DEMOGRAPHIC CHANGE IN ROMANIA - PAST AND FUTURE

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Abstract: *Assuming that demographic evolutions differ between regions and counties of the country, this study aimed at determining the demographic change in these levels during 1990-2030, using a methodology developed in a European study. The main results show rates of aging and population decrease between counties and between different regions of the country in the past, in the future, as well as between the previous and next period. One of the most affected districts in terms of aging and reducing the number of people has been and will be Tulcea County. The extent and type of demographic changes measured in this paper for each county/region together with analyses of factors that may influence demographic evolutions such as fertility, mortality, migration can form a basis of information for health service planning.*

Cuvinte cheie: *schimbare demografică, regiuni de dezvoltare, judeţe, România*

Rezumat: *Pornind de la ipoteza că evoluţiile demografice diferă între regiunile şi judeţele ţării, prezentul studiu şi-a propus să determine schimbarea demografică la aceste nivele în perioada 1990-2030, folosind o metodologie dezvoltată într-un studiu realizat la nivel european. Principalele rezultate arată ritmuri de îmbătrânire şi scădere a populaţiei diferite între judeţele şi între regiunile de dezvoltare ale ţării în trecut, în viitor, precum şi între perioada anterioară şi cea următoare. Unul dintre cele mai afectate judeţe din punct de vedere al îmbătrânirii şi reducerii numerice a populaţiei a fost şi va fi judeţul Tulcea. Amploarea şi tipul schimbărilor demografice cuantificate pentru fiecare judeţ/regiune de dezvoltare alături de analize ale unor factori care pot influenţa evoluţiile demografice precum fertilitatea, mortalitatea, migraţia vor putea constitui o bază solidă de informaţie pentru planificarea serviciilor sanitare.*

INTRODUCTION

According to publications and data provided by specialized national and international institutions, the population of Romania is in an accentuated process of demographic aging

In this perspective, demographic changes in different areas should be a topic of strategic interest in various sectors, one of these being the health field.

To meet the risks and also to benefit from these changes, health authorities, service providers need information reliable scientifically, easily accessible, that responds to the objectives pursued by them.

By mapping the demographic changes in regional and county level, this study provides a useful tool to inform decision-makers to meet these requirements and will help integrate these changes in strategic long health planning.

METHODS

For the conceptualization and quantification of demographic change in the counties and regions in the country there was used a methodology developed in a European study conducted by the Rostock Centre for the Study of Demographic Change and econsense initiative.(1)

Thus, demographic change, a two-dimensional concept, was expressed as an index that takes into account two dimensions: aging and reducing population. The aging was determined by calculating the average age of the population, and the reduction of the population was assessed by changing its density.

Indicators were calculated and studied for all counties and development regions in 1990, 2011, 2030 and for the periods 1990-2011, 2011-2030.

Estimation of average age and population density for the period 2011-2030, which were the basis for the calculation of aggregate indicators, was done using the "trend" function of the operating program Excel.

Data sources for calculating the indicators were the Statistical Yearbooks (2-9) and Health Statistics Yearbook (10-23) developed by the National Institute of Statistics and Ministry of Health, respectively.

Based on the average age of the population and its density population aging and reduction was calculated in absolute terms for each area (county or region) and on both the time periods*: the absolute aging* was calculated as the difference in years between the average age at the end and the beginning of a period and *the absolute reduction* in the population was defined as the negative of the percentage rate of change in population density.

The magnitude and pattern of demographic changes were emphasized by *the zonal demographic change index* (ZDC index), respectively, by *the zonal demographic change type* (ZDC Type*).*

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The zonal demographic change index captures the absolute demographic change by summing two dimensions, aging and reduction population, while the zonal demographic change type indicates whether an area (county or region) is aging faster or slower and increases or even decreases slightly compared to the national average, expressing the relative demographic change.

For simultaneous comparisons between periods and areas, the demographic change index is based on average annual indicators rescaled for aging and population reduction.

It is defined over the interval [0,1]; values very close to 0 (1) will only occur if an area simultaneously displays extremely low (high) ageing and reduction as compared to all areas. An index value around 0.5 may result from both fast ageing and growth/low reduction of population, from slow aging and high population decline or from a moderate ageing and reduction of population.

Based on average annual standardized indicators in order to determine the relative aging and reduction of the population, the counties and regions of the country were classified in each of the two periods considered, into four types:

I: Shrinking /lower growth, faster ageing (Quadrant/Type I)

II: Shrinking/lower growth, slower ageing (Quadrant/Type II)

III: Higher growth, slower ageing (Quadrant/Type III)

IV: Higher growth, faster ageing (Quadrant/Type IV)

as compared to the average at national level in the given time period.

Index and type of the zonal demographic change as well was indicators that formed the basis for their calculation were calculated for all counties and regions of Romania. Reference periods were 1990-2011 (past trend), 2011-2030 (future trend).

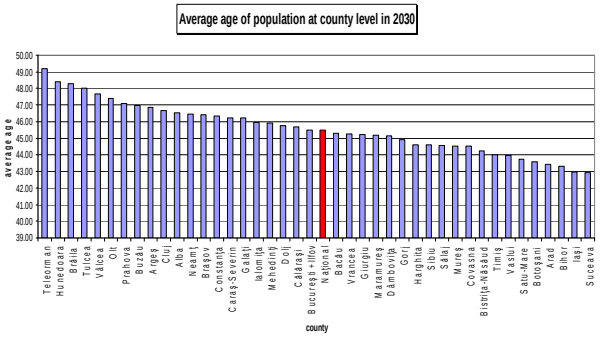
RESULTS AND DISCUSSIONS

Ageing took place in all counties during 1990-2011, the county where the average age was most increased being Tulcea County (7 years). Arad County registered the lowest increase in the average age, of 2.89 years.

Absolute aging during this period was 5.24 years at national level.

According to predictions, the highest average age in 2030 will be recorded in the County of Teleorman (49.19 years) and lowest will be in Suceava, 42.93 years (figure no. 1).

Figure no. 1. Average age of population at county level in 2030



The oldest region among development regions will be the South-East in this year, with a mean age of 46.63 years, while the youngest region is North-East where population average age will be of 44.13 years.

The county with the highest average annual rate of aging will be Tulcea (0.36 years), 1.5 times higher than the national average of aging, followed by Constanţa and Hunedoara (0.32 years) and the county with the lowest average rate of aging (2.3 times lower than the national average aging) will be Arad (0.10 years).

Romania's population density declined in 2011 compared to 1990 by 7.7 inhab/km^2. Both in 1990 and in 2011, the highest density of population was reached in Bucharest-Ilfov, Prahova followed and the lowest density which was recorded in Tulcea County. In the period 1990-2011, in all counties, population density decreased, less in Suceava and Iaşi, where it had a slight increase.

In this period, the speed reduction in population expressed as an average annual rate of reduction was high (greater than 0.7%) in Hunedoara, Teleorman and Caraş-Severin. Very low rates of population decrease (less than 0.15%) were in counties such as Bacău, Gorj.

Population density values in the counties in the three reference years: 1990, 2011 and 2030 show mthat apart from Iaşi County, where the density increased in 2011 compared to 1990 and it will increase in 2030 compared to 2011, and Suceava where the density varies least among the three years, in all other counties the population density in 2030 will be lower than in 2011 and 1990.

In 2030, the lowest population density will be in the West region (50, 94 inhab/km^2), while the highest density after Bucharest-Ilfov will be in the North-East (98.35 inhab/km^2).

It is noteworthy the situation of Tulcea County that will pass from absolute decrease of 9.89% in the period 1990-2011 to 16.40% absolute decrease in the 2011-2030 period. Average annual rate of population decline in this county will increase more than 80% compared with 1990-2011. Population will be much reduced compared to the period 1990-2011 in counties such as Constanţa, Cluj and Bucharest-Ilfov (average of the rates of decline in population will increase by over 50% from the previous interval). A particular situation occurs in Suceava where negative annual average rates will be positive, which means a slight increase in the population of the county in the 2011-2030 period, after a reduction of population decline in the previous period.

The average rate of annual decrease of population in the future will be higher in the western and central regions (above 0.60%) and lowest in the North-East region (below 0.30%), the other having a medium speed of decrease.

In the past period between 1990 and 2011, seven counties had significant demographic change (demographic change index was very high, between 0.80-1), namely: Hunedoara, Braşov, Tulcea, Brăila, Olt, Alba, Sibiu.

Hunedoara County had in this period both the average annual rate of aging very large (values rescaled 1) and the average annual rate of population reduction high (rescaled values of 1), in Braşov, Sibiu, Olt, Alba major demographic change was driven primarily by reduction population, while in Tulcea and Brăila it took place mainly due to a rapidly aging population.

The region with the largest index of demographic change in the period 1990-2011 was the Centre region (0.83). Both population aging and reduction were important. The smallest absolute demographic change occurred in the Bucharest-Ilfov.

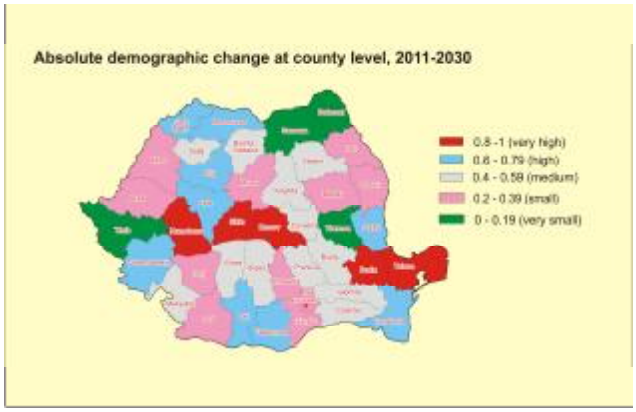
Demographic change absolute in all counties shown in figure no. 2 shows a great diversity in the next period.

It can be seen that between 2011-2030, demographic change will be major in five counties: Braşov, Hunedoara, Tulcea, Brăila and Sibiu.

In three of these, namely Braşov, Hunedoara, Tulcea demographic change index will be maximum

(1), being determined by the average annual high rate of aging and reduction, in Brăila the population aging will be accentuated (extreme annual rates of aging), while in Sibiu, demographic change will be due primarily to reducing the number of population.

Figure no. 2. Absolute demographic change at county level, 2011-2030

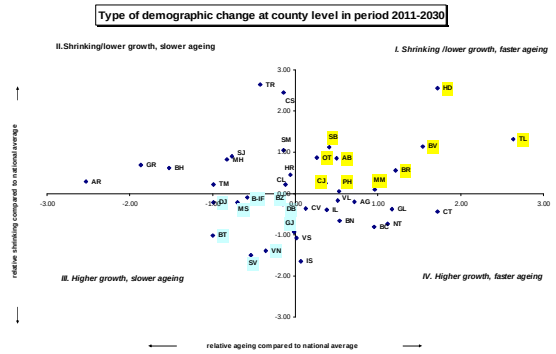


At the regional level, in period 2011-2030, major demographic change will be in the Centre Region, where demographic change index will be 0.86, and small demographic change will be registered in South-West, North-East and Bucharest-Ilfov, where demographic change will have lower index. Type of population demographic change is illustrated by a matrix showing the relative aging on the horizontal axis and the relative reduction of the population on the vertical axis. Origin axes corresponding national average.

Assessment of type of demographic change in counties and regions in the country in the period 1990-2011 shows that 12 of the counties (Teleorman, Hunedoara, Sibiu, Braşov, Olt, Alba, Harghita, Brăila, Buzău, Prahova, Maramureş and Tulcea) and two regions (Centre and South-Muntenia) had a more rapid aging population and significant reduction compared to the national level.

In the next period, ten counties will have great demographic change (type I) compared to the national level (see figure no. 3). Of these, Hunedoara, Braşov and Tulcea counties will have also very high demographic change index. While in Hunedoara, population reduction is stronger, in Tulcea aging will be faster than the national average.

Figure no. 3. Type of demographic change at county level between 2011-2013



Higher population growth accompanied by slower aging population (type III) compared to the national average will be in nine of counties. Of these, the largest population growth compared to the national average will have Suceava and the slowest aging will occur in the county of Botoşani, where also absolute demographic change suggested by demographic change index value during this period will be 0.

One of the eight regions that will experience a sharp decline in population and a rapidly aging compared to the national level will be the Centre region.

CONCLUSIONS

The population of all counties and development regions has been and will continue to be affected by aging, but in the different rhythms and degrees. The general trend of population decline will continue in the next period for all counties, less Iaşi. The number of regions that will have a great absolute decrease of population will increase to four: Sud Muntenia and North-West will join the Centre and West regions, which had large decreases in the past and will still maintain until 2030. There will be such counties with major, moderate and weak demographic change, specific and similar patterns between them, but also differences between neighbouring counties. In this perspective, developed demographic profiles together with the analysis of fertility, mortality, migration and structure by age groups in each county / region, factors known that may affect the extent of demographic change, will constitute a solid and complex basis of information, useful for the planning health services.

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