SECTION 14.
SOCIOLOGY AND STATISTICS

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DEMOGRAPHIC BURDEN CHANGES FORECASTING IN UKRAINE

The population of working age is predominantly economically active. It carries a demographic burden from two other groups of population: children and persons older than working age. An increase in the demographic burden means that the state must bear large costs to support and provide social services needed by children and the elderly.

In addition to the term "demographic burden", various publications also use the terms "age dependency" or "dependency ratio", which have the same meaning. For example, "the dependency ratio relates the number of children (0-14 years old) and older persons (65 years or over) to the working-age population (15-64 years old)". [1] The magnitude of the demographic burden in a particular country can be ascribed to a combination of factors that have been in the past: the birth rate, the population of reproductive age, the mortality rate of people of different ages, and migration processes.

The dependency ratio feature is as follows: the greater the demographic burden caused by the young population (the so-called "youth dependency ratio"), the better the country's potential for future labor force replenishment. The increased demographic burden caused by the older population (the so-called "old-age dependency ratio") means additional costs for the maintenance of these people. It is advisable to consider the youth dependency ratio (hereinafter referred to as YDR) and the old-age dependency ratio (hereinafter referred to as OADR) separately. Due to the inertia of demographic processes, changes in the demographic burden occur gradually. However, current processes caused by increased mortality from the coronavirus disease pandemic, increased labor mobility, forced migration due to military conflicts, and other factors are causing more rapid changes in the demographic burden. To make reasonable decisions regarding social and economic development, it is necessary to rely on the analysis of trends in demographic burden changes and the results of its forecasting for the future.

Official statistical data and scientific publications concerning the analysis of the population structure are used for forecasting. Calculations are performed according to the method based on the analysis of the population change factor [2].

Trends in demographic burden in Ukraine are determined by data on the number of relevant age groups in the past. Data on the population of three age groups (children, population of working age, and people over this age) in Ukraine are summarized in Table 1.

Table 1

The number of three age groups of the population in Ukraine for the period 2001-2021 (with an interval of 5 years), thousand people

Age groups	Years				
	2001	2006	2011	2016	2021
Under 15 years old	8,053.8	6,702.1	6,562.9	6,494.3	6,279.8
15-64 years old	33,696.2	32,576.9	31,985.4	29,327.7	27,927.7
65 years or over	6,912.4	7,508.8	7,157.8	6,768.9	7,211.2
Total	48,662.4	46,787.8	45,706.1	42,590.9	41,418.7

Source: summarized as per the State Statistics Service of Ukraine

A negative trend is a decrease in the share of the young population under the age of 15 years. This is a threatening phenomenon regarding population reproduction and the future replenishment of the working population cohort in Ukraine.

Based on the generalized data, YDR (caused by the young population 0-14 years old), OADR (caused by the population 65 years or over), and the total demographic burden per 1000 people of working age (15-64 full years old) were determined. The results are shown in Fig. 1.

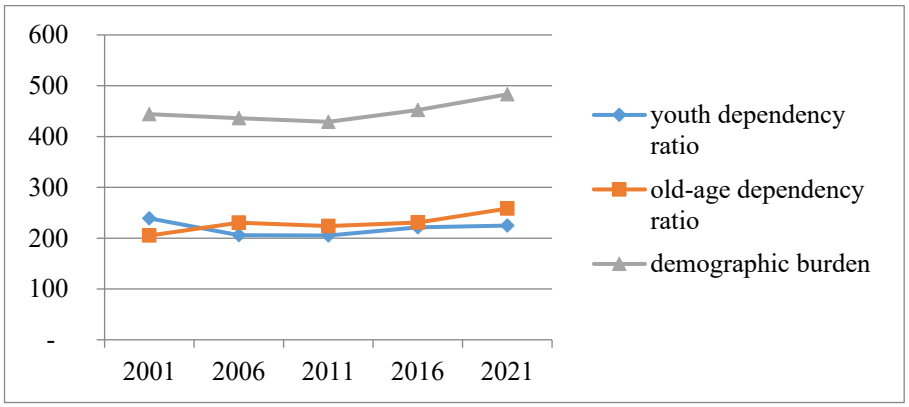

Fig. 1. **The calculations results of the demographic burden in Ukraine, people per 1000 people of working age**

The total demographic burden in Ukraine has increased from 444 per 1,000 working-age people in 2001 to 483 per 1,000 working-age people in 2021. Similar calculations were performed separately for the population living in cities and rural areas. The generalized calculations results as of 2021 are given in Table 2.

Table 2

Demographic burden in Ukraine as of 2021, in particular, urban and rural population (per 1000 people of working age)

Demographic burden	Population geography		
	Total	Urban	Rural
YDR	225	213	253
OADR	258	255	265
Total demographic burden	**483**	**468**	**518**

Source: calculated by the author

In Ukraine, YDR in rural areas is significantly higher than in urban areas. This can be explained by the relatively higher birth rate of the rural population. In both urban and rural areas, OADR is higher than YDR, which is due to a generally low past birth rate and, accordingly, a small number of children under the age of 15 years.

Forecast calculations cover the analysis of changes in the number of age groups. The change factors are determined by the population ratio in adjacent 5-year cohorts. If the factor value for a given age group is less than 1, it indicates a decrease in its number, and if the factor value is more than 1, it means an increase in the number. The population forecast in the first age group (0-4 full years old) considers the change in the population of reproductive age.

Based on the obtained values of the population change factors, the forecast population is calculated in each age group for 5 years, starting from the second. To do this, the population of the previous age cohort 5 years ago is multiplied by the change factor in the number of this age cohort. The population forecast in the first age group (0-4 full years old) considers the change in the population of the most reproductive age. The forecast results obtained make it possible to

calculate the expected changes in the demographic burden in Ukraine (Table 3).

Table 3

Current state and forecast changes for a 10-year period of the age structure of the population and demographic burden in Ukraine, in particular for cities and rural areas

Indicators	Country in total			Cities			Rural areas		
	2021	2026	2031	2021	2026	2031	2021	2026	2031
Population share aged under 15 years old	15.2%	13.8%	11.7%	14.5%	13.0%	10.8%	16.7%	15.7%	13.8%
Population share aged 15-64 years old	67.4%	67.8%	67.7%	68.1%	68.2%	68.0%	65.8%	66.8%	67.0%
Population share 65 years or over	17.4%	18.4%	20.6%	17.4%	18.8%	21.2%	17.5%	17.5%	19.2%
Demographic burden, per 1000 persons of working age	483	475	476	468	466	470	518	498	492

Source: calculated by the author

In Ukraine, as a whole, the demographic burden will slightly decrease (from 483 in 2021 to 476 in 2031). In particular, for the rural population (from 518 in 2021 to 492 in 2031), and the urban population the demographic burden will practically not change; it will amount to no more than 470 per 1,000 people of working age. Changes in the demographic burden will be driven by a decrease in the share of young people (aged under 15) and an increase in the share of old people aged 65 years or over) in both urban and rural areas.

The direction of further research will be forecasting changes in the structure of the population of Ukraine caused by the forced migration of a part of the Ukrainian population to other countries, including Poland, connected with the military aggression of the Russian Federation against Ukraine.

References:

1. DESA. (2007) Dependency Ratio. *The United Nations Department of Economic and Social Affairs.* https://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/demographics/dependency_ratio.pdf.
2. Matviishyn, Ye. & Dziurakh, Yu. (2021) Forecasting Demographic Changes on Rural Areas in the Regions of Ukraine. *Agrarian Economy*, 14(1-2), 91-102. https://doi.org/10.31734/agrarecon2021.01-02.091.