

## POPULATION AGING AND CHANGES IN THE AGE STRUCTURE OF SLOVAKIA

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UDK: 911.3:312

COBISS: 1.01

### **Abstract**

#### **Population aging and changes in the age structure of Slovakia**

The age group structure of the population in the districts of Slovakia was highlighted by means of an analysis of the three big age groups: 0 – 19 years, 20 – 64 years and 65 years and older. The paper reports on the development of the characteristics of the burden carried by the productive population in consequence of the demographic ageing of population in the conditions of the Slovakian regions. The main task of the paper was the identification the tendencies in age structure of Slovak population. Statistical methods and mathematics proceeding are used to compare different parameters age structure (e. g. index of ageing, youth dependency ratio etc.). That can be the ageing process as well as the forming of the population age structure considered as a demographical phenomenon with a fairly high degree of complexity. The results of the study will enhance the knowledge about demographic characteristics of Slovakia and therefore might be useful for further research in the field.

#### **Key words**

Age structure, Slovakia, pre-productive population rate, population ageing.

## **1. Introduction**

The analysis of population structure of Slovakia in terms of age groups in the selected time span (1945 – 2009) highlights the gradual rise of the elderly population's ratio, the main cause being the enormous social-economic differences in all Slovak regions during the transformation period (last decade of 20 century). The aging changes in population of Slovakia have been influenced by transformation of post-communist countries in Eastern Europe.

From the wide spectrum of the population study topics is the paper oriented on the structure of the population in terms of age groups to the assessment of human capital, which is affected to the formation of a new model of reproductive behavior characterized by the sudden decline of the natural population growth and of the reproduction rates to levels that do not provide for the self-reproduction of the population.

In principle, we can agree with this statement, however, we must note that this facts is very much influenced by long-term demographic behavior and family behavior of the regions which, as many authors (Van de Kaa 1987, 45; Pastor 2002, 50) indicates, are manifested in their ability to accept second demographic transformation difficulties. In Slovakia, the changes in demographic behavior are visible most significantly in three interrelated areas – reproductive behavior, the family behavior and ageing of the population (Mládek, Káčerová 2008, 194).

## **2. Methodology**

In demography two traditions in studies on the process of population aging exist: first, studying the population aging process of changes in population age structure consisting in the growth in number and share of aged population in the total population (Fratczak 1993, 15).

The second tradition in studying the process of population aging consists in examination of broadly understood changes in aged subpopulation. These studies refer to examination of changes in the aged population according to different demographic and socio-economic characteristics. A distinction is made between those who are between 65 – 74 (young-old) and those 75 years and over (old-old). We used both aspects of studying the aging of population.

The assessment of the population structure in terms of age groups and gender was analyzed in several works (Matlovič 2005, 152; Stoica et al. 2010, 106). The structure of the population in terms of demographic ageing and the development of burden carried by the productive population are relevant to the assessment of human capital, but also to identifying the capabilities to support economic activities that involve certain workforce characteristics (related to age, skills and training levels among others).

Several authors (Kovář, Říhánek 1995, 110; Mládek, Marenčáková 2003, 289; Vošta, Minařík 2007, 5; Svatošová 2008, 705; Mládek, Káčerová 2008, 192; Dufek, Minařík 2009, 265 and Bucher 2010, 207) were writing about the aging and age structure of Slovakia as well as other post-communist countries in the sense.

Another approach to the study of population aging process is studying the process as connected with the demographic transition. This type of consideration can be found in the works of: Klinger (1988, 65), Warnes (1989, 55), Myers (1990, 215). Valkovics (1990, 30) emphasizes that aging under demographic transition is connected transition from the stage of fertility-dominated population aging to the mortality-dominated stage of population aging.

The assessment of the age structure of Czech and Slovak inhabitants according (Kovář, Říháněk 1995, 112) and other demographic experts is usually represented by the relative expression, i. e. the ratios of three basic age groups. The methodology for calculation of the selected demographic indicators (Dufek 2006, 70):

- Ageing index specifies the proportion of the post-productive and pre-productive population.

Economic limit:  
$$I_{AGE(ec)} = \frac{P_{(65+)}}{P_{0-19}} \times 100$$

-Age index specifies the proportion of pre-productive and post-productive population.

Economic limit:  
$$I_{AGE II(ec)} = \frac{P_{(0-19)}}{P_{(65+)}} \times 100$$

- Youth dependency coefficient – the coefficient of the burden on the productive population imposed by the pre-productive population with critical economic age limits.

Economic limit:  
$$C_{D(y)} = \frac{P_{(0-19)}}{P_{(20-64)}} \times 100$$

- Old age dependency coefficient – the coefficient of the burden on the productive population imposed by the post-productive population.

Economic limit:  
$$C_{D(old)} = \frac{P_{(65+)}}{P_{(20-64)}} \times 100$$

- The coefficient of total burden – the coefficient of the burden on the productive population imposed by the pre and post-productive population.

Economic limit:  
$$C_{D(ov)} = \frac{P_{(0-19)} + P_{65+}}{P_{(20-64)}} \times 100$$

- The inflow coefficient – defined as a proportion of the part of the pre-productive population which is just entering to the productive population.

Economic limit:  
$$C_{in} = \frac{P_{(20-24)}}{P_{(20-64)}} \times 100$$

- The outflow coefficient – defined as a proportion of the part of the post-productive population which is just about to leave the productive population.



### 3.1 Ageing from bottom

The share of children and young people up to the age of 20 in the population constantly decreased since 1960, and suppose that in 2030 it will be lower than the share of seniors over the age of 65 +. The proportion of age category group 0 – 19 in Slovak population has rapidly diminished from 38.2 % (1945) to 22.1 % (2009). In the period 1945 – 2000, the age group 0 – 19 made up more than quarter of the whole population in Slovakia. As seen in the Fig. 2, in total numbers, the maximum of people in age group 0 – 19 was recorded in 1990, with more than 1.770.000 young people in the population. The number of population over 65 years has grown to 665 thousand citizens (2009), the proportional growth means from the value of 6.6 % (1945) to 12.3 % (in 2009). The population of the age of 20 – 64 stands for the productive age group. Its size increased as many as to 65.6 % at the end of analyzed period 1945 – 2009. The total number moved from 1.892 thousands in 1945 to 3.560 thousands in 2009.

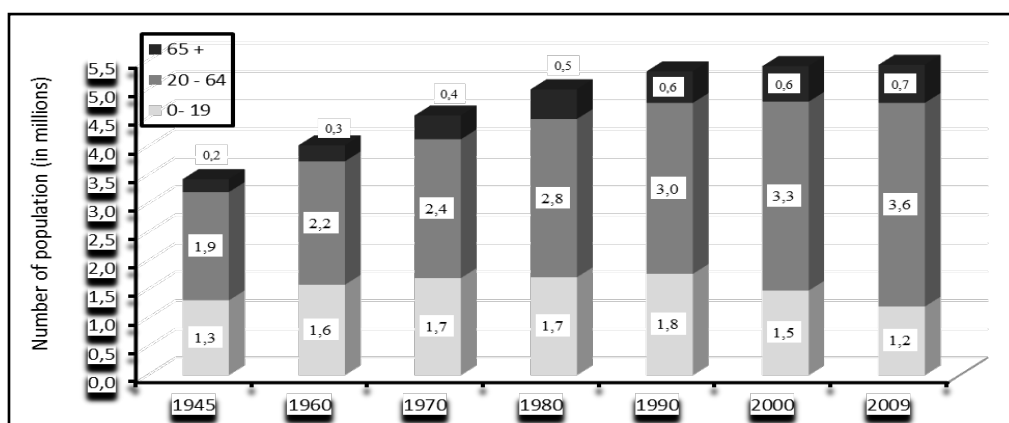


Fig. 2: Development of main age categories in Slovakia (1945-2009).

Source: Statistical Office of Slovakia, 2011.

### 3.2 Ageing from top

To specifying the old population contributes to the viewpoint on the up-to-date age of retirement, we have evaluated age groups of 65 – 74 years (young old), 75 – 84 (old-old) and over 85 + (oldest old). Categories (old-old) and (oldest old) register their maximum levels in 2009, which is caused by the improvement of mortality circumstances, by the prolongation of life expectancy and by shift of the younger age groups (waves).

As seen in Fig. 3, proportion of the population in age category (young old) had been increasing from 4.5 % in 1945 up to 7.0 % in 2009. Since 1945, the number of young old (65 – 74 years) in the total population of Slovakia increased from 155 thousands in 1945 up to 381 thousands inhabitants at the end of 2009. It is significant that mentioned category of population during the monitored period increased more than two times.

The population of the age over 85 + years records the proportional growth from 0.2 % (1945) to 1.1 % (2009). This age category records the fastest growth of all three post-productive evaluated categories in the period 1945 – 2009.

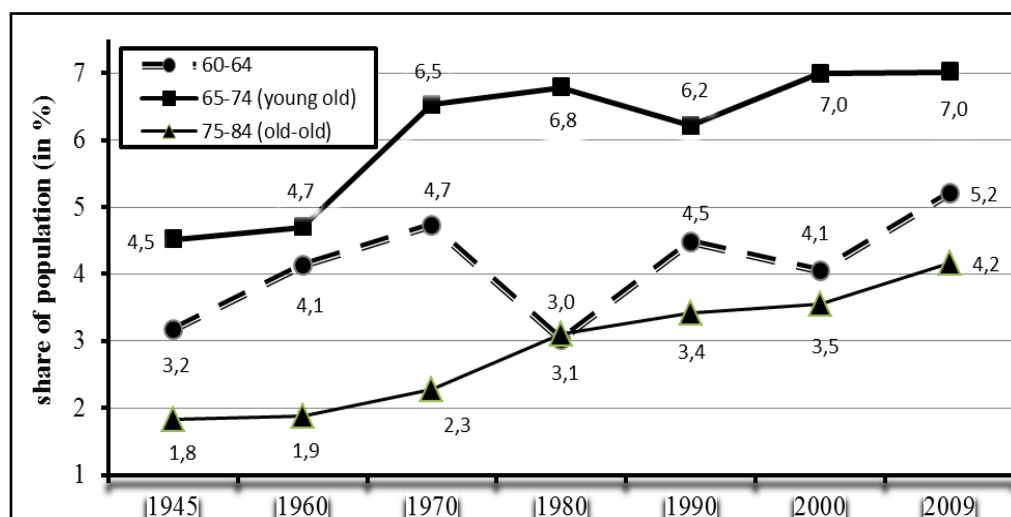


Fig. 3: Post-productive age groups in Slovakia, share in total population (1945-2009).

Source: Statistical Office of Slovakia, 2011.

### 3.3 Age pyramids

Evaluates of age pyramids of Slovak population was gotten following facts. The pyramid of 1945 has got progressive type. The major population group in 1945 was between 0 – 4 years old (Fig. 4). That population was born in period between 1940 and 1945.

From the gender aspect, male population groups, in comparison with females, were numerous in the all four young age groups in 2009 (0 – 4, 5 – 9, 10 – 14, 15 – 19). The biggest difference between the number males and females has existed in the older age categories, for example 70 – 74 (37.455 women more than men) and 75 – 79 (39.548 women more than men). Among all categories, the share of female in 2009 is dominant in the categories, which are elder than 45 – 49. Since women live longer than men do, they have dominant representation in the oldest age categories.

In 2009 with compare to 1945 Slovak population become older. In fact, age structure pyramid of Slovak population was transformed from progressive in 1945 to regressive type in 2009. It is significant, that during the monitored period we can also found declining of the ratio of young people and increasing of the portion of old people. As we mentioned in 2009 portion of young population (0 – 19) in total population of Slovakia become less and therefore the pyramid got regressive form.

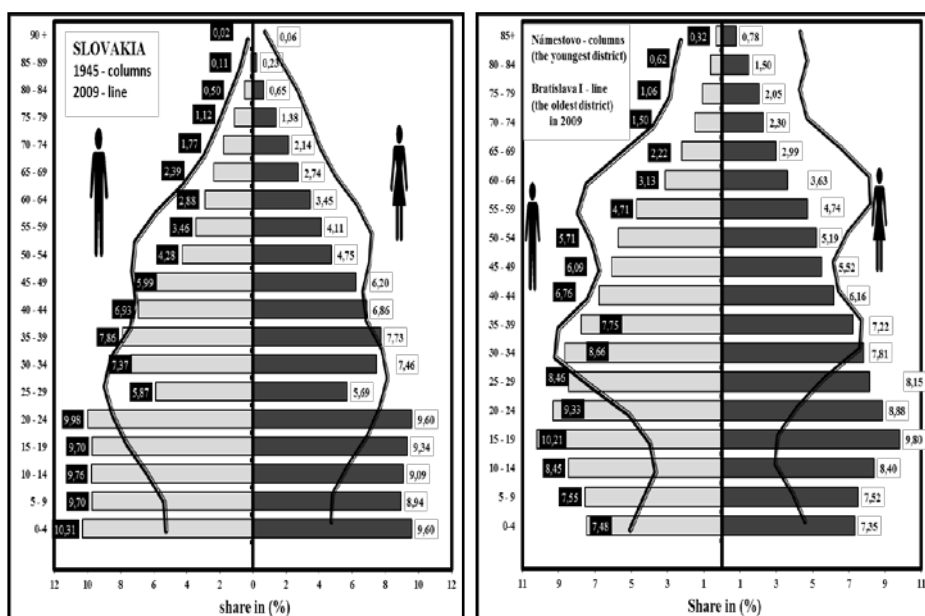


Fig. 4: Age structure diagram of Slovakia (in 1945, 2009) and selected districts of Slovakia (in 2009).

Source: Statistical Office of Slovakia, 2011.

### 3.4 Average age

In 1995, Penev gave parameters for seven different stages of age according to which Slovakia was passing through two stage of age since 1945. At the beginning of observed period Slovak population were in the threshold of demographic ageing, when in 2009 reached the five stage of demographic ageing. From 1960 to 2009 average age of Slovak population constantly increased. As seen in the Table 2 from 1960 to 2009 average age of female population increased for 8.7 years and of male population increased for 7.5 years. In observed period average age of females in Slovakia is higher compared to males. Explanation might be the fact that women are numerous because they live longer. In Slovakia, at the NUTS IV level, there is relative uniformity between individual regions. In 2009 almost 77 % of regions (61 units) have been identified in stage – demographic ageing (Tab. 1).

Tab. 1: Stages of demographic aging and criteria for their identification.

Stages	Average age	Number of units in 2009
1. Early demographic youth	<20 years	0
2. Demographic youth	20 – 25	0
3. Demographic maturation	25 – 30	0
4. Threshold of demographic ageing	30 – 35	4
5. Demographic ageing	35 – 40	61
6. Deep demographic ageing	40 – 43	13
7. Deepest demographic ageing	43 +	1

Source: Statistical Office of Slovakia, 2011.

For Europe, the demographic process evaluated here can be described as a gradual shift from a society with quantitatively dominant younger cohorts to a society in

which the elderly from solid majority. This is best reflected when looking at the average age (Kovačević et al. 2010, p. 73).

The study of average age of population is essential because of reproduction ability of this category. It is known that female reproductive period ending at 45. From the beginning of 21<sup>st</sup> century, an average age of Slovak female population was raised in critical limit (up to 40 year). Slovak population has just come to 5<sup>th</sup> stage. Politics, economists and demographers must find as soon as possible a solution for the rapidly ageing of Slovak population.

Tab. 2: Dynamics of changes of average age in Slovakia, 1960 – 2009.

Census	1960	1970	1980	1990	2000	2005	2009
Population of Slovakia							
Male	29.3	31.1	31.4	32.1	34.4	35.8	36.8
Female	31.4	33.0	33.7	34.9	37.5	39.0	40.1

Source: Statistical Office of Slovakia, 2011.

### 3.5 Old dependency coefficient

The old people dependence coefficient was climbing gradually throughout monitored years. In 2009 there were almost 19 people elder than 65 + per 100 economically active inhabitants. As seen in the Fig. 4, during the whole observed period 1945 – 2009 the old people dependence in the Slovakia increased from 11.9 % (1945) to 18.7 % (2009). The situation within the districts of Slovakia was much different. High values of old people dependence coefficient we can observe in urban districts of capital of Slovakia – Bratislava and in the south-west of Slovakia. Western Slovakia is the most urbanized region in Slovakia. Hungarian minority, which has occupied southern Slovakia have had during the observed years more intensive aging than Slovak population. District Medzilaborce reached the one of the highest value of old people dependency coefficient. It is located in the north-eastern Slovakia near the Polish and Ukrainian border. Very negative phenomenon which attacking this region for several years is the emigration of young, productive people. As we mentioned majority of migrants are predominantly young and educated people. On the other hand lowest values have been monitored in north and east part of Slovakia. Concerning individual districts, Bratislava I district reached the highest value of old dependence coefficient 29.1 %, the lowest value was in the district of Košice III 7.1 % in 2009.

### 3.6 Youth dependency coefficient

Youth dependency coefficient based on economic limits fell from 69.1 % to 33.7 % in the observed period 1945 – 2009 (Fig. 5). In 2009, some 34 young people were dependent on 100 members of the productive population. The most critical situation is in urban districts of Bratislava and in the south-western districts that recorded the lowest youth dependency coefficient (comprehensively lowest youth dependency coefficient was in the city districts of Bratislava but the fact is conditioned by the suburbanization tendencies, when productive population of the cities move into its suburbs). Districts like Banská Bystrica (27.1 %), Myjava (27.2 %), Partizánske (28.8 %) and Komárno (29.2 %) achieved the lowest values. In same year the highest youth dependency coefficient was achieved in the districts of Námestovo (56.6 %), Sabinov (55.4 %) and Kežmarok (55.0 %). It is results of relatively high level of fertility their inhabitants, which belongs to Gipsy minority (in case of eastern Slovakia – districts like Kežmarok and Sabinov) and distinctive rural landscape of



region Orava and Kysuce which are located in north part of Slovakia. This tendency is related with the fact that in the early 1990s, nearly the whole baby boom generation of the 1970s became productive. But if only limited part of a baby boom generation (aged above 20) moved into the productive sphere, the dependency coefficient would be affected accordingly.

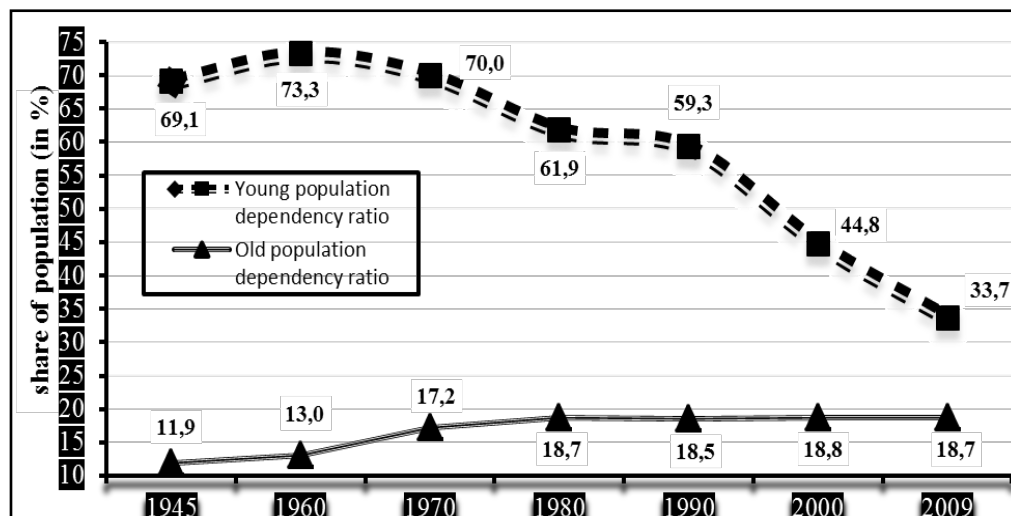


Fig. 5: Dynamics of change young and old population dependency ratio in Slovakia (1945 – 2009).

Source: Statistical Office of Slovakia, 2011

### 3.7 Overall dependency coefficient

Overall dependency coefficient equally is going down during the observed period, when in 2009 some 100 members of productive population carry the burden imposed on them 53 economic young or old people. Overall dependency coefficient remains more or less stable while the other coefficients are gradually falling or increasing.

### 3.8 Aging index

Aging index changed dramatically over the analyzed span of time. Aging index amid 1945 and 2009 enlarged from 17.2 % to 55.5 % (by economic standards). This trend was caused by the plummeting number of children and moderate growth in the number of the eldest population. In 2009, there were as many as 56 inhabitants above 65 years of age per 100 people in pre-productive age. According to projection it can be expected that in 2050, will be more than 170 inhabitants above 65 years of age per 100 people in pre-productive age. Ageing index in the Slovak districts reached the rate from 22.9 % (Námestovo) to 125.3 % (Bratislava I) in 2009. High aging index in certain districts of north-eastern Slovakia closely correlates with the ethnic and religious structure of population. The young age structure of these units making a potential for their progressive reproduction (manifested in the values of natural increase). Such a character of the development is also supported by specificities of the national and religious structure. An impact of the higher level of religiosity is present in northern Slovakia (more than 90 % of the population in the regions Kysuce and Orava are religious). For Roman Catholic population, which is

case of mentioned regions, is typical higher level of fertility and families with more children. The most depressed situation is in the big cities like Bratislava and Kosice, and in the south-west part of country. Globally the highest rates of aging index were detected in the city districts Bratislava I (125.3 %), III (100 %), II (93.2 %), Myjava (83.4 %) and Nové Mesto nad Váhom (76.7 %). These districts stand for comparatively elder age structures. Similarly like the young districts, we can talk about the impact of the age structure having a negative effect on the intensity of fertility and natural increase. The evidence can be found in the negative values for the natural increase of population. Again, we can consider the impact of the religiosity and of the national structure on the population aging. The populations of Hungarian nationality with a higher proportion in the southern districts mostly avow an affiliation with Reformed Christian churches preferring a lower intensity of fertility and model of single-child family.

### 3.9 Inflow, outflow and substitution coefficients

Inflow and outflow coefficients describe the situation when a five-years-old age group of population is preparing to reach the lower or upper age limit marking the productive life span.

Inflow coefficient based on economic limits fell from 17.7 % to 11.8 % in the observed period 1945 – 2009 (Fig. 6). It is clearly that the inflow coefficient is going down to the low level of 12 people aged 20 – 24 per 100 inhabitants in the reproductive years (20 – 64 years). It is significant that fewer and fewer people enter the productive age.

Outflow coefficient has been rising from 5.7 % (in 1945) to 7.9 % (in 2009). It means that nearly 8 people aged 60 – 64 per 100 inhabitants in the reproductive years (20 – 64 years). It is clearly that there is a rise in the number of people leaving the productive age for the post-productive one.

While at the beginning of the period (1945) being investigated the inflow coefficient exceeded the outflow coefficient by nearly 12 percentage points, in 2009 it was only 3.9 percentage points. It means the inflow of economically active people is still higher than the outflow; however, both the coefficients have been converging in the past years.

The substitution coefficient is the sum of the effects of the inflow and outflow coefficients and it is also of a decreasing character. Substitution coefficient has been shrinking due to changes in the demographic situation of Slovakia during the observed period, when the generation entering the productive age has been continuously decreasing since 1945.

When studying the burden on the productive population, it is also suitable to watch the dynamics of burden change, which is connected with the inflow, outflow and substitution coefficients. The inflow coefficient states the ratio of pre-productive population which is just about to enter the productive population to the productive population, the outflow coefficient expresses the ratio of the post-productive population which is just leaving the productive population to the productive population, and the substitution coefficient declares the ratio of the numerators of the previous coefficients (Vošta, Minařík 2007, 6).

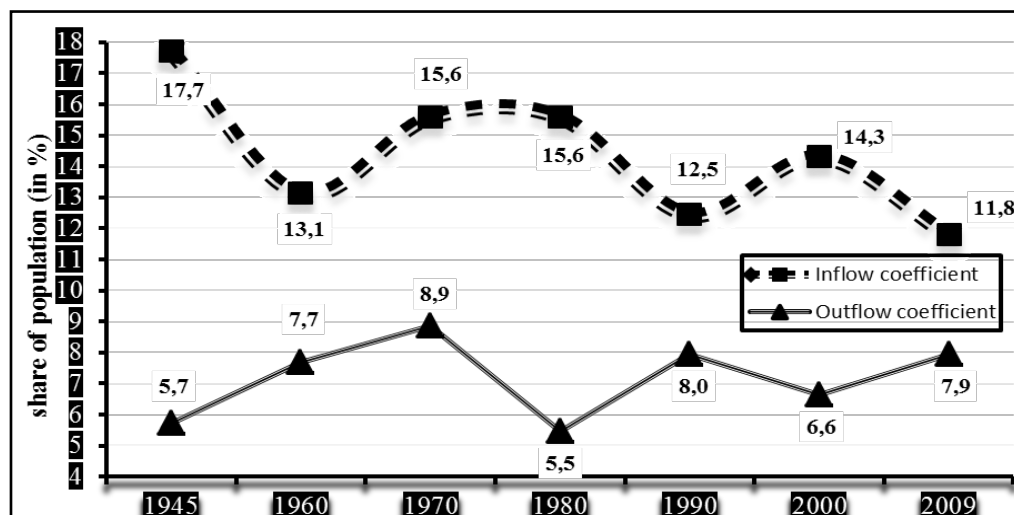


Fig. 6: Dynamics of change outflow and inflow coefficients in Slovakia (1945 – 2009).

Source: Statistical Office of Slovakia, 2011

#### 4. Conclusion and synthesis

Ages 0 – 19 and 65 + were implemented as criteria for population ageing analyzes. The demographic old age analyzes involved and index (age index) of the oldest group to the youngest group (number of 65 + per 100 of (0 – 19s). The ageing rate was determined with the age index changes during 2001 – 2009. An attempt to identify the areas exposed to ageing was based on the value and growth rate of the age index. To do that, the 2009 index was divided into to the three categories around the average for the whole area and three types the demographic old age were defined – high, medium and low categories. Also the growth/decrease rates of the index during 2001 – 2009 were divided into to the three groups around the districts average (Tab. 3 and 4).

Tab. 3: The level of population ageing in 2009.

The level of population ageing	The type of population ageing	Elderly-to-youth coefficient
High	I	above 62.8
Middle	II	50.5 – 62.8
Low	III	below 50.5

Source: Statistical Office of Slovakia, 2011.

Tab. 4: The dynamics of population ageing process in 2001 – 2009.

The dynamics of population ageing	The type of population ageing	Elderly-to-youth coefficient variability
High	a	above 8.5
Middle	b	3.1 – 8.5
Low	c	below 3.1

Source: Statistical Office of Slovakia, 2011.

Tab. 5: Population ageing hazard level 2001 – 2009.

Population ageing hazard level	Type	Subtype	The level of population ageing	The dynamics of population ageing
High	I	Ia	high	high
		Ib	high	middle
		Ic	high	low
Middle	II	IIa	middle	high
		IIb	middle	middle
		IIc	middle	low
Low	III	IIIa	low	high
		IIIb	low	middle
		IIIc	low	low

Source: Statistical Office of Slovakia, 2011.

As seen in the Tab. 5 and Fig. 7, cluster three is comprised units with negative growth, i. e. regions where the population was growing younger. The second cluster encompassed units with positive growth rates but below the region average, while the final group (I) had higher than average growth rates indicating fast-ageing population. Taking into account the current ageing in 2001 and the growth rates during 2001 – 2009, three main types of areas were defined, featuring high, medium and low risk of demographic senility (Tab. 6). Each type was further broken down into three subtype's with the different ageing rates.

Tab. 6: Population ageing in districts of Slovakia 2001 – 2009.

Subtype	Name of district (level NUTS IV)
I a	Banská Bystrica, Bratislava I, Bratislava II, Bratislava III, Bratislava IV, Detva, Levice, Medzilaborce, Myjava, Piešťany, Topoľčany, Trenčín, Turčianské Teplice, Zvolen, Žarnovica (15)
I b	Komárno, Košice IV, Liptovský Mikuláš, Nitra, Nové Mesto nad Váhom, Nové Zámky, Partizánske, Poltár, Prievidza, Sobrance, Zlaté Moravce, Žiar nad Hronom (12)
I c	(0)
II a	Brezno, Humenné, Ilava, Pezinok, Púchov, Trnava, Veľký Krtíš (7)
II b	Banská Štiavnica, Dunajská Streda, Hlohovec, Košice I, Košice II, Krupina, Lučenec, Martin, Rožňava, Ružomberok, Senica (11)
II c	Bánovce nad Bebravou, Galanta, Malacky, Považská Bystrica, Skalica, Snina, Šaľa, Žilina (8)
III a	Bratislava V, Kysucké Nové Mesto, Revúca, Rimavská Sobota (4)
III b	Dolný Kubín, Gelnica, Trebišov (3)
III c	Bardejov, Bytča, Čadca, Kežmarok, Košice III, Košice-okolie, Levoča, Michalovce, Námestovo, Poprad, Prešov, Sabinov, Senec, Spišská Nová Ves, Stará Ľubovňa, Stropkov, Svidník, Tvrdošín, Vranov nad Topľou (19)

Source: Statistical Office of Slovakia, 2011.

Throughout 2001 – 2009, the average proportion of the 65 + group in Slovakia increased from 11.4 to 12.3 %, whilst the proportion of 0 – 19 decreased from 27.0 % to 22.1 %. The elderly-to-youth coefficient variability dropped (i.e. the age structure became younger) in 13 units located in northern and eastern Slovakia. The youngest population was detected in following regions – evaluation according elderly-to youth coefficient variability (2009 – 2001): Stará Ľubovňa (-23.1 %), Spišská Nová Ves (-18.4 %), Tvrdošín (- 13.3 %), Námestovo (-10.9 %) and Kežmarok (10.3 %). The drops amid 0 % and minus 5 % have been attained in Žilina, Čadca, Skalica, Senec, Sabinov, Stropkov, Košice-okolie and Levoča. On the other hand, the fastest ageing population was found in the western regions of Slovakia – Púchov (20.8 %), Turčianské Teplice (19.8 %), Zvolen (19.7 %) and Bratislava I (19.4 %).

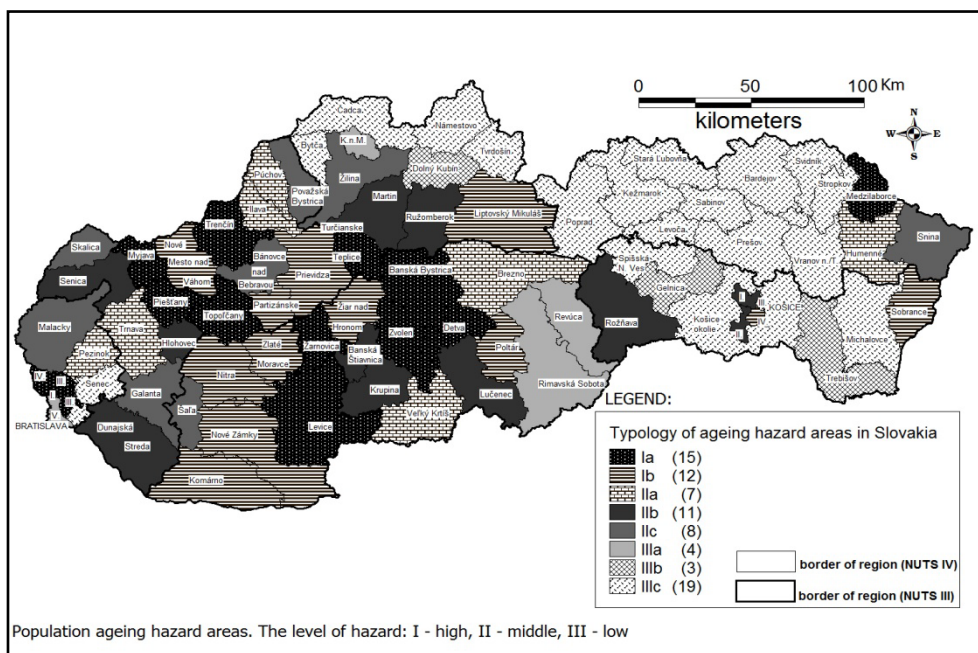


Fig. 7: Population ageing hazard areas in Slovakia, 2009.

Source: Statistical Office of Slovakia, 2011.

Studying the works which deal with regional aging processes in Slovakia, all the authors agree that different capability of regions to adapt social and economic transformation is the main reason for emerging and deepening of ageing disparities in Slovakia. This allows us to present a classification of regions of Slovakia according to their aging condition.

Another method that was used for evaluation of aging processes in Slovak regions is aggregate of ageing index, which consists from following factors (Tab. 7).

The first category (types I. and II.) includes districts predominantly positioned in eastern and northern part of Slovakia (Tab. 8 and Fig. 8). In stated category are districts with high level of crude live birth rate, high level of natural increase of population. For this category are distinctive lower values of average age – compare with Slovakia, high level of young population dependency ratio and higher share of 0 – 19 year old in total population compare with Slovakia.

Instead we have a lot of districts mainly in western part of Slovakia (types IV. and V.) with the highest values of crude death rate, mean age, ageing index and old population dependency ratio. These regions exemplify units with the oldest population in Slovakia.

Tab. 7: Indicators of aggregate ageing index in Slovak regions – 2009.

Name of coefficient (2009)	minimum rate	maximum rate
Crude live birth rate – number of live births per 1.000 population	Zlaté Moravce (8.73 ‰)	Kežmarok (19.27 ‰)
Crude death rate – number of deaths per 1.000 population	Bratislava V (5.79 ‰)	Bratislava I (13.67 ‰)
Natural increase/decrease per 1.000 population	Turčianske Teplice (-3.94 ‰)	Kežmarok (11.08 ‰)
Average age	Námestovo (32.2)	Bratislava I (44.3)
Young population dependency ratio	Bratislava V (18.9 %)	Námestovo (56.6 %)
Old population dependency ratio	Košice III (7.1 %)	Bratislava I (29.1 %)
Ageing index	Námestovo 22.9 %	Bratislava I (125.3 %)
Age index	Bratislava I (79.8 %)	Námestovo (436.1 %)
Inflow coefficient	Košice IV (8.0 %)	Stará Ľubovňa (15.5 %)
Outflow coefficient	Námestovo (5.7 %)	Košice IV (13.5 %)
Share of 0 – 19 year old in total population	Bratislava V (14.8 %)	Námestovo (33.4 %)
Share of 65 + year old in total population	Košice III (5.4 %)	Bratislava I (19.1 %)

Source: Statistical Office of Slovakia, 2011.

Tab. 8: Synthesis of population ageing in districts of Slovakia – 2009.

TYPE	Name of district (level NUTS IV)
I. (very low level of ageing)	Námestovo, Kežmarok, Košice III, Stará Ľubovňa, Tvrdošín, Spišská Nová Ves, Šabinov, Levoča, Bratislava V, Vranov nad Topľou, Gelnica, Bardejov, Košice-okolie, Čadca, Michalovce, Dolný Kubín (16).
II. (low level of ageing)	Prešov, Bytča, Trebišov, Poprad, Revúca, Svidník, Senec, Stropkov, Humenné, Ružomberok, Rimavská Sobota, Malacky, Pezinok, Kysucké Nové Mesto, Rožňava, Košice II (15)
III. (average level of ageing)	Považská Bystrica, Krupina, Snina, Šaľa, Púchov, Žilina, Skalica, Dunajská Streda, Senica, Bánovce nad Bebravou, Lučenec, Banská Štiavnica, Košice I, Ilava, Galanta, Veľký Krtíš (16)
IV. (high level of ageing)	Brezno, Hlohovec, Martin, Trnava, Banská Bystrica, Nitra, Sobrance, Prievidza, Zvolen, Poltár, Liptovský Mikuláš, Levice, Topoľčany, Detva, Žarnovica, Žiar nad Hronom (16)
V. (very high level of ageing)	Košice IV, Bratislava IV, Trenčín, Zlaté Moravce, Komárno, Partizánske, Nové Zámky, Turčianske Teplice, Piešťany, Medzilaborce, Nové Mesto nad Váhom, Myjava, Bratislava II, Bratislava I, Bratislava III (16)

Source: Statistical Office of Slovakia, 2011.

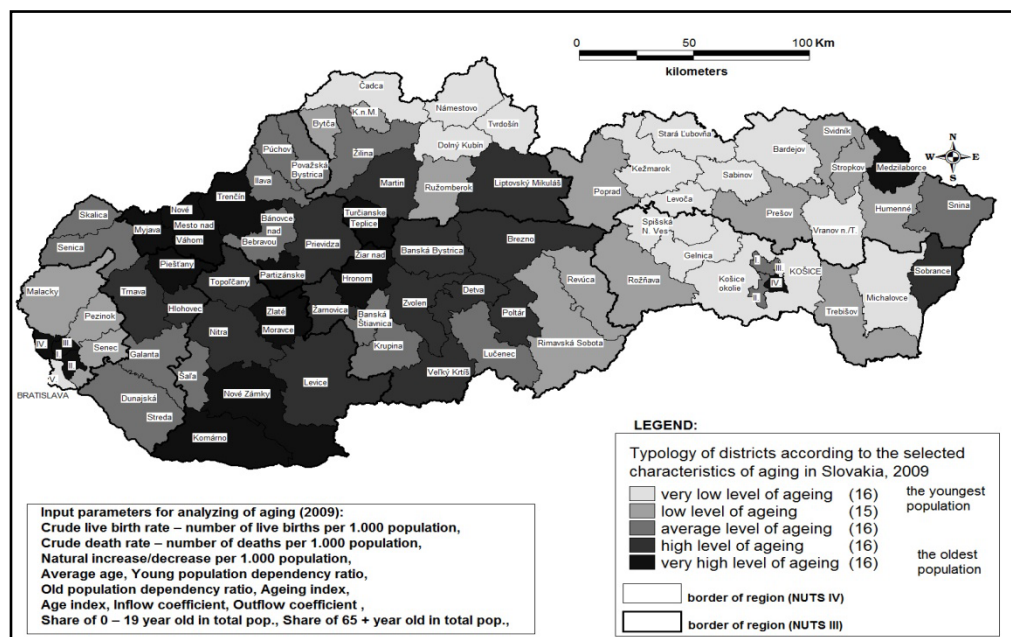


Fig. 8: Typology of districts according to the selected characteristics of aging in Slovakia, 2009.

Source: Statistical Office of Slovakia, 2011.

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## **POPULATION AGING AND CHANGES IN THE AGE STRUCTURE OF SLOVAKIA**

### **Summary**

Slovak population attained to the fourth stage of population aging. For this stage is significant stabilization of fertility and mortality level occur. Stabilization of fertility takes place at replacement level or below. Population structure becomes stable with preserving both – high number of the aged population and relatively high proportion of the aged.

Population structure by 2009, highlighted by the population pyramid, indicates the drastic drop of young age groups, or their ultimate absence – compared with population pyramid in 1945. Overall, we can claim, that all parameters of age structure shows that population in Slovakia is aging. According to data from 2009, the old aging index was more than 3 times higher related with the beginning of observed period (1945).

In Slovakia there are two greater regional entities with different population aging grade. Pronounced region in the south and southwest of Slovakia is described by a higher ageing grade. The second entity, spreading in the north and east of Slovakia is the region with relatively lower ageing grade and with younger population.

Slightly more sophisticated measures of social and familial dependency provide a better picture of changes in the dependency of the young and the older generations. These measures, in contrast to the age ratios, take into account certain changes in the social circumstances, more specifically in the length of education and in labor force participation, besides shifts in the age distribution.

The measures which relate various groups of the economically inactive population to the active population describe changes in the support burden more accurately, and also indicate that, while demographic ageing necessarily involves an increase in the proportion of the aged inactive population, this increase is more or less compensated for by the decreasing burden imposed by the young generations.

The structure of the current by age suggests that in the near future the pace of demographic ageing will soon quicken due to changes in the level of fertility, mortality, migration as well as natural shifts in the age structure of population. As we can see in age structure diagrams of Slovakia large cohorts currently of productive age will gradually grow old but they will not be replaced in middle age by generations numerically equal in size. The numerically small cohorts that will soon enter productive age will not be able, nor evidently even willing (according to polls on attitudes towards reproduction), to increase reproduction in order to raise the expected fertility rate, thus there will be a further decrease in the share of children in the population. In further, there will be a lot of consequences of population aging for society in the field of education system, labor supply, productivity and employment, social services, intergeneration transfers, health and health care, age structure of population and level of fertility, mortality and migration. The expected further improvement of mortality conditions will serve to quicken the pace of demographic ageing and the Slovakia will gradually join the ranks of countries in which a high proportion of the population is of post-productive age.

Population ageing and the postponement or rejection of marriage by some young people will lead to a continuous increase in the share of one-person households and family households of young childless people. This will gradually lead to a change in

the way of life of an increasingly greater part of the population less, encumbered" by the need to care for children and the costs that involves. This will certainly be made apparent with stronger consumer tendencies in the population of productive age, but also in continuing consumption among the population of post-productive age.

In accordance with similar findings in other cases, the development of all characteristics of the burden on the productive population in NUTS IV level of Slovak regions is very negative. When there are some more favorable values found in the northern and eastern regions, at the state level Slovak population slowly getting older in all parameters of demographic ageing. Due to rising number of inhabitants at the post-productive age and, in contrast, the falling number of the inhabitants at the productive age in spite of a temporary increase, the negative trend is reflected in the increasing coefficient of the burden on the productive population imposed by the post-productive population (the old people dependence coefficient). Population ageing processes cause needs to solve a whole line of social problems, which recently meet especially developed countries.