

REDUCING THE CONSEQUENCES OF POPULATION AGEING FOR THE PENSION SYSTEM BY RAISING THE RETIREMENT AGE IN THE CZECH REPUBLIC

Tomáš Fiala

Abstract

The growth of the financial burden of the pension system as a result of the continuing ageing of the population is a theme often discussed not only by demographers. In the Czech Republic the consequences of the ageing of the population for the pension system are partially eliminated by the constant raising of the retirement age. The article contains the projection of the development of some demo-economic characteristics in the Czech Republic, taking into account the above-mentioned fact with various variants of demographic development. Both values and trends of the development of these characteristics differ relatively strongly from the indicators normally used, which assume a constant upper limit of 65 years for productive age.

From the projection it emerges that the constant raising of the retirement age can, in the medium variant of demographic development (assuming the preservation of the size of the population of the Czech Republic at roughly the present level) prevent a decline in labour force in the long term and also contribute to the financial stability of the present pension system. The consequences of the ageing of the population of the Czech Republic would then not look anything like as ominous.

Key words: demographic development, population projection, ageing of the population, retirement age, pension system.

JEL Code: AO, BB

Introduction

One of the frequently discussed themes concerning the whole of society is the continuing ageing of the population and its anticipated consequences in the economic, social and political sphere. A number of projections exist, which model the expected future development of the population of the Czech Republic, its size and its structure and which document, on the basis of selected indicators, the expected increase in the proportion of people of greater age and the

consequences of this development. Let us mention, for instance, the projections of the Czech Statistical Office (ČSÚ, 2009) or of Burcin and Kučera (Burcin & Kučera, 2010).

The financial burdening of the pension system is usually estimated on the basis of the relationship of the number of persons of post-productive age to the number of persons of productive age. Very often the upper bound of productive age is considered to be the age of 65 years, which is (or was until recently) the usual retirement age in a number of European countries. In demographic projections, however, we usually assume the continuing growth of the length of life and a number of studies show that together with the increase in the length of life there is also an improvement in the state of health of the population. The question is therefore whether it is correct to consider a constant limit for old age in long-term prognoses. An alternative limit for old age proposed is, for example, that age at which the average (remaining) life expectancy is equal to 15 years (Sanderson & Scherbov, 2010).

From the economic viewpoint an important boundary line is the age when there is usually entitlement to an old-age pension (hereafter referred to as retirement age). In the Czech Republic the retirement age has been rising steadily since 1995 and according to present legislation it will continue to do so. This article contains the main results of the present demographic projection of the population of the Czech Republic, where in the calculation of the indicators of ageing, especially the index of the dependency of seniors, the limit age used is not the usual 65 years, but the retirement age for the year in question.

It is a matter of up-dating the projection (Fiala, Langhamrová, Miskolczi & Pavlík, 2012), taking into account the data for 2012. With regard to the further drop in the net migration in 2012 adjustments were made in particular to the scenarios for migration in the medium and high variants. As opposed to the last projection mentioned above the growth of the net migration is expected to be slower.

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 the volume in individual years is 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 (latest available data), which already reflects the results of the 2011 Census.

We considered only one (medium) variant for the development of mortality. This assumes the further reduction of mortality for the entire period of the projection, but with gradually dropping the annual growth of life expectancy at births.

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

<i>Characteristic</i>	<i>Variant</i>	2012 ¹	2020	2030	2040	2050	2060	2070	2080	2090	2100
Life expectancy at births – males	medium	75,00	76,76	78,90	80,85	82,59	84,14	85,50	86,65	87,62	88,40
Life expectancy at births – females	medium	80,88	82,72	84,72	86,52	88,14	89,57	90,80	91,85	92,72	93,40
Total fertility rate	low	1,450	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
	medium	1,450	1,500	1,600	1,700	1,700	1,700	1,700	1,700	1,700	1,700
	high	1,450	1,550	1,700	1,850	2,000	2,000	2,000	2,000	2,000	2,000
Net migration	low	10 293	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000	10 000
	medium	10 293	20 000	30 000	30 000	30 000	30 000	30 000	30 000	30 000	30 000
	high	10 293	25 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000	50 000

Source: author's assumptions

An overview of the individual variants of the projection is given in Tab. 1. Similar scenario was used for the projection of development 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, 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. Similar scenario was used for the projection of development of human resources in the Czech Republic (Fiala & Langhamrová, 2009).

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

¹ Actual values

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. 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: Main characteristics of population development according to projection

<i>Characteristic</i>	<i>Variant</i>	<i>2012²</i>	<i>2020</i>	<i>2040</i>	<i>2060</i>	<i>2080</i>	<i>2100</i>
Total population (as of 31.12.)	low	10 516 125	10 505 277	9 857 064	8 816 477	7 499 505	6 413 262
	medium	10 516 125	10 582 994	10 604 316	10 511 496	10 271 961	10 224 075
	high	10 516 125	10 621 968	11 176 885	12 035 003	13 007 927	14 341 779
Live births	low	108 482	89 106	76 999	54 599	48 488	39 946
	medium	108 482	96 403	102 513	87 949	91 737	90 345
	high	108 482	100 098	120 489	123 531	146 597	160 702
Natural increase	low	387	-20 317	-50 069	-74 201	-72 083	-59 659
	medium	387	-13 081	-25 297	-43 926	-38 133	-28 610
	high	387	-9 417	-7 910	-10 964	8 502	24 051

Source: author's calculations

2 Development of the number of persons of productive age and the number of employed persons

An important economic-demographic characteristic of every population is the number and proportion of the population in productive age. Due to the fact that an increasing number of young people are continuing to study after completing their elementary education, we shall not consider the lower limit of productive age to be 15 years, but 20. The upper bound of productive age very often used is 65 years. But up to 1995 the retirement age in the Czech Republic, was only 60 years for males and for females was even as low as 53–57 years (according to the number of children reared). Since then there has been a gradual rising of the retirement age, which is to continue even after exceeding the limit of 65 years. This is why the standard upper bound of productive age (65 years) is very misleading for the case of Czech Republic and it is more correct to replace it with the current retirement age. We shall thus consider the upper limit of productive age to be rising – equal to the retirement age at the given moment according to current legislation. For the sake of simplicity we assume that every woman brought up two children (see Tab. 3).

For the more accurate measurement of the financial burden on the pension system the most important matter, however, is primarily the number of employed persons, for it is chiefly

² Actual values

these who pay premiums on social insurance. We calculate an estimate of the development of the number of employed persons by a derived projection based on the projection of the population age structure and specific rates of employment. We shall assume that their values up to 55 years will remain for the duration of the projection at the level of the average values for 2012 from the Labour Force Sample Survey (see Czech Statistical Office, 2013). For the higher age intervals we assume, in order to simplify the calculation, that the rates of employment of persons who have not yet reached retirement age will drop with each year of age by 1 percentage point (see Tab. 4), whereas the rates of employment of persons of retirement age are expected to be zero.

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

Retirement age	2012	2020	2030	2040	2050	2060	2070	2080	2090	2100
Males	62 6/12	63 8/12	65	66 6/12	68	69 4/12	70 10/12	72 2/12	73 8/12	75
Females with two children	59 4/12	61 8/12	65	66 6/12	68	69 4/12	70 10/12	72 2/12	73 8/12	75

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

Tab. 4: Expected sex-and-age specific rates of employment (as %)

Age group	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74
Males	4,2	48,9	83,6	92,7	93,6	93,7	91,4	89,0	87,0	82,0	77,0	72,0
Females	2,8	35,2	60,3	58,4	74,9	85,1	88,2	83,6	82,0	77,0	72,0	67,0

Source: up to the age of 55 years LFSS CZSO 2012, after that author's assumptions

Note: We consider the rates of employment at an age over 55 years provided that the retirement age is higher than the upper limit of the age group concerned

The estimated number of employed persons E_t at time t has been computed by the following formula (separately for males and females)

$$E_t = \sum_{x=20}^{[r_t]-1} S_{t,x} \cdot e_x + (r_t - [r_t]) \cdot S_{t,[r_t]} \cdot e_{[r_t]},$$

where

$S_{t,x}$ is the number of persons of the age x at time t ,

e_x is the rate of employment at the age x (see Tab. 4) and finally

r_t is the retirement age at time t , $[r_t]$ denotes its integer part.

We are anticipating, then, that with the raising of the retirement age some people will terminate their economic activity before they reach retirement age and that the level of employment of females, even after reaching the age of 50, will be roughly 5 percentage points lower in all age groups than the employment of males.

The rising of retirement age relatively sharply compensates for the decrease in numbers of persons between the ages of 20 and 64. The proportion of persons of productive age (taking into account the actual retirement age) should fluctuate in all variants between 55–60 % and at the end of the century in the middle and high variants it should actually exceed this value. The proportion of persons in employment should also remain at the present level (roughly 45 % of the population) in all the variants. See Tab. 5.

Tab. 5: Population in productive age, employed population

Numbers of persons

<i>Characteristic</i>	<i>Variant</i>	2012 ³	2020	2040	2060	2080	2100
Persons in productive age (from 20 until retirement age)	low	6 071 659	5 927 763	5 761 653	4 778 132	4 358 002	3 795 336
	medium	6 071 659	5 964 729	6 155 436	5 793 394	6 081 297	6 274 919
	high	6 071 659	5 983 213	6 492 926	6 651 880	7 669 327	8 785 154
Employed persons (without persons in retirement age)	low	4 800 573	4 791 782	4 565 346	3 800 926	3 433 646	2 969 391
	medium	4 800 573	4 818 166	4 871 163	4 579 494	4 777 691	4 895 954
	high	4 800 573	4 831 357	5 134 833	5 245 707	5 999 666	6 832 394
Persons in retirement age	low	2 373 906	2 500 415	2 566 717	2 728 330	2 075 701	1 757 755
	medium	2 373 906	2 500 926	2 577 442	2 804 506	2 307 856	2 141 029
	high	2 373 906	2 501 181	2 585 421	2 868 412	2 518 945	2 485 594

Proportion of persons (as %) from the total population

<i>Characteristic</i>	<i>Variant</i>	2012	2020	2030	2040	2050	2060	2070	2080	2090	2100
Proportion of persons in productive age (from 20 until retirement age)	low	57,8	56,5	58,6	58,5	55,0	54,2	56,9	58,0	57,9	59,2
	medium	57,8	56,6	58,5	58,2	55,4	55,2	57,8	59,1	59,9	61,4
	high	57,8	56,7	58,6	58,4	55,7	55,5	57,6	58,7	59,7	61,2
Proportion of employed persons (without persons in retirement age)	low	45,0	44,9	45,6	45,0	42,5	41,8	43,4	44,0	43,8	44,5
	medium	45,0	44,9	45,5	44,8	42,7	42,4	44,0	44,9	45,3	46,2
	high	45,0	44,9	45,6	45,0	43,0	42,5	43,8	44,5	45,2	46,1

Source: author's calculations

3 Development of the burden on the pension system

Often used as a characteristic of the economic burden of the current pension system is what is known as the old-age-dependency ratio – the ratio of the number of persons aged 65 and over to the number of persons between the ages of 20 and 64. For the case of the Czech Republic it would be more correct to replace the standard indicator mentioned above with the relationship of the number of persons of retirement age to the number of persons of productive age, using the current retirement age in the given year (see Tab. 3).

³ Actual values

The disadvantage of the above indicator is the fact that, whereas the number of persons of retirement age is a relatively good estimate of the number of old-age pensioners, the number of persons of productive age is not a good estimate of the number of persons who are in employment and therefore paying contributions to the pension system. (See Tab. 6.) A more accurate indicator of the level of the economic burden on the pension system is therefore the comparison of the number of persons of retirement age and the number of persons in employment.

Tab. 6: Retirement age according to current legislation (as of 1 January)

<i>Retirement age</i>	2008	2009	2010	2011	2012
Persons of retirement age	2 230 863	2 263 425	2 295 796	2 332 730	2 365 094
Old-age pensions paid out	2 047 435	2 087 187	2 184 200	2 300 090	2 340 684
Persons of productive age	6 073 171	6 109 944	6 095 421	6 071 810	6 069 238
Persons in employment	5 002 000	4 934 000	4 885 000	4 904 029	4 890 053
Clients with pension insurance	4 928 437	4 941 971	4 958 409	5 025 888	5 024 663

Source: Czech Statistical Office, Czech Social Security Administration

The results of projection show that the approved constant raising of the retirement age will not prevent a certain increase in the number of pensioners per 100 persons of productive age after the year 2030, when the strong population generationys born in the seventies will reach retirement age. With the exception of the low variant, however, this is only a temporary increase. According to the low variant, around 2060 there would be almost 60 persons of retirement age (instead of the present almost 40) for every 100 persons of productive age, in the middle variant only just under 50 persons and in the high variant just under 45 persons.

After 2060, however, one can expect a drop in the number of persons of retirement age for every 100 persons of productive age. By 2100 in the medium and high variants this number would drop to values lower than in 2013, i.e. under 35 or under 30 respectively. Only in the low variant would this number be higher in 2100 than in 2013, this value being slightly over 45. See Tab. 7.

The values of the number of persons of retirement age per 100 employed persons are naturally higher than the number for every 100 persons of productive age, but the development trends are practically identical: up to 2060 an increase and then a decline, which in the case of the medium and high variants would be below the level of 2013. At the present moment there are just below 50 persons of retirement age per 100 persons in employment. By 2060 this number will rise in the low variant to 75, in the medium variant to 60, and in the high variant to just below 55. In the course of the following 40 years a drop can be expected

to values of around 60, 45 and under 40 respectively, according to the variants of demographic development.

Tab. 7: Characteristics of the economic burden of the current pension system

<i>Characteristic</i>	<i>Variant</i>	2012	2020	2030	2040	2050	2060	2070	2080	2090	2100
Number of persons in retirement age per 100 persons in productive age	low	39,1	42,2	41,2	44,5	53,5	57,1	51,0	47,6	48,6	46,3
	medium	39,1	41,9	40,0	41,9	47,9	48,4	41,8	38,0	36,7	34,1
	high	39,1	41,8	39,2	39,8	44,0	43,1	36,6	32,8	31,0	28,3
Number of persons in retirement age per 100 persons in employment	low	49,5	52,2	51,6	56,2	67,1	71,8	64,6	60,5	61,7	59,2
	medium	49,5	51,9	50,2	52,9	60,3	61,2	53,2	48,3	46,8	43,7
	high	49,5	51,8	49,2	50,4	55,5	54,7	46,8	42,0	39,8	36,4

Source: author's calculations

Conclusion

To ensure appropriate pension for seniors is a very important task for social policy. Especially old women – widows living alone are very often in danger of poverty (Bartošová & Želinský, 2013), (Řezanková & Löster, 2013)

It is evident that after taking into consideration the raising of the retirement age the given demo-economic indicators will have completely different values and there will also be a change in their development trend. The consequences of the ageing of the population of the Czech Republic do not look nearly as threatening as when the “classical” indicators are used, employing the age of 65 years as the upper limit of productive age.

Even though the calculations made are very much simplified, they do capture the main trends of the development of the pension system. They confirm that the approved constant raising of the retirement age can, in the long term, contribute in a promising manner to the financial stability of the present pension system with the medium variant of demographic development.

First and foremost, however, it is necessary that there should be sufficient suitable jobs for persons of higher age groups, especially those over 60. Especially in some regions it may be a little complicated issue. Due to economic crises unemployment in the Czech Republic is rising during last years. And its regional differentiation 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.

It will also be necessary to provide for the financing of the system in the period after 2050, when the strong population years born in the seventies enter retirement age. Apart from

this it will be essential to resolve the pension security of persons in professions where the constant raising of the retirement age is not realistic.

The calculations show, according to expectation, the relatively strong dependence of the burden on the pension system on the future development of fertility and migration. Although the preliminary data of the CZSO for 2012 demonstrates a continuing rise in the fertility of women, the level of the migration balance has continued to decline far more than was expected. The net migration of the Czech Republic in 2012 was the lowest in the last 10 years. At the same time foreign immigration can considerably eliminate the population ageing (Arltová, Langhamrová, 2010).

In any case one of the ways to ensure the stability of the pension system in the future should be (apart from a suitable employment policy aimed in particular at the older age categories) also a suitable population and family policy. One of the possibilities would be taking into account to a greater extent in the pension system the number of properly reared children, whether in the form of lower payments by parents or higher pensions or perhaps a combination of the two. Such models have already been proposed.

This would be in accordance with the often-mentioned principle of increased dependency, for in the current pension system there are two types of merit. Apart from the level of the payments into the pension system, which ensure the paying out of pensions to existing seniors, the upbringing of children – future payers – also deserves merit. Apart from this, taking children more into account would be a logical reaction to one of the causes of the ageing of the population – the low birth-rate – just as the raising of the retirement age is a logical reaction to the second cause – growing life expectancy.

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Contact

Tomáš Fiala

Department of Demography, Faculty of Informatics and Statistics

University of Economics, Prague

Nam. W. Churchilla 4

130 67 Praha 3, Czech Republic

fiala@vse.cz