Ageing of the Population of the Czech Republic and its Economic Consequences in the Sphere of Pension Security and the Financing of Health Care

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Key words: ageing of population, demographic projections, pension security, financing of health care

1. Introduction

In all economically developed countries the ageing of the population has been taking place for many years. Forecasts expect that in the future the life expectancy will rise still further, whereas fertility will more probably stagnate below the replacement level. The ageing of the population will therefore continue in this century.

The ageing of the population has a number of consequences in many areas of the life of society. One of the most frequently mentioned is the impact of the population ageing on the field of pension security systems. Also in the sphere of the financing of health care the population ageing must be taken into account.

The paper provides a simple analysis of the population ageing of the Czech Republic in the past decades and offers estimates of the ageing in the future based on population projection.

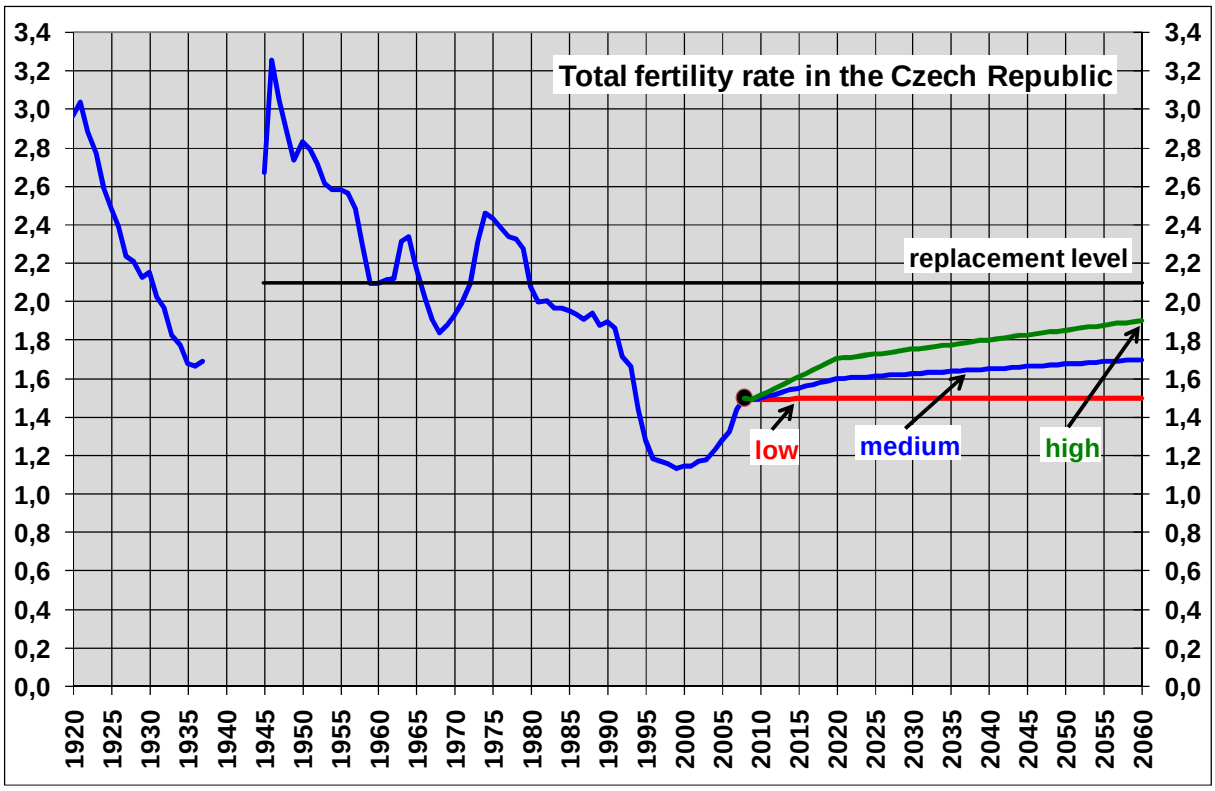
2. Source data and Methodology

All analyses are based on the time series of the sex-and-age structure of the population of the Czech Republic. Until the end of 2008 the real demographic structure of the population has been used (data of the Czech Statistical Office). Since 2009 the data of the population projection are used.

The projection has been computed in the Department of Demography of the Faculty of Informatics and Statistics of the University of Economics, Prague. The classical component method with simplified migration (no emigration supposed, immigration equal to net migration) has been used for computations:

Initial demographic structure for the projection has been that of 1st January 2009. Three variants (low, medium and high) of the development of fertility, life expectancy and migration have been taken into account.

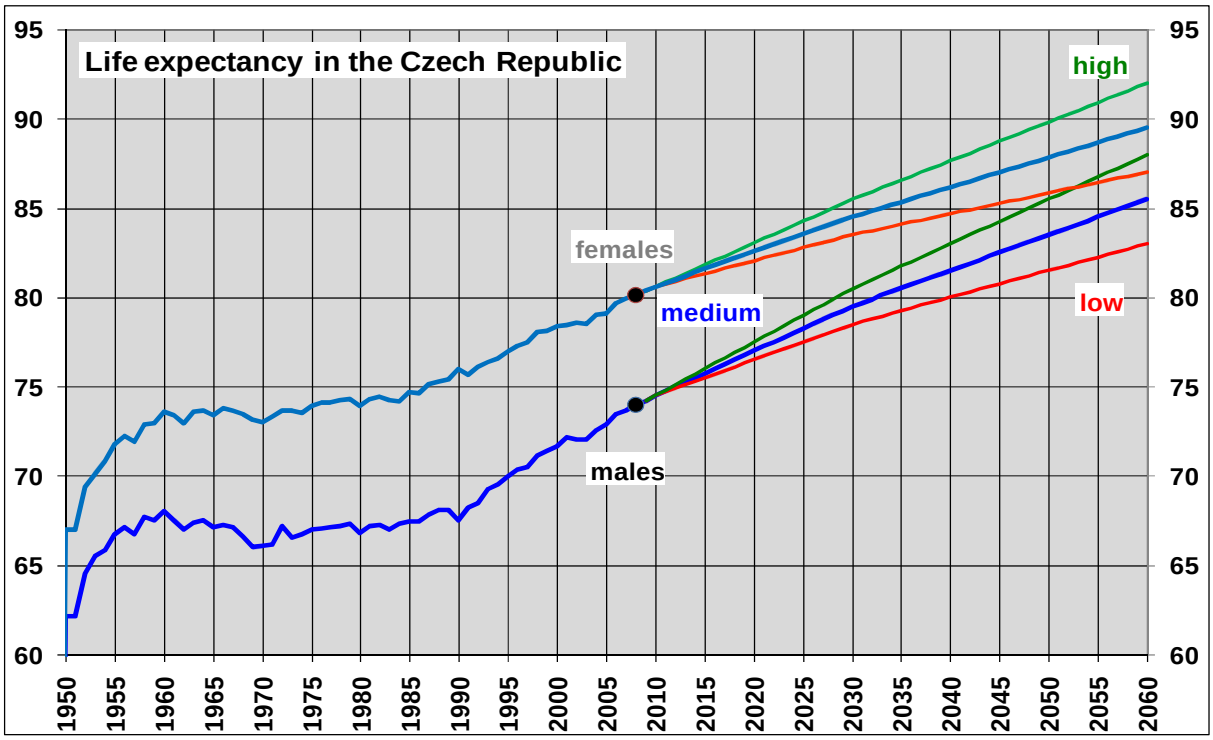
Preliminary demographic data of the first quarter of 2009 show that after several years of fertility growth the total fertility rate this year will probably be the same or even a little bit lower than in the previous year. The low variant of fertility development is therefore based on stabilization of the fertility at the present level with total fertility rate equal to 1.5. According to medium or high variant the total fertility rate will slowly continue to grow to the value 1.7, or 1.9 respectively. (See the Graph 1.)



Source: Czech Statistical Office data, own population projection

Graph 1: Total fertility rate (development in the past and scenarios in the future)

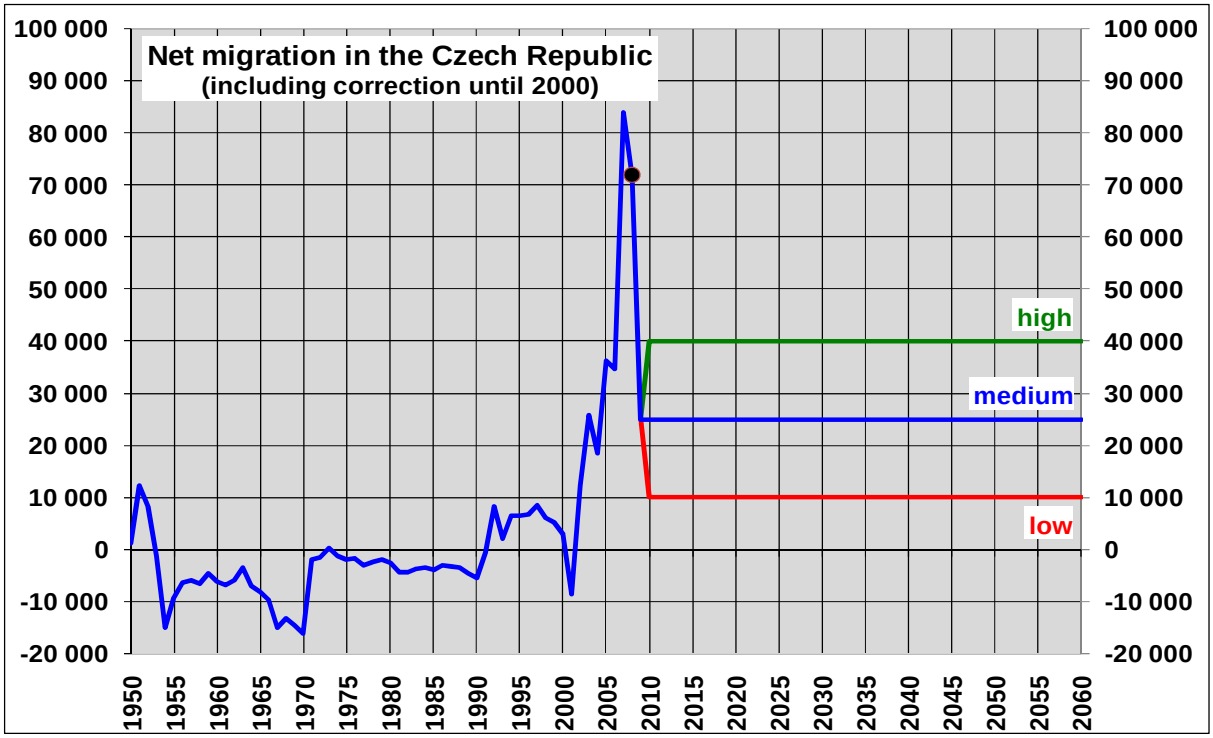
The previous increase of the life expectancy is supposed to be continuing all the time. The variants differ only in the rate of growth. The difference between the life expectancies of females and males is supposed to diminish. (See the Graph 2.)



Source: Czech Statistical Office data, own population projection

Graph 2: Life expectancy (development in the past and scenarios in the future)

It is very difficult to predict net migration at the present time. Preliminary data indicate that this year the net migration may be at the level of only one third of the value of the previous year. One of the main reasons for this may be the continuing economic crisis. Because of this fact the projected annual net migration is supposed to be lower than in previous years in all variants. (See the Graph 3.)



Source: Czech Statistical Office data, own population projection

Graph 3: Net migration (development in the past and scenarios in the future)

The overview of the projection scenarios is given in the Table 1. Main assumptions are very similar to those of the latest population projection of the Czech Statistical Office.

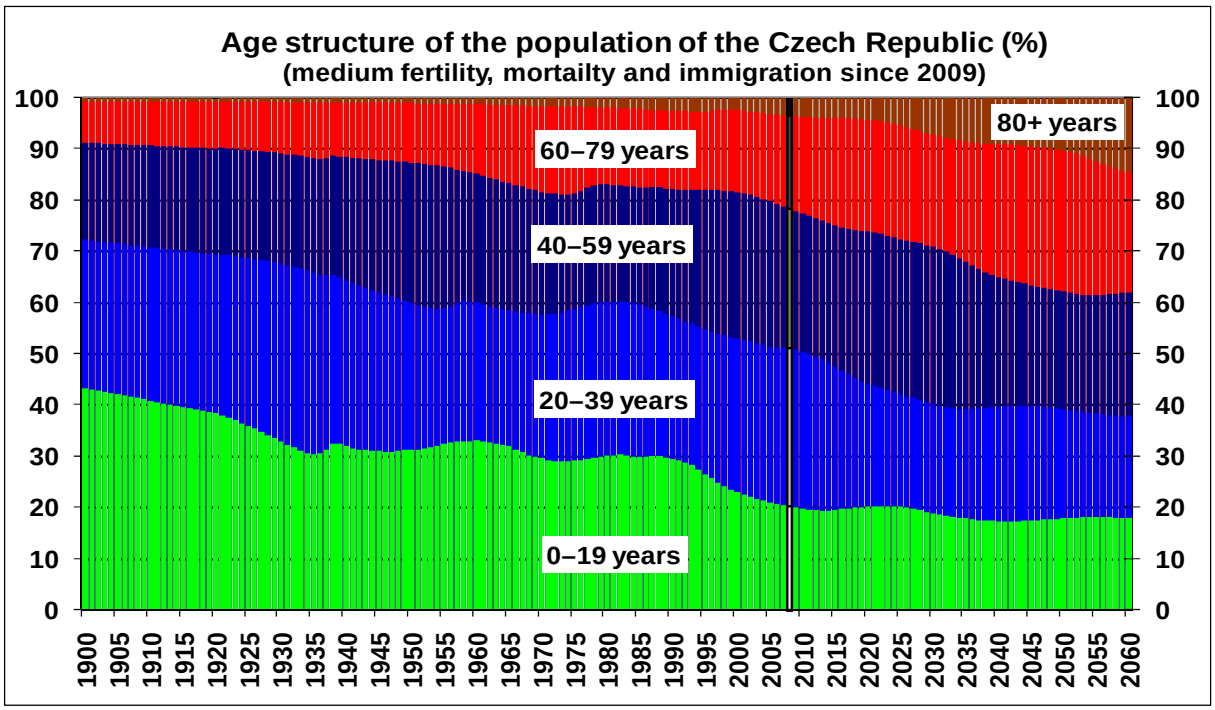
Table 1: Projection scenarios

Year	Total fertility rate			Life expectancy						Net migration		
	low	medium	high	low		medium		high		low	medium	high
				males	females	males	females	males	females			
2008	1,50	1,50	1,50	73,96	80,13	73,96	80,13	73,96	80,13	71 790	71 790	71 790
2009	1,49	1,49	1,49	74,20	80,35	74,20	80,35	74,20	80,35	25 000	25 000	25 000
2010	1,49	1,50	1,51	74,50	80,60	74,50	80,60	74,50	80,60	10 000	25 000	40 000
2020	1,50	1,60	1,70	76,50	82,05	77,01	82,56	77,51	83,06	10 000	25 000	40 000
2030	1,50	1,63	1,75	78,50	83,50	79,50	84,50	80,50	85,50	10 000	25 000	40 000
2040	1,50	1,65	1,80	80,00	84,67	81,50	86,16	83,01	87,65	10 000	25 000	40 000
2050	1,50	1,68	1,85	81,50	85,83	83,50	87,82	85,51	89,82	10 000	25 000	40 000
2060	1,50	1,70	1,90	83,00	87,00	85,50	89,50	88,00	92,00	10 000	25 000	40 000

Source: Own population projection

3. Ageing of the population of the Czech Republic

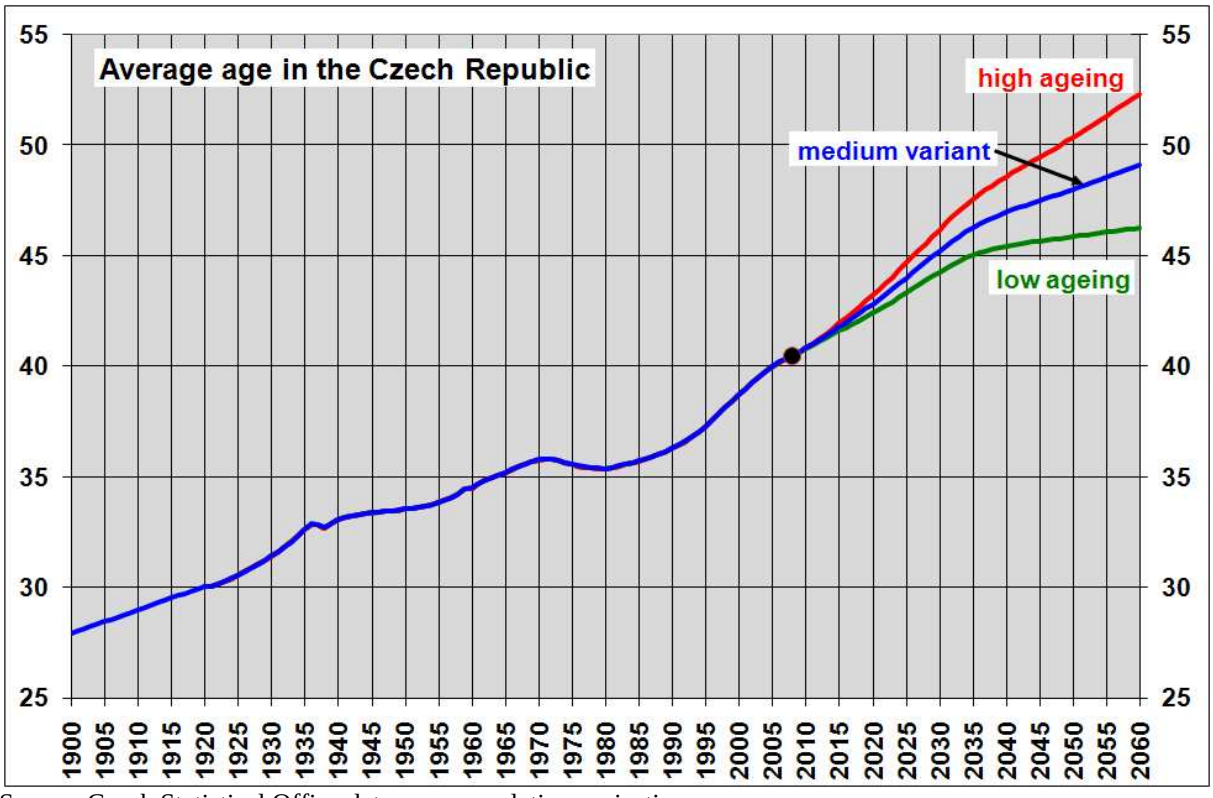
The population of the Czech Republic has been ageing recently. In 1900 there were still more than 40 % of all citizens of the Czech Republic under the age of 20 and only about 10 % older than 60 years. (See the Graph 4.)



Source: Czech Statistical Office data, own population projection

Graph 4: Changes in the age structure of the population

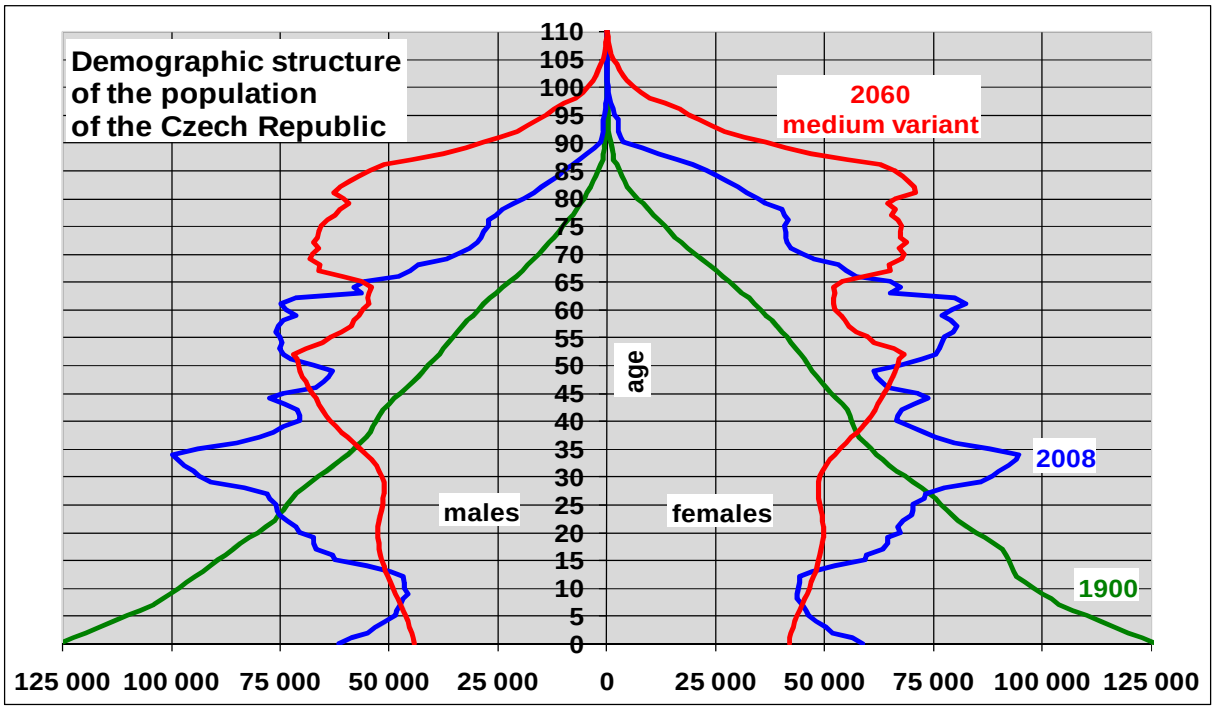
The average age of the inhabitants of the Czech Republic at that time was about 28 years. At present the proportion of persons under the age of 20 years is only about 20 %. On the other hand, the proportion of people over the age of 60 has exceeded 20 % and the average age is already around 40 years. (See the Graph 5.)



Source: Czech Statistical Office data, own population projection

Graph 5: Changes in the average age of the population

The changes in the sex-and-age structure in the previous century are apparent also from the differences in the age pyramids (see the Graph 6). At the beginning of the 20th century the demographic structure of the Czech population was very regular and it was a typical structure of the population of progressive type with prevailing share of young people.



Source: Czech Statistical Office data, own population projection

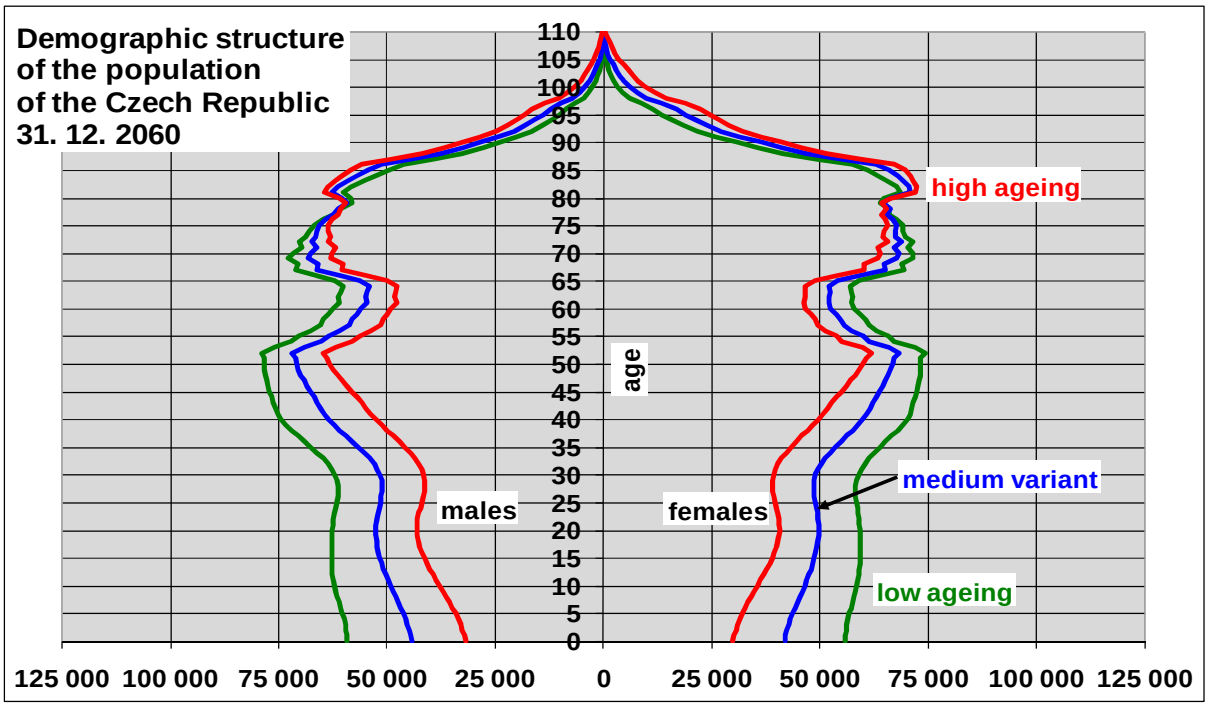
Graph 6: Changes in the age structure of the population

The present age structure of the population of the Czech Republic is very irregular. It is characterized in particular e.g. in the higher proportion of those aged from 50–64 years. This is caused by the growth in the number of those born during the 2nd World War and mainly after it. (The political situation on the territory of the present Czech Republic was quite specific during the Second World War compared with the other European countries. Bohemia and Moravia were occupied, the army disbanded and the establishing of a family became, among other things, one of the possibilities for attempting to avoid forced labor for the Great German Reich.) On the other hand the Czech Republic has a lower proportion of those aged 35–49. This was caused by the decline in the natality in the late fifties and in the sixties, when the weak population cohorts of those born in the thirties (at the time of the economic depression) were at the age of highest fertility. There is also a markedly higher proportion here of those aged 25–34 years. This marked the climax of the fertility of the strong population cohorts of those born after the 2nd World War, also influenced by the pro-population measures in the seventies. From the viewpoint of a demographer these measures were unsuitably timed and resulted in a further increase in the already great irregularity of the age structure. In the Czech Republic there is also a lower proportion of children at the age about 10, caused by the decline in the fertility as a result of the political, economic and social changes after 1989. Fertility is dropping far below the so-called replacement level and young people are postponing the birth of a child until a later age as in the majority of the countries of Western Europe. New opportunities have arisen for personal and professional self-realization, greater application to work is required and the role of education is increasing. This irregular age structure of the population brings with it irregular course of the ageing of the Czech population in the future.

The population ageing in the future will depend on the future development of fertility, mortality and migration. According to medium variant of the projection it is probable that in the fu-

ture the proportion of persons under the age of 20 will stay permanently below the level of 20 %. (See the Graph 4.) The proportion of people of main productive age, i.e. the age of 20–59 years, will drop from the present 60 % to less than 45 % in the year 2060. There will therefore be a considerable decline in workforces. And the proportion of seniors will continue to grow. The proportion of people aged 60 and over will increase from the present 20 % to almost 40 %. In fifty years time every seventh citizen of the Czech Republic will be over 80 years of age. The average age will be coming close to 50 years. (See the Graph 5.) The Czech population will be among the oldest in the world.

It is evident that minimal ageing of the population will occur in the case of high fertility and high net migration and simultaneously low life expectancy. And on the other hand low fertility and low net migration in combination with high life expectancy will lead to the highest ageing of the population. (See the Graphs 5 and 7)



Source: Czech Statistical Office data, own population projection

Graph 7: Demographic structure of the population on 31. 12. 2060

4. Consequences in the sphere of pension security

The ageing of the population will have a number of consequences in many areas of the life of society. One of the most frequently mentioned consequences is the impact on the field of pension security. At present pension security guaranteed by the state in the Czech Republic is still based exclusively on the so-called PAYG (pay-as-you-go) system. Economically active people pay contributions to pensions into the system of pension security and this is immediately re-allocated to payments to present pensioners. Saving for one's own pension in pension funds is so far merely voluntary. A suitable degree of burden on the current system is therefore the so-called old-age-dependency ratio (the ratio of the number of persons of retirement age to the number of persons of productive age).

Until the end of 1995 the retirement age in the Czech Republic was 60 years for males and 55 years for females with two children (the retirement age for females in the Czech Republic depends on the number of their children). For simplicity we have supposed that the retirement age of all women is the same as for women having two children. Since 1996 the retirement age is increasing according to the year of birth: for each subsequent year of births the pension

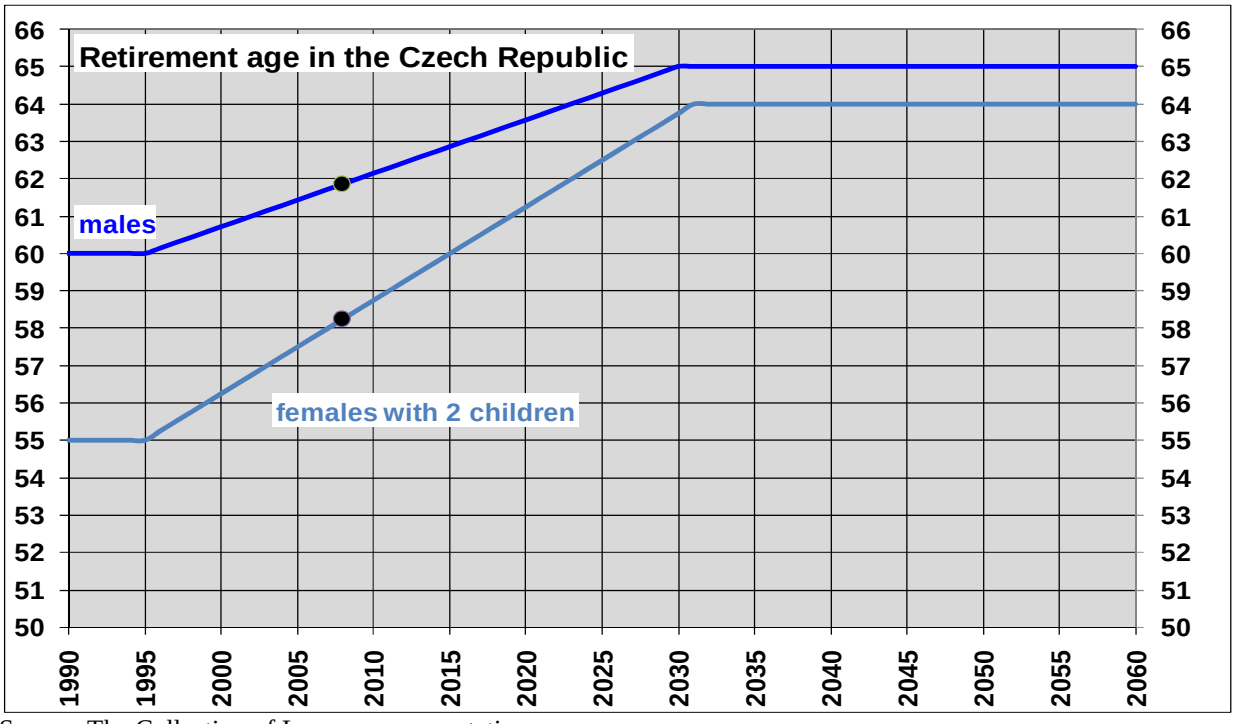
age is 2 months higher (for males), or 4 months higher (for females) than for the previous year of births (see the Table 2). According to present legal regulations this increase will continue until the retirement age will reach 65 years for males and 64 years for females with two children, respectively.

Table 2: Increase of the retirement age

Males			Females with 2 children		
Year of births	Retirement age	Year of reaching the retirement age	Year of births	Retirement age	Year of reaching the retirement age
1935	60y	1995	1940	55y	1995
1936	60y+2m	1996/97	1941	55y+4m	1996/97
1937	60y+4m	1997/98	1942	55y+8m	1997/98
1938	60y+6m	1998/99	1943	56y	1999
1939	60y+8m	1999/00	1944	56y+4m	2000/01
1940	60y+10m	2000/01	1945	56y+8m	2001/02
1941	61y	2002	1946	57y	2003
1942	61y+2m	2003/04	1947	57y+4m	2004/05
:	:	:	:	:	:
1959	64y	2023	1961	62y	2023
1960	64y+2m	2024/25	1962	62y+4m	2024/25
1961	64y+4m	2025/26	1963	62y+8m	2025/26
1962	64y+6m	2026/27	1964	63y	2027
1963	64y+8m	2027/28	1965	63y+4m	2028/29
1964	64y+10m	2028/29	1966	63y+8m	2029/30
1965	65y	2030	1967	64y	2031

y=years, m=months
Source: The Collection of Law, own computations

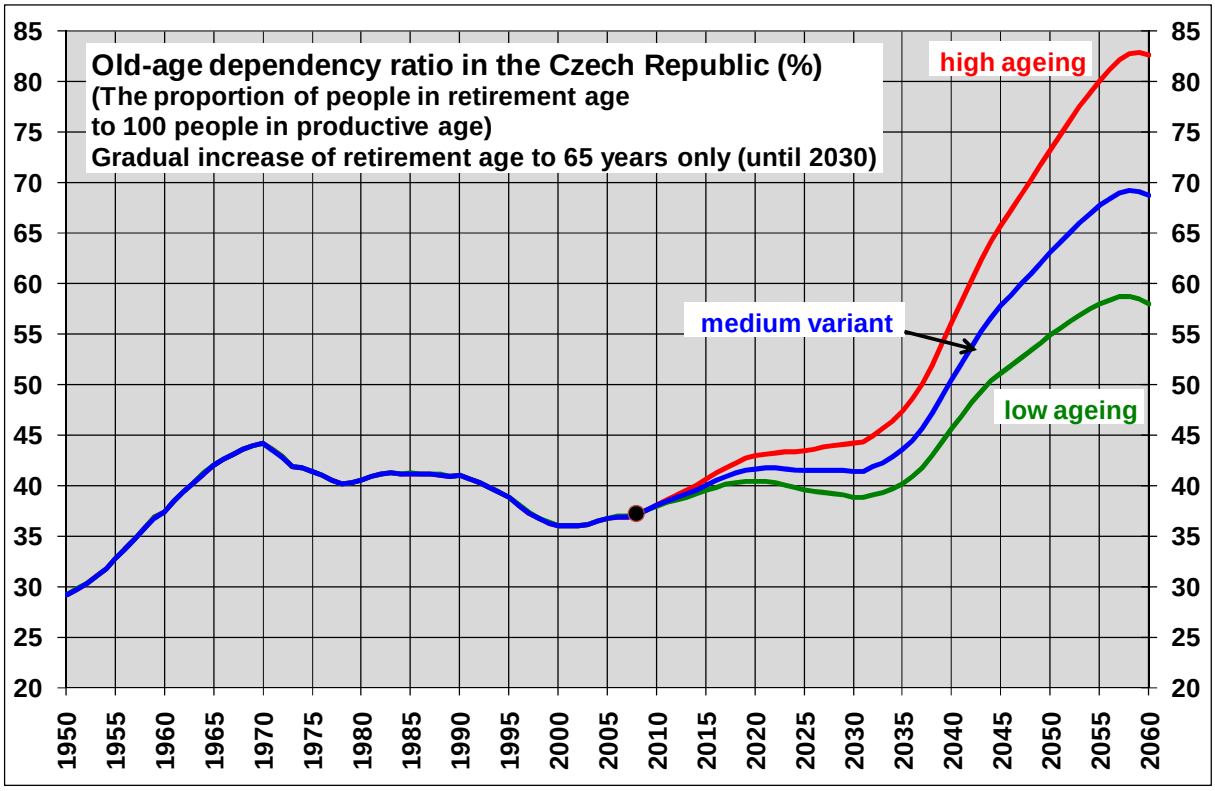
It is evident that the average annual increase of the retirement age in time is 1/7 years for males and ¼ years for females (see the third and the sixth column, respectively, of the table above.) The dependence of the retirement age on time is shown in the Graph 8 (for simplicity the linear instead of stepwise function was used).



Source: The Collection of Law, own computations

Graph 8: Growth of the retirement age according to present legal regulations

The values of the old-age-dependency ratio have been computed taking into account the increase of retirement age in time. At present for 100 people of productive age there are about 37 persons of pension age. The gradual raising of the retirement age will not prevent the increase of the old-age-dependency ratio. Around 2030 there may already be about more than 40 pensioners for every 100 persons of productive age. And in following decades when the retirement age is supposed not to grow more, the old-age-dependency ratio would rise very rapidly. In 2060 it might already be as many as 60–80 pensioners depending on the variant of demographic development. (See the Graph 9.)



Source: Czech Statistical Office data, own population projection

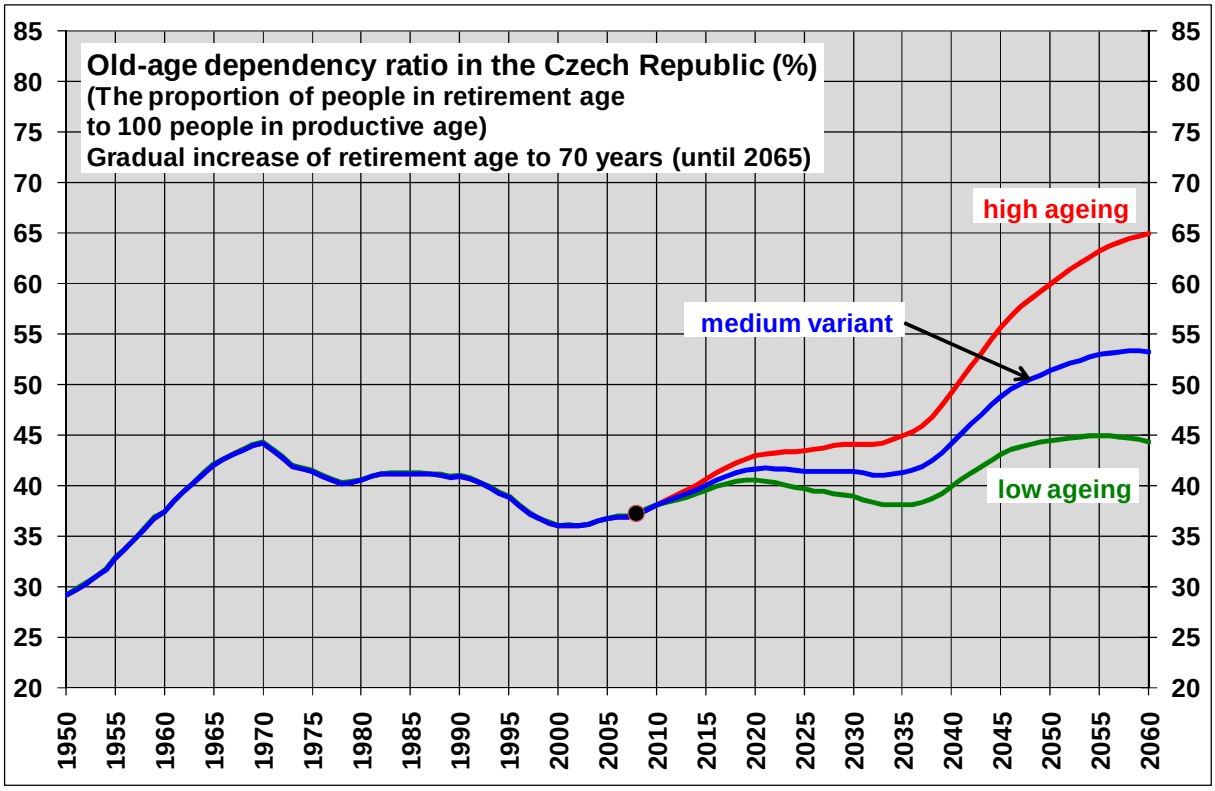
Graph 9: Expected growth of the old-age-dependency ratio in the case of increase of the retirement age to 65 years only

It is of course possible and probable that the legal regulations will change and the increase of retirement age will continue permanently in the same way as today for males (i.e. for each subsequent year of births the pension age will be 2 months higher than for the previous year of births). In 2065 it would reach the level 70 years. But the Graph 10 shows, that even this permanent increase will not be satisfactory to eliminate the influence of population ageing. It will only cause that the increase of the old-age-dependency ratio will be not so rapid as in the previous case. In 2060 the value of the old-age-dependency ratio would be about 45–65 persons of retirement age to 100 persons of productive age. The main reason is that after 2040 the strong population cohorts born in the seventies will reach the retirement age.

If the increase of retirement age should quite eliminate the impact of the population ageing, it should be more rapid than at present. (See the Graph 11.) The retirement age should reach 65 years of age by the year 2020, in 2045 the retirement age should be about 70 years and in 2060 its value should be about 75 years. In this case the value of the old-age-dependency ratio would stay at the present level (37 %) all the time.

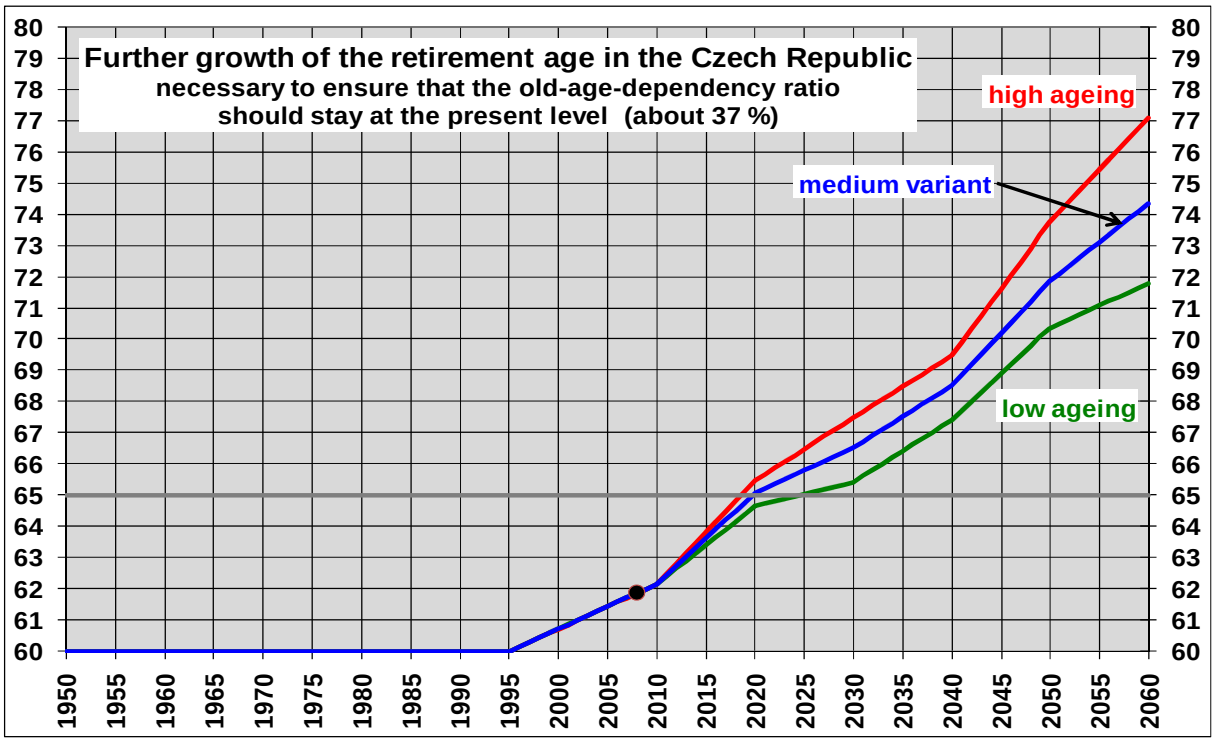
The question is, of course, whether the seniors would be able to work in such a high age and whether there would be sufficient suitable jobs for them.

A number of further solutions suggest themselves: the introduction of obligatory deductions to pension funds, the raising of deductions for pension security, greater support for additional pension insurance, etc.



Source: Czech Statistical Office data, own population projection

Graph 10: Expected growth of the old-age-dependency ratio in the case of further increase of the retirement age to 70 years



Source: Czech Statistical Office data, own population projection

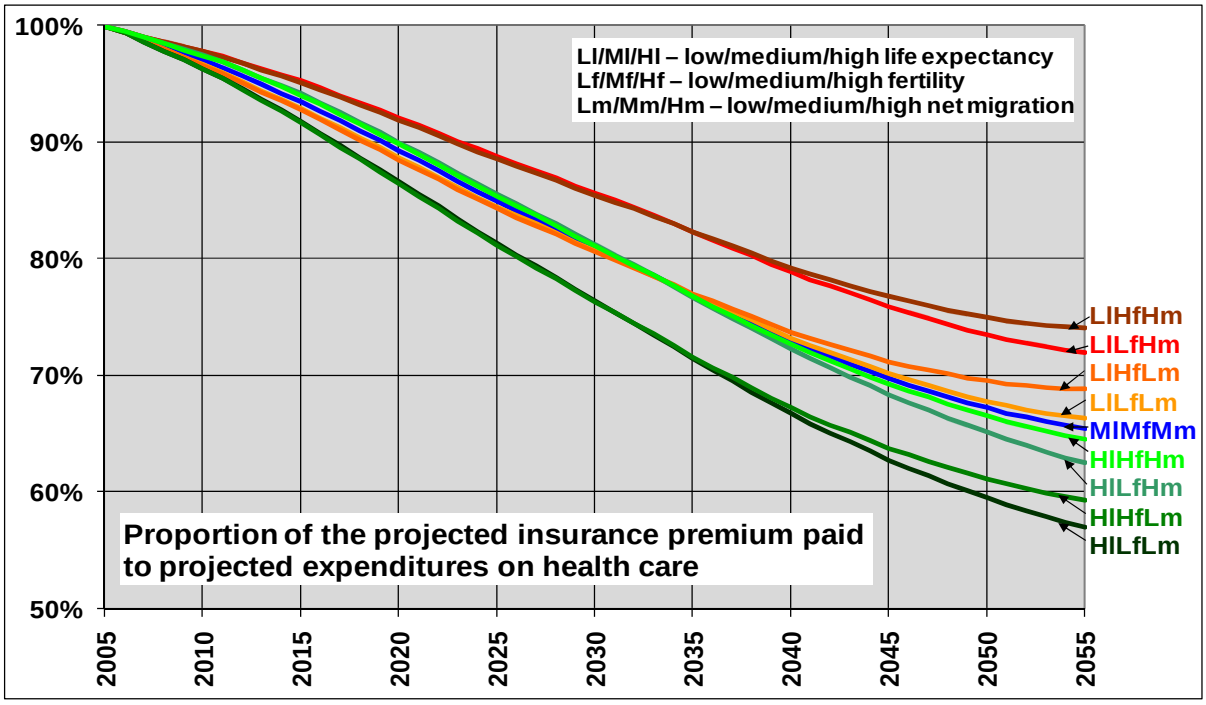
Graph 11: Growth of the retirement age necessary to stabilize the old-age-dependency ratio.

5. Consequences in the sphere of financing of health care

Also in the sphere of the financing of the health service we must ask ourselves whether, with a declining proportion of persons of productive age who are making contributions from their incomes to the system of health insurance, these reduced deductions will suffice for the expenses, which will, on the contrary, increase because seniors require health care more frequently and to a greater extent than younger persons. Future demographic development will therefore also result in increased expenditure on public health. It will influence not only expenditure, but also revenues into the system.

The population projection used for this analysis was two years older than the projection mentioned above but the main trends of demographic development were almost the same.

On the basis of the population projection were then made projections of the expenditure on health care and projections of the insurance premium collected for health insurance. The projection of the expenditure on health care was based on the assumption that the costs per insured person according to sex and five-year age groups would remain for the entire duration of the projection at the level of 2004. The estimate of the development of a selected premium was more difficult as there were no analogous data available on the average level of premium paid according to sex and age. The basis was therefore the simplified assumption that employed persons (including self-employed persons) pay a premium corresponding to the gross average wage for the given sex and the given age in 2004, whereas for an unemployed person the premium is paid by the state at the prescribed level (again for 2004). The projection of the development of the population was then calculated in several variants. Apart from the medium variant various combinations of extreme variants of mortality, birth rate and immigration were considered.



Source: Czech Statistical Office data, own population projection

Graph 12: Proportion of the insurance premium paid to expenditures on health care paid by the health insurance companies

We may characterise the development of the financial burden on the system of health insurance by the share of the total of the expected insurance paid in the total of the expected costs of health care paid by the insurance companies. The development of this characteristic for the

individual variants of the projection is depicted in Graph 12. We can see that in all the alternatives of demographic development there would be a drop in the share of the insurance premium in costs far below the unit value. This means that the insurance premium would not be enough for insurance companies to cover expenditure on health care. The smallest decline would occur, according to expectation, in the case of a low increase in the life expectancy and high immigration and the greatest drop, on the contrary, would occur with a high increase in the life expectancy and simultaneous low immigration. The other development variants, especially in the first years, do not differ too much from the medium variant of the projection. The influence of the rate of growth of fertility would begin to make itself felt to a more marked extent only after several decades, when a higher increase in fertility would mean a lesser decline in the proportion of insurance premium to expenses and vice versa. For the majority of persons who are not employed the state usually pays the premium for health insurance (children, pupils, students, non-working pensioners, unemployed persons actively seeking work, etc.).

In all variants of development the proportion of insurance premium paid by the state would increase. Again it would be most in the case of a high increase in the life expectancy and low immigration, least in the opposite case. High fertility would again mean in the first years an increase in the burden, but later would lead to its reduction. In all variants of demographic development, then there would be a considerable increase in the difference between the expected incomes and expected expenditure of the health insurance companies. What are the possibilities of resolving this unfavourable trend? The first possibility is naturally the increasing of returns for health insurance. If we were to wish, for instance, for the proportion of the insurance premium collected to expenditure on health care covered by the insurance companies to be equal approximately to one even in further years, then the rate of the insurance premium (assuming other characteristics to be unchanged) would have to rise gradually up to 2055 from the present 13.5 % to 18–24 % of the measurement base.

Another possibility of how to increase the total collected premium and reduce the burden on the state is increasing the level of employment, especially in connection with the continuing rise in retirement age. If by 2055, for instance, the level of employment of men aged 55-59 years increased to 80 % and that of men aged 60-64 to 75 % and the level of employment of the women in these age groups were only 5 percentage points lower than in the case of the men, then in 2055, in the case of the medium variant of demographic development, the ratio of the collected premium to the costs of health care would be roughly equal to 70 % (whereas with the present level of employment it would be only 65 %). The raising of employment, then, would only reduce the rise in the differences between incomes and expenses, but not eliminate them completely. It is also probable that it will be possible in the future to achieve the continuing improvement of the state of health of the population (in connection with the development of new medical technology) with relatively lower expenditure than at present.

6. Conclusions

The population ageing will mean an increase in the economic burden on society.

An interesting idea consists in the following combination of PAYG system and obligatory contributions to pension funds. While the rate of contribution to PAYG system would be the same for all, the rate of contribution to pension fund would be indirectly dependent on the number of children. Childless people would receive pension only from the fund, other people would have pension both from the fund (indirectly dependent on the number of children) and from the PAYG system (dependent on the number of children) so that the total pension would practically not depend on the number of children. People having 4 and more children would be regarded as people with 3 children only. (This pension reform has been proposed by James

Hyzl, Martin Kulhavý and Jiří Rusnok, see the References.) This idea could not only insure the stability of the PAYG pension system but also maybe increase the fertility.

It may also be assumed that labour productivity will increase with the rise in the education of the population. There is, then, some measure of hope that in the future it will be possible to maintain the present material standard of society even with a lower proportion of economically active persons and higher proportion of seniors than at present.

It is without doubt that the ageing of the population will continue. It is impossible to prevent the ageing but it is possible to slow it down by increase in fertility and immigration.

We should find the ways and create some solutions to harmonize professional career and parents' role of people. Not only in the sense that the child must not be an obstacle for the parents in their professional career but mainly that the professional career must not be an obstacle for the parents in the care and education of their children. It would be good take advantage of the possibility of work at home, flexible working time etc. as much as possible.

We should find the ways and create some solutions how to diminish the fear and negative distance between immigrants and the society. Immigrants should not be mainly the source of low-cost labour force. It is necessary to improve their working and living condition, eliminate illegal work, corruption in obtaining visa and other documents etc.

In any case the proportion of seniors in the society will increase. We should find the ways and create some solutions that the society will not only admire economic effect, success, youth, beauty, but also will be able to recognize the specific qualities of seniors and accept them. So that the seniors could feel their own personal dignity again as it is in some so called "primitive" societies (e. g. traditional American Indians).

Let's hope that the thinking of the society will change to be more concentrated and to pay more attention not only to economic growth, but also to social relations, environmental problems, culture, spirituality etc. Because if this change will come true, we are able to solve successfully not only the problem of population ageing but all the problems of the present time.

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