AGEING OF POPULATION OF PRODUCTIVE AGE IN THE CZECH EPUBLIC

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Abstract

The continuing ageing of the population is a theme frequently discussed not only by demographers. There is often talk, for example, of the consequences of the ageing of the population for the pension system or the financing of health care.

A somewhat neglected fact is the ageing of the labour force. The raising of retirement age may indeed lead to the preservation of the proportion of persons of productive age in the population, but their age structure will change. The number of new school-leavers entering the labour market will drop and the extension of working activity to an increasingly higher age can be expected both in the case of males and especially in the case of females.

The article includes a projection of the development of the age structure of persons of productive age with different variants based on the latest available data. In all variants of development the labour force will be ageing. The proportion of younger workers will decline; whereas the proportion of employees over the age of 50 years will increase relatively strongly.

Key words: demographic development, population projection, ageing of the population, productive age, retirement age

JEL Code: AO, BB

Introduction

The continuing ageing of the population is a phenomenon concerning all economically developed countries, including the Czech Republic. A reality that is somewhat neglected is the impact of population ageing on the number and age composition of persons of productive age. The raising of the retirement age may on one side contribute to preserving the number and proportion of persons of productive age in the Czech Republic on the other side it will accelerate the ageing of labour force.

The article includes an analysis of the development of the age structure of persons of productive age in the Czech Republic in the period 2010–2060 based on population projection with various variants of demographic development. As opposed to the standard definition

usually given, where the upper limit of productive age is considered to be 65 years, in this article this limit will be considered as the actual retirement age valid in the Czech Republic in the given year.

1 Projection and scenarios of its individual variants

The projection was calculated by the component method (Bogue, Arriaga & Anderton, 1993) with a simplified model of migration. We are considering only immigration where its volume in equal to the assumed net migration. The initial age structure was the sex-and-age composition of the population of the Czech Republic as of 1.1.2013 (the latest available data), which already reflects the results of the 2011 Census.

Due to the fact that mortality is relatively low at a productive age we considered only one (medium) variant for its future development. This assumes the further reduction of mortality for the entire period of the projection, but with the annual growth of life expectancy at births gradually dropping.

For fertility and migration we project three variants of development: low, medium and high. Whereas the low variant of the projection assumes the stabilization of both fertility and migration at a level slightly lower than present values, the medium variant assumes a light increase and the high variant a relatively strong increase in both fertility and migration, but late stabilization.

Tab. 1: Scenarios of the projection

Characteristic	Variant	2012[1]	2020	2030	2040	2050	2060
Life expextancy at births – males	medium	75,00	76,76	78,90	80,85	82,59	84,14
Life expextancy at births – females	medium	80,88	82,72	84,72	86,52	88,14	89,57
Total fertility rate	low	1,450	1,400	1,400	1,400	1,400	1,400
	medium	1,450	1,500	1,600	1,700	1,700	1,700
	high	1,450	1,550	1,700	1,850	2,000	2,000
Net migration	low	10 293	10 000	10 000	10 000	10 000	10 000
	medium	10 293	20 000	30 000	30 000	30 000	30 000
	high	10 293	25 000	50 000	50 000	50 000	50 000

Source: authors' assumptions

An overview of the individual variants of the projection is given in Tab. 1. Similar scenario was used for the projection of developenet of human resources in the Czech Republic (Fiala & Langhamrová, 2009). The assumed development of average life expectancy at births is roughly at the level of the high variant of the projection of Burcin and Kučera (Burcin & Kučera, 2010) and the medium variant of the projection of the Czech Statistical Office (ČSÚ,

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[1] Actual values

2009). The medium variant of migration and fertility is approximately at the level of the medium variant of the projection of Burcin and Kučera, whilst the range between the low and high variants was intentionally selected to be somewhat greater than in the prognoses mentioned.

1   Population development

In the medium variant the number of inhabitants of the Czech Republic in the next 50 years would remain at roughly the present level – around 10.5 million. According to the low variant the number of inhabitants would drop below 10 million around the year 2035 and by the end of the period of the projection would already be lower than 9 million. According to the high variant, on the contrary, the number of inhabitants would come close to 11 million in roughly 20 years of time and would reach 12 million around 2060. In all the variants, however, the number of births each year would be lower than the number of deaths. At the end of the projection period in the middle variant the annual natural decline would exceed 40,000, in the low variant it might even come close to 75,000. In the high variant it would amount to roughly 10,000 persons. In the medium variant the natural decline in the population would be relatively well compensated by immigration; in the high variant the number of inhabitants would even actually continue to grow thanks to immigration.

The main characteristics of the demographic development of the population of the Czech Republic on the basis of the given projection are shown in Tab. 2.

Tab. 2: Basic characteristics of population development according to projection

Characteristic	Variant	2012[2]	2020	2030	2040	2050	2060
Total population (as of 31.12.)	low	10 516 125	10 505 277	10 251 476	9 857 064	9 402 491	8 816 477
	medium	10 516 125	10 582 994	10 596 604	10 604 316	10 610 510	10 511 496
	high	10 516 125	10 621 968	10 831 555	11 176 885	11 623 934	12 035 003
Live births	low	108 482	89 106	71 390	76 999	65 207	54 599
	medium	108 482	96 403	86 407	102 513	93 896	87 949
	high	108 482	100 098	95 772	120 489	124 522	123 531
Natural increase	low	387	-20 317	-46 400	-50 069	-61 157	-74 201
	medium	387	-13 081	-31 663	-25 297	-34 042	-43 926
	high	387	-9 417	-22 495	-7 910	-4 730	-10 964

Source: authors' calculations

3   Development of the number of persons of productive age

A significant economic-demographic characteristic of every population is the number and proportion of the inhabitants of productive age, i.e. the number and proportion of potential labour force. Due to the fact that an increasing number of young people continue to further

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[2] Actual values

their studies after completing elementary school (which can be seen from the very low values of the levels of economic activity of those aged between 15 and 19 years), we shall consider the lower limit of the productive age to be not 15 years, but 20. The upper limit of the productive age will – as opposed to the often-used limit of 65 years – be considered as rising and equal to the retirement age at the given moment according to current legislation. For the sake of simplicity we shall assume that each woman has brought up 2 children (see Tab. 3). The idea of using increasing bound of ageing (instead of fixed limit 65 years) has been developed in Sanderson & Scherbov (2010).

Tab. 3: Retirement age according to current legislation (as of 1 January)

| Retirement age	2012	2020	2030	2040	2050	2060
Males	62 6/12	63 8/12	65	66 6/12	68	69 4/12
Females (with two children)	59 4/12	61 8/12	65	66 6/12	68	69 4/12

Source: authors' calculations based on Law No. 155/1995 Coll. (3)

With regard to the constant raising of retirement age the number of persons of productive age in the medium variant would remain at the present level for the entire duration of the projection – roughly around 6 million persons. In the low variant, however, the number of persons of productive age would begin to decline roughly in the middle of the thirties. At the end of the projection period it would only amount to just under 5 million persons, which would be roughly 20 % lower than at present. In the high variant, on the contrary, the number of persons of productive age would exceed 6.5 million (see Fig. 1).

The proportion of persons of productive age with regard to the total population would at first fluctuate around the present value of 58 %; in the second half of the projection period there would be a drop to around 54–55 % according to the variant of demographic development (see Fig. 2).

Both the number and proportion of the population of productive age would, then, be relatively stable, but its age structure would change. Because the development of the age structure does not differ too much in the individual variants, we shall concentrate only on the analysis of the medium variant development.
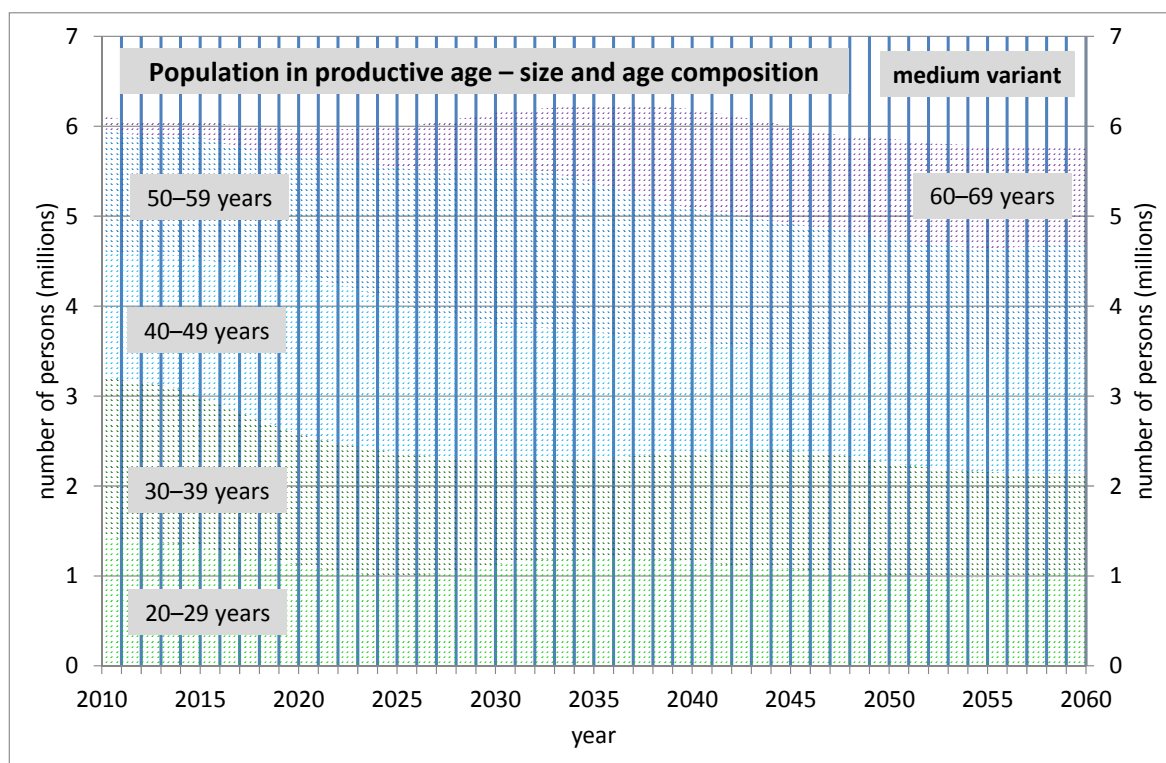
Fig. 1: Population in productive age
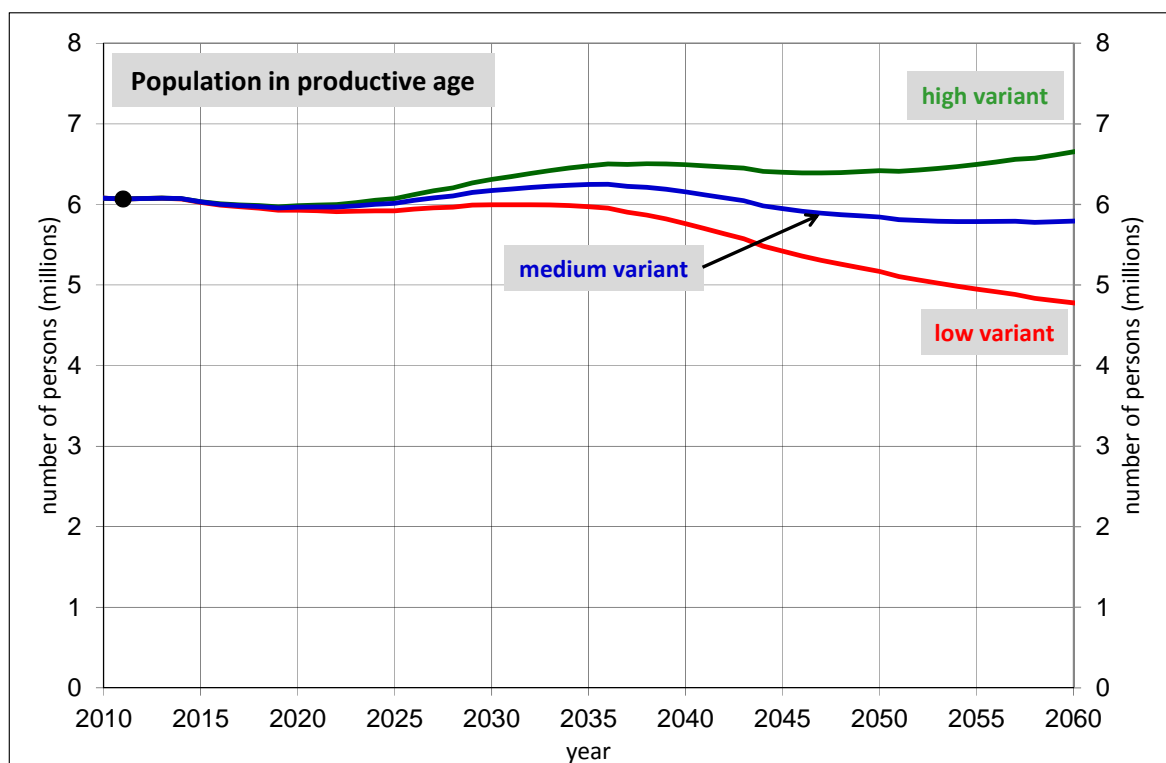
Source: authors' calculations

Fig. 2: Proportion of population in productive age
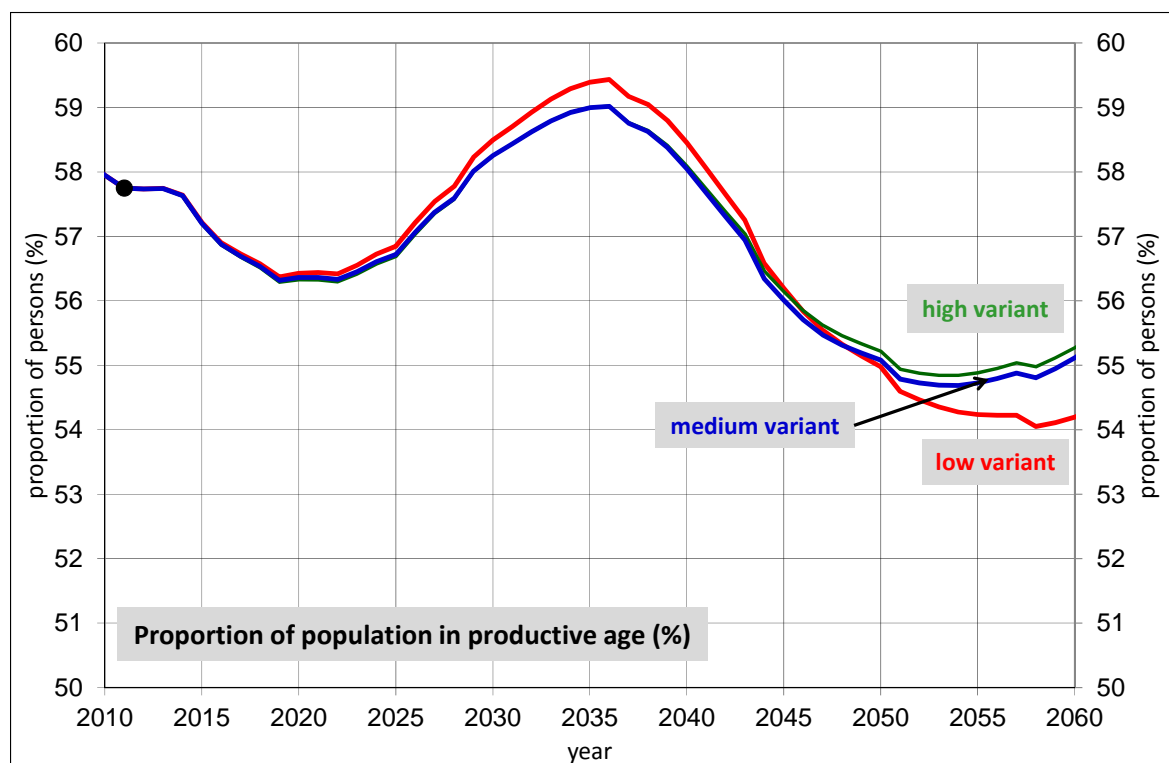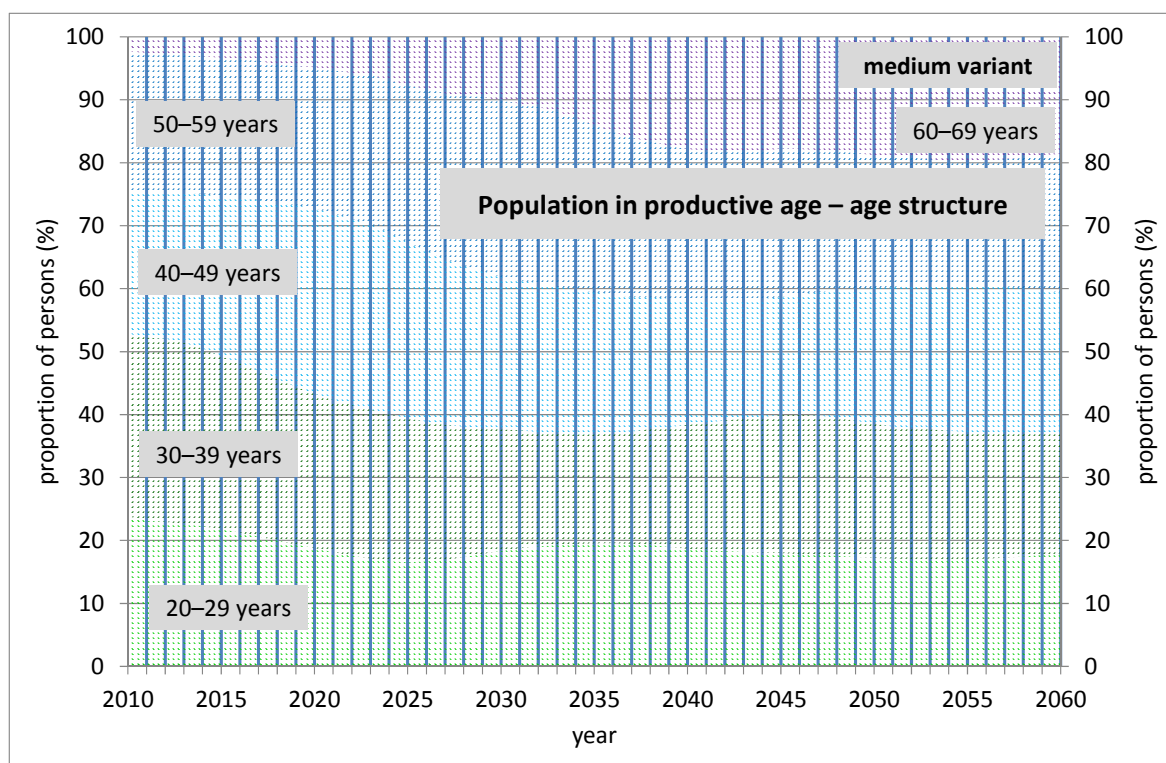

Source: authors' calculations

Fig. 3: Population in productive age – size and age composition

Source: authors' calculations

Fig. 4: Population in productive age –age structure
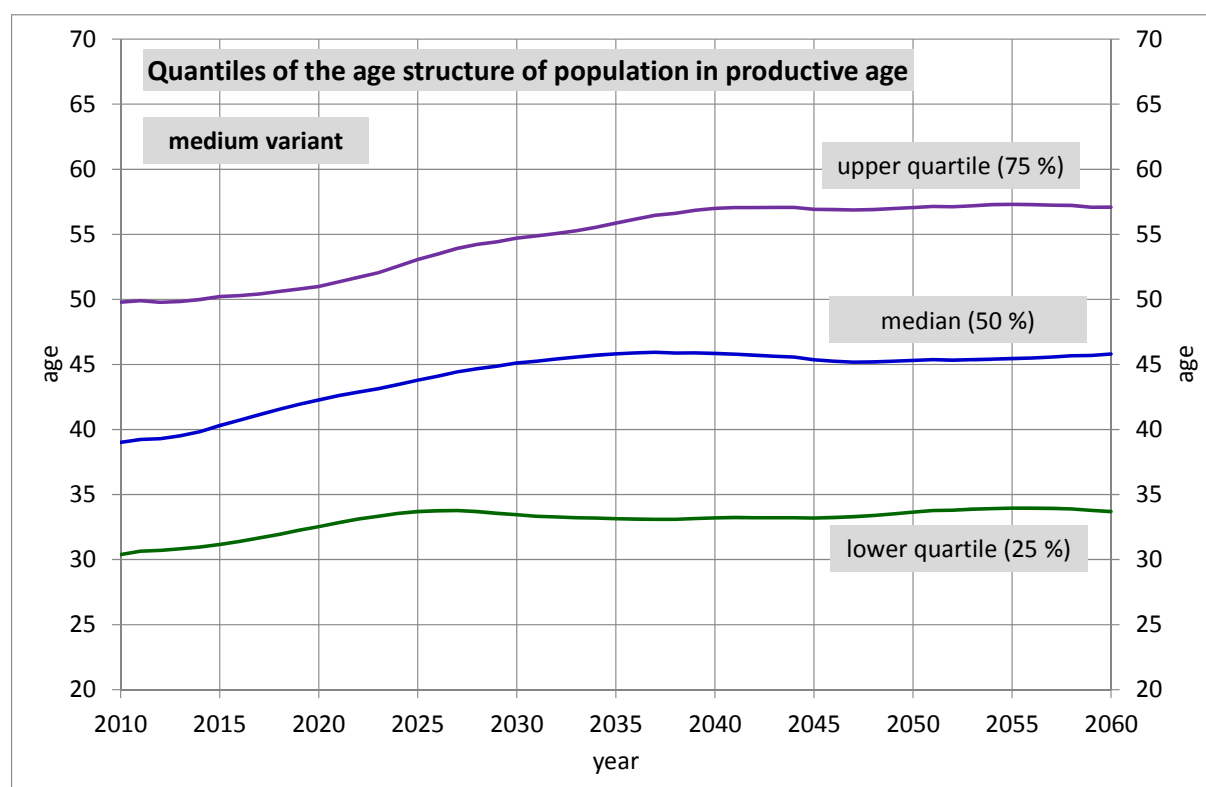

Source: authors' calculations

The total number of persons of productive age would fluctuate around 6 million. The number of the youngest group (20–29 years) would, however, drop in the course of 10 years from the present almost 1.4 million to a mere 1 million and would remain in the region of this value for the entire remainder of the projection period. We record an even stronger decline in those aged 30–39 years: from the present more than 1.7 million to a mere 1.1 million. The number of those aged 40–49 years will increase in the next decade, but will later drop to values somewhat lower than the present ones. We record a similar development trend in those in the 50-59 years group, where the increase will naturally take place roughly 10 years later than for the preceding age-group. The greatest increase will understandably occur in the group aged 60–69 years. Whereas at present the number of persons of productive age in this age group (i.e. persons who have not yet reached retirement age) is just below 200,000, at the end of the projection period it will be more than a million persons (see Fig. 3).

The population of persons of productive age will, then, age. The proportion of those aged 20–29 years will drop relatively quickly from the present more than 22.5 % to below the value of 20 %, and at the end of the projection period will be only just above 18 %. The proportion aged 30–39 years will also drop from the present almost 29 % gradually down to 19 %. The proportion aged 40–49 years will drop only slightly (from 24 to 22 %), the proportion aged 50–59 years, after a transitory increase, will return to the present roughly 22 %. The proportion aged 60–69 years will rise from the present 3 % to almost 19 % (see Fig. 4).

The ageing of the working-age population is also confirmed by the anticipated development of quartiles of the distribution according to age. The age median will increase in the course of the next 25 years from the present 40 years to almost 46 years. The first quartile will increase from the present 30.8 by almost 3 years, the third quartile from just below 50 years to more than 57 years. Apart from anything else, this means that whereas at present roughly half the persons of productive age are under 40 and three-quarters of them below the age of 50 years, around the year 2060 half of the persons of productive age will be aged 46 years or more and a quarter of them will actually be aged 57 years or more (see Fig. 5).

In the other variants of demographic development the given characteristics of age structure will not vary too much from the values for the medium variant. The value of the age median, for instance, will be just under a year higher in the low variant and in the high variant only just under a year lower compared with the medium variant.

Fig. 5: Population in productive age –age structure

Source: authors' calculations

Conclusion

With regard to the anticipated raising of the retirement age in the Czech Republic the number and especially the proportion of persons of productive age will not change too much. There will, however, be a relatively striking change in the age structure of the workforce, which will age. In the course of the next roughly 25 years the value of the age median of persons of productive age will rise from the present 39 years to roughly 46 years. The proportion of younger persons of productive age (those aged 20–39 years) will decline from the present more than 50 % to a mere 37 %. The proportion of those aged 60–69 years will increase six-fold: from 3 % to more than 18 %. These trends of population ageing can be partly reduced by increasing migration (Arltová & Langhamrová, 2010.)

Persons of productive age are only potential members of the workforce. The question is naturally whether there will be in the future sufficient suitable work opportunities for persons aged 60 and over, where a somewhat greater proportion will be women. Present development suggests rather the opposite: many people over the age of 50 years who lose their jobs now often find it very difficult to find new employment. On the other hand it is probable that, with the decline in the number of young people newly entering the labour

market, there will be an increase in the number of jobs available to older people who have not yet reached retirement age.

Due to the economic crises unemployment in the Czech Republic is rising during last years. And its regional diiferenciation is relatively high (Löster & Langhamrová 2012). Especially the increasing long term unemployment in several regions (Löster & Langhamrová, 2011) is a problem not only from economical but mainly from the social point of view. Wage growth has almost stopped, although the inflation continues and there is a group of people with considerably high wages. See, e. g., Bílková, D. (2012) or Langhamrová & Bílková (2011).

In some branches, however, the consequences of the ageing of the workforce may be relatively serious; in many branches it is not too realistic to expect people to work to the age of 70 and even beyond. It is therefore essential to prepare for the future ageing of the population of productive age, to react to it in a suitable manner and in good time and to come to grips with its consequences.

Acknowledgment

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