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THE LEVEL AND DYNAMICS OF POPULATION AGEING PROCESS ON THE EXAMPLE OF DEMOGRAPHIC SITUATION IN EUROPE

ABSTRACT. The aim of this study was to present the level of demographic ageing in European countries and to show the pace of this process in the years 1989–2001, and to attempt an assessment of hazard of demographic ageing. Several alternative formal solutions have therefore been proposed in this place, and a simple assessment provided of the hazard of demographic ageing in particular countries. It confirmed the quick ageing of the population in the Mediterranean Basin, and on the other hand the reduction in the ageing of the Scandinavian societies, which were first to achieve a high level of ageing.

KEY WORDS: demographic ageing, the ageing index, the burden index, typology of ageing.

One of the significant social problems in the world concerns the issue of population ageing in particular countries. The issue, recently often mentioned in scientific works, is discussed in many economic, demographic and social aspects. First attempts to define a criterion for assessing the age of societies were made in the late 19th century by Sundbärg (1894; 1900). Later significant analyses in this respect also included the studies by inter alia Souvay (1948; 1956), Rosset (1959), Veyret-Verner (1959), Clarke (1965) or Beaujeu-Garnier (1966).

The present achievements related to the issue can be classified into two categories. The first one refers to the ageing of societies from the point of view of demographic structures – the works of Bartiaux (1991), Molinie (1992), Pa-

rant (1992), and Długosz (1996; 1998); the other – to the socio-economic implications of this process – covered in the works of: Cain (1991), Dharmalingam (1994), Gonnot, Prinz, Keilman (1995), Toutian (1997), Glaser, Grundy (1998).

The first group of works is dominated by studies referring to the advancement of demographic ageing, while less space is devoted to the methodology of the dynamics of this process. Therefore, the aim of this study was more methodological approach and not only to present the level of demographic ageing, but also to show the pace of this process in the years 1989–2001, and to attempt the typology in the perspective to the year 2025. Several alternative formal solutions have therefore been proposed in this place, and a simple assessment provided of the hazard of demographic ageing in particular countries in Europe. For the first cross-section studied, the data comes from the Demographic Yearbook, while the second uses the data from the Population Reference Bureau.

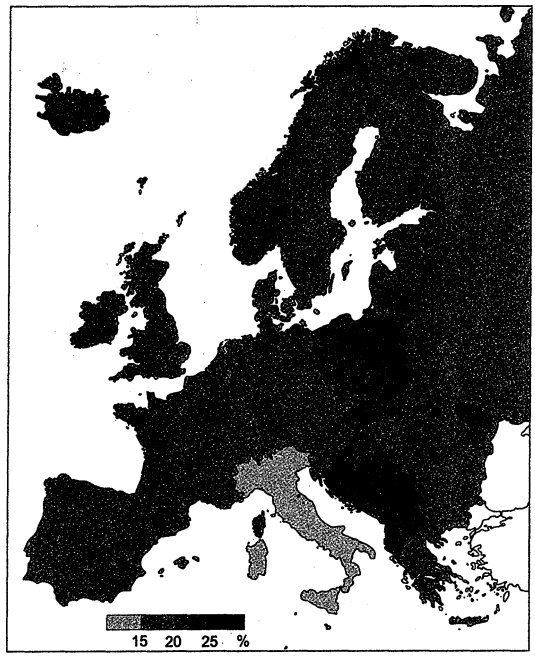

Fig. 1. The percentage of population aged 0–14 in 2001

The age structure of a society of each country is a result of demographic conditions and the socio-economic situation, which have a direct impact on the natural growth and migrations of the population. Therefore, they shape the demographic image of modern Europe. Thus, after the political transformations of the continent at the turn of the 1990s, countries at various stages of demographic transformations have entered the 21st century with varied population struc-

tures and with different impetus of transformations in this respect. Trends referring to the birth rate, mortality and foreign immigration, which have lasted for fifty years, with the changeable average life span, conflicts in the Balkan states, have made a significant impact on particular European countries.

Therefore, what is the situation and the pace of such changes at the turn of the century. An attempt has been made to show the situation using widely adopted measures. In order to define the young age (or, by reverse, the old age) of the population, first the percentage of children aged 0–14 was considered, as well as the dynamics of its changes within the last twelve years. As it can be seen (Fig. 1), definitely the largest share of population in this age group in 2001 was observed in Albania (33%), while the lowest share – in Italy (14%). As concerns the changes in this respect in the years 1989–2001 (Fig. 2), the increase in the share of the youngest group of society was recorded in Denmark, Holland, Monaco, Switzerland and Norway, while the highest drop was noted in Bosnia, Czech Republic and Moldavia. In this period, the population remained on the same level in Croatia, France, Germany, United Kingdom and Italy.

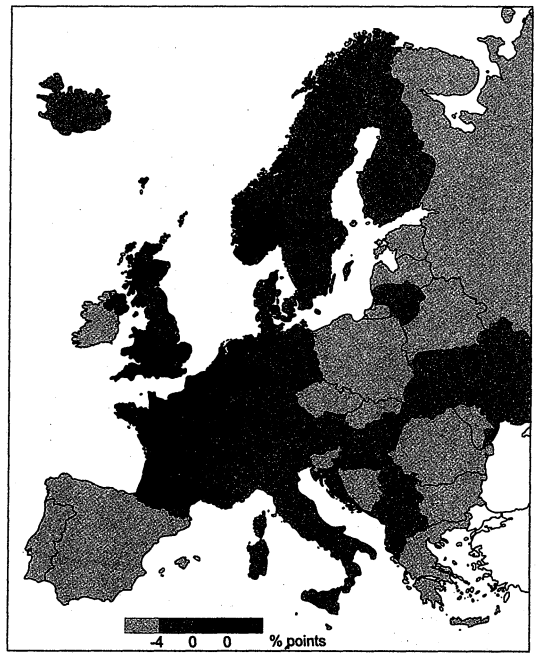

Fig. 2. Changes in the percentage of population aged 0–14 in the years 1989–2001

A different spatial layout was recorded for population aged above 65 (Fig. 3) and the changes in this respect.

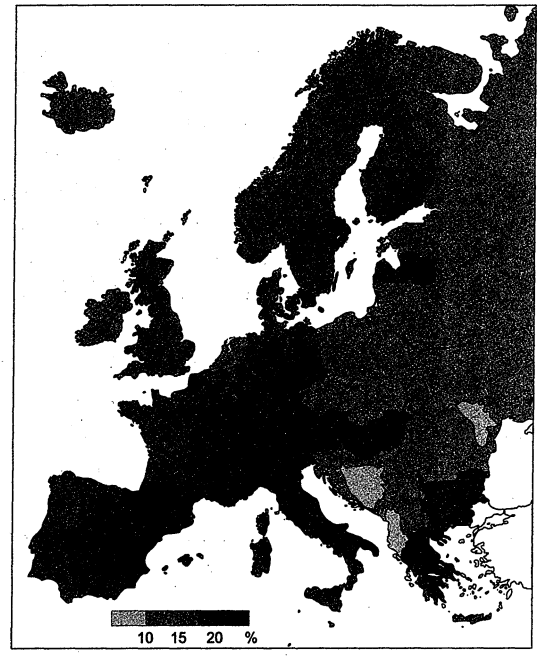

Fig. 3. The percentage of population aged above 65 in 2001

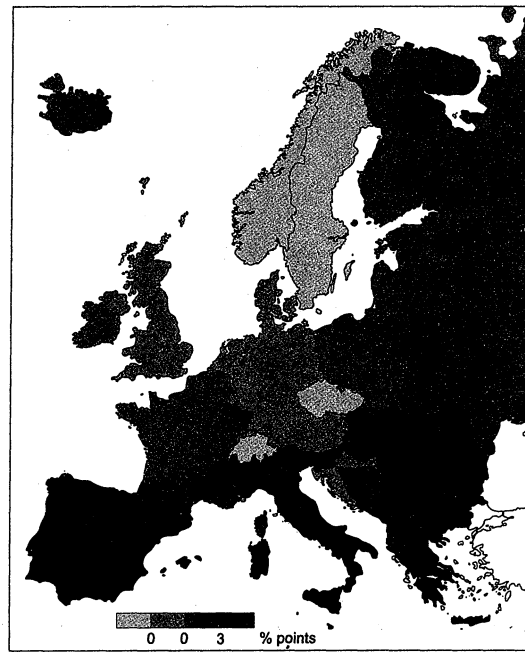

Fig. 4. Changes in the percentage of population aged above 65 in the years 1989–2001

The largest share of this age group in 2001 was noted in Monaco (23%), while the smallest in Albania (6%), Bosnia and Herzegovina (8%) and Moldavia (9%). As concerns the dynamics of changes of the percentage of people defined as old (Fig. 4), the relatively highest increase in their share was observed in Spain, while a drop was recorded in this period in Czech Republic, Norway, Switzerland and Sweden.

In order to define the level of ageing and the dynamics of the process, so that the issue can be better illustrated, another measure is used. This involved applying the index of burdening the young population (aged 0–14) with the older population (aged >65), and thus the measure also accounted for the relationship between these two age groups (Fig. 5). The pace of the investigated process can be also estimated by counting the changes between the two analysed periods of time.

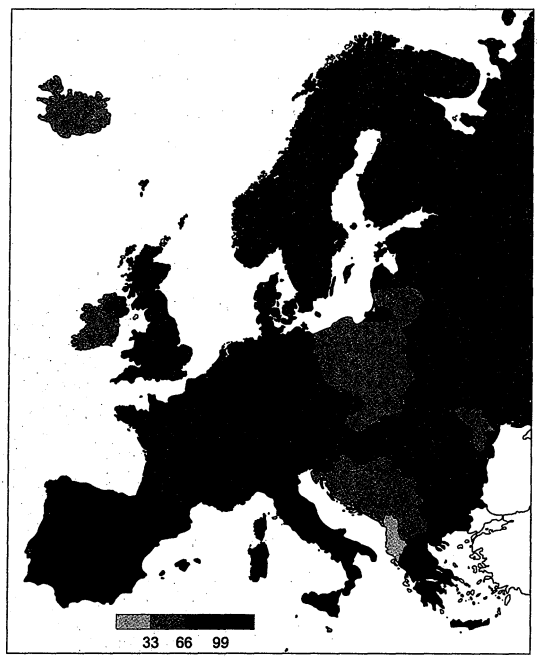

Fig. 5. The index of burdening the young population (aged 0–14) with the older population (aged above 65) in 2001

Changes in the share of the young and old population that have occurred in the analysed period of time can be synthetically defined using the ageing index, which indicates the differences in the percentage share of the youngest and the oldest group in the period studied, and the balance of such differences is a measurable value, illustrating the process of population ageing.

$$W_{SD} = [U(0–14)t - U(0–14)t+n] + [U(>65)t+n - U(>65)t]$$

where:

W_{SD} – ageing index,

U(0–14)t – share of population aged 0–14 at the beginning of the period studied,

U(0–14)t+n – share of population aged 0–14 at the end of the period studied,

U(>65)t+n – share of population aged 65 and more at the end of the period studied,

U(>65)t – share of population aged 65 and more at the beginning of the period studied.

As results from the spatial layout of the population ageing index in the years 1989–2001 (Fig. 6), the process had the highest impact in Bosnia and Herzegovina, while the population became younger in Denmark, Monaco, Switzerland and Sweden. No changes were recorded at this time in Croatia, Holland, Liechtenstein, Luxemburg, Germany and United Kingdom.

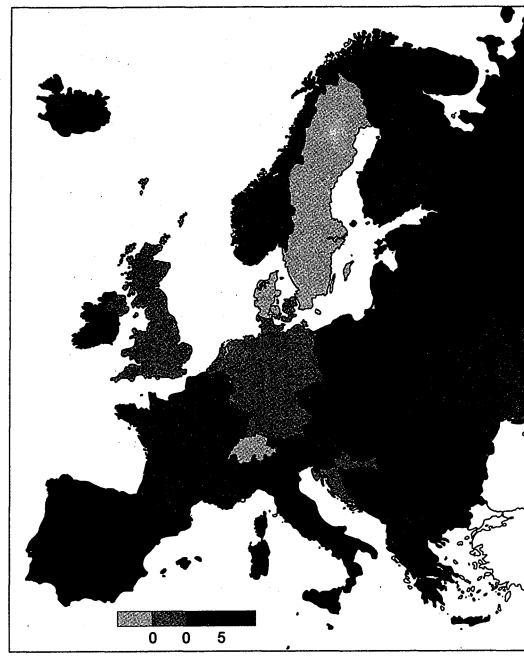

Fig. 6. Population ageing index W_{SD} in the years 1989–2001

As a graphic solution to the value of the population ageing index (Wsd), showing the mutual relationships between the changes in the share of population in the age groups of 0–14 and >65, one can apply a modified system devised by J.W. Webb used for assessment of the components of the actual population movements. In this case (Fig. 7), the ordinate axis presents the values of changes in the percentage of population aged 0–14, while the abscissa presents the values of changes in the percentage of population aged 65 and more. The additional introduction of diagonals to the system, allowed for a more precise definition of the dependencies between the value of changes in the shares of these two age groups. By setting the points corresponding to the mutual relations of the changes in the adopted age groups in the coordinate system, it is possible to define the type of the population studied. The characteristics of eight theoretical types (A–H) can be synthetically presented in the following way:

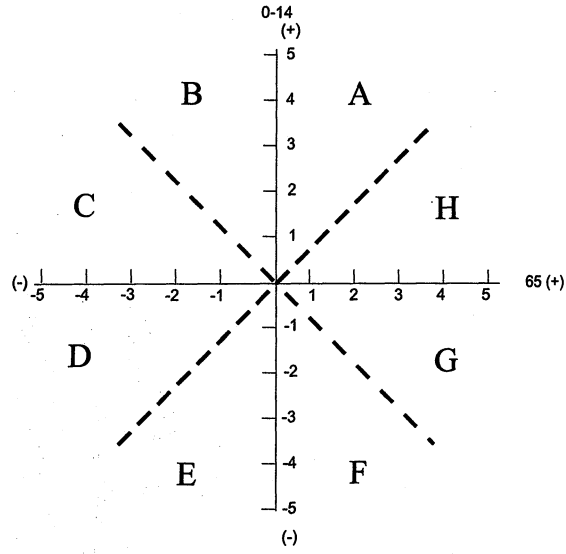

Fig. 7. Theoretical types of the mutual relations of the changes in the shares of population aged 0–14 and above 65

type A – society becoming younger due to the domination of an increase in the share of population aged 0–14 over the increase in the share of population aged >65;
type B – society becoming younger due to the decrease in the share of population aged >65 and an even higher increase in the share of population aged 0–14;
type C – society becoming younger due to the increase in the share of population aged 0–14 and an even higher drop of the share of population aged >65;
type D – society becoming younger due to the domination of the increase in the share of population aged >65 over the decline in the share of population aged 0–14;

type E – ageing of society due to domination of the drop of the share of population aged 0–14 over the drop in the share of population aged >65;
type F – ageing of society due to the increase in the share of population aged >65 and an even higher drop in the share of population aged 0–14;
type G – ageing of society due to the drop in the share of population aged 0–14 and an even higher increase in the share of population aged >65;
type H – ageing of society due to domination of the increase in the share of population aged >65 over the increase in the share of population aged 0–14.

An attempt was made to assess the hazard of demographic ageing in European conditions taking into account the state and tendencies of the process. For this purpose, typological matrices were used (Table 1), in which the earlier adopted most representative measures were juxtaposed, i.e. the burden index (Isd) in the year 2001 and the ageing index (W_{sd}) for the period 1989–2001.

Table 1. The matrice of the hazard of demographic ageing for European countries

I_{SD} \ W_{SD}	decrease (< 0)	stagnation (= 0)	increase (> 0)
< 33	I	II	III
33–66	IV	V	VI
> 66	VII	VIII	IX

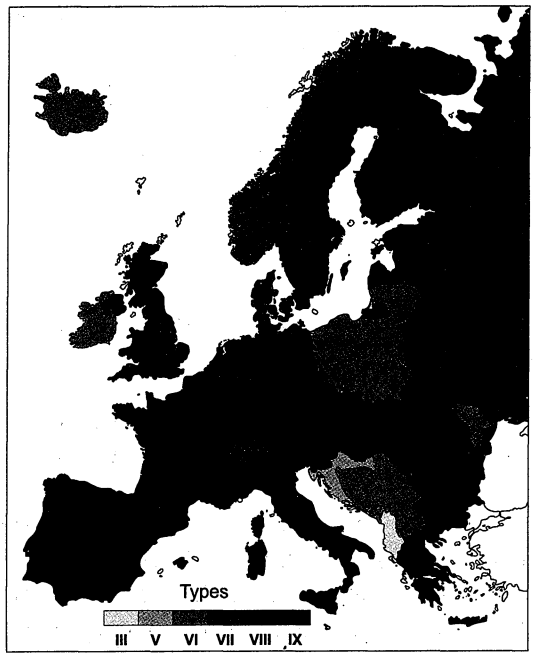

Fig. 8. Types of countries according to the hazard of the demographic ageing

Type I – progressive demographic youth
Type II – stable demographic youth
Type III – ageing – demographic young population
Type IV – becoming younger – demographic mature population
Type V – stable – demographic mature population
Type VI – ageing – demographic mature population
Type VII – becoming younger – demographic old popupulation
Type VIII – stable – demographic old population
Type IX – ageing – demographic old population

From among 9 theoretical types, European countries occur in 6, which spatial layout was presented in Fig. 8.

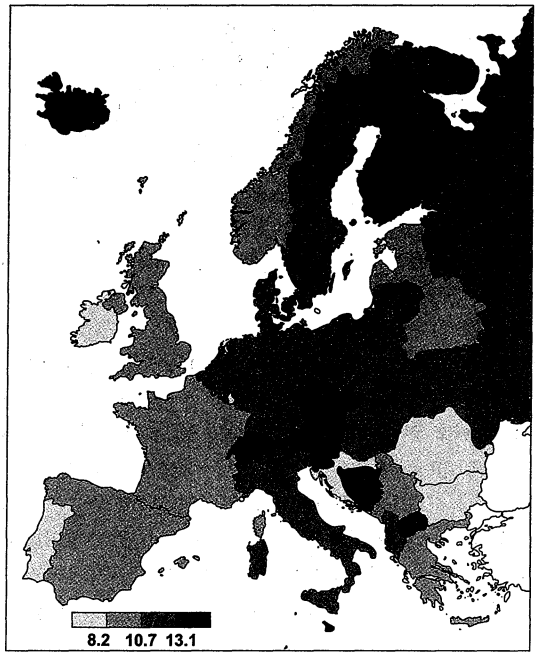

Fig. 9. The projection of poopulation ageing index W_{SD} in the years 2000–2025

It is difficult to assess how the present demographic situation and trends in population ageing will affect the image of European society. The projections to the year 2025 published in 2002 by UN concerning population age structure for Europe indicate that the pace of population ageing according to the ageing index (Wsd, Fig. 9) can lead to more polarized spatial layout (Fig. 10). The projections show that the relatively youngest population will be characterized by Albania, Ireland, Jugoslavia, Macedonia and Moldova, whereas the oldest by Austria, Greece, Spain, Germany, Switzerland and Italy.

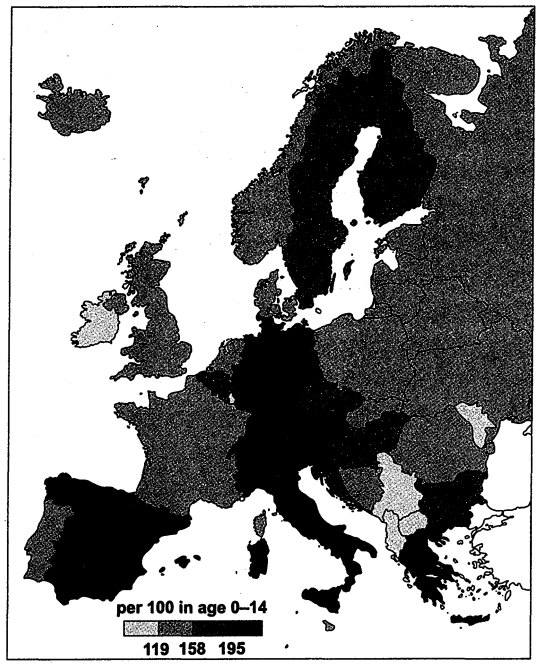

Fig. 10. The index of burdening the young population (aged 0–14) with the older population (aged above 65) in 2025

The results presented, as well as the methods of presentation of the level and the dynamics of the process of population ageing do not present a definite solution to the issue. The presentation aimed to show the present demographic image of the continent, as well as pointing to the fact that the choice of measures causes a slightly different view of the issue.

As it seems the investigation of the population ageing should lead to the most objective formulation of the analysed process, not only in European conditions but also in other regions of the world differ in demographic character.

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