DIFFERENCES IN AVERAGE PERIOD OF RECEIVING PENSION BY EDUCATION LEVEL

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Abstract

The Czech system of old-age pension (based on Pay-As-You-Go principle) has relatively high level of solidarity. The relationship of old-age pension to average income is higher for people with lower income than for people with higher income.

It is not so often mentioned that people with lower income are very often people with lower education level. And it is well known that mortality of these people is relatively much higher than mortality of people with higher education level. It results in the fact that people with lower income have relatively higher pension but receive it for shorter period in comparison with higher income people.

This paper gives model estimations of the total average amount of pension insurance contributions and the total average amount of old-age pension paid distinguished by the level of education. The computations are based on the life tables by education level and on employment rates and average income by level of education. Retirement age threshold of 65 years for both males and females is assumed.

Key words: old-age pension, pension insurance, education level, Czech Republic

JEL Code: H55, J11, J14

Introduction

The pension system in the Czech Republic shows a relatively high level of solidarity. The old-age pension amount consists of two components. First of it is constant and quite independent on both the length of the insurance period as well as on the earnings of the pensioner during his/her economic active period. The other component is dependent on both these factor mentioned but the dependence on the earnings is decreasing with the increase of the income. The higher is the income the lower is the replacement rate (ratio of pension amount to previous earnings).

A frequently used counterargument against the high level of solidarity of the Czech pension system is that people with higher earnings usually have a higher education and are in better health; therefore, even though their old-age pension is relatively lower, they receive it for a longer time.

The goal of this article is to present model calculations comparing the estimated average time of receiving an old-age pension depending on the highest achieved education and to show how much a lower replacement rate of old-age pensions of persons with higher earnings is compensated with a longer average time of receiving old-age pensions.

1   Basic principles of Czech old-age and pension system

Since many old-age pension system characteristics in the Czech Republic are derived from the Czech average earnings, many characteristics in this model example will be expressed as an average earnings percentage that keeps changing from year to year. For better clarity, we used the model average earnings of CZK 25,000 in some examples, even though the actual average wage is currently somewhat higher. Old-age pension insurance contributions (which are a part of social security insurance) represent 28% of the so called assessment base of the insured. An employee's old-age pension insurance contribution is assessed based on his total earnings, while that of a self-employed person is assessed based on at least one half of his tax base (Act No. 589/1992, Section 7). The maximum annual assessment base is quadruple the average annual wage. In other words, a little bit simplified, an employee's old-age pension insurance contributions (payed both by the employer and employee) represent 28% of his gross wage, while those of a self-employed person represent a 14% of the difference between his earnings and expenses but not less than 25% of the Czech average earning. In both cases, this rather high ceiling of old-age pension insurance contributions is directly proportional to earnings. For instance, a person with two-fold earnings (unless it exceeds quadruple the average wage) pays double the old-age pension insurance contributions.

On the other hand the old-age pension amount is not directly proportional to the earnings during the relevant time period (and thus on the amount of paid-in old-age pension insurance contributions). An old-age pension consists of two components - a basic assessment and a percentage assessment. The so-called basic assessment represents 9% of the Czech average earnings (Act No. 155/1995, Section 33) and is the same for all old-age pensions independent on the lengths of insurance and on income, i.e. does not depend on paid-in old-age pension

insurance contributions. E.g. if the average earnings in the Czech Republic would be CZK 25,000 the basic assessment of the pension would be CZK 2,250.

The percentage assessment depends (besides the length of old-age pension insurance) on the so-called personal assessment base that - in a simplified way - means the average of assessment bases during the relevant time period indexed (with respect to the growth of average earnings in the Czech Republic) to the wage level of the last year. (It is thus a certain characteristic of the average indexed earnings for the entire period of economic activity). However, the percentage assessment of an old-age pension is paid based on the so-called calculation base, which is determined based on the personal assessment base as follows: the amount under 44% of the Czech average earnings (the so-called first reduction limit) is completely included; while from the amount exceeding the limit only 26% is included (Act No. 155/1995 of Coll., Section 15). Thus, e.g. a person with a personal assessment base equal to the Czech average earnings has calculation base reduced to (44+56*0.26)=58.56% of Czech average earnings.

The percentage assessment of an old-age pension for each whole year of old-age pension insurance represents 1.5% of this calculation base, e.g. for 40 years of insurance it is 60%. It means that the percentage assessment amount is directly proportional to the lengths old-age pension insurance period. E.g. person with e.g. 48 years of insurance has percentage assessment at the level of 72% of its calculation base. On the other hand, due to the reduction of pension base assessment the percentage old-age pension assessment of a person with double earnings is usually much less than double (with the same old-age pension insurance period).

For instance, the percentage old-age pension assessment of a person with a personal insurance assessment base of 150% of the Czech average earnings is (with the same old-age pension insurance period) only 2.86 higher than that of a person with an assessment base of 25% of the average earnings, although he/she paid approximately 6 times higher old-age pension insurance contributions. Therefore, considering the amount of paid-in old-age pension insurance contributions, this person's percentage old-age pension assessment is roughly relatively only "one half" of that of the former person. Persons with higher earnings thus have (in view of paid-in old-age pension insurance contributions) lower old-age pensions than persons whose earnings are below 44% of the average wage. People with the maximum assessment base (quadruple the average earnings) would contribute to old-age pension insurance approximately 16 times more than people with a wage about 25% of the average earnings, but the percentage assessment of their old-age pension would be only 5.46 times higher (Tab. 1).

Tab. 1: Reduction of old-age pensions

Personal insurance assessment base	Corresponding pension calculation base	Index of insurance assessment base	Index of pension base	Proportion of pension base with respect to insurance base	Pension with 40 years of insurance (including basic assessment) percentage of Czech average earnings	Proportion of pension with respect to insurance base (replacement rate)
percentage of Czech average earnings						
25.00%	25.00%	1.00	1.00	100.00%	24.00%	96.00%
50.00%	45.56%	2.00	1.82	91.12%	36.34%	72.67%
75.00%	52.06%	3.00	2.08	69.41%	40.24%	53.65%
100.00%	58.56%	4.00	2.34	58.56%	44.14%	44.14%
125.00%	65.06%	5.00	2.60	52.05%	48.04%	38.43%
150.00%	71.56%	6.00	2.86	47.71%	51.94%	34.62%
175.00%	78.06%	7.00	3.12	44.61%	55.84%	31.91%
200.00%	84.56%	8.00	3.38	42.28%	59.74%	29.87%
225.00%	91.06%	9.00	3.64	40.47%	63.64%	28.28%
250.00%	97.56%	10.00	3.90	39.02%	67.54%	27.01%
275.00%	104.06%	11.00	4.16	37.84%	71.44%	25.98%
300.00%	110.56%	12.00	4.42	36.85%	75.34%	25.11%
325.00%	117.06%	13.00	4.68	36.02%	79.24%	24.38%
350.00%	123.56%	14.00	4.94	35.30%	83.14%	23.75%
375.00%	130.06%	15.00	5.20	34.68%	87.04%	23.21%
400.00%	136.56%	16.00	5.46	34.14%	90.94%	22.73%

Source: Act No 155/1995, author's computations

A frequently used old-age pension feature is the so-called replacement rate, i.e. old-age pensions relative to gross wages. An analogic feature in the Czech old-age pension system is the relation of old-age pension and the personal assessment base (that characterizes the average monthly wage). The rate for persons with 40 years of old-age pension insurance is shown on the last column of Tab. 1. Since the basic assessment is independent of earnings and because of the reduction limit for determining the calculation base, the replacement rate is inversely proportional to the wage. For instance, the old-age pension of a person with a personal assessment base representing 25% of the Czech average earnings and with 40 years of old-pension insurance would be 24% of the model average earnings (i.e. the replacement rate would be 96%). A person with wage approximately equal Czech average earning would have old age pension only about 44%, and if a person had the maximum assessment base quadruple of the average earnings its replacement rate would be only 22.73%.

Therefore, the Czech pension system is (similarly to the systems of many other countries) a combination of Beveridge's solidary model of equal old-age pensions (that does not stem from paid-in old-age pension insurance contributions) and Bismarck's model of full

financial equivalence of paid-in old-age pension insurance contributions and the old-age pension amount. The reduction limits used for determining the calculation base of old-age pensions of persons with higher earnings were the subject matter of a lawsuit filed to the Constitutional Court in 2007.

2 Mortality in the Czech Republic 2000–2001 by education attained

Mortality depends mostly on age but also on many other factors. It is very often mentioned that mortality depends on marital status (e.g. Hu & Goldman, 1990), the fact that people with higher level of education have usually lower mortality rates is also well-known (e.g. Steenland, Henley & Thun, 2002).

Particular analysis of the development of mortality by age in the Czech Republic during latest decades was presented in Arltová, Langhamrová & Langhamrová (2013). Dependence of mortality on marital status in the Czech Republic was analyzed by Pechholdová & Šamanová (2013).

Studies focusing on the correlation between mortality and education in the Czech Republic are less frequent mostly due to the fact that such data are often not available. For instance, the Czech Statistical Office's Demographic Yearbook shows every year the number of deaths as well as the number of living persons by gender, age and marital status, while the number of living persons by education level is published only when the population census is conducted. The number of deaths by educational attainment is shown in the Demographic Yearbook only in a very rough classification by age, and moreover in latest years the education of the majority of the deaths is not identified. For these reasons, mortality tables by level of education attained are usually provided only at the time of population census. (E.g. Rychtaříková, 2005)

The difference in the time of receiving old-age pensions by education was estimated according to complete mortality tables by level of education attained separately for males and females. Cross-section life tales for the time period of 2000–2001 were computed using special data of the Czech Statistical Office. Four levels of education usually used in Czech statistics have been distinguished:

- basic education (including incomplete education),
- secondary education without A-level examination,
- secondary education with A-level examination,
- higher education.

Tables have been computed using standard indirect method based on specific mortality rates by gender, age and education level in the period 2000–2001. The living mid-year population of the relevant gender, age and education was estimated by the population census results with a value of the exact age as of 31 December 2000 (not as of the day of the population census). The specific mortality rates for the age under 20 were not distinguishing education. It was unfortunately not possible to make an analogic calculation for the time period of 2010-2011 (that would provide more actual information about the correlation between mortality and education attained) since the information about education was not identified in almost 40% of the deaths during 2010–2011.

The correlation between life expectancy and education is still higher for males than for females. It is true not only for life expectancy at birth but also at a higher age. To estimate the average time of receiving old-age pensions, we used for simplicity life expectancy at the age of 65. (See Table 2-3.)

The average time of receiving an old-age pension for males with a secondary education is almost 50% longer and for males with a higher education almost twice as long in comparison to that for males with basic education. The difference for females is considerably smaller. The time of receiving an old-age pension for females with a secondary education was longer only by 10% and for females with a university education only approximately by 40% longer in comparison to that for females with basic education. Values of median earnings by gender and education attained (expressed as percentage of total average earning) came from the Czech Statistical Office (CZSO, 2017)

With respect to the aforesaid wages, the pension base for males with basic education would be almost 75% of earnings, while for males with higher education only about 50%. But these differences are "fully compensated" with longer time of receiving pension. The pension base multiplied by the index of life expectancy is about 90–100% for males with secondary or higher education (Tab. 2).

For females the compensation is only partly because of lower differences in life expectancy between education categories. The pension base for basic education is about 85% of earnings while for higher education less than 60%. After taking into account differences in life expectancy the "indexed" pension base is (except the case of secondary education without A-level examination) still a little bit lower than 85% (Tab. 3).

Tab. 2: Differences by education – males

Education attained	Life expectancy	Life expectancy	Median earning	Corresponding pension		

	at the age of 65 years	index with respect to basic education	calculation base		Pension base (percentage of earnings)	Pension base multiplied by life expectancy index
			percentage of total average Czech earning			
basic	9.84	1.00	68.4%	50.3%	73.6%	73.6%
secondary without A-level examination	14.55	1.48	80.9%	53.6%	66.3%	97.9%
secondary with A-level examination	14.60	1.48	98.5%	58.2%	59.1%	87.6%
higher	19.62	1.99	137.5%	68.3%	49.7%	99.0%

Source: author's computations

Tab. 3: Differences by education – females

Education attained	Life expectancy at the age of 65 years	Life expectancy index with respect to basic education	Median earning	Corresponding pension calculation base	Pension base (percentage of earnings)	Pension base multiplied by life expectancy index
			percentage of total average Czech earning			
basic	15.90	1.00	55.1%	46.9%	85.0%	85.0%
secondary without A-level examination	17.29	1.09	58.0%	47.6%	82.2%	89.3%
secondary with A-level examination	18.08	1.14	81.7%	53.8%	65.9%	74.9%
higher	22.14	1.39	103.3%	59.4%	57.5%	80.1%

Source: author's computations

Conclusion

We can say that the reduction limit used to calculate the percentage assessment of an old-age pension is for males fully and for females partly "justified" by the fact that persons with higher earnings receive their old-age pension for a longer time on average.

We made many simplifications in our model calculations. We used only the median wage for each education group instead of dividing wages within each education group. The differencies in earnings by education can change in time. Also, the time of receiving an old-age pension is individual and may differ from life expectancy shown in the tables for the given education category; besides, generational mortality tables should be used instead of cross-section tables, the construction of which would not however be simple.

To obtain more accurate calculations, we would need to have data about lifelong earnings, level of achieved education and the time of receiving an old-age pension for individual groups of persons that, however, are not available.

Acknowledgment

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