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"FROZEN" DEMOGRAPHIC POTENTIALS OF SERBIA – THE LIMIT TO SUSTAINABLE POPULATION DEVELOPMENT

(Séance / Session 3)

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«Congelé» potentiel démographique de la Serbie - Limite le développement durable de la population

Résumé

Le nombre de mâles est approximativement égal au nombre de femmes dans le groupe d'âge démographiques le plus vital (20-39 ans) de la population en Serbie, due à la combinaison des facteurs: la sex-ratio à la naissance, structure d'âge, la mortalité, et la structure d'âge de la migration externe. Cependant, les permanentes migrations de "village -ville" au cours des cinq dernières décennies ont perturbé l'équilibre sexuel de ce groupe d'âge au niveau du règlement. En règle générale, les régions à «excès» des hommes âgés de 20-39 ans sont pauvres, agraires, principalement montagneuses et frontalières, alors que les régions «excédentaires» des femmes dans ce groupe d'âge, à prédominance urbaine. Comme le résultat, la mise en œuvre des trois importants des stratégies nationales en vue du développement durable de la population (la promotion de naissance, la réduction de la pauvreté et le vieillissement de la population) est limitée par le congelé potentiel de reproduction lequel est pratiquement inutilisable en raison de sa fragmentation spatiale. L'analyse des indicateurs de la composition par sexe perturbés aux niveaux inférieurs spatiale a souligné les facteurs profondément enracinés économique et social (analysés à travers les indicateurs de la pauvreté) en tant que moteurs de la migration interne dans une boucle de rétroaction positive typique »la population contre la pauvreté». L'analyse est fondée sur les résultats de l'Enquête sur le niveau de vie en 2007, menée par la méthodologie de la Banque mondiale et le Recensement de 2002. Résultant polarisée zones agraires de l'excédent des jeunes hommes et urbaines "îles" de l'excédent des jeunes femmes de renforcer les processus du vieillissement démographique et la pauvreté malgré les objectifs de la politique d'État. Ainsi, à travers la projection de la population stochastique, a souligné la nécessité de surmonter les obstacles physiques comme condition préalable à la mise en œuvre des stratégies nationales.

Mots-clés: limites démographiques, sex-ratio, le vieillissement démographique, Serbie

"Frozen" Demographic Potentials of Serbia – The Limit to Sustainable Population Development

Abstract

The number of men is roughly equal to the number of women in the most vital age group (20-39 years) of Serbia's population due to combination of factors: sex ratio at birth, age pattern of mortality, and age pattern of international migration. However, continuous "village to town" migration during the last five decades produced disturbed sex composition of the group at settlement level of the country. Generally, regions having more men than women aged 20-39 are poor, agrarian, mountain and mainly border while areas populated by more women than men of the age are predominantly urban. As a result, implementation of three substantial national strategies in view of sustainable population development (the pronatalist, the poverty reduction and the strategy on ageing) is constrained by the "frozen" reproductive potential which is of no effective use on account of its spatial factionalism. The analysis of indicators of disturbed sex composition at lower spatial levels pointed to profound economic and social factors (analyzed through poverty indicators) as a driving force of internal migration in a typical positive feedback loop "population-poverty". The analysis is based on the 2007 Living Standards Measurement Study conducted by World Bank and the 2002 Census of Population in Serbia. Resulting polarized agrarian zones of young men surplus and urban "islands" of young women surplus reinforce processes of demographic ageing and poverty despite the goals of policy makers. The need to overcoming the problem of territory obstacles as a prerequisite for implementing the national strategies is emphasized through the stochastic population projection.

Key words: demographic limits, sex ratio, population ageing, Serbia

Geodemographic Polarization

Most of Serbia's population lives in the northern part, predominantly presented by plain (the lowest part of Pannonia, the region of Belgrade City and river valleys of Central Serbia) while the mountain regions (located in the southern part of the country, specifically in the east and the west border region) are almost deserted, gathering the oldest population in the country. Demographic indicators were polarized in that way for decades. Indeed, this is the main result of continuous "high- to lowlands" migration within country borders that started soon after World War II. Demographic implications of the phenomenon are substantial for the sustainable population development of Serbia on long run. Dominant demographic process during the next decades will be population ageing throughout the whole of Europe. The process that has already started affected especially Serbia due to its half a century long period of below replacement fertility and traditional emigration history. However, demographic polarization between urban and rural that existed for such a long period becomes less and less pronounced as population ageing has had the fastest pace in urban areas for the last two decades. It is the effect of permanent, irreversible migrations of the population of the highest reproductive potential from villages toward towns after World War II. Nowadays, the largest part of those generations entered into the group of old age population, leaving behind considerably smaller generations of descendants than themselves.

Given the essential striving of the process in regard to homogenization of the level of demographic ageing across the territory of the whole country (Nikitović 2006), typical demographic indicators of ageing process, such as ageing index and median age of population, cannot express essential differences between plain regions (mainly urban)[1] and mountain regions (mainly rural). From the point of the paper topic, substantial information on the capabilities of the future sustainable population development of the country lies in the sex ratio of the population aged 20-39 years. In other words, it would not be possible to implement most of the aims planned by the government pronatalist strategy if significant number of people in their highest reproductive ages is without chances of finding a partner of the opposite sex due to effects of continuous migration from mountain to plain regions. For decades, more young females than males have migrated from villages to towns. In the beginning of the process, the highest intensity migrations were from mountains to nearby towns while afterwards, when demographic capacities of hinterland subsided, the biggest flows were from small and middle sized towns to the largest centers in the country. The number of men is roughly equal to the number of women in the group aged 20-39 years (the proportion is 1,006)[2] at the level of the country due to a combination of factors: sex ratio at birth, age pattern of mortality, and age pattern of international migration.

However, continuous "high- to lowlands" migration during the last five decades produced disturbed sex composition of the group at settlement level of the country. Generally, regions having more men than women aged 20-39 years are poor, agrarian, mountain and mainly border, while areas populated by more women than men of the same age group are predominantly urban and low land. The cause of the selectivity of migration by sex is founded in traditional family organization where males were taught to be "tied to land" while females were encouraged to leave their paternal houses. During the strong and fast industrialization of the former Social Federative Republic of Yugoslavia (SFRY), mountain, agrarian regions were generally neglected which transformed them into backward areas characterized by low agriculture production and lower economic position in relation to the rest of the country. On the other side, fast growing towns (on account of immigration) during the period took advantage of industrialization and modernization presenting today the only oases of development in the country.

The idea of the paper is to point out to the correlation between the disturbed sex ratio of the most vital population and indicators of economic development across the regions in Serbia. In other words, the surplus of young men in mountain regions and the surplus of young women in low lands could be the fine tuned indicator of an area's development level showing simultaneously in which ways national strategies concerning demographic processes in the future sustainable development should be implemented. Disturbed sex ratio of the most vital age group at the settlement level points to the "frozen" demographic potential unrecognized in the official national strategies. In that sense, sustainable population development between two macro regions is of specific interest for the country. In the opposite sense, underdevelopment of the mountain region in synergy with lack of females in reproductive ages will reinforce both demographic desertification of the area and the trend of population concentration in the several biggest urban centers of the country.

"Frozen" Demographic Potentials

The analysis is based on the 2002 Census of Population and the 2007 Living Standards Measurement Study in Serbia funded by the World Bank. The 2002 Census provided a possibility for the analysis at the settlement level which was used as a starting point. Settlements were not classified into low or high lands according to their absolute elevation but rather to their position in relation to the frontier between the Plains and the Mountains. The frontier was drawn according to the administrative districts of the Republic. This kind of distinction provided classification that gives more weight

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[1] About 85% of urban population in Serbia lives in plain regions.

[2] According to the 2002 Census of population; 0.998 - according to the 2007 Living Standards Measurement Study.

to the geographical surroundings of a settlement than to its own absolute elevation. The main advantage of the approach is that it is closer to reality. For example, it does not put automatically a settlement into the high lands category if it is located on an isolated hill inside plain since it is the part of surrounding net of settlements.

The 2007 Living Standards Measurement Study (LSMS) resulted from the questionnaires prepared by the instructions of the World Bank experts as help in formulating the Government Poverty Reduction Strategy. The sample encompassed 17,375 persons who reside in Serbia. Territorial representativeness of the sample was adjusted to the NUTS 2 level of the country[3]. It means that this study distinguishes among six large regions each of which consisted of two or more districts.[4] For the analysis in this paper, main demographic characteristics of the questioned population were used along with two summary indicators of living standard – the limit of poverty and quantiles of the consumption.

Two of the six regions – the East and the Southeast plus half of the West region represent the Mountain area as it is defined in this paper. According to the 2002 Census the area is populated by 1,565,080 inhabitants, which represents 20.9% of the country population. Slightly more people live in rural than in urban settlements: 51.7% against 48.3% while in low lands area this relation is quite opposite: 41.5% against 58.5%.

Table 1.1 shows homogenization of the population ageing across the country according to usual summary indicators – age dependency ratios. Results from both sources the 2002 Census of population and the 2007 LSMS are presented.

Table 1.1 Dependency ratios of two geographical areas by urban/rural distinction

	Area	65/0-19			65/20-64		
		Urban	Rural	Total	Urban	Rural	Total
the 2002 Census	Plains	0.67	0.88	0.76	0.23	0.33	0.27
	Mountains	0.43	0.98	0.70	0.18	0.40	0.28
the 2007 LSMS	Plains	0.76	0.95	0.84	0.23	0.33	0.27
	Mountains	0.53	1.43	0.91	0.20	0.49	0.33

Sources: Statistical Office of the Republic of Serbia (2003); World Bank (2007).

As it was noted earlier, there is no substantial difference between high and low lands according to the dependency ratios for total population by both surveys. However, it can be noted that old population (aged 65 and over) make somewhat higher pressure in the Mountains than in the Plains if rural settlements are considered.[5] On the other hand, urban places are older in the Plains than in the Mountains. The difference between these two areas in the level of dependency ratios for urban population (ageing index particularly) indicates the direction which dominates migration streams in the country during the last five decades. Since the majority of the settlements' population is presented by migrants who settled down during the 1960-1980s period, these places are now facing strong population ageing caused by entering of big immigrant cohorts into old ages.

While the direction of internal migrations in Serbia is still generally from the Mountains to the Plains, the most attractive targets of migrants are the biggest cities in the country, now. Since industrialization almost exhausted population stock of rural areas, particularly in the Mountains, small and middle sized towns became new sources of population influx for several large urban oases in Serbia. Consequently, this directed more detailed analysis of the sex ratio at the most dynamic part of migrating population, those aged 20-39 years, which represents the population of the highest reproductive potential at the same time. Table 1.2 shows the ratio for this population segment depending on its geographical location and type of settlement.

Table 1.2 Sex ratio of the population aged 20-39 years according to its geographical location

	Area	Males/Females		
		Urban	Rural	Total
the 2002 Census	Plains	0.955	1.072	0.999
	Mountains	0.959	1.130	1.036
the 2007 LSMS	Plains	0.911	1.116	0.981
	Mountains	1.039	1.136	1.079

Sources: Statistical Office of the Republic of Serbia (2003); World Bank (2007).

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[3] The final NUTS 2 classification of regions in Serbia is still under the question since the authorities want to make five instead of actual seven regions. In the paper, actual division of the country into seven NUTS 2 regions was used.

[4] The seventh region represents administrative province of Kosovo and Metohija, but there is no data for it.

[5] The difference is more pronounced by the 2007 LSMS, which can be accounted for continuation of the process and, to a certain extent, for the variation of the sample.

According to the 2002 Census, both geographical areas are characterized by male surplus of the group if rural population is considered while surplus of females is common feature for urban centers of the two areas. Furthermore, the 2007 LSMS shows that only urban areas of lowlands are populated by more women than men of the group confirming what the 2002 Census already indicated by ageing index (Table 1.1). Comparison of the two surveys shows the increase of young male surplus in rural zones of the Plains while towns in mountain regions started to have lack of females of reproductive ages. This clearly confirms accumulation of young women in urban centers of the Plains which reflects even in the difference between the Plains and the Mountains for sex ratio of the group irrespective of settlement type. Observing of the sex ratio aged 20-39 at regional level (NUTS 2) gives a more precise look at the spatial distribution of the indicator inside the two macro geographical areas (Table 1.3).

Table 1.3 Sex ratio (males/females) of the population aged 20-39 years according to NUTS 2 level

NUTS 2 level	the 2002 Census			the 2007 LSMS		
	Urban	Rural	Total	Urban	Rural	Total
Belgrade City	0.931	1.029	0.948	0.821	1.062	0.857
Vojvodina	0.990	1.074	1.024	0.986	1.043	1.009
Central Serbia	0.940	1.067	0.998	1.054	1.153	1.096
West Serbia	0.931	1.108	1.031	1.124	1.181	1.156
East Sebrbia	0.976	1.096	1.031	0.844	1.082	0.948
Southeast Serbia	0.968	1.134	1.044	0.932	1.269	1.064

Sources: Statistical Office of the Republic of Serbia (2003); World Bank (2007).

Belgrade city has the biggest surplus of young females in the country. Compared to the other five regions, it is obvious that the capital represents the most attractive destination of internal migration flows. It can be noted that only Central Serbia (according to the 2002 Census) and East Serbia (according to the 2007 LSMS) has female surplus of the group. In the former case it can be explained by the fact that Central Serbia belongs to the Plains given the distinction adopted in the paper, and in the latter by the traditional emigration flow to the West European countries – "citizens working abroad" (consisted mainly of males), which was most typical for Eastern Serbia[6] (Grečić 1998). Rural areas of all regions suffer from lack of females of reproductive ages but a worse situation is in the Mountains compared to the Plains, while the Southeast region (which is economically least developed in the country) stands out as the worst. Unfortunately, the latter survey (the 2007 LSMS) indicates that even traditional industrial centers of the West and Central Serbia lack young females. If we take a closer look (municipality level) to the spatial differentiation of sex ratio of those aged 20-39, the distinction between the Plains and the Mountains in regard to this indicator is clearly pronounced (Figure 1.1).
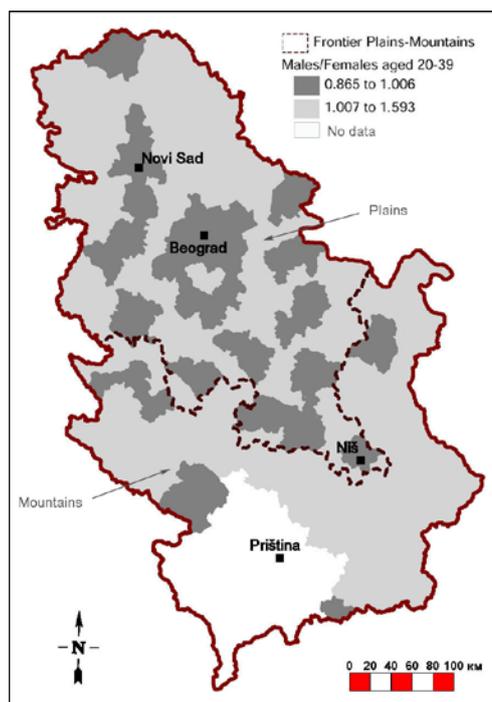
Figure 1.1 "Islands" of young women surplus against zone of young men surplus

Almost all of the "islands" of young female surplus belong to the Plains while only four of them are located in mountain regions. Besides, their location outside the Plains could be easily explained. Two of these "islands" represent industrial

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[6] East Serbia has lower surplus of young males compared to other mountain regions of Serbia (West and Southeast) for rural population according to both surveys and even for urban population according to the 2007 LSMS.

centres based on mining while the other two are predominantly populated by Muslims whose male population considerably participates in the country's emigration stock in Western Europe, called "citizens working abroad". Thus, it is quite obvious that regional centers of the Mountains lacked female population of reproductive ages already according to the 2002 Census. In other words, there is a tendency of concentrating young females in regional centers of the country but unfortunately almost none of them are located in the Mountains. As it can be noted in map 1, frontier between the Plains and the Mountains, almost sharply split up the country into two parts: Northern with islands of young female surplus and Southern – almost compact zone that lacks females of reproductive ages. This frontier could be a huge obstacle in achieving aims planned by the government pronatalist strategy but also the long term limit to sustainable population development of Serbia.

Apart from war conflicts, economic factors are dominant stimuli to migrations. Given the nature of industrialization process in Serbia during the last half of the twentieth century, it was expected that agrarian, mountain regions would be the less developed part of the country today. That situation shaped the general direction of internal migration in Serbia – from the high lands to the low lands. As a result, the Plains got more working-age population having higher living standard compared to the Mountains. But this process has no tendency to allow the areas to exchange their positions. It is more likely that distinction between them will be more pronounced in the future. The question is - why? The analysis of indicators of disturbed sex composition at lower spatial levels pointed to profound economic and social factors (analyzed through poverty indicators) as a driving force of internal migration in a typical positive feedback loop "population-poverty". The mechanism of this feedback loop behaves as follows: people will migrate from poor regions to the wealthier ones leaving behind worse population structure than it was, but improving demographic composition of wealthier areas. In other words, the less young people stay in the Mountains the poorer mountain regions will be. And the opposite, the more young people come to the urban centers, the better living standard in the Plains. "In system terms these structures are called "success to successful" feedback loops. They tend to be endemic in any society that does not consciously implement counterbalancing structures to level the playing field" (Meadows et al 2004: 44).

One of advantages of using a questionnaire about the living standards of Serbia's citizens instead of common GDP refers to the fact that size or wealth of the economy is not such an important predictor as it is the extent to which economic improvement actually touches the lives of all families, and especially the lives of women. In this paper, quantiles of consumption were used as a basic indicator of the living standard of people. The spatial distribution of the sex ratio of those aged 20-39 years, as shown at map 1, already indicated potential positive correlation between female surplus of the age group and higher consumption level across the small territorial units. Since the 2007 LSMS results are representative at NUTS 2 level, statistically based inferences about the correlation could have been estimated across the six large regions only. The Pearson product moment correlation coefficient is 0.72, which confirms hypothesis about sex ratio of the most vital age group as a fine tuned indicator of the living standard of an area. This relatively strong correlation points, above all, to socially very established way of personal dealing with inherited problems of highly uneven development across the regions in Serbia, which can be generalized by intrinsic opposition between the Plains and the Mountains. Consequently, the aims presented in government strategies on pronatalism, poverty reduction and population ageing imply counterbalancing of strong regional differences. If this prerequisite is absent, the well-established migration flow from high (poor) to low (higher standard) lands will further deteriorate sex structure of the most vital population group across the regions of the country. This analysis recognized some of the not so obvious demographic limits to sustainable population development of Serbia pointing to already significant amount of "frozen" reproductive potential which is of no effective use on account of its spatial dispersion. Resulting opposition between backward agrarian zones of young men surplus and urban "islands" of young women surplus will reinforce processes of demographic ageing and poverty throughout the country despite the goals of policy makers. The population projection results illustrate this the best way.

The Long-term Implications

Probabilistic population projection specially prepared for the purpose of the paper presents some of possible ways to overcoming current demographic limits to sustainable population development of Serbia. General hypothesis on demographic components coincide with assumptions used for making population projection included in government Strategy on spatial development of Serbia up to 2020. In addition, projection horizon has been extended up to 2050 in this paper in order that long term implications of current demographic trends could be considered. Precisely, the projection does not assume any dramatic improvement of fertility, similarly to the hypotheses in the recent probabilistic projections of European countries (Lutz and Scherbov 1998, Alho 2002, Statistics Netherlands 2005), but takes into account both polar cases – implementation of officially proclaimed pronatalist aims and decreases of total fertility rate to the lowest level recorded in Europe. It was generally assumed slow increase of life expectancy where target values are close to current levels of countries with longest life span. Migration as a component of population change has generally the lowest predictability (Matysiak and Nowok 2006), especially in countries like Serbia (Nikitović 2010). On the other hand, its importance could be immense in traditional low fertility countries where fertility impact on improving age structure is limited (Nikitović and Lukić 2010). This projection took into account both possible integration into EU in the near fu-

ture, which could transform Serbia's net migration balance from a negative one to positive one under certain conditions, and intensifying emigration character of migration due to an unfavourable political and economic situation. It was assumed that the direction and intensity of internal migration is perfectly correlated to the predicted character of international migration.

The probabilistic forecast shows that Serbia will face significant population ageing with no chances to revert the process during the projection. With respect to decreasing trend of population size, fertility increase is one of two indispensable conditions if Serbia wants to restore its current size. The other is huge immigration that could be accomplished if the country experiences fundamental political and economic changes in the forthcoming period. Even then, there is only 9 percent probability that Serbia's population size in 2050 will be higher than it is today.

In that context, population projection for the Mountains shows that current demographic situation could be improved if positive trends in migration occur in the next period. In addition, mountain regions will be probably somewhat younger than low lands due to accumulation of migrant population in the Plains during the last several decades. That stock will enter the old aged group during the projection horizon (table 1.4).

Table 1.4 Population projection results for 2030 and 2050 – median and 80% forecast limits

	2030						2050					
	TOTAL	OADR	AI	0-19 (%)	65+ (%)	80+ (%)	TOTAL	OADR	AI	0-19 (%)	65+ (%)	80+ (%)
MOUNTAINS	*(1,565,080)*	*(0.284)*	*(0.695)*	*(23.92)*	*(16.63)*	*(1.96)*	*(1,565,080)*	*(0.284)*	*(0.695)*	*(23.92)*	*(16.63)*	*(1.96)*
Upper limit	1.425.944	0,379	0,703	20,41	22,57	5,05	1.369.850	0,458	1,898	19,66	26,67	8,05
Median	**1.328.330**	**0,345**	**0,652**	**18,55**	**20,86**	**4,38**	**1.200.869**	**0,394**	**1,426**	**16,51**	**23,58**	**6,44**
Lower limit	1.228.989	0,314	0,606	16,74	19,29	3,79	1.044.433	0,340	1,081	13,71	20,70	5,04
PLAINS	*(5,932,921)*	*(0.271)*	*(0.755)*	*(21.88)*	*(16.52)*	*(1.93)*	*(5,932,921)*	*(0.271)*	*(0.755)*	*(21.88)*	*(16.52)*	*(1.93)*
Upper limit	5.672.501	0,411	1,413	20,13	24,01	5,45	5.561.897	0,580	2,275	19,42	31,28	9,74
Median	**5.282.586**	**0,374**	**1,209**	**18,34**	**22,22**	**4,79**	**4.871.665**	**0,496**	**1,708**	**16,24**	**27,73**	**7,86**
Lower limit	4.892.599	0,341	1,044	16,65	20,55	4,18	4.225.684	0,427	1,305	13,38	24,57	6,22

Source: Author's calculation; Notes: OADR - Old age dependency ratio (65+/20-64), AI - Ageing index (65+/0-19);

Values in parenthesis - the 2002 Census

The median, or the most probable forecast, shows a decrease of total population in the Mountains by almost one fourth in 2050 compared to the 2002 Census. But if the aims of the government pronatalist strategy failed and emigration intensified, population size of the area could be even reduced by one third according to the lower limit of the 80% forecast interval. On the other hand, not even positive winds, especially immigration into the area in synergy with fertility improvement, could stop decrease of population size of the Mountains in the long run. Indeed, those improvements are of limited capacity given the actual age structure of the population and growing spatial dispersion of the most vital age group.

Anyway, forecasted dependency ratios show that population ageing will most probably be stronger in the Plains than in the Mountains, which is expected given the accumulated stock of working age population from actual and earlier periods. But, it is not so encouraging for the future of the Mountains because its demographic indicators are not much favourable compared to the Plains. Besides, these general figures hide spatial isolation among places in the mountain region, which could easily place real future values of demographic indicators closer to the unfavourable forecasting limit rather than to the most probable forecast (median) or desirable forecasting bound. At the same time, population settled in the Plains could achieve at least most probable forecast (median) values using benefits of its high spatial concentration given the same migration conditions across the country. In other words, even if Serbia experiences large population influx in the next decades, it would be much easier to achieve desired demographic development with population at most vital ages that is not spatially dispersed and differentiated according to sex.

<p style="text-align:center">∗∗∗</p>

"Frozen" demographic potentials of Serbia, i.e. lack of females in reproductive ages in the rural mountain regions and their "surplus" in the urban settlements, accelerate the demographic polarization of the country presented by dense "islands" of old population against spacious deserted areas. Only synergy of substantial improvement of fertility and huge immigration could stop population desertification of the mountain, border and agrarian regions of Serbia on the long run. Recognized limits to sustainable population development of the country will be further deteriorated if causes of spatial barriers between two sexes in the most vital ages remain. Thus, basic prerequisite for the future sustainable population development of Serbia is counterbalancing of strong regional differences; above all, between the Plains and the Mountains.

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