DEMOGRAPHIC DIMENSION OF SUSTAINABLE DEVELOPMENT OF UKRAINE

Sustainable development can be achieved with an optimal balance of demographic, economic and environmental development in a particular country or region. Population is an essential element of the social, economic and environmental spheres of any territory, so demographic sustainability should be seen as an indispensable condition for sustainable development in general. In the narrow sense, the demographic sustainability is interpreted as maintaining a constant population and characterized by indicators of population dynamics and changes in its age-old structure. In the broad sense, the demographic sustainability can be defined as an ability of a demographic sphere to maintain a stable population with optimal proportions between its age categories and a balanced social and economic structure of the society. It also means an ability to withstand external and internal factors of destabilizing the demographic situation and an ability to return to the previous balance state. The article defines the concept "demographic sustainability" and its relationship with the concept of sustainable development. The main factors of the regional dimension of demographic sustainability are outlined. The demographic sustainability of the region is considered as a result of the attractiveness of the region for education, work and human habitation. The main indicators of demographic sustainability and demographic dynamics in Ukraine are analyzed. The analysis of the age structure of the population showed a steady tendency of population aging and reduction of the absolute number of children. Along with this, the average life expectancy at birth is constantly increasing. The low total fertility rate confirms the lack of simple reproduction of the population and indicates a decrease in its population in the future. The population pyramid for 2018 clearly indicates the inevitable further decline of the country’s population and the growth of the proportion of older age groups in its structure. These processes are intensified by ongoing migratory movements, which are predominated by working-age population group.
The concept of a stable population was first introduced into the demographics by A. Lotka [2] as a separate case of the so-called “Malthusian populations”. A. Lotka stated that a stable population can be seen as a limiting condition that a territorial community with a constant mortality and birth rate is aiming for. According to modern approaches (Z. Rocca, M. Oliveira Rocca) [3], the demographic sustainability of the region should be considered in two dimensions such as demographic (qualitative) and social-economic (quantitative) one. Some other dimensions of demographic sustainability are suggested by O. Roy [4]. He considers the demographic sustainability of the territory in structural and dynamic dimensions. Structural level reflects the population ratio of the territory and the degree of its economic impact (using the Zipf regularity). Some theoretical and methodological aspects of demographic sustainability have been considered by A. Nepytaliuk [5]. He has reflected essence and value of demographic sustainability at the terms of globalization. The theoretical approaches to the definition of the mentioned category as basis of endogenous economic growth was systematized. O. Gladun and A. Romanik [6] investigated existing and forthcoming demographic tendencies in Ukraine. But demographic sustainability in the dimension of sustainable development is under-researched in relevant studies.

Key words: demographic economics, demographic sustainability, sustainable development, population structure, population pyramid, Ukraine.

Ключові слова: демографія, демографічна стійкість, стійкий розвиток, структура населення, статевобіхова піраміда населення, Україна.

### PURPOSES OF THE RESEARCH

The aim of this article is to analyze the concept “demographic sustainability” and its relationship with the concept sustainable development as well as to outline the main indicators of demographic sustainability in Ukraine.

### RESULTS OF THE RESEARCH

Theoretical aspects of demographic sustainability. According to the peculiarities of demographic dynamics (population growth or decline), countries can be conventionally divided into 3 groups. Most developed countries are at the stage of the second demographic transition that is characterized by low mortality, low birth rate and, consequently, low population growth rates (USA, UK, Germany, France, Japan, Australia). Instead, the global population growth is driven mainly by high birth rates in countries of the second group (mostly in Africa and South Asia). The third group is formed by the countries with a steady tendency of population decline (countries of Eastern and Central-Eastern Europe, including Ukraine). At the same time, there are regional differences in the demographic processes in each country.

Differences in the course of demographic processes at the national and regional levels cause the development of fundamentally different directions of demographic social and economic policies in different countries and regions. However, in all cases, it is necessary to proceed from the point of the optimal correlation between the demographic, economic and environmental spheres of a particular country or region. The key elements of this relationship are the concept of balance and sustainability of the mentioned spheres. The population is an essential element of functioning of social, economic and environmental spheres of any territory, and demographic sustainability should be considered as an indispensable condition for sustainable development in general. On the other hand, any measures are aimed at improving the life quality of population and the environment as a whole. Therefore, one of the main criteria for assessing the development sustainability of national and regional communities should be indicators of demographic sustainability, which in this case should be considered with reference to the specific territory of population, namely country, region or settlement.

On this basis, it is important to provide an understanding of demographic sustainability within the concept of sustainable development in Ukraine. The development of sustainable development involves the formation of a long-term balance of three subsystems that are environmental, economic and
sustainable development of the territory is the stabilization driven by the goals of the demographic social and economic sustainability in general or its individual elements is largely social and economic conditions. Assessment of demographic demographic structures in the corresponding historical and continuous restoration of quantitative and qualitative of the demographic sphere of the region, which ensures the distribution by sources of livelihoods, and Gini coefficient (population stratification), regional structure, population region is considered demographically sustainable if it has a potential support ratio etc.

In addition to the characteristics of economic activity, dependency, various relationships between the population of working age and retirement age (demographic load, professional structure and education, the social and economic conditions, access to services); the scientific nature of certain areas of enterprises' activity (development of specialized small enterprises, or individual entrepreneur).

In addition to the objective determinants of the demographic sustainability of the region, subjective ones are important as they are related to specific decisions by people in certain social, economic and ecological conditions.

From this point of view, the demographic sustainability of a particular region can be seen as a result of the region’s attractiveness for three important factors such as learning, work and living habits. Accordingly, it can be distinguished three so-called branches of the human life path, which determine person’s decision regarding the choice of residence [4, p. 43].

1. Educational branch is related to the need to choose a place and demanded education. There are enough educational institutions in the region that can hold their own youth and attract students from other regions (countries).
2. Labour branch is the level of salary in comparison with neighbouring regions (countries) that determines the level, direction and type of migration of able-bodied population.
3. Housing branch is connected with the choice of residence place. The availability of affordable tools for buying or renting accommodation can help to keep mostly younger categories of able-bodied population.

Demographic dynamics and demographic sustainability in Ukraine.

For Ukraine and its regions, such factors are the negative tendencies of the natural movement of the population, the migration outflow, the worsening of the life quality, the economic crisis, the military and political conflict, etc. Ukraine is the 15th in terms of population decline over the last decade (4.5%) [1, p.15]. Furthermore, UN experts predict further decline in next 30 years by almost 20% (5th place in the world).

As of January 1, 2019 the permanent population of Ukraine was accounted for 42 153.2 thousand people (disregarding the occupied Crimean peninsula). In general, during the last 5 years (2014—2018) population of the country has
One of the main indicators of demographic sustainability is the population age structure. Over the last 30 years there have been significant changes in this structure. First, reduction in the number of children has occurred — from 11.1 million in 1989 to 6.5 million in 2018. Same trend is present for the working-age population — decrease from 34.3 million to 28.7 million respectively. The absolute number of people aged 65 and older has increased from 6 to 7 million, and in 2007 the number of this age group has reached its maximum of 7.6 million. This indicates that ageing in Ukraine over the analysed period (females per 100 males) is resulting primarily from the "bottom-up" type, being the reflection of gradual (yet relatively swift) reduction in the number of children (mainly due to the decrease in the birth rate). However, the positive dynamics of the average life expectancy at birth (Table 2) against the increase in the elderly population groups indicates the so-called "top-bottom" ageing, which occurs from decline of mortality of the elderly with simultaneous relatively slow increase in the number of children.

Another indicator of demographic sustainability is the overall fertility rate, calculated as the average number of children per woman. Since 1989, this indicator has begun to sharply decline — from 1.94 in 1989 to as low as 1.12 in 2000 (Table 2). In the following years there was a gradual increase in the total fertility rate, however, the fluctuation of this indicator within the range of 1.21—1.31 points to an aforementioned further decrease in the proportion of children in relation to other age groups. In general, over the 30 years, the number of children per 100 population aged 65+ has decreased almost twofold — from 184 to 94.

Significant differences in demographic sustainability exist between urban and rural areas. Depopulation of Ukrainian rural areas in most regions began in the 80’s, as decreased by 919.2 thousand people (or 2.0%), yet altogether with the population lost to Russia the number increases to 3.27 million (or 7.2%). Analysis of this indicator since 1989 indicates its rapid decline up to year 2010, and the slowdown in the rates of decline during the 2011—2014. However, the annexation of the Crimea and military occupation of the eastern regions of the country have drastically influenced the decline, weakened the conditions for natural reproduction of the population and provoked migratory processed from eastern regions to the rest of the country and abroad.

The main cause of the short-term decrease in the total fertility rate in 2015—2016 is related to temporary migration of the population of the occupied Autonomous Republic of Crimea, same concerns all of calculated indicators.

Table 2. Indicators of demographic sustainability in Ukraine

| Indicators | 1989 | 1995 | 2000 | 2005 | 2010 | 2015 | 2018 |
|------------|------|------|------|------|------|------|------|
| Population (total), thousands | 51,452.0 | 51,300.4 | 49,115.0 | 47,100.5 | 45,782.6 | 42,759.7 | 42,216.8 |
| Age structure | population aged 0-14, % | 21.6 | 20.5 | 17.9 | 14.8 | 14.2 | 15.1 | 15.5 |
| | population aged 15-64, % | 66.7 | 65.9 | 68.2 | 68.9 | 70.2 | 69.3 | 68.0 |
| | population aged 65+, % | 11.7 | 13.6 | 13.9 | 16.0 | 15.6 | 15.6 | 16.5 |
| Total fertility rate (per one female) | | 1.94 | 1.40 | 1.12 | 1.21 | 1.45 | 1.51 | 1.37 |
| Population 0-14 per 100 people aged 65+ | | 184 | 151 | 129 | 93 | 90 | 97 | 94 |
| Demographic dependency on population aged 15-64 (per 1000 people) | | 499 | 517 | 465 | 445 | 425 | 443 | 470 |
| | population aged 65+ | | 176 | 206 | 203 | 230 | 223 | 225 | 243 |
| Potential support ratio | | 5.7 | 4.9 | 4.9 | 4.3 | 4.5 | 4.4 | 4.1 |
| Average age, years | | 36.5 | 37.2 | 38.4 | 39.5 | 40.2 | 40.7 | 41.3 |
| Sex ratio of the population aged 65+ (females per 100 males) | | 241 | 215 | 204 | 194 | 200 | 201 | 198 |
| Average life expectancy at birth, years | | male | 65.6 | 61.2 | 62.1 | 62.2 | 65.3 | 66.4 | 67.0 |
| | female | 74.8 | 72.5 | 73.5 | 74.0 | 75.5 | 76.3 | 76.8 |

1 Here and throughout the article all the demographic data presented in the text (unless mentioned otherwise) is based on the official website of the State Statistics Service of Ukraine and the government portal "Population of Ukraine" maintained by the State Statistics Service of Ukraine. All of the national level data after 2014 is presented without the input from temporarily occupied Autonomous Republic of Crimea, same concerns all of calculated indicators.

2 Excluding data from Autonomous Republic of Crimea due to unavailability.

3 Excluding data from Autonomous Republic of Crimea due to unavailability.

Source: developed by the second author based on data from the "Population of Ukraine" portal (State Statistics Service of Ukraine).

Figure 1. Population pyramids for Ukraine in 1989

Source: developed by the second author based on data from the "Population of Ukraine" portal (State Statistics Service of Ukraine).

there was a steady outflow of rural youth to the urban areas, gradually resulting in increasing differences in the proportion of elderly people in cities and villages, which for a long time was quite high — 7.1—7.3% during 1989—1998. Later on a steady approximation of this indicator occurred with its simultaneous growth for both rural and urban population. As the rates of such growth in cities were higher, by 2018 the difference between the population shares at the age of 65+ was only 1.3%. The population aged 65+ in cities and villages of Ukraine has increased significantly over the past 30 years — by 6.7% and 0.9% respectively.

Changes in the age structure of the Ukrainian population can be well illustrated by the pyramids of the age sex. Figure 1 shows that by 1989 there was a stable birth...
have distinctive demographic dynamics (population growth being 1.13 years shorter from urban. Males' average life expectancy equaled 65.5 years and was 2.35 years shorter from urban. Case of females and for 17 years in case of males. As of 2017 rural males' average life expectancy equaled 65.5 years being 1.13 years shorter from urban. Breakdown of this indicator into urban and rural population shows wide margins between these types of residents, which have been growing in the past 13 years in case of females and for 17 years in case of males. As of 2017 rural males' average life expectancy equaled 65.5 years and was 2.35 years shorter from urban residents, while in case of females in rural areas the same indicator equaled 76 years being 1.13 years shorter from urban.

Another indicator of demographic sustainability is the average life expectancy at birth. This indicator has been dropping in case of males from 65.6 years in 1989 to 62.1 years in 2000, yet later regained the primary level and even exceeded it in the 2018 with the value of 67.0 years. Similar with the female indicator observed at the level of 74.8 years in 1989 and later characterized by a softer decline followed by a quicker upward dynamic from mid-90ies reaching 76.8 years in 2018. Yet breakdown of this indicator into urban and rural population shows wide margins between these types of residents, which have been growing in the past 13 years in case of females and for 17 years in case of males. As of 2017 rural males' average life expectancy equaled 65.5 years and was 2.35 years shorter from urban residents, while in case of females in rural areas the same indicator equaled 76 years being 1.13 years shorter from urban.

CONCLUSIONS

Demographic policy is an important component of the UN Sustainable Development Goals. Countries in the world have distinctive demographic dynamics (population growth or decline), but in all cases, one must start from a sustainable reproduction of the demographic, economic and environmental spheres of a particular country or region. In the narrow sense, demographic sustainability is interpreted as maintaining a constant population, which is ensured by its simple reproduction (as a separate case of the so-called "Malthusian population"). In a broad sense, demographic sustainability can be defined as the ability of a demographic to maintain a stable population with optimal proportions between its age categories and a balanced socio-economic structure of society. At the same time, "sustainability" also means the ability to withstand external factors destabilizing the demographic situation and the ability to return to the previous equilibrium. Indicators of demographic sustainability are quantitative (natural and mechanical population movement, age structure, marital and family structure of the population, life expectancy, demographic load, different relationships between the population of working age, working age and retirement age) and qualitative parameters (socio-economic structure and religious composition, social structure, regional structure, distribution of population by livelihoods, Gini coefficient). Additional demographic sustainability factors related to human life cycles, such as study, work and living, are taking place at the regional level.

Analysis of demographic processes in Ukraine during the past 30 years indicates a steady trend towards ageing, which from the demographic point of view is the process in which the share of elderly people in the total population is increasing. Duration of such changes in reproduction of population is playing a key role, and in case of Ukraine these changes are evidently having a long-term effect. The population pyramid for 2018 clearly indicates the inevitable further decline of the country's population and the growth of the proportion of older age groups in its structure. These processes are intensified by ongoing migratory movements (mainly from rural areas to cities or from rural and urban areas abroad), which are predominated by working-age population group.

The long going process of depopulation is causing the intensification of demographic researches in Ukraine, which allow outlining of new challenges for economic and social development. Permanent natural population began its swift decline at the nineties of the twentieth century and was a reflection of two steady trends: a sharp drop in birth rate and a relatively slower increase in mortality rate, caused by the population's age structure (high share of people aged 65 and over). From the beginning of the XX century and until now depopulation is being intensified by strong migration processes, which reflect different vectors and
characteristics. Due to such development of the demographic situation in Ukraine over the past three decades, the age structure of the nation's population has become substantially deformed.

Thus, research into the components of demographic sustainability demonstrates the complexity and diversity of this concept and its prominent role in achieving the Sustainable Development Goals. Nowadays, this is enhanced by the increase in the mobility of the population, the formation of new forms of employment, including virtual one. In addition, the trends of the last decades make the priority to prevent depopulation of certain regions of Ukraine and to develop effective measures to ensure their demographic sustainability.

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