A COMPARISON OF POPULATION AGEING IN THE CZECH REPUBLIC AND THE SLOVAK REPUBLIC BASED ON GENERATION SUPPORT AND EXCHANGE

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Abstract

The object of study is the population of the Czech Republic and Slovak Republic, and the aim was to identify the process of population ageing using two approaches: temporal and spatial. In the analysis of population ageing sophisticated instruments of cognition were used. Indicators are based on the comparison of selected generation groups. The comparison shows a high degree of similarity. In the development of ageing processes, we can observe however also certain differences between the CR and SR. The population ageing in the Czech Republic starts earlier than in Slovakia, and the process is more intense.

Shrnutí

Komparace stárnutí populace České a Slovenské republiky na základě generační podpory a výměny

Předmětem studie je obyvatelstvo České a Slovenské republiky, cílem pak identifikace procesu stárnutí populace při zohlednění dvou aspektů: časového a prostorového. Při analýze stárnutí obyvatel byly použity sofistikované nástroje poznání. Indikátory jsou založeny na srovnání vybraných generačních skupin. Komparace ukazuje vysokou míru podobnosti. Ve vývoji procesů stárnutí pozorujeme mezi ČR a SR určité odlišnosti. Stárnutí obyvatelstva v ČR začíná dříve než na Slovensku a probíhá intenzivněji.

***Key words**: population ageing, index of potential economic support, social support index, coefficients of inflow, outflow and exchange, dynamic index of economic ageing, Slovak Republic, Czech Republic*

1. Introduction

Age structure can be considered one of the most important attributes of a population. This is because every age structure develops over a long time period. The actual age structure is a result of many population processes over the past one hundred years. Although the characteristics of an age structure are instantaneous, cross-sectional variables, they reflect the basic demographic processes – fertility, mortality and migration. At the same time, the current age structure will affect population development in the next one hundred years.

Age structure is indispensable in the construction of indicators for the evaluation of many demographic phenomena and processes – because individual age groups affect these indicators to varying degrees (reproduction, marriage rate, migration, etc.). In addition to theoretical and methodological applications, the population age structure also represents a wide range of social and practical consequences. It is essential that its characteristics are taken into account when assessing the potential labour force, in creating educational systems, health care, and social security (particularly inactive population groups).

These are just a few of the reasons for the great interest in the evaluation of population age structures, both their typologies and transformation. One of the most important changes is the ageing of population structures (the process of population rejuvenation is less common). From the demographic point of view, such changes increase the number or proportion of higher age categories within the population (top-down ageing). The changes also involve the reduction of the number and proportion of children in the population (bottom-up ageing). A seemingly straightforward evaluation of the young and older age categories of the population is complicated by their mutual interrelations, as well as by the relations to other age categories of the population under assessment. Such changes of age structure are considered as general patterns of population development in most countries.

Sauvy (1948) commented on population ageing as on a phenomenon that is the least debatable, easily measurable, and the most stable. He believed that age structure is subject to gradual changes, even in the case of unforeseen disasters. Today it is apparent that in the 1950s, the seriousness of the process of population ageing was not sufficiently foreseen. Currently the stage of population development of most developed countries is the rapid – and for most observers alarming, level of population ageing. On the other hand, the positive aspect of population ageing is considered to be the continuous increase of the quality of life, manifested specifically in increased life expectancy. In Slovakia, life expectancy in 1950 was 59 years for males and 63 years for females. In the Czech Republic it was 62 years and 67 years respectively. By 2009, these indicators had increased in Slovakia to 71.3 years (and to 74.2 in the CR) for males and 78.7 years (and 80.1 in the CR) for females. Also during the 20th century, in Slovakia the population category of 65 and over increased 4.2-fold (while the total population increased only 1.8-fold) and its proportion increased from 5.3% to 12.3%. In the Czech Republic between 1920 and 2009, the total population increased 1.1-fold, and the 65 and over population increased 2.5 times, while the proportion of this population group increased from 6.2% to 15.0%.

The object of this research is to compare the changes in the age structures of the population of the Czech Republic and Slovak Republic, The aim was to identify the process of population ageing in Slovakia and the Czech Republic using two approaches: temporal and spatial. The time period for the temporal analysis was selected based on the availability and comparability of data from 1920 to 2025[1]. The spatial analysis at the country level deals with the ageing process and changes between 1996 and 2009. Both populations under observation were part of a single common state for an extended time (except for the period 1939–1945). The population of these countries was thus affected by a uniform population policy, "which sought to increase or at least maintain an adequate level of fertility and establish conditions to enable the reduction of mortality" (Kučera, 1968). Despite the common approach of both countries, certain differences in their population development can be observed. During the entire period, the population of the Czech Republic responded to external reproduction stimuli (economic, psychological, etc.) faster than the population of Slovakia (Andrle, Srb, 1983). Our analysis will demonstrate the degree to which this difference was reflected in the population ageing processes.

2. Theoretical backgrounds

There is a wide range of methods available in Slovak as well as wider literature to measure the parameters of population ageing, or to measure the changes in the age structure of the population. Our method was based on the traditional measurement of the population ageing process through the proportion of selected age groups, the ageing index, Billeter index[2] and similar (Pavlík et al., 1986; Mládek et al., 2006; Pavlíková, Mládek, 1999; Káčerová, 2009; Ondačková, 2011; Mládek, Káčerová, 2008; Mládek, 2004; Verešík, 1974; Michálek, 1995). The application of very frequently used indicators of ageing – the ageing index and Billeter index – enables a preliminary assessment of ageing in both populations over the course of the century (Fig. 1). In particular, characteristic features appear such as the similarity between the population ageing process in the Czech Republic and the Slovak Republic (almost parallel curves). Along with the obvious similarity, there is also the advance of the Czech Republic in the development of the indicator that was accentuated in the 1930s. Until the beginning of World War II, the Czech Republic was closer to the western type of family behaviour as described by Hajnal line (Rabušic, 2001), while the Slovak Republic was closer to the eastern model. Since the age of marriage in the western type of family behaviour was high and sexual intercourse before marriage was strongly discouraged, the age at first birth was also high as a consequence. In the Czech society between the wars, the preference was for only one child (Roubiček, 1997), while in Slovakia, a family model with two or more children was preferred.

The analysis of the age structure of the population and its ageing using sophisticated instruments is a crucial work part of this study. The indicators are based on a comparison or substitution of the selected population groups, most often generation groups – generations associated with certain major demographic, economic and social processes and functions. These may be generations with a major reproduction function, generations of the economically active population, generations with the function of education and social support (Długosz, Kurek, 2009; Hrubý, 1996; Lutz, 2006; Qiao, 1988).

The evaluation of the process of population ageing, or the level achieved by using these tools, requires more detailed data on age structures, and the interpretation of the acquired information is sometimes quite difficult.

[1] For both populations it applies that 1920–2009 are the real age structure, while for the SR 1921–1930 are from the census records. For 2010–2025 we used a population forecast.

[2] Billeter index = [(Population (0–14) – Population (50+)) / Population (15–49)] × 100

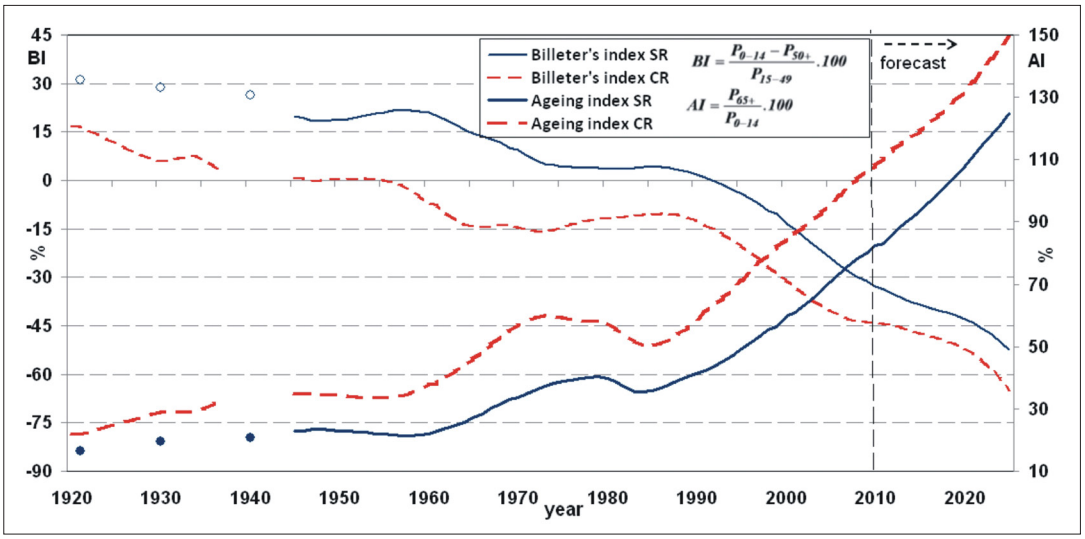

Fig. 1: Development of population ageing indices in CR and SR (1920–2025)
Source: Statistical Office of SR (1946–2010, 2006), Czech Statistical Office (2009, 2010a), Bleha, Vaňo (2007)

From the economic aspect, the quantitative relation between the age categories of productive and post-productive population is very important. This is expressed by the *Index of potential economic support* – I_{pes}.

$$I_{1pes} = \frac{P_{15-64}}{P_{65+}} * c \qquad I_{2pes} = \frac{P_{20-64}}{P_{65+}} * c$$

If we substitute 100 for c, then the index represents the number of people in the productive age, per 100 people in the post-productive age. The index can be defined and used in two modifications. In the first case I_{1pes} is used on the basis of statistical data for the productive population aged 20–64 and in the second case – I_{2pes} is based on data for 15 to 64 year olds. Both indicators have a similar trend. If we use the number of economically active individuals as the numerator and the number of pensioners as the denominator, the index would represent the number of working individuals per 100 nactive individuals (pensioners).

The category of the productive population is generally considered very important socio-economically, which is why we need to assess its changes as younger generations enter the category of productive population, and older generations leave it (Hrubý, 1996; Káčerová, 2009).

$$C_i = \frac{P_{10-14}}{P_{15-64}} * c \qquad C_o = \frac{P_{60-64}}{P_{15-64}} * c \qquad C_e = \frac{P_{10-14}}{P_{60-64}} * c$$

C_i – coefficient of inflow, C_o – coefficient of outflow, C_e – coefficient of exchange

Very often the emphasis is put on the substitution of certain important social age groups. Długosz, Kurek (2009) consider the 85+ age category to be one of such important social groups. Usually this age category is associated with the need for special care, social or family support. With respect to certain demographic trends and life expectancy of the Slovak and Czech population we have reduced this age limit to 80 years. With such a modification, the *index of potential social support* (parents) looks as follows:

$$I_{ss1} = \frac{P_{80+}}{P_{50-64}} * c \qquad I_{ss2} = \frac{P_{85+}}{P_{50-64}} * c$$

Index (I_{ss1}) represents the number of individuals in the 80+ age group per 100 individuals aged 50–64. This ratio can be viewed as a relationship between the generation of parents and their children and as a potential possibility of direct inter-generation assistance.

Dynamic population ageing metrics attempt to compare the size of the age groups that enter or leave the important age categories of the population at a certain time. The dynamic index of economic ageing of the productive population is used to compare the population entering with the population leaving the category of productive population (Długosz, Kurek, 2009).

$$I_{ead} = \left[P_{(0-14)t} - P_{(0-14)t+n}\right] + \left[P_{(65+)t+n} - P_{(65+)t}\right]$$

I_{ead} – dynamic economic ageing index, $P_{(0-14)t}$ – share of population aged 0–14 at the beginning of the study period, $P_{(0-14)t+n}$ – share of population aged 0–14 at the end of the study period, $P_{(65+)t+n}$ – share of population aged 65+ at the end of the study period, $P_{(65+)t}$ – share of population aged 65+ at the beginning of the study period

I_{ead} represents the speed of the population ageing process. If the index assumes positive values, it means that the population is growing older (an unequivocal

sign is the positive difference between both age categories, demonstrating that each subsequent generation of 0 to 14 years is smaller than the previous one and at the same time each subsequent generation of 65 and over is larger than the previous one). The larger the value of I_{ead}, the faster is the process of ageing. If the index assumes negative values, this indicates that the population is rejuvenating.

If we were to assess the changes of the population age structure with respect to reproduction, we should use the modified indicator – *dynamic reproduction ageing index*.

$$I_{rad} = \left[P_{(0–14)t} - P_{(0–14)t+n}\right] + \left[P_{(15–49)t+n} - P_{(15–49)t}\right]$$

I_{rad} – dynamic reproduction ageing index, $P_{(0\text{-}14)t}$ – share of population aged 0–14 at the beginning of the study period, $P_{(0\text{-}14)t+n}$ – share of population aged 0–14 at the end of the study period, $P_{(15\text{-}49)t+n}$ – share of population aged 15–49 at the end of the study period, $P_{(15\text{-}49)t}$ –share of population aged 15–49 at the beginning of the study period.

3. Temporal aspect

The development of all *indices of potential economic support* I_{pes} shows a decline, demonstrating the ageing of the population in both countries. Worth noting are the almost parallel curves, indicating the similarity of population development in both countries. In the early 1920s, the ratio of the post-productive to productive population was one to 8.9 and 11.6 respectively (Fig. 2). During the first half of the 20th century, there was a slow decline in these indicators to 7.5 and 10. By 1990, the values of these indicators had decreased to 5 and 6, and then stabilized over the next 20 years. The forecast of future development shows that the declining trend will be resumed, reaching the value of 2.6 to 3.5 in 2025. The only period of rejuvenation of both populations in terms of this indicator was the period 1980–85, when the smaller population born during World War I was entering the post-productive age. The graphical interpretation of the development of I_{pes} values clearly demonstrates that in all of these periods the Czech population was ageing markedly faster than the Slovak population. At the same time, both populations are converging in terms of the ageing rate (the index interval in 1950 was 1.6 and 1.2, and in 2025 the values are expected to reach 0.7 and 0.6 respectively).

The *coefficient of inflow* represents the number of individuals in the age category 10–14 entering productive ages. Overall, the inflow coefficient in both populations is declining, which means a decrease in the inflow of young population to the productive age category (Fig. 3). In 1920, there were 17–19 persons aged 10–14 years per 100 of the working population. A significant decline in this indicator can be observed in the early 1930s, when the age group 10–14 included the smaller populations from the period of the First World War. But even discounting this negative deviation, a declining trend in the inflow coefficient can be observed, reaching 10–16 in the 1950s. This was followed by a short-term increase as a result of increased fertility after 1938, due to the closure of universities, the abolition of military service, as well as the fact that pregnancy and early motherhood was a protection of sorts against total deployment in Germany (Fialová, 1991). Moreover, the mothers of young children were protected from deployment as labour, and last but not least, young families had a better food supply (Srb, 2004). The declining trend was more recently interrupted only in the 1980s, thanks to successful pronatal measures in the 1970s, which resulted in the growth of the pre-productive age category of the population. By 2009, the inflow coefficient was reduced to 6–7 (of 10–14-year olds per 100 of the working population). At the same time, we can observe the convergence of the Slovak and Czech populations as a result of low fertility in both countries in the 1990s, which resulted in very low values of this indicator (coefficient of inflow) by the end of this period. Throughout the entire reporting period, the inflow coefficient was higher in Slovakia – reflecting the higher birth rate of the Slovak population. According to the population forecasts, the situation will change after 2015.

The *coefficient of outflow* represents the movement out of 60 to 64-year olds from the productive age category to the post-productive population. The curves demonstrate the growing trend in both populations, but there is a significant reduction in 1976–81 when the less numerous generations born during the First World War (Fig. 3) were entering the 65 and over age category. The higher value of the coefficient for the Czech population demonstrates the faster ageing of the Czech population – except for the forecast period after 2010.

The *coefficient of exchange* expresses the changes in the proportion of "incoming" to and "leaving" from the productive population. During the period of interest, the situatiоn changed dramatically. At the beginning of the century the exchange coefficient reached 300 to 359%. Since the coefficient of outflow in this period was stabilized, the development was in line with the trends of the inflow coefficient. In the 1950s, the ratio of "incoming" to "outgoing" population was 1.5–3. The decline was interrupted only at the end of the 1970s when the generations born during

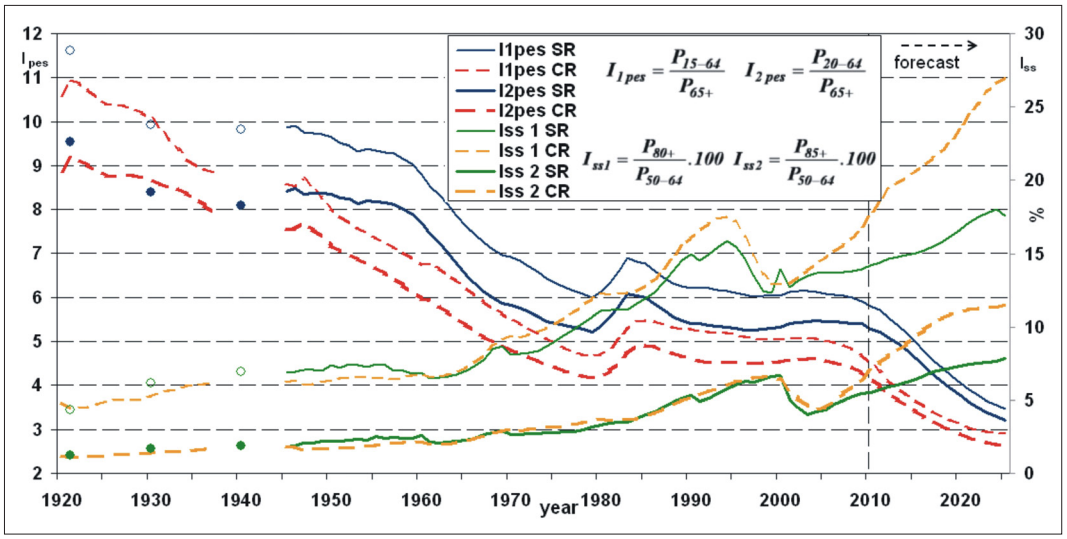

Fig. 2: Index of potential economic support and potencial social support in CR and SR (1920–2025)
Source: Statistical Office of SR (1946–2010, 2006), Czech Statistical Office (2009, 2010a), Bleha, Vaňo (2007)

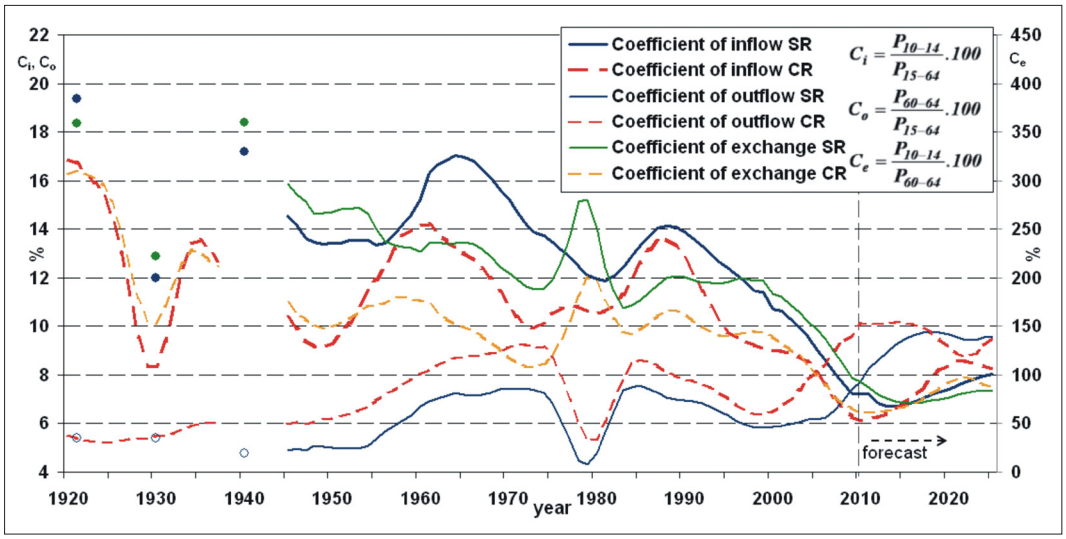

Fig. 3: Coefficient of inflow, outflow and exchange in CR and SR (1920–2025)
Source: Statistical Office of SR (1946–2010, 2006), Czech Statistical Office (2009, 2010a), Bleha, Vaňo (2007)

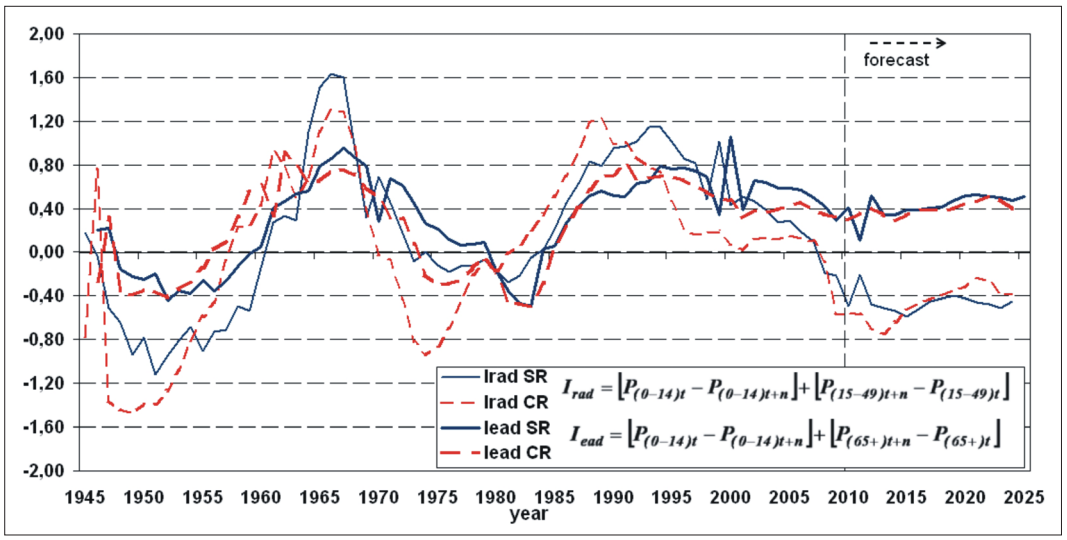

Fig. 4: Dynamic economic ageing index and dynamic reproduction ageing index in CR and SR (1945–2025)
Source: Statistical Office of SR (1946–2010, 2006), Czech Statistical Office (2009, 2010a), Bleha, Vaňo (2007)

the First World War were leaving the productive ages, and the first generations born during the years of increased birth rate began to enter the workforce. At present the inflow of the young population groups does not compensate for the outflow (94% for the Slovak and 65% for the Czech population), with a slightly increasing trend (Fig. 3).

Development in the ratio of the generation of "parents" (80+) to the generation of their "children" (50–64 years) confirms the ageing of the population in Slovakia and the Czech Republic through the *social support index*. At the beginning of the subject period, this indicator was at the level of 4–5 with a slight upward trend, and thus in the 1950s for 100 individuals in the generation of children there were only 7 parents. By 1980, the index had risen to 11, and in 1993, it was 17–18 (Fig. 2). The most significant factor was reduced mortality associated with so-called premature deaths (before the age of 65), which was disproportionately high in the Czech Republic in comparison with developed countries (Dzúrová, 2001). The reduction of the social support index since 1994 (to the level of 12–13) is associated with the transition of the smaller generations born during the First World War into the 80+ age category. In recent years, the value of this index has increased to 14%, and according to demographic forecasts, it should reach 18% in Slovakia and increase to almost 28% in the Czech Republic by 2025.

Dynamic economic ageing indices of the Slovak and Czech population reflect the characteristic changes in both age categories (0–14 year olds, 65 and older), and alternating periods of population ageing and rejuvenation (Fig. 4). Periods of population rejuvenation can be observed in the 1950s and 1970s, where the main factor was mainly increased fertility. Accelerated population ageing was observed in the 1960s and from the end of the 1980s. More recently, the ageing process has been affected especially by reduced fertility (bottom-up ageing), resulting from strong individualism, and the mass spread of (hormonal) contraception. Moreover, the situation was intensified by social insecurity, growing unemployment and an unfavourable economic situation, particularly in the area of independent housing (Mládek et al., 2006). In 1980, the proportion of the population in the 0–14 age category (children) was 26.1% in Slovakia (in the Czech Republic 23.3%), and the proportion of 65+ age category was 10.4% (CR 13.5%). By 2009, the proportion of children category in Slovakia was reduced to 15.3% (14.2% in the CR), and the proportion of 65 and over increased to 12.3% (15.0% in the CR). The positive values of I_{rad} indicate the faster reproductive ageing of the population. There is a decline in the proportion of children (potential for reproductive category) and the reproductive age category. In the case of negative values I_{rad}, the reproductive rejuvenation of the population occurs.

The development of reproductive ageing in both countries is of a cyclical nature (Fig. 4), reflecting the development cycles of fertility and the subsequent rise or fall of the proportions of the reproductive category. The first is during the 1950s with the rejuvenation of the population mainly as a result of high fertility. In the 1960s it was replaced by the ageing of the population, resulting from declining fertility which was a consequence of both the global economic crisis and the passing of a more liberal abortion law. During this period, the Czech Republic had even seen a decline in total fertility, gross and net reproduction rates below replacement level. Another period of population rejuvenation was observed in the 1970s and the first half of the 1980s, reflecting the increase in fertility, and the influx of the more numerous generations from the 1950s into the reproductive age category. A new ageing period is observed in the late 1980s and 1990s, mainly due to a sharp decline in fertility. More remarkable is the reduction of the rate of ageing in recent years with even the hint of rejuvenation in both populations. Apart from a slight recovery in fertility, these changes have to be attributed to the numerically large generations born in the 1970s, representing increased reproductive potential. The reduction of this indicator is also strongly affected by the transfer of post-war baby-boomers to the post-reproductive age group.

4. Spatial aspects of population ageing

The transformation of the population age structure towards ageing over time is characterised by significant regional differences. The significant differences in ageing at the global level, especially the differences between the population of the developed and less developed countries are well known. Socially developed countries experienced faster processes of ageing, which result in particular economic and social issues. There are also considerable regional differences in ageing among developed European countries (Pavlíková, Mládek, 2001; Káčerová, Bleha, 2007).

Potential economic support of the population was assessed at district level in the period between 1996 and 2009. In the observed years, the index remained unchanged on average, and certain similarities can be observed in regional distribution. The trend is affected especially by a higher fertility rate in recent years, and the resultant growth of the population of working age. Historically, the most youthful districts (north-western districts of the Czech Republic and the north-eastern districts of the

Slovak Republic) had the highest values of the index of economic support, and districts with advanced ageing had the lowest support index. There is a significant influence of the young Roma population age structures in the north-eastern and some southern districts of the Slovak Republic (Pukačová, Mládek, 2012). However, there are certain exceptions. One of these is the Prague-West District, which in 1996 was among districts with very low values, while in 2009 it had the most favourable figures, especially thanks to the extension of the Prague region (Fig. 5, Tab. 1). In both populations, low values are also characteristic of regions with high unemployment and for regions less attractive to the economically active population – peripheral Czech inland districts and the districts of southern Slovakia.

The index of potential social support also demonstrates the process of ageing and its varying regional manifestations (Fig. 6, Tab. 2). The comparison of spatial differentiation in 1996 and 2009 points to only slight changes, and in many districts the index of potential support of "parents" and their "children" remains very similar. However, while in the Czech Republic there was a further increase in the index of potential social support, Slovakia saw a slight decline. In the Czech Republic the lowest values were observed especially in those districts with a lower life expectancy – the northwest border regions. This negative state is attributed by Andrle and Srb (1983) to the adverse ecological conditions in these districts. Lower life expectancy is a result of higher unemployment and lower education levels. A low proportion can also be observed in the Moravian-Silesian region with a similar physical and social environment. The highest values were recorded in the districts of large cities (Prague, Brno, Hradec Králové), probably due to the concentration of educated people who care for their health and where health care is more available. The districts of Slovakia where historically there is the highest proportion of elderly people (regions Trenčín and Nitra) unsurprisingly also have the highest level of the potential social support index.

Regional differences in ageing impact individual districts in the Czech Republic and Slovakia quite considerably. The rate of ageing was evaluated using the dynamic economic ageing index in the period 1996-2009. Although the Czech population began the subject period with a significantly older age structure, in general, the Slovak population was ageing faster. At the same time, while in the case of the Slovak Republic the population ageing was evident in all districts, in the Czech Republic, there was a rejuvenation of the population in two districts (Prague-West and Prague-East). Lower values are characteristic of the entire region of Prague and Central Bohemia. This region is marked by the emigration of the post-productive population (freeing their residences for their descendants), as well as the immigration of the productive population seeking job opportunities. In contrast, the lack of jobs following the social and economic transformation in the Moravian-Silesian region has resulted in faster ageing. In Slovakia, the above average rate of ageing is observed in the western part of Slovakia, with the exception of the wider Bratislava region. The districts of northern and eastern Slovakia are the second significant geographical area. Different rate of ageing is reflected in the complex relations of the increase (decrease) of the young age group, and an increase (decrease) of older age groups (Fig. 7, Tab. 3).

Lowest Slovak Republic				**Lowest Czech Republic**			
District	**1996**	**District**	**2009**	**District**	**1996**	**District**	**2009**
Sobrance	3.4	Medzilaborce	3.6	Jičín	3.8	Brno-City	3.7
Medzilaborce	3.4	Sobrance	4.2	Praha	3.8	Pelhřimov	3.7
Krupina	3.9	Turčianské Teplice	4.2	Nymburk	3.9	Písek	3.7
Turčianské Teplice	4.0	Nové Mesto n. V.	4.3	Praha-západ	4.0	Hradec Králové	3.8
Poltár	4.1	Myjava	4.4	Kolín	4.0	Pilsen-City	3.8
Highest Slovak Republic				**Highest Czech Republic**			
Spišská Nová Ves	6.7	Stará Ľubovňa	6.3	Český Krumlov	6.1	Pratur-West	5.3
Poprad	6.7	Spišská Nová Ves	6.4	Česká Lípa	6.1	Český Krumlov	5.3
Námestovo	7.1	Tvrdošín	6.8	Chomutov	6.1	Chomutov	5.4
Tvrdošín	7.4	Kežmarok	7.2	Tachov	6.3	Tachov	5.4
Košice	7.4	Námestovo	7.7	Sokolov	7.0	Česká Lípa	5.4
average SR	**5.3**	**average SR**	**5.4**	**average CR**	**4.5**	**average CR**	**4.3**

Tab. 1: Extreme attributes of the potential economic support index
Source: Statistical Office of SR (1997, 2010), Czech Statistical Office (1997, 2010b)

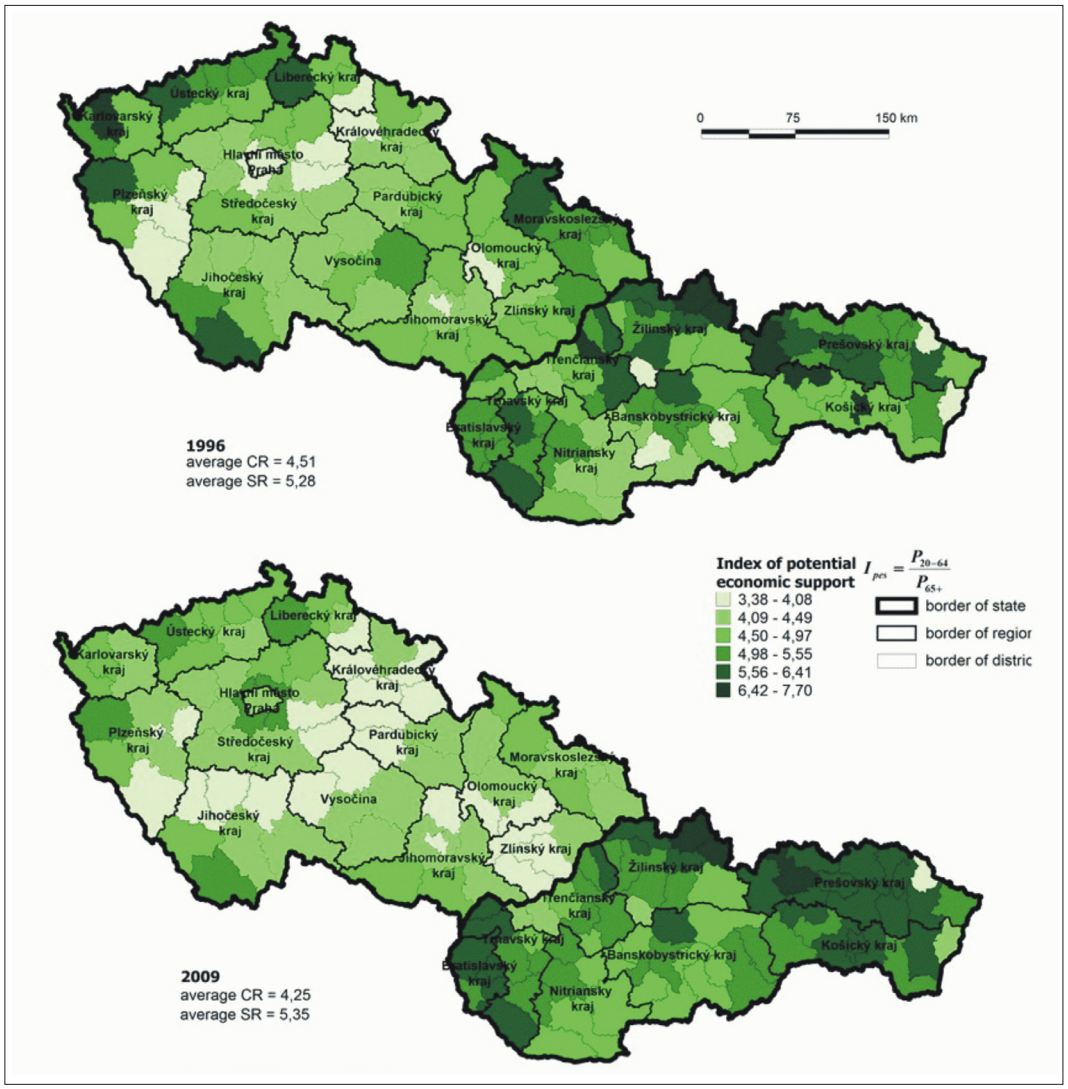

Fig. 5: Index of potential economic support in Czech Republic and Slovak Republic in years 1996 and 2009
Source: Statistical Office of SR (1997, 2010), Czech Statistical Office (1997, 2010b)

Lowest Slovak Republic				Lowest Czech Republic			
District	**1996**	**District**	**2009**	**District**	**1996**	**District**	**2009**
Košice	10.1	Tvrdošín	10.9	Sokolov	7.2	Tachov	11.0
Tvrdošín	10.3	Košice	11.0	Most	9.9	Sokolov	11.1
Ilava	10.4	Dunajská Streda	11.2	Tachov	10.2	Chomutov	11.6
Kysucké N. Mesto	11.0	Ilava	11.3	Karlovy Vary	10.5	Česká Lípa	12.1
Dunajská Streda	11.2	Spišská Nová Ves	11.3	Chomutov	10.8	Český Krumlov	12.1
Highest Slovak Republic				**Highest Czech Republic**			
Banská Štiavnica	18.8	Poltár	17.5	Nymburk	19.2	Prostějov	19.2
Poltár	19.2	Nové Mesto n. V.	17.6	Prostějov	19.4	Hradec Králové	19.5
Liptovský Mikuláš	19.2	Turčianske Teplice	18.5	Třebíč	19.9	Semily	19.5
Krupina	20.1	Sobrance	21.8	Vyškov	21.0	Prague	20.9
Turčianske Teplice	22.4	Medzilaborce	23.4	Jičín	21.6	Brno-City	21.8
average SR	**14.6**	**average SR**	**13.9**	**average CR**	**15.5**	**average CR**	**17.1**

Tab. 2: Extreme attributes of the potential social support index
Source: Statistical Office of SR (1997, 2010), Czech Statistical Office (1997, 2010b)

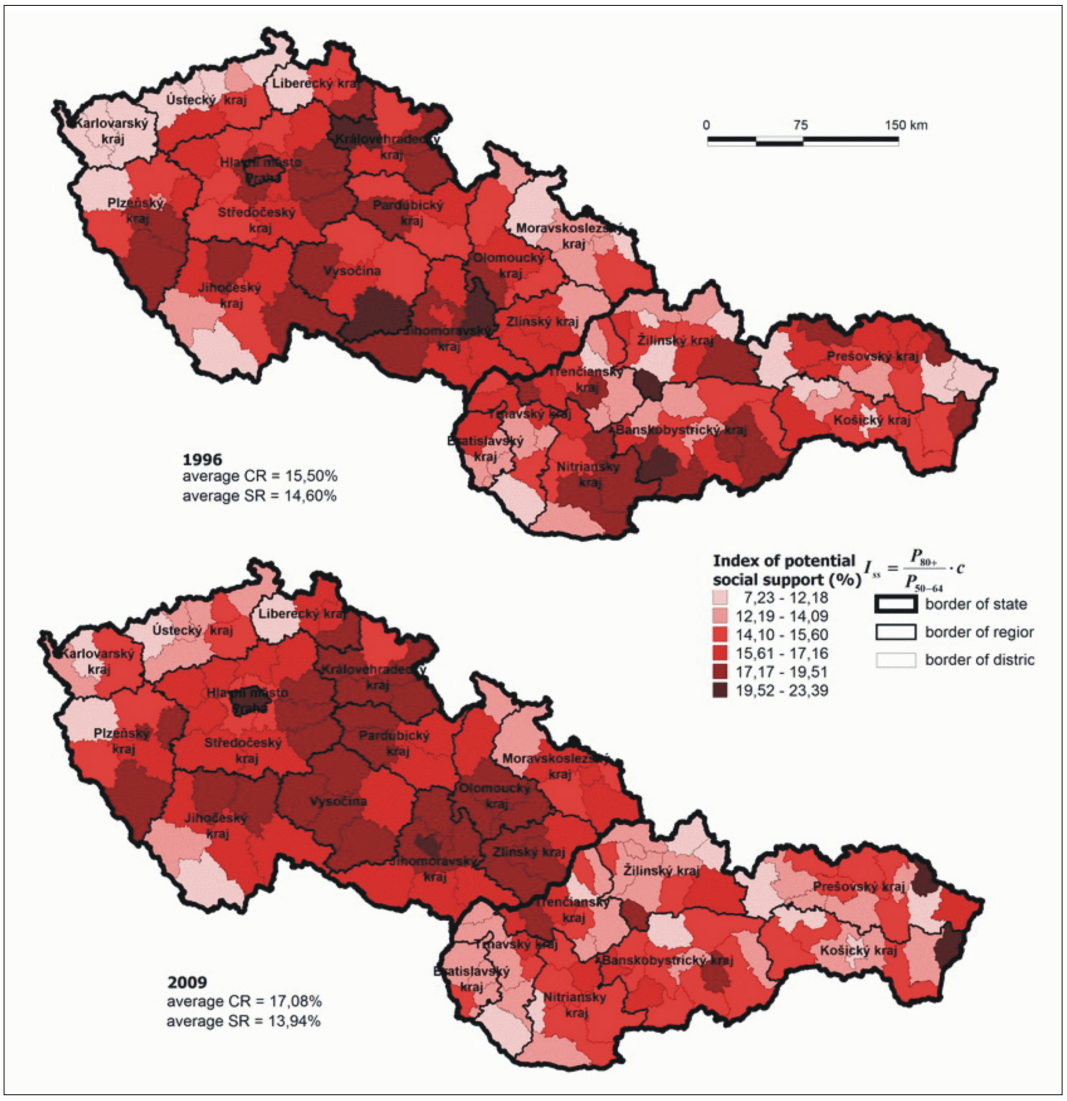

Fig. 6: Index of potential social support in Czech Republic and Slovak Republic in years 1996 and 2009
Source: Statistical Office of SR (1997, 2010), Czech Statistical Office (1997, 2010b)

Lowest Slovak Republic		**Lowest Czech Republic**	
District	**1996**	**District**	**1996**
Košice - okolie	3.1	Prague-West	−4.3
Rimavská Sobota	3.2	Prague-East	−2.6
Senec	3.4	Nymburk	0.8
Sobrance	3.4	Beroun	2.3
Krupina	4.0	Prague	2.6
Highest Slovak Republic		**Highest Czech Republic**	
Košice	10	Jeseník	8.1
Humenné	10.7	Bruntál	8.2
Prievidza	10.8	Žďár nad Sázavou	8.7
Považská Bystrica	11.3	Sokolov	9.3
Ilava	12.6	Karviná	9.4
average SR	**7.5**	**average CR**	**5.4**

Tab. 3: Extreme attributes of the dynamic economic ageing index
Source: Statistical Office of SR (1997, 2010), Czech Statistical Office (1997, 2010b)

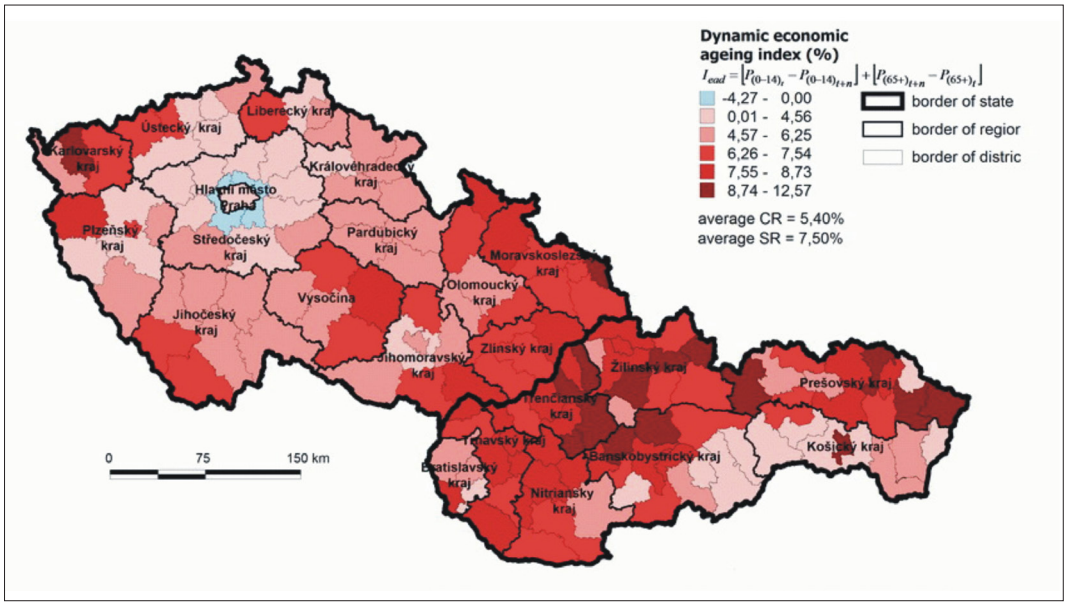

Fig. 7: Dynamic economic ageing index in Czech Republic and Slovak Republic in years 1996–2009
Source: Statistical Office of SR (1997, 2010), Czech Statistical Office (1997, 2010b)

In order to simplify the information on both populations at the regional level (Fig. 8), a simple combination of the index of ageing and the dynamic economic ageing index was chosen. Their respective values in the districts were compared with the average figures of both indicators, determined as the average of both populations (Czech Republic and Slovak Republic). This resulted in the identification of 6 types of regional populations (according to Długosz, Kurek, 2006).

In general, it can be stated that the Czech Republic has more districts with older populations, while in Slovakia, there is a larger number of more youthful age districts. A population ageing index with a below-average index of ageing can be observed in the Czech Republic in the north-western border, this is a result of past migration trends from Bohemia and Slovakia. The incoming immigrants had a higher fertility level, which was then maintained in subsequent generations (Bartoňová, 1999). Districts in the Czech Republic mainly age at a slower rate, while the Moravian and Silesian districts are characterized by higher values of the dynamic index of ageing. The positive impact of the capital city Prague means that the districts of Prague – both West and East – have a unique position with their younger age structure and a trend towards rejuvenation. A similar effect can be observed in the suburban area

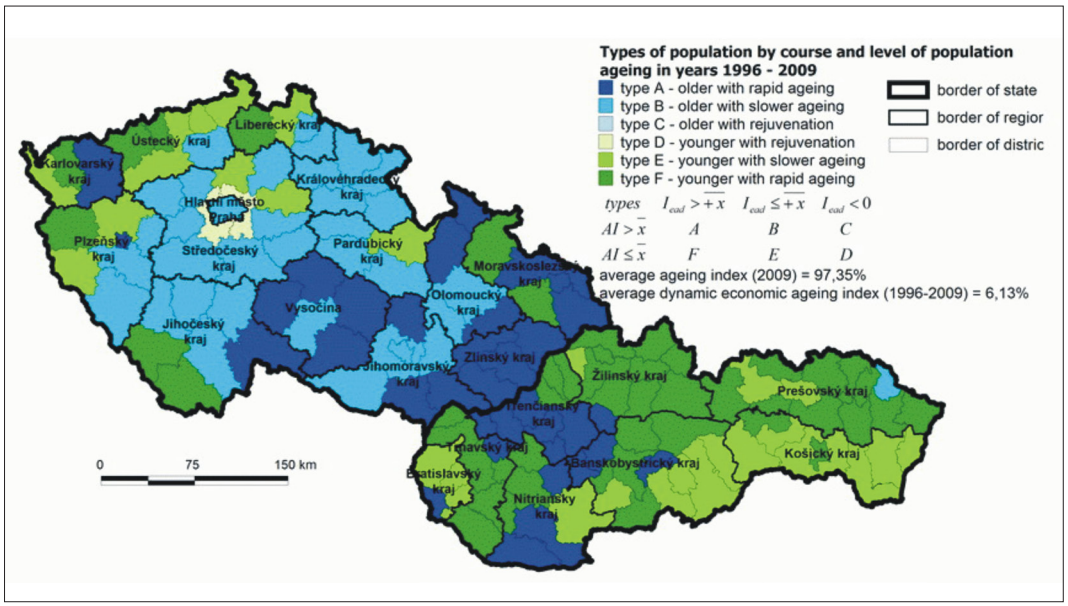

Fig. 8: Types of districts of Czech Republic and Slovak Republic according to population ageing in years 1996–2009
Source: Statistical Office of SR (1997, 2010), Czech Statistical Office (1997, 2010b)

of Bratislava, where the population is ageing as well, but at a slower rate. A lower dynamic ageing index is also characteristic of south-eastern districts of Slovakia. In contrast, most districts of the Slovak Republic demonstrate higher values of the dynamic ageing index. The exceptions are districts in the Trenčín region with an above-average index of ageing.

5. Conclusion

In order to explore the processes involved in the population ageing intensively, a number of methods and techniques have been used. The new ones include an attempt to compare the number and proportion of major age categories. Some of them compare the pre-reproductive and post-reproductive categories of population and thus provide the knowledge about the development of the reproduction environment with respect to the exchange of generations. A set of indicators compares the productive population groups and provides information about the growing category of young age groups, as well as changes in the numbers of older age groups (retired persons). Mutual relations of these population ages introduce irreplaceable knowledge for the whole economic sphere. The quantitative relationship of "parents" and their "children" is important for the social welfare (security). Especially for the older age population groups such comparisons provide some idea of intergenerational support or care.

The comparison of ageing indicators in the CR and SR shows an exceptionally high degree of similarity. If the processes of population ageing such as changes of age structure are to be assessed comprehensively, then their similarity has to be sought in similar population and social processes in the CR and SR. The historical development of the reproductive population, in particular, showed the significant effects of the First World War, the economic crisis in the 1930s, and the effects of the Second World War (mainly post-war increase in fertility). A uniform population and family policy in the former Czechoslovakia (prenatal measures in the 1970s, social transformation in the early 1990s) influenced demographic behaviour too. Surprising may be also the similarity of population development forecasts, which reflect a certain inertia of future developmental trends.

In addition to the similarity of development processes of ageing we can also observe certain differences between the CR and SR. Each population has its own individual demographic behaviour, which reflects their distinctive historical, cultural and political conditions. The ageing of the population in the CR started earlier than in Slovakia, and the process is more intense. This can be observed on the basis of the development of the ageing index and the development of the Billeter´s indexes (Fig. 1).

The same results are demonstrated by the used indicators of generation substitutions, too. The indexes of potential economic support show the same geographical differences. In 1996, the level of this indicator was comparable in both countries, about 13 ears later there were significant differences. The level of potential economic support in the CR has clearly decreased, while in many districts of Slovakia it has slightly increased.

Regional differences in population ageing are also the result of long-term migration trends, especially the young population's migration to urban areas (urbanization). It is mainly caused by the concentration of employment opportunities at places of many economic activities. However, the opposite directions of migration occur as well, especially the population of large cities often moves into rural villages (suburbanisation).

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