapter it was necessary to limit ourselves to examining the impact of two factors - climate change and air pollution. In addition to the relative unavailability of data, we singled out these two factors from the wide range of other potential environmental impacts on the health, fertility and migration of the Serbian population. In addition, although we con-

sider the influence of other environmental factors to be important, the format of this report does not allow the inclusion of all of them, as such an endeavour would, at least, require a separate and rather extensive study.

When it comes to data sources, the text primarily relies on climate models and projections because they represent the gold standard in the scientific study of the impact of climate change on socio-demographic trends. As these models are complex and far from everyday experience, as an additional source we use case studies that well illustrate the impact of climate change and environmental challenges on the quality of life of the Serbian population and the accompanying socio-demographic changes.

2 Climate Change and Depopulation Processes in Serbia

2.1 Serbia and Climate Change

2.1.1 Socio-political Context of Climate Change in Serbia

Despite being a global problem, climate change has disproportionately large impacts outside the Global North (Sabherwal & Kácha, 2021). Regarding climate change causes and consequences, post-socialist countries, Serbia being one of them, belong to the "Global East" meaning somewhere in between the North and the South (Muller, 2020). Socialist legacy and specific trajectory of post-socialist development seems to matter in terms of mitigation and adaptation to environmental and climate risks. For instance, the most important infrastructure and the material environment were built during socialism, and then (re)constructed since the 1990s, alongside the structural transformations of the post-socialist societies (Ferenčuhova, 2020). The legacies of the state-socialist era, including environmental burdens from the past (e.g. from intensive industrialisation), energy-consuming and unsustainable infrastructures built before 1989, seem highly relevant even 30 years after the collapse of state-socialism (Petrović & Backović, 2019; Pavlinek & Pickles, 2004). Moreover, the profit-oriented private developments (investor urbanism) and mushrooming of the foreign owned high-polluting plants that occurred in the post-socialist era, have created new environmental problems in the region contributing the countries' vulnerability to climate change and their capacity to adapt (Ferenčuhova, 2020; Petrović & Backović, 2019; Filipović, 2021; Zeković et al., 2015).

The process of European integration, on the other hand, has an important and mostly positive influence on environmental and climate policies in the region, especially among the countries that have already became the EU members, but on the candidate countries as well (Braun,

2016; Borzel & Buzogany, 2019, Petrović, 2020). Taking into consideration the general orientation of Serbia towards the EU integration and harmonization of domestic legislation within the EU acquis, it is not surprising that the country has undergone significant changes regarding environmental and climate legislation and institutional framework in the past decade. Today, Serbia has comprehensive environmental and climate legislation, with more than a hundred laws and bylaws. It also should be noted that Serbia has ratified all relevant climate change framework agreements such as Kyoto Protocol, UNFCCC, Paris Agreement etc. For instance, under the Paris Agreement Serbia has committed to reduce GHG emissions for 9.8% by 2030 compared to 1990 levels[211] (Draft Climate Strategy and Action Plan RS, 2019: 6-7).[212] There are still some important drawbacks regarding the harmonization with the EU legislative framework (Antić, 2020: 22).

Although the environmental acquis has been transposed into national legislation in the past two decades, what is most concerning is that the implementation is largely missing. Negotiation Chapter 27 is considered to be one of the hardest and most expensive segments of the accession process, with approximately 15 billion euros of investments needed[213] (Antić, 2020; Starinac, 2019). As a consequence, improvements in the environmental sector are slow, the environmental impact assessments largely remain a formality and public participation in decision-making is limited and mostly ineffective. Judicial practice in environmental matters remains under-developed while the Inspection for Environmental Protection lacks capacity for an adequate supervision of environment protection (Antić, 2020: 26). The weaknesses regarding national legislation and implementation of the environmental and climate laws are noted in the European Commission Progress Report which states that: "Serbia has some level of preparation on climate change, but implementation is at a very early stage. Recent positive developments include the adoption of the long-pre-

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[211] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Serbia%20First/Republic_of_Serbia.pdf (accessed 25/01/2022)

[212] However, Serbia failed to submit updated contributions during Glasgow meeting in 2021.

[213] https://www.emins.org/otpad-kosta-15-milijardi-evra-za-poglavlje-27/ (accessed 25/10/2021)
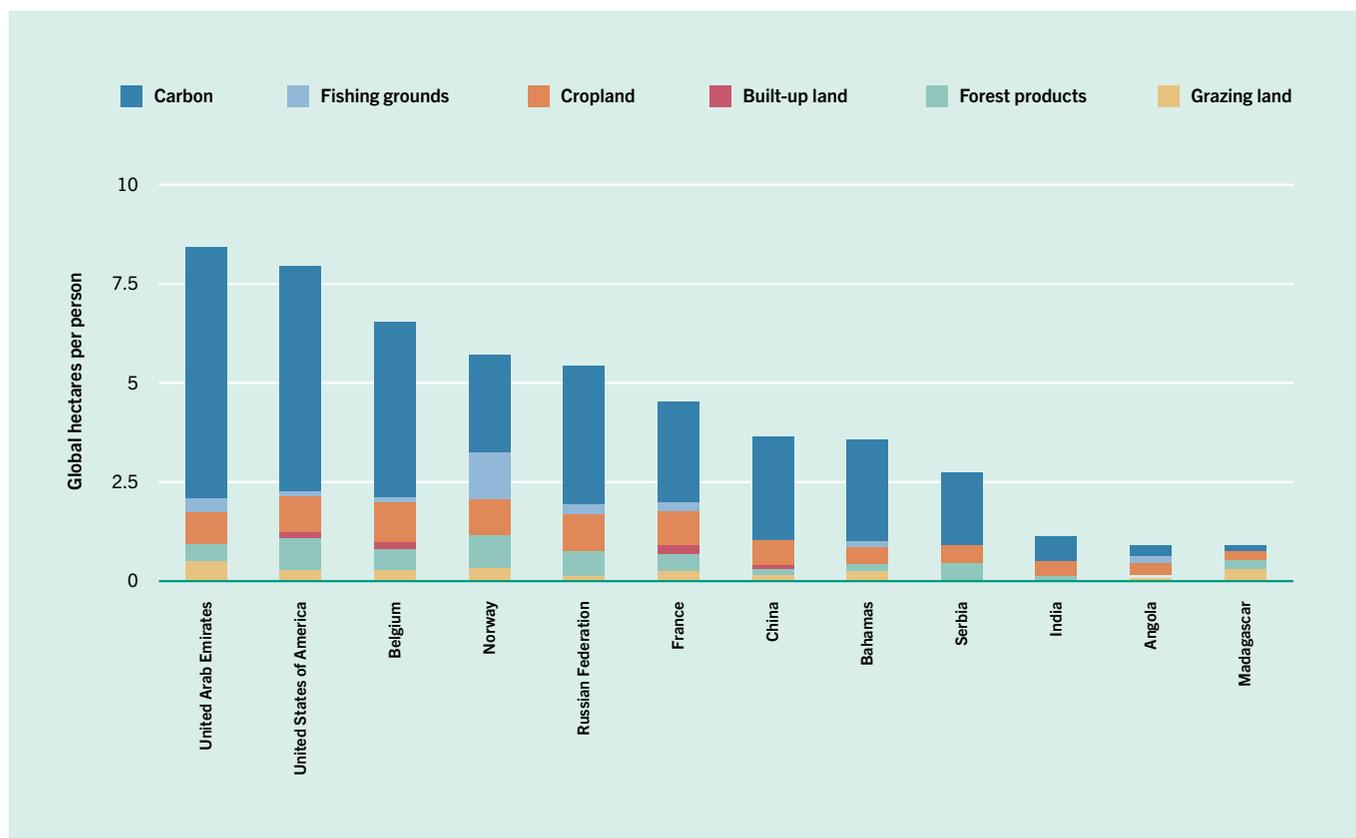
Figure 1. Environmental Footprint per Capita of Selected Countries, 2017.

Source: https://data.footprintnetwork.org (Accessed 8/10/2021)
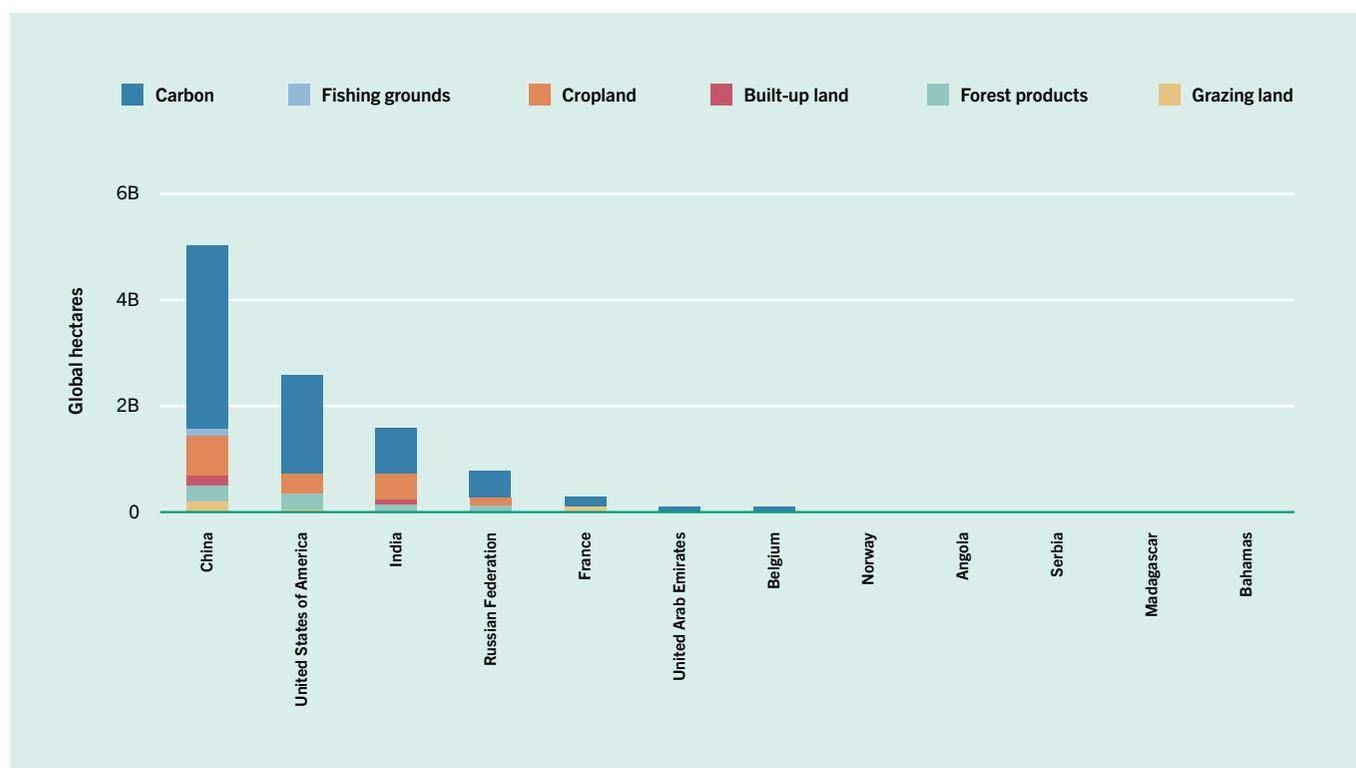
Figure 2. Total Environmental Footprint of Selected Countries, 2017

Source: https://data.footprintnetwork.org (accessed 8/10/2021)
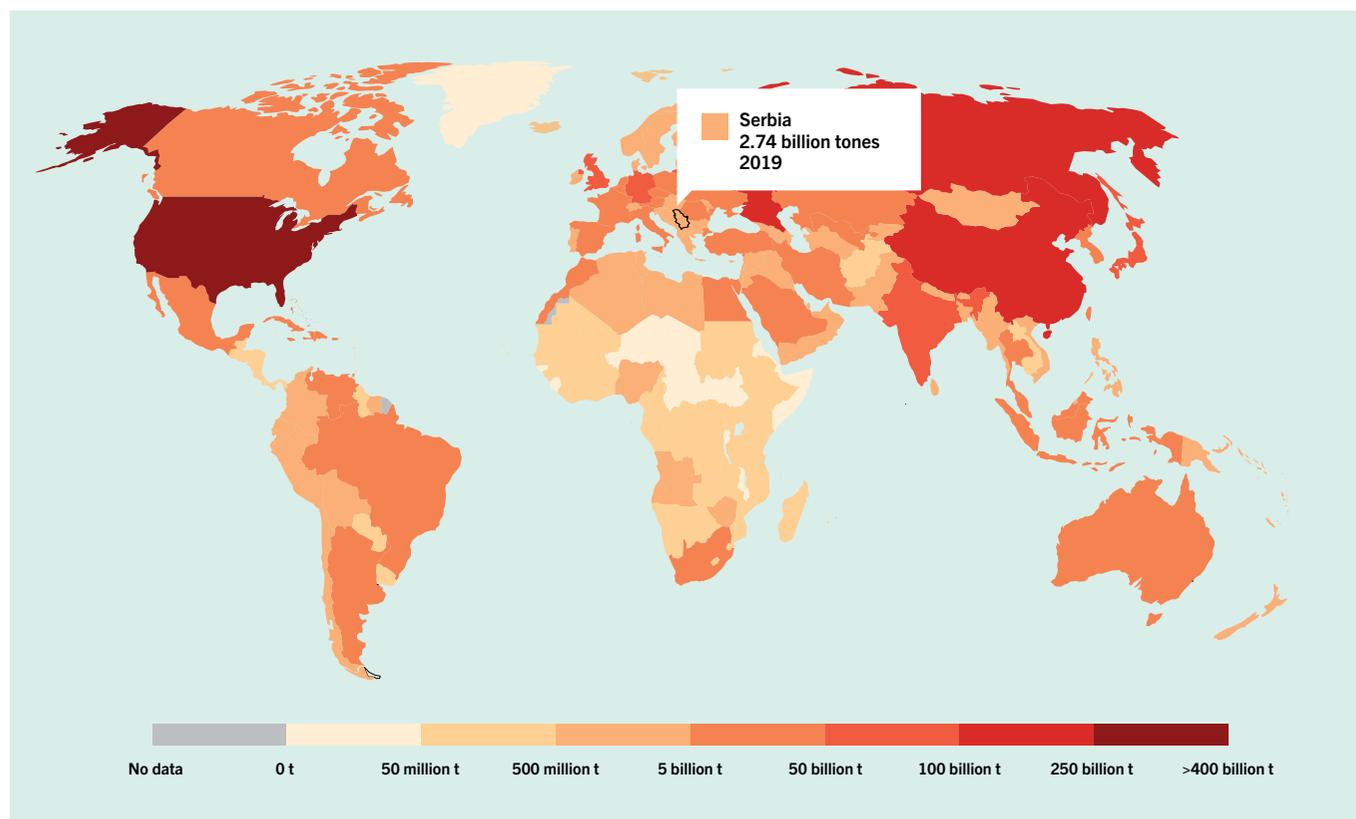
Figure 3. Cumulative CO$_2$ emissions, 2019

Source: https://ourworldindata.org/contributed-most-global-co2 (accessed 8/10/2021)

pared Law on climate change in March 2021. Serbia should develop an ambitious integrated National energy and climate plan (NECP) in a transparent and effective way, translating its commitment to the Green Agenda for the Western Balkans into concrete action including on introducing carbon-pricing instruments and phasing out coal subsidies". On the other hand, some harsher critics of the Europeanization of former socialist states suggestthat, in many aspects, the harmonization with the environmental and climate legislation is a "Potemkin harmonization" meaning that changes exist mainly on paper, while old practices remain intact (Ruso & Filipović, 2019; Bugaric, 2015; Crnčević & Orlović Lovren, 2017; Petrović, 2020).

Within the post-socialist bloc Serbia is everything but an exception in terms of the development and the implementation of environmental and climate policies. Former socialist countries are still lagging behind the level of environmental protection achieved in the older member states, sometimes being criticized and referred to as "enfants terribles" of the EU climate policy. Since large populations have greater impacts on the climate than smaller ones, in total amounts, the climate footprint of Serbia is rather low. However, *per capita* contribution is significant. In comparative terms, the historical impact of

Serbia on climate change is assessed as medium, with a total of 2,74 billion tons of CO2 (Figures 1, 2, and 3).

It should be noted that over 80% of total GHG emissions in Serbia come from the energy sector while EPS[214] is responsible for 50% percent of emissions.[215] Although certain changes in individual consumption patterns (e.g. reduction of electricity use within households and improvements in energy efficiency) can contribute to lowering emissions, the reliance on unrenewable energy sources of the large emitters and energy losses in the process of transmission (estimated at 15%) should be taken as the most important factor contributing to the climate change in Serbia. It is expected that by joining the European Union, Serbia will be obliged to drastically reduce GHG emissions, and success in this process will primarily depend on EPS's readiness to invest in cleaner forms of electricity production. The total value of these investments is measured in billions of euros (Antić, 2020: 146, 154). The transition to a low-carbon economy is expected to bring significant social, economic and environmental benefits to Serbia as a whole, but these benefits and associated costs will not be evenly distributed throughout society, creating winners and losers of decarbonization (Cavalheiro, 2020: 5). One of the biggest challenges will be to make decision regarding the fu-

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[214] Public Enterprise Electric Power Industry of Serbia (JP Elektroprivreda Srbije)

[215] The effects of the COVID-19 pandemic should also be taken into account. At the beginning, the Pandemic has led to a reduction in GHG emissions worldwide (in Serbia as well), however emissions have returned to the same level and probably will increase as was the case after the Global Recession (2008-9) . Moreover, recent research on urban mobility in Belgrade show that, while the overall reduction in urban mobility had a positive effect on the environment (reduction in the air pollution and GHG emissions), changes in the structure of the means of transport have a potentially negative impact due to a significant decrease in the use of public transport, with increasing use of private vehicles and more or less unchanged use of alternative (ecological) means of transport (Petrović, 2021).

ture of lignite use (the main source of the energy at the moment), since relying on low-quality lignite requires advanced technological systems to cope with the industry's low productivity and its vast environmental externalities (Young & Macura, 2020: 2).

Regarding the public attitudes towards climate change, the data from the 8th round of the European Social Survey (2016/2017) show that citizens in post-socialist countries are often more sceptical about climate change than the European average; they are less sure that climate change is happening and are more sceptical regarding the idea that changes in individual energy consumption could mitigate climate change (Portinga et al. 2018). Unfortunately, Serbia was not included in this research wave, but the results from other research show that, despite the evident unfavourable trends and the relatively high general awareness of environmental problems and climate change, Serbian citizens are not particularly willing to engage in environmental protection (Petrović, 2020). Although over three quarters of the respondents are aware of the environmental risks and express concern regarding health consequences, only 5% are willing to engage more actively in this area (e.g. recycling, reducing energy consumption, signing petitions, participating in environmental actions etc.). In other words, there is a noticeable "value-action" gap between environmental awareness and everyday practices. The development of environmental practices in the future might be expected with the growth of information about environmental problems in the media and their problematization in the public discourse (Petrović, 2020). Moreover, as other research demonstrates, direct experience of extreme nega-

tive climatic events such as heat waves, wildfires and floods can enhance citizens' environmental and climate awareness (Li et al., 2011; Zaval, Keenan et al., 2014). However, there are currently insufficient data on the extent to which the perception of vulnerability to environmental and climate risks affects individual assessments of quality of life in Serbia, as well as decision-making in this regard (e.g. relocation to less risky areas; individual measures of prevention and protection against pollution, etc.). Certainly, conducting research that would take these factors into account would be of great value.

To conclude, environmental burdens, suboptimal infrastructure, and unsustainable practices of environmental protection and planning inherited from socialism and aggravated by a specific trajectory of post-socialist transformations in Serbia (characterised by postponed Europeanization and intensive neoliberalisation) largely shaped the system of environmental protection in Serbia. As the following sections will demonstrate, the situation regarding climate change and air pollution in Serbia is far from optimal.

2.1.2 Observed and Predicted Socio-environmental Consequences of Climate Change in Serbia

Serbia will be one of the areas strongly affected by climate change, especially regarding the increase in average temperatures (Božanić & Mitrović, 2019). The mean state of climate in Serbia is already significantly altered in comparison to the mid-twentieth century base-
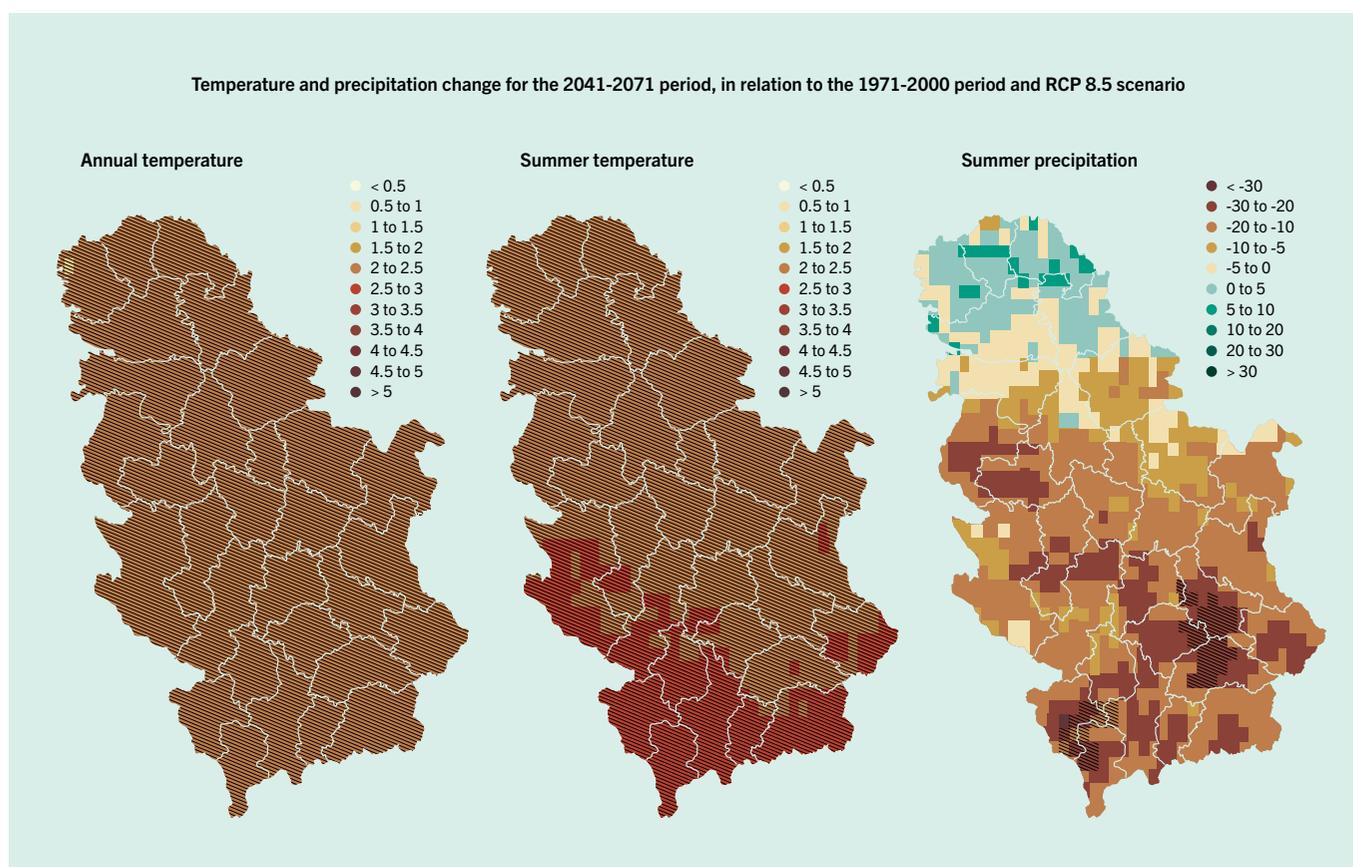

Figure 4. Future projections in temperature and precipitation change for for the mid-21st century depicting main changes in climate conditions in Serbia

* Hatched areas are with statistically significant change.

line, particularly in terms of average temperature levels. The change is toward warmer conditions and intensification of different weather and climate extremes, such as heat-waves, extreme precipitation, prolonged dry periods etc. (Đurđević et al., 2018). Since the 1960's there has been a positive increase in temperature of 0.36 °C per decade, while climate change scenarios predict an overall increase between 2°C and 4,3°C until 2100, compared to the period 1986-2005. The change in annual precipitation cycle is observed, with less precipitation during summer, and a slight increase during other seasons. Moreover, the extreme precipitation episodes had become more frequent (Draft Climate Strategy and Action Plan RS, 2019; Janković et al., 2019: 352).

Following the results from the climate change projections, the observed trends will continue in the future (Vukovic et al., 2018). The IPCC intermediate climate scenario RCP4.5[216] in Serbia envisages an increase in temperature of about 0,5°C in the period 2016-2035; about 1,5°C for the period 2046-2065 and about 2°C in the period 2081-2100, compared to the reference period (1986-2005) (Draft Climate Strategy and Action Plan RS, 2019: 43-44). According to the worse-case scenario[217] (RCP8.5[218]), for the period 2041-2070 the expected annual temperature increase will be 2.0 – 2.5°C and expected increase in summer temperatures 2.5 – 3.0 °C in comparison to the period 1971-2000 (Figure 4).

As presented in the figure 4, increase in annual temperature (left) and summer temperature (centre) is expected, together with a decrease of summer precipitation in most regions in the country (right).[219] Vulnerable areas in Serbia cover around 57% percent of territory which is prone to heatwaves, drought, floods, landslide hazards, forest fires and erosion (Dragicevic et al., 2011). Greater increase in average temperature is expected in southern Serbia in comparison to the northern parts of the country.[220] Except changes in mean annual and mean seasonal values of the essential climate variables, temperature and precipitation, changes of the different extremes are also projected (Vukovic et al., 2018; Djurdjevic et al., 2018). The number of hot and tropical days will continue to increase, and heat waves will become more intense and more frequent in the future. Extreme heat waves, which were rare during the reference period, will occur on average at least 2-3 times a year by the middle of the twenty-first century. The changes in precipitation extremes indicate a further intensification of the already observed changes.[221]

The impact of climate change on various aspects of life in Serbia is already visible. Only in the period 2000-2015, material damage caused by extreme climatic and weather events amounted to over 5 billion euros[222] (Božanić & Mitrović, 2019; UNFCC, 2021; VRS, 2020) and in-
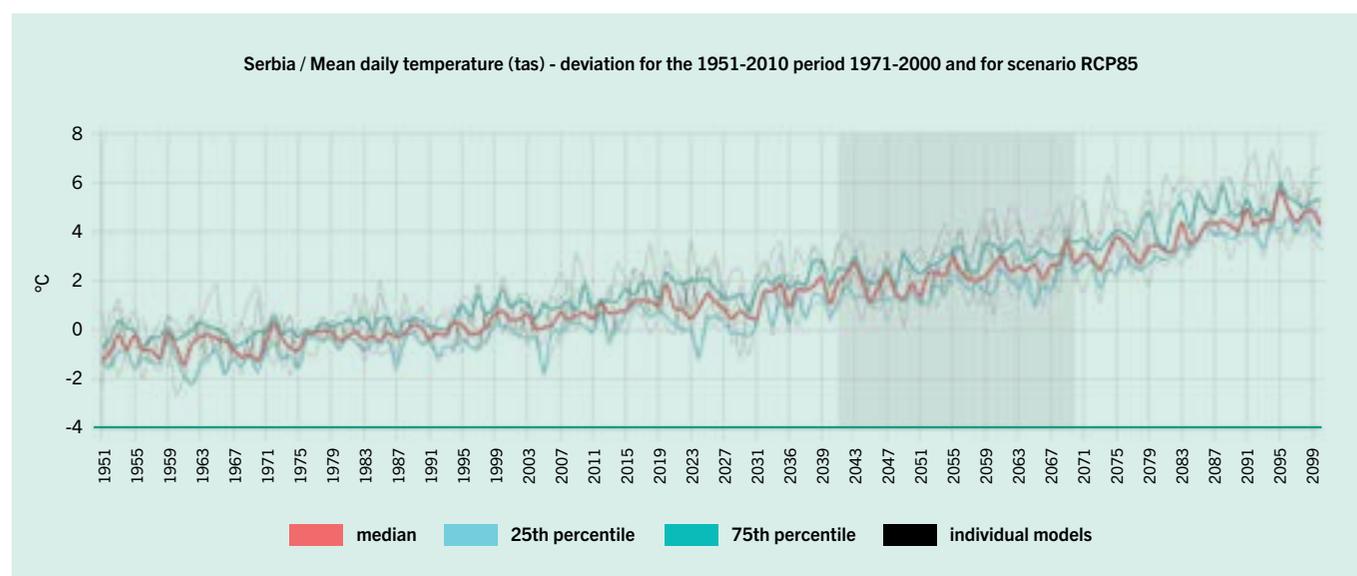

Figure 5. Mean annual temperature change (average over Serbia) up to 2100, following RCP8.5 scenario.

Source: Digital platform developed within the project project "Improving mid-term and long-term planning of adaptation measures to changed climate conditions in the Republic of Serbia", funded by the Green Climate Fund, the Ministry of Agriculture, Forestry and Water Management and the Ministry of Environmental Protection of Serbia

[216] Representative Concentration Pathway (RCP) 4.5 is a scenario of long-term, global emissions of greenhouse gases, short-lived species, and land-use-land-cover which stabilizes radiative forcing at 4.5 Watts per meter squared in the year 2100. RCP 4.5 is described by the IPCC as an intermediate scenario.

[217] For the next 30 years the choice of scenario is not crucial for the assessment of the temperature and precipitation change signals, given that emission scenarios (and GHG concentrations) are not significantly different in this time frame. The differences between scenarios are more visible for the last decades in 21st century.

[218] RCP8.5 is generally taken as the basis for worst-case climate change scenarios.

[219] It is expected that there will be no significant changes in total amount of annual precipitation, but according to projections changes in the annual cycle will intensify and become more visible in comparison with currently observed trends.

[220] In the north regions of the country a slight increase in summer precipitation of about 5% can be expected, and in the central and southern regions the decrease in summer precipitation ranging from -5 to -30% (Figure 4, right panel).

[221] In the future the changes in precipitation distribution intensity towards more frequent heavy precipitation events and higher precipitation accumulations during intense precipitation events are expected.

[222] See also: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Serbia%20First/Republic_of_Serbia.pdf (accessed 10/02/2022)

The Case of Exceeding Levels of Aflatoxin in Milk and Climate Change in Serbia

An illustrative example of the socio-economic and political consequences of climate change is the case of the exceeding concentration of aflatoxin M1 in milk. Due to a severe drought that hit Serbia in summer 2012 (which can be attributed to climate change), the corn yields were significantly lower, and on top of that aflatoxins appeared in it (Milićević et al., 2019). Since the cattle was fed with the lower quality corn, this toxin was then transferred to cow's milk. Finally, milk with an increased concentration of aflatoxins reached the market. Scared and confused, consumers reacted by decreasing the consumption of milk and dairy products. The milk supply chain was seriously shaken and a mini-political crisis emerged (Popović et al., 2016; Nešić i Zorić, 2013).

Climate-related threats to public health in Belgrade

The risk of the abovementioned climate-related threats to public health in Belgrade is estimated as high (heat waves, extreme cold temperatures, floods) or medium high (droughts, storms). The negative consequences of the extreme weather events are the following:

(1) in heat waves: death, mainly due to the cardiovascular diseases, cerebrovascular and respiratory system diseases; expanding infectious diseases; modified allergic patterns; heat stress;

(2) in extreme colds: increased traumatism, circulation disorders, with a possible fatal outcome;

(3) In extreme precipitation and floods: traumatism and deaths; expanding infections, mainly due to polluted water (Đokić & Grujuć, 2015: 17).

People who reside and work in vulnerable areas, especially extremely poor, elderly, infants and children, people with disabilities, chronic patients, and women are at the highest risk (Đokić & Grujuć, 2015: 17; MacDonald, 2021: 31-32).

creased for additional 1,8 billion euros[223] in the period 2015-2020. The impact of climate change endangers public infrastructure, agriculture productivity, water availability and public health. The most vulnerable sectors are agriculture, forestry, hydrology and water resources (Draft Climate Strategy and Action Plan RS, 2019: 10). When it comes to the health of the population, heat stress is considered to be one of the most harmful consequences of climate change leading to increase in mortality and frequency of various diseases (respiratory, cardiovascular, etc.), especially among old persons. Chronic patients (diabetics, kidney patients, etc.) are at a highest risk of heat stress, but also residents of cities where green areas are scarce (Bogdanović et al., 2013).

The unfavourable consequences of climate change especially affect the poorest, rural areas in Serbia, which accelerates the depopulation processes (MUP, 2017). This is especially the case with the least developed region of Southern and Eastern Serbia, covering a third of the country's territory and facing pronounced depopulation trends. The agriculture is at special risks, mostly from droughts, high temperatures and storms. It is estimated that losses in agriculture (mostly from decreased corn yield) amount to 2,2 billion dollars (Djurdjević, 2019; Stričević et al., 2020). Decrease of agriculture yield destabilises the local economy and can trigger migration of working-age people looking for a job. With depopulation, rural areas remain predominantly inhabited by an elderly population which poses serious challenges to rural development (Igić, 2020: 2-3).

Urban environments are also at risk, especially those prone to floods and extreme temperatures (Bogdanović et al., 2013; Radulovic et al., 2015). For instance, extreme weather events in Belgrade have become more frequent, causing serious and sometimes catastrophic consequences. The urban core of Belgrade is particularly at risk of heat waves, due to the lack of vegetation, asphalt and concrete coverage and limited air movement. That said, it should be mentioned that a recent study warned that Belgrade urgently needed a heat health warning system (Stanojević et al., 2014). Other research also demonstrates the importance of digital systems in detecting environmental hazards (via state

owned and community sensors), making them immediately available via networks during environmental crisis (Stupar & Mihajlov, 2016).

In addition to vulnerability to heath waves, parts of Belgrade near the Sava River are extremely endangered by flooding, which was especially visible during the 2014 floods. Another example is the Zemun municipality located in the northern part of Belgrade, that has experienced a number of landslides in the last three decades, jeopardizing buildings and roads, as well as the livelihoods of local population, particularly in the case of the 2010/2011 landslides. It is expected that without adequate adaptive measures this "hidden risk" will become more visible and dangerous in the future (Lukić et al., 2018).

One recent research conducted in Belgrade has shown that 88% of respondents are to some degree aware of the climate risks, and about 70% think that climate change has a negative impact on their every-day functioning (Cvetković et al., 2019). However, despite the awareness of climate related risks, existing research shows that there are many challenges to decarbonisation in Serbia, both on local and on national level, and among different stakeholders (Bajić Brković et al., 2012).

In the boxes are given two illustrative examples of the negative impact of climate change in Serbia: the 2007 summer heat wave and 2014 floods (Milutinović, 2018: 12).

Moreover, one should keep in mind the dangers of climate change related compound extreme weather events that can seriously jeopardize normal functioning of a society. For example, in the summer 2010, Russia was struck by an unprecedented heatwave combined

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[223] https://www.klimatskepromene.rs/wp-content/uploads/2020/10/CCA-revizija-NDCs-NACRT-oktobar-2020.pdf, p. 22 (accessed 10/02/2022)

2007 Summer Heat Wave

In July 2007, almost on the whole territory of the country, maximum daily temperatures exceeded 35°C during nine consecutive days between 16 and 24 July. Serbia's highest ever temperature of 44.9°C was recorded in the District of Smederevska Palanka and Podunavlje District on 24 July. During this heatwave there were a total of 167 excess deaths in Serbia. People aged 75 years and older accounted for 151 (90%) of all excess deaths. An increase of mortality among older persons was 76% in comparison to the baseline mortality. Excess female mortality was over two times higher than excess male mortality. The biggest increase in mortality was from diabetes mellitus, chronic kidney disease, respiratory system diseases, and nervous system diseases. Cardiovascular and malignant neoplasms mortality accounted for the highest absolute numbers of excess deaths (Bogdanović et al., 2013: 140).

2014 Floods

When cyclone Tamara struck, Serbia was unprepared. As a consequence of heavy rains in May 2014 (nearly 50% of the May 1950–2013 climatological precipitation fell in only 48 hours) there was a significant increase in water levels in a short period of time on many rivers (especially the Sava, Tamnava, Kolubara). The catastrophic floods hit 38 towns and municipalities in central and western Serbia and around 20% of the population, while over 30,000 people were displaced (among whom almost 25,000 from Obrenovac). The floods resulted in 51 fatalities, of which 23 from drowning. The economic damage was estimated at €1.7 billion, causing economic recession (Đokić & Grujić, 2015; Crnčević & Orlović Lovren, 2017; Stadtherr et al., 2016). The May 2014 flood showed the significant unpreparedness of Serbia for the extreme weather events. It revealed all the consequences of three decades of poor maintenance, outdated planning and information system, inefficient implementation and unsustainable management, lack of technology and infrastructure (Trgovčević et a., 2020). This event also exposed the alarming levels of gender inequalities and pronounced climate vulnerability of women in Serbia. During the imminent danger, men (especially older men who had completed their National Service) were at an advantage because they owned boats and possessed basic knowledge of rescue procedures. Consequently, single women and single mothers were at greater risk than those with male household members and much more dependent on both organized assistance and informal support (Baćanović, 2014: 29-30).

with a prolonged drought. The extremely dry and hot conditions led to wildfires, which damaged crops and caused many casualties. The wildfires also induced extreme levels of air pollution in cities such as Moscow, adding to the total number of deaths caused by the heatwave (Zscheischler et al., 2018). Similarly, last year in the midst of the covid-19 pandemic, Northern Macedonia had to face the huge problems in the energy system as a result first of extreme flooding and then droughts (BGEN, 2020). The probability of such events in Serbia is high, and mitigation and adaptation policies should take into account potentially devastating effects of compound negative climatic events on the socio-economic functioning of the society.

Climate change is also one of the triggers of migrations. In Serbia, migrations from rural to urban areas are resulting in unfavourable social structure both in urban and rural areas. Unfavourable existing age and gender structure of the remaining population, together with negative demographic growth represents a threat to rural development and makes climate change adaptation more difficult (Igić et al., 2020: 2). Changes in the ability to perform agricultural work and reduced agricultural yields (and thus household income) as a result of droughts, fires or reduced rainfall due to climate change, can be one of the drivers of migration from rural to urban areas and thus contribute to depopulation of these areas.

However, the opposite trend of migration from urban to rural areas could also be expected in the future, as the ecological migrations of middle classes are becoming more frequent. In addition to proactive strategies, such as participation in environmental actions, one of the strategies of the wealthier and more educated part of the population in the future might be migration in areas that are more environmentally friendly (so-called lifestyle migrations, already practiced in developed countries) (Benson & O'Riley, 2016)

It is clear that the already observed and projected changes due to the altering climate will affect virtually all aspects of life in Serbia.

It will have significant effect on the overall health and quality of life people, which will impact the health system, and almost all sectors of the economy will experience some kind of challenges; people will be pushed to migrate from areas particularly affected by climate change (for example, due to loss of agricultural opportunities, economic decline, frequent floods, landslides, droughts, fires, etc.). Having in this in mind, it is obvious that future population policies will have to take into account the effects of climate change and environmental disturbances that adversely affect all three components of depopulation: fertility, mortality and migration. In this sense, the next chapter will consider the relationship between the climate change and population dynamics in Serbia.

Based on the case studies discussed so far, we have had the opportunity to see that climate change is already adversely affecting the population of Serbia, primarily through increased morbidity and mortality, but also through forced migration. Unfortunately, studies examining the impact of climate change and pollution on fertility have not been conducted, while research examining the specific impact of climate and environmental factors on migration is scarce. What we know from the existing studies on migration in Serbia (see chapter on migrations) is that, for now, economic reasons are the main incentive

Lifestyle migrations in Serbia

Lifestyle migrations of the upper-middle classes can be expected in Serbia in the future, but mostly in the form of "secondary homes" in environmentally attractive areas, in addition to primary homes located mostly in the urban centres.

One of the examples is Fruška Gora. The eastern part of Fruška Gora, which is in the vicinity of the Belgrade – Novi-Sad highway, has always been an attractive location for cottage houses. However, since a few years ago, and especially with the COVID 19 pandemic, this was expanded to the whole mountain (especially in Vrdnik, which was in a significant demographic decline). This trend can also be observed on Mt. Kosmaj, in Veliko Gradište, Golubac, and in the area between Užice and Zlatibor.

However, it is doubtful whether these processes actually ad to the repopulation of existing villages, since lifestyle migrants usually opt for new houses built in new settlements, sometimes in former agricultural or even forest land, neglecting emptied houses in the nearby villages.

for migration. However, the global trend of increasing ecological refugees and lifestyle migration indicate that in Serbia, too, an increase in this form of spatial movement can be expected in the near future. Of course, it should be borne in mind that climate and environmental migration can be mediated by economic factors. As said, the decrease of income from agriculture due to climate change can encourage a number of people to leave rural areas in search of better living conditions. On the other hand, environmental and climatic factors, such as extreme weather events, can directly affect temporary or permanent relocation, as was the case with Obrenovac residents after the 2014 floods. It is important to emphasize here that without very detailed and focused research, it is impossible to separate the influences of climatic and environmental factors from the influence of socio-economic and political factors, and changes in (perception) of quality of life on migration decisions. Similarly, without focused research, it is not possible to determine the isolated impact of climate and environmental factors on the other two components of the (de) population – mortality and fertility, because they are mediated by a complex set of socio-economic factors (e.g. lack of developed health care system and the system of informing citizens about environmental risks and prevention measures; lack of technological and infrastructural preparedness of the state for extreme weather events, etc.), as we have seen in the presented case studies.

In the next section, we shift our attention from the observed effects of climate change to the projections of future climate effects on population dynamics in Serbia.

2.2 Population Dynamics and Climate Change in Serbia

Connecting population dynamics and climate change is a complex and often controversial task. It is important that any discussion of the links between the two takes into consideration both the size of population and its structure, as well as the consumption patterns. It is much fairer to say that consumers, rather than people, contribute to climate change; and important to recognize that there is a significant variation in contribution to climate change between developed countries (with intense consumption and low fertility rates) and developing countries (with negligible consumption and high fertility rates).[224] It should also be clear that socio-demographic factors (e.g. growth rates, composition, spatial distribution and education levels) affect the adaptive and mitigation potential of populations. Last but not least, migration should be regarded as a crucial aspect linking population and climatic change (Stephenson et al., 2010).

One of the analytical tools used to better understand the interplay between population growth and composition, climate change and socio-economic development, is the concept of Shared Socioeconomic Pathways (SSPs) has been introduced (KC & Lutz, 2017). SSPs are scenarios of projected socioeconomic and climatic global changes up to 2100[225] based on five narratives describing alternative socio-economic and climate developments (Riahi et al., 2017). Up until recently, climate models have included only very rough estimates of future population changes. However, SSPs scenarios take into consideration multiple population characteristics (Lutz & Striessnig, 2015). The basic ideas behind the SSPs storylines are presented in the box and summarized in the Figure 6 (for an extended description of the SSP storylines, see: O'Neill et al., 2014; O'Neill et al., 2015; Fricko et al., 2016). In a nutshell, these narratives describe the alternative paths of future society. SSP1 and SSP5 scenarios predict relatively optimistic future human development, with significant investments in education and health, fast economic growth and well-functioning institutions. They are different in sense that SSP 5 assumes that this will be driven by an energy-intensive economy based on fossil fuels, while in SSP1 there is a growing shift towards more sustainable society. SSP3 and SSP4 are more pessimistic regarding future economic and social development, with little investment in education or health in poorer countries, coupled with rapid population growth and growing inequalities. SSP2 is a "middle of the road" scenario with historical patterns of development continue throughout the 21st century.[226]

Table 1 shows the correlation of key components of population change with SSP models. The yellow colour in the table indicates the group of countries with low fertility to which Serbia also belongs. In this part of research, the method of multi-dimensional mathematical demography was used to project Serbian population based on alternative assumptions on future, fertility, mortality, migration and educational transitions that correspond to the five shared socioeconomic pathways (SSP) storylines (for more details, see: KC & Lutz, 2017).

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[224] Of course, one should be aware of the cases of China and India (the world's two largest countries, by population) that combine population growth with already globally significant levels of greenhouse gas emissions.

[225] https://unece.org/fileadmin/DAM/energy/se/pdfs/CSE/PATHWAYS/2019/ws_Consult_14_15.May.2019/supp_doc/SSP2_Overview.pdf (Accessed 05/10/21)

[226] https://www.carbonbrief.org/explainer-how-shared-socioeconomic-pathways-explore-future-climate-change (Accessed 05/10/21)

Shared Socio-economic Pathways

SSP1 Sustainability (Taking the Green Road) (small challenges for mitigation and adaptation to climate change). This scenario assumes moving toward a more sustainable future characterised by better management of global common goods, emphasis on human well-being, health and education instead of economic growth, which, on the other hand, accelerates demographic transition to a relatively low number of the world population (KC & Lutz, 2017; Riah et al., 2017). This scenario corresponds with the previously more often used IPPC RCP2.6 (significant mitigation)[227] scenario, which is considered to be a stabilization scenario and rather optimistic, envisioning the stabilization of CO2 emissions from 2040 onwards. In demographic terms, this path leads to lower mortality and higher education in all countries. In rich OECD countries, it is expected that the emphasis on quality of life will make it easier for women to combine work and family, preventing further fertility decline. For this reason, for this group of countries, the medium fertility assumption was chosen in the prediction model developed by KC and Lutz. For all other countries, the assumption of low fertility was anticipated, stemming from the assumption of the rapid continuation of demographic transition. Migration levels were anticipated to be at a medium level for all countries (KC & Lutz, 2014, 2017).

SSP2 Middle of the Road (medium challenges for mitigation and adaptation to climate changes). In this scenario, the world does not shift considerably from the present-day trajectory, with the continuation of the observed social, economic, and technological trends. Development and income growth proceeds unevenly, and the global efforts toward achieving sustainable development are relaxed. This scenario corresponds to the RCP4.5 climate scenario (moderate mitigation). Environmental systems still experience degradation and the environmental challenges remain, although there are some improvements in resource consumption. Global population growth is moderate (Riah et al., 2017; Fricko et al., 2016).[228] All countries are expected to have medium fertility with medium mortality and medium migration (KC & Lutz, 2014, 2017; for more details see: KC and Lutz, 2017 and Dellink et al., 2017).

SSP3 Regional Rivalry (great challenges for mitigation and adaptation to climate changes). This scenario refers to a fragmented world with an emphasis on national sovereignty, security at the expense of international development. A resurgent nationalism, concerns about competitiveness and security, and regional conflicts push countries to increasingly focus on domestic issues. Investments in education and technological development decline. Economic development is slow, consump-

tion is material-intensive, and inequalities persist or even increase over time. A low international priority given to environmental concerns leads to strong environmental degradation in some regions. The international movement of people is controlled and restricted. It presumes high mortality and low education for all countries. Fertility is assumed to be low in the rich OECD countries and high in the rest of the world. Due to the emphasis on security and barriers to international exchange, migration is expected to be low for all countries (KC & Lutz, 2017; Fujimori et al., 2017).

SSP4 Inequality (A road of divisions) (low challenges for mitigation, high challenges for adaptation). This scenario refers to a world characterised by high inequalities. Highly unequal investments in human capital, combined with increasing disparities in economic opportunity and political power, lead to increasing inequalities and stratification both across and within countries. Over time, the gap widens between an internationally-connected society that contributes to knowledge and capital-intensive sectors of the global economy, and a fragmented collection of lower-income, poorly educated societies that work in a labour-intensive economy. In terms of fertility, this scenario implies continued high fertility in today's high fertility countries and continued low fertility in other countries. The high fertility countries are expected to suffer from high levels of mortality, whereas the others have medium mortality. Migration is expected to be at a medium level for all countries (Calvin et al., 2017; KC & Lutz, 2014, 2017).

SSP5 Development based on fossil fuel (great challenges for mitigation, low challenges for adaptation). This scenario refers to a world that underlines technological progress and where economic growth is fostered by strong investments in health, education, and institutions to enhance human and social capital. At the same time, the push for economic and social development is coupled with the exploitation of fossil fuel resources and the adoption of a lifestyle that implies consumption of resources and energy around the world. All these factors combined lead to fast growth of the global economy. This scenario corresponds with the RCP8.5 climate scenario with no mitigation of usual emissions. In demographic terms, it is assumed that all this reflects on high education and low mortality in all countries. The fertility pattern is strongly differentiated, with relatively high fertility anticipated for the rich OECD countries, and low fertility for all other countries. The emphasis on market solutions and globalization implies high levels of migration for all countries (KC & Lutz, 2017: 184; Kriegler et al., 2017).


SSP5: Fossil fueled development
- Rapid economic growth, free trade fueled by carbon-intensive fuels
- High technology development
- Low regard for global environment and SDGs
- Technology fixes Low population and high mobility

Markets first

Clash of civilisations

SSP3: Regional rivalry
- Competition among regions
- Low technology development
- Environment and social goals not a priority
- Focus on domestic resources
- High population growth
- Slow economic growth dev. countries

SSP2: Middle of the Road

SSP1: Sustainability
- Global cooperation
- Rapid technology development
- Strong environment policy
- Low population growth
- Declining inequity
- Focus on renewables & efficiency
- Dietary shifts
- Forest protection

UN world

SSP4: Inequality
- Inequality accros and within regions
- Social cohesion degrades
- Low technology development
- Environment priority for the new affluent
- Limited trade

Have's and have not's

Challenge to mitigation

Challenge to adaptation

Figure 6. Shared Socio-economic Pathways

[227] RCP stands for Representative Concentration Pathways

[228] https://unece.org/fileadmin/DAM/energy/se/pdfs/CSE/PATHWAYS/2019/ws_Consult_14_15.May.2019/supp_doc/SSP2_Overview.pdf (Accessed 05/10/21)

	Country groupings	Fertility	Mortality	Migration
SSP1	High fertility group	Low	Low	Medium
	Low fertility group	Low	Low	Medium
	Rich - OECD	Medium	Low	Medium
SSP2	High fertility group	Medium	Medium	Medium
	Low fertility group	Medium	Medium	Medium
	Rich - OECD	Medium	Medium	Medium
SSP3	High fertility group	High	High	Low
	Low fertility group	High	High	Low
	Rich - OECD	Low	High	Low
SSP4	High fertility group	High	High	Medium
	Low fertility group	Low	Medium	Medium
	Rich - OECD	Low	Medium	Medium
SSP5	High fertility group	Low	Low	High
	Low fertility group	Low	Low	High
	Rich - OECD	High	Low	High

Table 1. Demographic Components with Regard to Shared Socio-economic Pathways Scenarios

Adapted from: KC & Lutz, 2017: 184

Within the framework developed by KC and Lutz (2017), Serbia belongs to the Low Fertility group (Table 1).

In population projections the starting point and the most important piece of information is the total size of the population (Graph 1). Four out of five projections envision a significant population decline in Serbia by the end of the century. The only exception is the SSP3 scenario (regional rivalry) characterised by high fertility and significantly restricted movement of the people.

In the SSP1 scenario in which the sustainability path is selected, the population of Serbia (with Kosovo[229] and Metohija) will start to decline sharply after 2050, reaching the level of around 6 million at the end of the century. SSP1 envisions low fertility and mortality rates combined with medium migrations, which means that the migration component will be the leading factor of the depopulation process in Serbia.

The "Middle of the road", SSP2 scenario predicts population decline after 2060, but not as sharp as in the previous case, whereby the population Will number close to 7.7 million at the end of the century. The SSP2 scenario Provides for medium levels of fertility, mortality and migration in Serbia, keeping the total number of people more stable than in the SSP1 scenario.

In the SSP3 scenario, characterised by rising nationalism, closing of borders and competition between the nations, migrations are project-
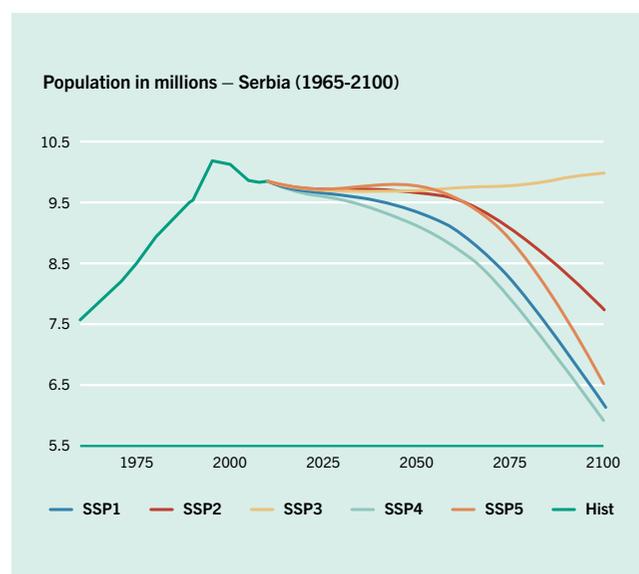
Graph 1. Population Change According to SSP Scenarios

Source: https://tntcat.iiasa.ac.at/SspDb/dsd?Action=htmlpage&page=30 (accessed 14/11/21)

[229] References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

ed as low (combined with a rather high level of fertility and mortality), which will lead to a slight increase in the population to around 10.1 million. However, the increase in the number of people is due to their limited movement and comes about in an unfavourable context of a high mortality rate and international rivalry and conflicts.

The SSP4 model predicts the sharpest decline in the total number of people in Serbia (less than 6 million in 2100). This will be the result of low

fertility and medium mortality and migration. The entire context will be characterised by pronounced social inequalities, low social cohesion, low technological development, and the neglect of the environment.

Finally, the SSP5 scenario, which is the most pessimistic in terms of climate, envisions a population decline to the level of approximately 6.5 million. Such an outcome is the result of a combination of high migrations and low fertility and mortality rates.

Figures 7.1—7.6 Population pyramid projections in accordance to the SSP scenarios, Serbia 2010 - 2050

Source: https://tntcat.iiasa.ac.at/SspDb/dsd?Action=htmlpage&page=30 (accessed 14/11/21)

Although important, the total size of the population does not give the entire picture of future demographic trends. Therefore, population projections need to go beyond the consideration of population size alone. This is important because human populations are not homogeneous and this heterogeneity greatly matters for the future growth of the population. Populations that have only a small proportion of women or with more older people are likely to have a lower birth rates than populations of comparable size, but with a larger proportion of women in reproductive age. In this sense, future population growth is a direct function of the age- and sex-structure of the population, and for this reason it is important that population projections do explicitly incorporate these two sources of population heterogeneity and define their assumptions in the form of a specific fertility, mortality and rate of migrations for various age categories. The age- and sex-composition of the population is also of interest in its own right. Population aging is considered a highly important socio-economic issue, which can only be quantitatively addressed if the age-structure of populations is explicitly incorporated in the projection model (KC & Lutz, 2017).

Figures 7.1-7.6 give sex-, age- and education-pyramids as projected for Serbia under the five scenarios, with the year 2010 as the starting year. Given that most of the assumptions integrated into the SSP scenarios (with the exception of mortality) mostly affect the younger population, and the time horizon is only 40 years, the five pyramids (7.2-7.6) are quite similar to one another regarding the older population but differ for the younger population. The population aging is

evident in all scenarios with reverse pyramid trends (narrowing of the base of the age pyramid) in all cases, with the exception of the SSP3 scenario. The overall education of the population is expected to improve in the next four decades, but some scenarios are worse than others regarding population educational levels. For instance, the SSP4 (inequality) scenario envisions a considerable share of young people without formal education.

This section was aimed at pointed to the connectedness between climate change and demographic movements. While the previous section showed the reader how climate change is already affecting the population, this section was supposed to show the possible futures. Of course, climate models and demographic projections do not provide an unambiguous answer to the question of what the future will look like, but they clearly show that climate change significantly affects demographic trends, both globally and locally, and that decision-makers at all levels must take this factor into account in formulating population policy. In other words, it is necessary to understand that, in a certain sense, climate policy is at the same time demographic policy, also; the opposite is true, as if these were two sides of the same coin. Climate changes adversely affect population size and structure, as well as the quality of life. Likewise, population growth coupled with unsustainable consumer styles has the effect of increasing climate risks. The most important message of this section is that population policy must take climate change into account, both the changes already observed, as well as the future projections.

3 Air Pollution and the Depopulation Processes in Serbia

3.1 Air pollution in Serbia

In addition to climate change, air pollution is one of the biggest environmental challenges in Serbia. Air pollution is measured by the concentration of particulate matters (PM). The size of the particles is directly linked to their potential for causing health problems. Small particles (less than 10 micrometres in diameter) pose the greatest problems, because they can reach deep into the lungs, and some (less than 2.5 micrometres in diameter) may even reach the bloodstream. Exposure to such particles can affect both the lungs and the heart. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including: premature death in people with heart or lung disease, non-fatal heart attacks, irregular heartbeat, aggravated asthma, reduced lung function, increased respiratory symptoms, (such as irritation of the airways, coughing or laboured breathing. The latest WHO report estimates that the annual mean PM2.5 concentration in the country reaches 19.4 μg/m^3, with somewhat higher mean levels in urban zones (21.0 μg/m^3) compared to rural areas (19.4 μg/

m^3).[230] These figures are significantly higher than the average annual mean PM2.5 concentration in Europe as a whole (14.0 μg/m^3) and the WHO recommended value (10μg/m^3) (WHO, 2019).

The main sources of air pollution in Serbia are the following: 1. the energy sector (thermal power plants, district heating plants and individual household heating); 2. the transport sector (an old vehicle fleet); 3. waste dump sites; 4. manufacturing activities (oil refineries, the chemical industry, mining and metal processing and the construction industry). The most important individual contributors to air pollution include the petrochemical industry complex in Pančevo and Novi Sad; cement factories in Popovac, Kosjerić and Beočin; chemical plants and metallurgical complexes in Smederevo, Sevojno and Bor; thermal power plants in Obrenovac, Lazarevac and Kostolac (WHO, 2019).

One of the factors that contributes to air pollution is the use of coal for electricity generation and individual household heating. In Serbia, the level of pollution is particularly high as 72.4% of electric energy is produced from coal, usually of a very low quality. As much as

PM 2.5 Annual mean

Annual PM 2.5 EU limit value

Ref   WEM   WAM A   WAM B
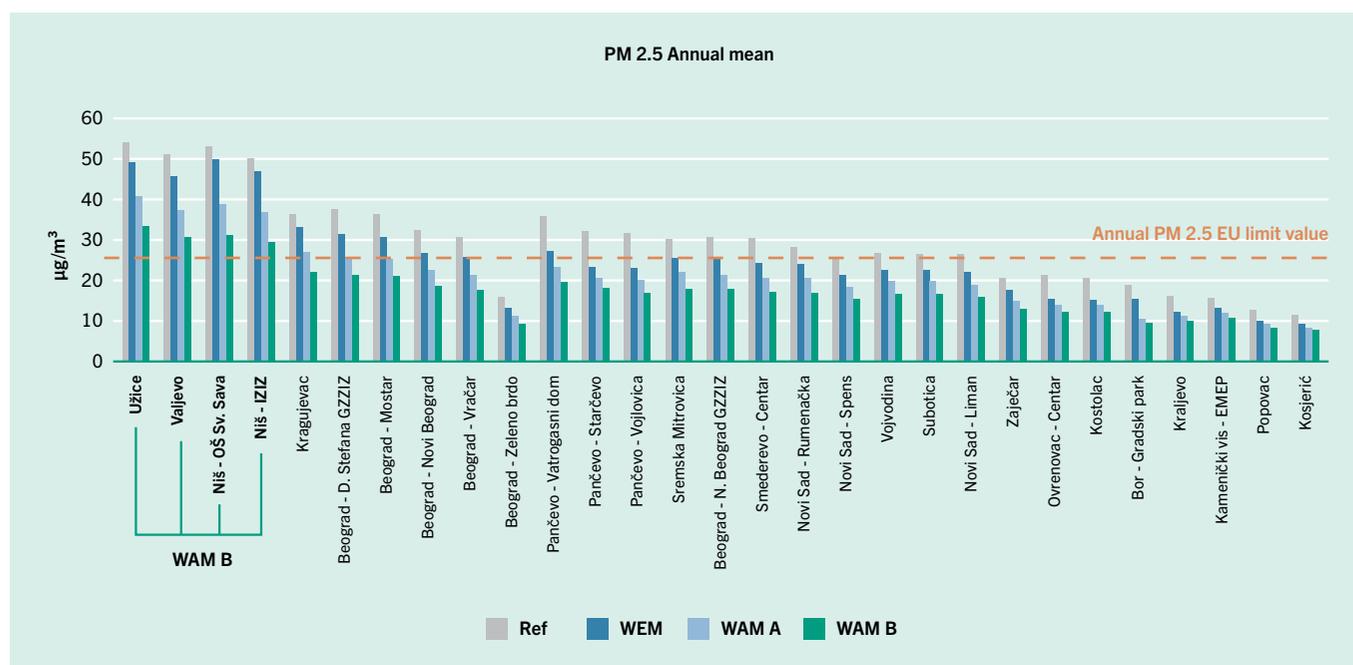
Figure 8. Annual mean concentrations of PM 2.5 according to different scenarios WEM, WEM A, WEM B

Source: Real, 2021

32 million tons of that coal are burned annually in Serbia (Carvalho, 2019). Recent information suggests that the increased use of tailings for heating (instead of coal) additionally increases the already high levels of pollution in Serbia (BGEN, 2020b). It also should be noted that the Western Balkan are almost as high as from the 296 existing coal plants in the EU-28. Coal power plants in the Western Balkans emit 13 times more SO_2 and 30 times more PM2.5 per installed megawatt than the average European plant. From the 1st January 2018, the countries of the Western Balkans have been expected to start reducing their emissions for large combustion plants and align national laws and regulations with the EU ones. This process is stemming from the Energy Community rules, which require coal plants currently operating in the Western Balkans to cut their emissions gradually until the end of 2027. However, it is already becoming clear that operators struggle to keep the limit values for emissions (Matkovic Puljic et al., 2018).

Cities with exceeding levels of PM2.5 in Serbia are: Užice, Valjevo, Niš, Kragujevac, Beograd, Pančevo, Novi Sad, Sremska Mitrovica, Smederevo, and Subotica (figure 8) in which lives approximately 2,7 million people or about 40% of total population. Even with significant improvements, the annual levels of PM2.5 will still be above the EU limits (25 μg/m³)[231] and far above the WHO recommended value (5 μg/m³) in Užice, Valjevo and Niš (Figure 8).

According to the 2021 Annual progress reports of the European Commission for Serbia[232] in the field of air quality, Serbia has attained a good level of alignment with the EU acquis. However, Serbia has to speed up implementation of the existing laws including air quality plans, and further improve its air quality monitoring system. Adopting the EU air quality index is stressed as a key recommendation. The unfavourable situation with the air pollution in Serbia has prompted certain policy initiatives in this area, such as the development of the Air Protection Program (WHO, 2019). However, it is only the initial phase.

3.2 Impact of air pollution on public health, morbidity and mortality in Serbia[233]

Exposure to air pollution, especially airborne particulate matter (PM), is associated with increased mortality and morbidity, mostly from cardiovascular and respiratory diseases. The World Health Organization (WHO) estimated that exposure to ambient air pollution accounted for 4.2 million premature deaths globally in 2016, including half a million in the WHO's European region (WHO, 2019). These particles have been recognized as the main risk factor associated with air pollution. Around 83% of all deaths related to air pollution in Europe in 2015 can be attributed to PM2.5, particles, 14% to NO2[234], and the remaining deaths are attributed to ozone (Carvalho, 2019).

An analysis of the countries and territories with multiple deaths attributed to air pollution, reveals that the region of Eastern and South-

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[231] https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health(accessed 10/02/2022)

[232]

[233] Although there is not enough space in this chapter to deal with the other sources of pollution in Serbia, one should keep in mind that they also have a certain negative impact on the overall health and livelihoods of people (for more information see: Environmental Report, 2019).

[234] nitrogen dioxide
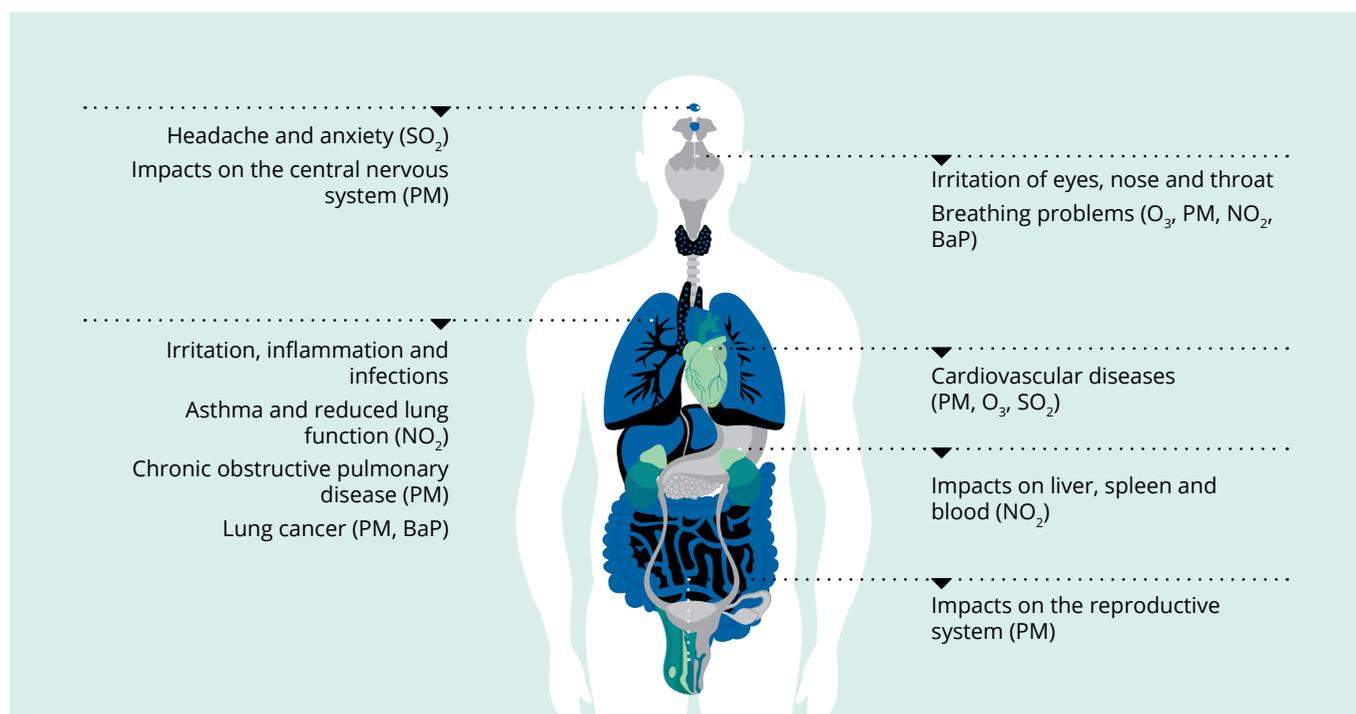
Figure 9. Health impacts of air pollution

Source: EEA, Healthy environment, healthy lives, 2019.

ern Europe has the lead, with Kosovo, Bulgaria, Serbia, Macedonia and Hungary at the very top of the list (Table 2).

The annual mean PM2.5 levels for most of the countries and territories with an increased mortality rate are four times higher than the WHO recommended level of 5 μg/m³.

According to the 2020 Report on Air quality in Europe (EEA, 2020: 158), it is estimated that over 16,000 people die prematurely in Serbia due to the level of air pollutants being exceeded. Other sources estimate the number of premature deaths due to air pollution to 6,592 (WHO, 2019) and 9,773 (Air Protection Programme in the Republic of Serbia with an action plan[236]). Although estimations differ, it is clear that the situation is far from good, as every year the population of a small town disappears.

Estimations of premature deaths attributable to exceeding levels of PM2.5 (WHO air quality guideline of 10 μg/m³) are summarized in table 3. As estimated by WHO, 3,585 premature deaths in the 11 cities can be attributed to exposure to exceeding levels of PM2.5. The estimated proportion of all deaths attributable to PM2.5 is highest Užice and Valjevo (almost 19%) where mean concentrations of PM2.5 are four times higher than recommended. In absolute terms, air pollution has by far the highest impact in Belgrade. However, when estimated per 100,000 inhabitants, existing concentration of PM2.5 is associated with the highest relative impact on health, in Valjevo and Užice (WHO, 2019:14).

Rank	Country/ territory	Deaths by 100.000 inhabitants	Annual mean PM 2.5 μg/m³	% Energy produced from coal
1	Kosovo[235]	215.5	26.4	97.5
2	Bulgaria	210.9	24.1	46.2
3	Serbia	200.7	23.3	72.4
4	Macedonia	154.7	28.7	58.4
5	Hungary	148.4	18.9	19.5
6	Italy	138.7	18.5	16.7
7	Greece	137.3	19.1	42.7
8	Romania	137.3	18.1	27.6
9	Poland	125.0	21.6	80.9
10	Croatia	122.1	17.4	20.6
11	Montenegro	110.9	18.5	50.3
12	BH	105.1	18.9	64.0
13	Czech Republic	104.9	17	54.0
14	Slovenia	99.9	17.4	29.6
15	Slovakia	99.8	19.1	11.9

Table 2. European countries and territories with higher death rates attributed to air pollution, Air Quality Report 2018

Source: Carvalho, 2019.

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[235] All references to Kosovo shall be interpreted in accordance with Security Council Resolution 1244 (1999).

[236] https://eas3.euzatebe.rs/rs/o-projektu (accessed 14/11/21)

City	Mean con-centration (µg/m³)	Total popu-lation	Population aged ≥ 30 years	Estimated attributable deaths		Estimated attributable proportion	
				No.	CI	%	% (95% CI)
Beočin	22.2	15 304	10 183	14	9-18	7.1	4.68 - 9.29
Belgrade	29.2	1 364 453	937 461	1796	1194 - 2337	10.9	7.25 - 14.19
Old Belgrade	29.4	932 813	640 819	1259	838 - 1639	11.0	7.34 - 14.37
New Belgrade	28.7	431 640	296 642	539	358 - 702	10.7	7.08 - 13.87
Kosjerić	31.1	11 341	8 234	25	17 - 33	11.9	7.93 - 15.46
Kragujevac	30.5	178 610	122 020	250	166 - 324	11.6	7.74 - 15.11
Lazarevac	34.2	57 735	37 999	104	69 - 135	13.5	9.05 - 17.54
Niš	29.2	257 883	176 513	354	236 - 461	10.9	7.27-14.23
Novi Sad	22.8	350 930	231 604	280	185 - 367	7.4	4.90 - 9.72
Obrenovac	31.9	72 323	48 594	117	78 - 152	12.3	8.24-16.04
Smederevo	39.3	105 774	70 221	223	150 - 287	16.2	10.87 - 20.85
Užice	44.4	75 805	52 856	180	121 - 231	18.7	12.62 - 23.98
Valjevo	44.6	87 944	61 802	242	164 - 311	18.8	12.69 - 24.1
All		2 578 102	2 694 948	3 585			

Table 3. Total long-term mortality due to PM2.5 in 11 Serbian cities

Source: WHO, 2019: 12

In the continuation of this section of the report, we rely on the data gathered through the project "Air Protection Programme in the Republic of Serbia with an action plan". Within the project, four scenarios of air pollution in Serbia until 2030 were made (WEM, WAM-A, WAM-B, WAM-C). The analysis of the impact of air pollution in Serbia on population health, morbidity and mortality is based on information on the levels of primary air pollution emissions from different scenarios for Serbia: the reference scenario from 2015 (REF), which is the baseline scenario compared to 2030, which is a projected scenario of a situation with the application of existing regulations (WEM 2030), and three mitigating scenarios: WAM A, WAM B and WAM C (Šuht, 2021: 1). Each scenario implies additional efforts (with additional measures) compared to the previous one.

- WEM: with existing measures. The scenario includes policies and measures adopted and implemented by January 1, 2019.

- WAM A: with additional measures A. Relevant EU directives and regulations are not yet fully transposed and implemented;

- WAM B: with additional measures B. More intensive control than in the case of WAM A. In addition to WAM A measures, stricter emission limits are introduced in some sectors and measures are set for national financial and fiscal measures for key categories of emission sources;

- WAM C: with additional measures C. Complete control scenario. In addition to WAM B measures, new measures are introduced,

Scenario	REF	WEM	WAM A	WAM B	WAM C
Year	2015	2030	2030	2030	2030
PM 2.5 (µg/m³)	17.4	13.9	12.5	10.8	10.2
SOMO35 (ppb,dana)[237]	3036	2559	2512	2469	2466
NO₂ (µg/m³)	9.1	6.5	5.9	5.3	5.2
Population size 2015: **7 108 454**					

Table 4. Average annual exposure of the population in relation to the scenarios

*Source: Šuht, 2021: 12*
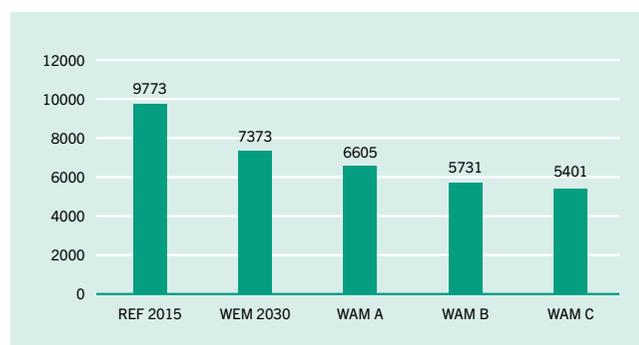
Figure 10. Number of annual premature deaths in Serbia caused by air pollution

Source: Šuht, 2021: 15

[237] SOMO35 means the sum of mean ozone values greater than 35, and it is an indicator for health impact assessment recommended by the WHO. It is defined as the annual sum of daily maximums of 8 hours on average for more than 35 ppb (https://www.emep.int/mscw/definitions.pdf).

including site-specific measures (e.g. incentives, restrictions and prohibitions) aimed at ensuring compliance with air quality limit values in certain cities (Directive 2008/50/EC, in particular for suspended PM10 and PM2.5 particles).

The impact of implemented measures on the concentration of air pollutants are represented in Table 4. With the implementation of the two more ambitious scenarios WAM B and WAM C, Serbia would practically meet the WHO recommendations regarding the levels of PM 2.5.

Figure 10 represents a drop in the number of premature deaths in Serbia in accordance with the implementation of different scenarios. The implementation of the least ambitious scenario WEM, which practically means compliance with the existing laws on air protection, including the National Emission Reduction Plan, 2,400 lives would be saved per year. This scenario envisages desulphurization in state-owned thermal power plants (interventions regarding individual household heating and transportation are not included), which should be managed by the state authorities. If the WEM C scenario (the most restrictive) was applied, compared to the current situation (REF 2015), the number of premature deaths from air pollution would be almost halved and reduced to 5,041 people per year. In other words, with the implementation of the WAM C scenario, it is estimated that 4,382 lives per year would be saved. Estimated negative health impacts which would be avoided in 2030 thanks to the implementation of the mitigation scenarios (WAM A - WAM C), comparison to WEM are further elaborated in Table 5.

In terms of money, according to international standards, every avoided case of premature death or any other impact on health (hospital admission due to respiratory or cardiovascular disorders, bronchitis, days of reduced working capacity, days of absence from work etc.), is an economic benefit for the whole of society. The net benefits are equal to the annual avoided health care costs (health benefits) minus the additional annual investments and operating costs (for the implementation of measures), according to mitigation scenarios and compared to WEM 2030 (Cavalhiero, 2021: 8). Additional measures (WAM A, WAM B, WAM C) to reduce emissions could save up to 3 billion euros in health care costs until 2030. This can be seen

from the graph in Figure 10, which shows the avoided health damage (= benefits), compared to the basic WEM 2030 scenario. The lower estimated benefit for this scenario, which relies on the mortality rate according to VOLY[238], is € 800 million (Šuht, 2021). On the other hand, VSL[239] methodology estimates the negative health impact of air pollution at 15,6 billion euros (4.6 billion euros VOLY) for REF 2015 year, compared to the most optimistic scenario WEM C – 8.6 billion euros VSL (value of statistical life) (2.3 billion euros VOLY) annually (see figure 11). What is indicative is that with the implementation of measures envisioned by the existing legislation (REF 2015 - WEM) alone, somewhere between 1.5 billion (VOLY) and 4 billion euros (VSL) of health costs could be saved. However, it should be taken into consideration that different scenarios demand different levels of investment. For example, it is estimated that the implementation of WAM A will cost around 1 billion euros, while WAM B and WAM C will cost 2.8 and 2.9 billion euros respectively.[240]
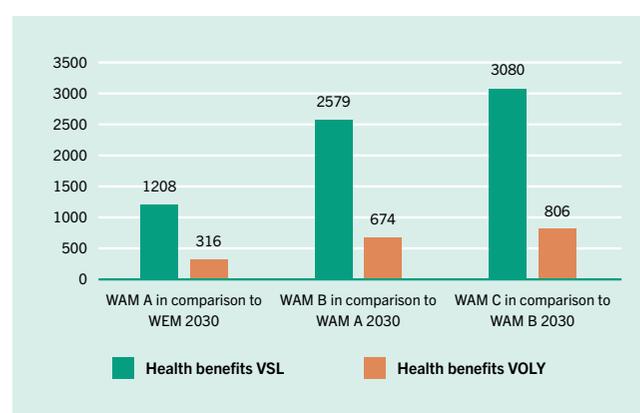

Figure 11. Benefits to health in comparison with WEM 2030 in millions of euro
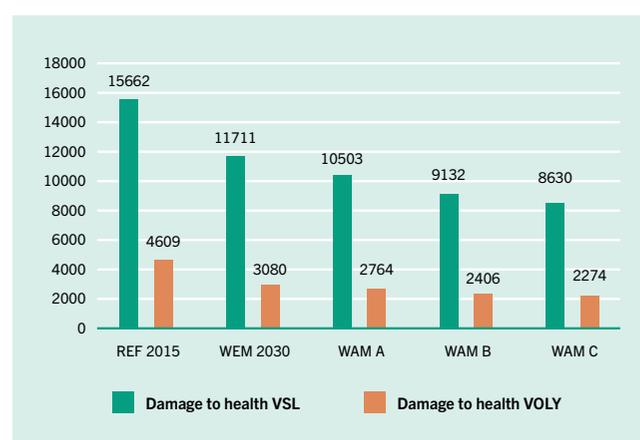
Source: Šuht, 2021

Figure 12. Total annual damage to health in millions of euro

Source: Šuht, 2021

Scenario / indicator	WAM A in comparison to WEM 2030	WAM B 2030 in comparison to WAM A 2030	WAM C 2030 in comparison to WAM B 2030
Cases of premature death of PM2.5, per year	768	1,642	1,972
Lost years of life cause by PM2.5, per year	6,289	13,446	16,142

Table 5. Negative health impacts that were avoided in 2030 as a result of implementation of mitigation scenarios, in comparison to WEM

Source: Šuht, 2021: 14

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[238] VOLY stands for value of a life year

[239] VSL stands for value of statistical life

[240] https://drive.google.com/file/d/1uf1aNcO4uayRqEKagZtEe6nPXmp6aFyY/view (Accessed 14/11/21)

To conclude, the presented data show that every year a population of the size of a smaller town disappears in Serbia as a result of air pollution with the health cost that amounts up to 15.6 billion euros annually. This puts Serbia at the very top of the list of the European countries with regards to air pollution. The largest part of the air pollution is attributable to the state-owned thermal power plants and district heating plants, which means that the improvements in this sector largely depend on the willingness of the government to tackle this issue. It also should be noted that most of the European laws regarding air protection are transposed into domestic legislation and that their implementation would save 2,400 lives every year as well as up to 4 billion euros (in healthcare costs) annually. Therefore, the first step would be to implement the existing laws.

4 Recommended measures

The general recommendation is that climate change and environmental degradation should be taken as an important factor of (future) depopulation in Serbia - either through a direct impact on the quality of life, mortality, birth rates and migration, or indirectly through economic decline and a loss of vitally important natural resources. Therefore, improvements in terms of mitigation and adaptation to climate change and reduction of pollution should have multiple positive effects on all three aspects of population change: fertility, mortality and migration.

The implementation of existing measures in line with European environmental legislation would bring significant progress in reducing morbidity and mortality due to air pollution and climate change. For example, the new Law on Climate Change[241] adequately regulates this area, however it is necessary to develop bylaws and to work on their implementation. Bylaws should be developed having in mind the adverse effects of climate change on the population and human development, as well as the need to promptly act on reversing observed trends.

Reducing the levels of air pollution in accordance with the WAM scenarios is complex and involves significant technological advances, policy measures and their implementation, as well as campaigns to raise public awareness. However, it is clear that implementing stricter regulations would significantly reduce the number of premature deaths and improve the overall public health. Controlling the air pollution from the coal power plants presents a huge opportunity to save lives and millions of euros in healthcare costs in the next decade.

Additional intervention directly aimed at reducing air pollution could be: 1.) reducing the use of low-quality coal and solid fuels in the energy sector; 2.) increasing the use of low-emission fuels and renewable power sources; 3.) reducing emissions from industrial sites by implementing new technologies; 4.) increasing energy efficiency of buildings; 5.) stimulating sustainable urban mobility; 6.) upgrading the air quality monitoring system in order to make pollution data more accurate, accessible, personalized and applicable for citizens; 7.) improving general awareness of the health risks of air pollution.

The isolated impact of environmental factors on fertility have not yet been researched in Serbia, and it is recommended that a research study exploring the links between pollution and male and female infertility be conducted.

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[241] http://www.parlament.gov.rs/upload/archive/files/cir/pdf/zakoni/2021/337-21.pdf (accessed 14/11/21)

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