

Is the Slovak Pension System Prepared for the Next Decades?

Jakub BUČEK* and Michal TOMČO

Masaryk University, Brno, Czechia; jakubbucek@mail.muni.com; 455799@mail.muni.cz

* Corresponding author: jakubbucek@mail.muni.com

Abstract: This paper compares the financial stability of two alternative pension systems in Slovakia – the first one with gradually increasing retirement age and the second one with fixed retirement age. To achieve this goal, we have created a population projection based on the cohort-component model and the financial flows model working with the income and expenditure of the pension fund. We have found that the overall population will face a gradual decline in the size, however the post-productive population will increase until 2060s, which will increase the pressure on the public finance. While the pension system with fixed retirement age will cause higher burden on the pension fund, the costs of the pension system with flexible retirement age are passed on to other areas of the social security system. It is necessary to employ other policies that will increase the productivity, support natality to reverse the negative population projection, or liberate the labour migration to stabilize the public finance in the long run.

Keywords: pension system; financial stability; minimum retirement age

JEL Classification: H55; J11; J18

1. Introduction

Many European countries are facing the challenge of aging population. The main reasons are the increasing number of older people along with prolonging of a life expectancy due to improved medical care. Additionally, the number of children born per woman is decreasing for the last decades. This will put a pressure on the public finance in the upcoming decades because the imbalance in pension systems between incomes and expenses will grow even larger and national governments may be forced to implement major reforms to keep the public finance sustainable.

Slovakia is no exception to the phenomenon and the first significant attempt to reform of pension system in Slovakia appeared in the year 2019. The new regulation of the social security system came into effect at the beginning of the July 2019. It replaced the old way of determining retirement age which took into account development of the life expectancy and set a fixed retirement age to 64 years for all citizens. Because the new retirement age is significantly lower than the old retirement age, this will put even higher pressure on the public finance in Slovakia.

The regulation has become a source of discussions in which some argue in favor of the government's decision while others argue against it. Proponents argue with decreased ability of the older people to provide the same work performance. Opponents emphasize an

expected demographic development which may lead to pension fund deficit due to continuing decrease in a productive part of the society and increase in number of retired. Another argument against this act of parliament relates to its form. The act was enrolled as a constitutional law which makes it more difficult to be change.

Although everyone agrees on the importance of sustainability of the pension system, no academic papers comparing these two pension systems in Slovakia has been published to the authors' best knowledge. The main goal of this paper is to compare the two pension systems in Slovakia. The current one with fixed minimum retirement age and the old one with gradually increasing retirement age that reflects increasing of life expectancy. The comparison focuses on financial sustainability of both pension systems and their impact on public finance in the long-term.

2. Methodology

As a first step we construct our own population projection for Slovakia, because available Slovak population projections includes rather aggregated information about age groups than information for each age, i.e. a single number for age group 60-64 is available while our approach requires number for each age from 60 to 64. The need of own estimation emerged mainly for the reason to distinguished between people who do and do not reach minimum retirement age in the pension system with gradually increasing retirement age.

The selected population model is a variation of cohort-component model (for example O'Neill et al. (2001) and Štědroň (2012)). The model is based on the current age distribution of population and it assumes that each year part of population in a given age cohort survive till the next time period and the rest die. The model is also populated with women that can give a birth with a given probability that corresponds to current fertility statistics in Slovakia. These births represent newborn people in the model.

The method can be summarized by Equation 1 which is computed separately for men and women as their survival rates differ. The principle of the population development can be referred as a natural growth increment.

$$\begin{aligned} \textit{Total Population} &= \textit{Newborn} \\ &+ \sum_{t=1}^{100} (\textit{Population at the age } t \cdot \textit{Survival rate at the age } t) \end{aligned} \quad (1)$$

On the other hand, it is important to mention a major restriction of the selected population model. It is constructed as a model of a closed economy which means that the migration of people is not considered. This decision was made because of low migration to and from Slovakia compared to the total population. The ratio of difference between people migrating to and from Slovakia to the total population ranged from 0.03% to 0.07% in the current decade. For the reason, we omit the effect of migration in our population model.

Despite this limitation, the selected population model can be considered as reliable although its prediction power is naturally decreasing in the long run. According to the

backward projection of the population growth, it is following the same trend as the real observed data. We also compared the population projection from the estimated cohort-component model with population projections from other authors (Department of Economic and Social Affairs, Population Division, 2019; Batog et al., 2019) and they follow the same trends.

As a next step we construct the pension fund financial flows model. It is based on simple principle of the contributions and expenditures of the pension fund. It is described by Equation 2.

$$\begin{aligned} \textit{Pension fund balance} \\ &= (\textit{Labours} \cdot \textit{Yearly contribution}) \\ &- (\textit{Pensioners} \cdot \textit{Yearly pension}) \end{aligned} \quad (2)$$

The contributions to the system are determined by the number of labours, the average yearly salary, and the social security tax rate. The number of labours is determined by the number of people in a particular age and the employment rate for a given age. Please note that as people are approaching the retirement age, their employment rate is slowly decreasing and eventually the employment rate for Slovaks between 60 and 64 years old is only around 33% according to the current statistics. It is expected that this figure will increase along with the increasing retirement age and improvement of general life conditions, however we have fixed this parameter to the current value in the model.

The pension fund expenditures are product of the number of the old-age pensioners and the average monthly pension. All people older than the legislative retirement age are considered as the old-age pensioners and this number differs in both systems. In case of the system with fixed minimum retirement age, all people above 64 years are old-age pensioners. In the system with gradually increasing retirement age, the minimum retirement age is recalculated every year and for simplicity it is rounded down to the whole years. This creates the characteristic zig-zag shape of the lines in graphs for the pension system with increasing retirement age.

Both revenues and expenditures of the pension fund are influenced by a share of people that are members of the second pillar of the pension system. The contributions to the pension fund are proportionally reduced according to the valid legislation for the members of the second pillar, however they also get reduced pensions from the public pension system when they reach the pension age. For the paper, we assume that the share of people that are members of the second pillar is stable for the whole period and it is set to 50%.

In this paper, three scenarios of the financial flows of the pension funds are considered. A negative scenario characterizes a situation in which the growth of average yearly salaries is lower than the growth of the average yearly pension. A neutral scenario is projecting the same growth for the average yearly salary as well as for the average yearly pension and their growth is set to value 2%. This value is a minimum guaranteed growth rate of pensions in Slovakia. If the annual inflation rate is higher than 2%, the growth of pensions is same as the inflation rate. A positive scenario is considered as a growth of the yearly salary higher than 2%. All considered scenarios are summarized in Table 1.

Table 1. The summary of the considered scenarios of the pension fund financial flows

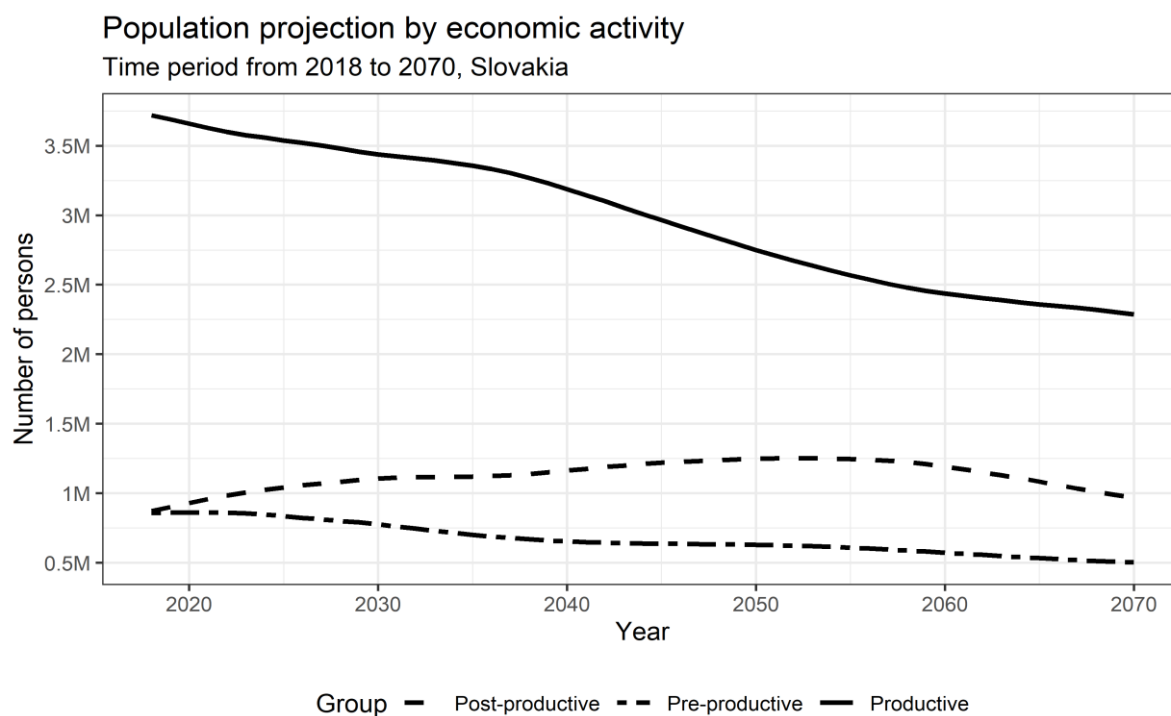
	Positive scenario	Neutral scenario	Negative scenario
Average yearly salary growth	3%	2%	1%
Average yearly pension growth	3%	2%	2%

Measured values of the pension fund balance are expressed proportionally to the GDP of the current year. Its value in the next years is gained from 2018 GDP which is constantly increased by the same yearly growth rate as the yearly salary growth.

3. Results

3.1. Population projection for Slovakia

The results from the population projection follow our expectations and they are also in line with other available population projections for Slovakia (Department of Economic and Social Affairs, Population Division, 2019; Batog et al., 2019). Figure 1 shows a significant decrease of the overall population during the next 50 years. The whole Slovak population will be reduced to one third of its current size during the observed period. This is caused mainly by the low natality which will lead to halving the pre-productive population and this will afterwards result in decrease of the productive group. In contrast, the size of the post-productive population will reach its peak around the year 2055 and it will get back to the level of the year 2020 in the following 20 years.

**Figure 1.** Population development by economic activity in time period between 2018 and 2070, Slovakia

The decrease of the productive population might have a serious impact on the number of labours that corresponds to a single old-age pensioner. Figure 2 displays development of the labours and old-age pensioners under both alternatives, the fixed minimum retirement age and the gradually increasing retirement age.

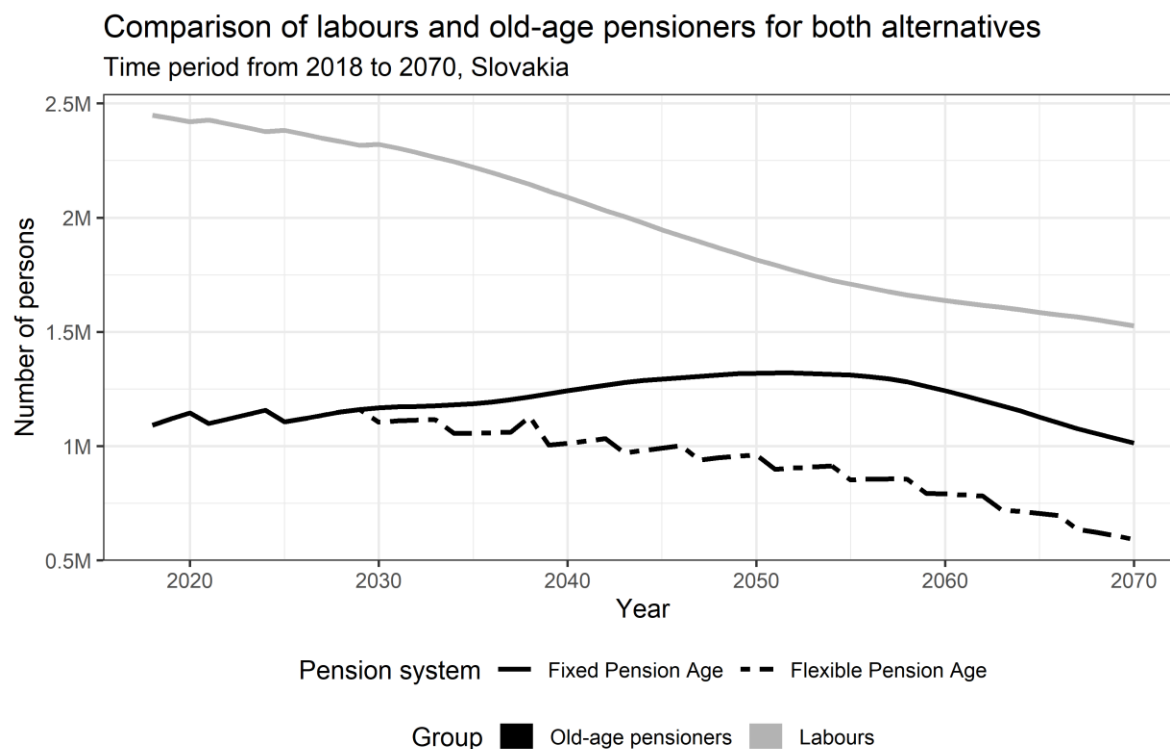


Figure 2. Comparison of labours and old-age pensioners for both alternatives in time period between 2018 and 2070, Slovakia

The development of the labours is almost identical in both systems, while the development of old-age pensioners differs significantly. The number of labours is gradually decreasing in both systems. It starts on 2.5 million labours at the beginning of the time period and it will eventually drop to 1.5 million labours in the year 2070. Although there are almost no differences in the number of labours between these two pension systems, there is a hidden important phenomenon which is related to the gradually increasing retirement age system. The system with flexible retirement age is source of the high old-aged people unemployment due to low employment rates in the higher age groups. Their existence is not present in the figure.

On the hand, the difference in the number of old-age pensioners is clearly visible. The pension system with fixed retirement age will generally generate more old-age pensioners. The increase in the number of pensioners in the system with fixed retirement age will be driven by a strong population wave born in the 1970s. The peak will be reached around the year 2055 and then the number of pensioners will start to decrease. Related to this development, the pension fund balance is expected to see the most critical period between 2050 and 2060.

We have run a several scenarios of the possible pension fund development in Slovakia. Figure 3 shows financial flows of the pension fund in both pension systems for all scenarios.

We can notice a better performance of the gradually increasing retirement age system (solid lines) compared with the pension system with fixed retirement age (dashed lines) in all considered scenarios. The only exception is the period of the first decade when both alternatives provide the same results. This is caused by gradual approaching of the retirement age to the guaranteed minimum age and therefore retirement age in both scenarios are similar for the first couple of years.

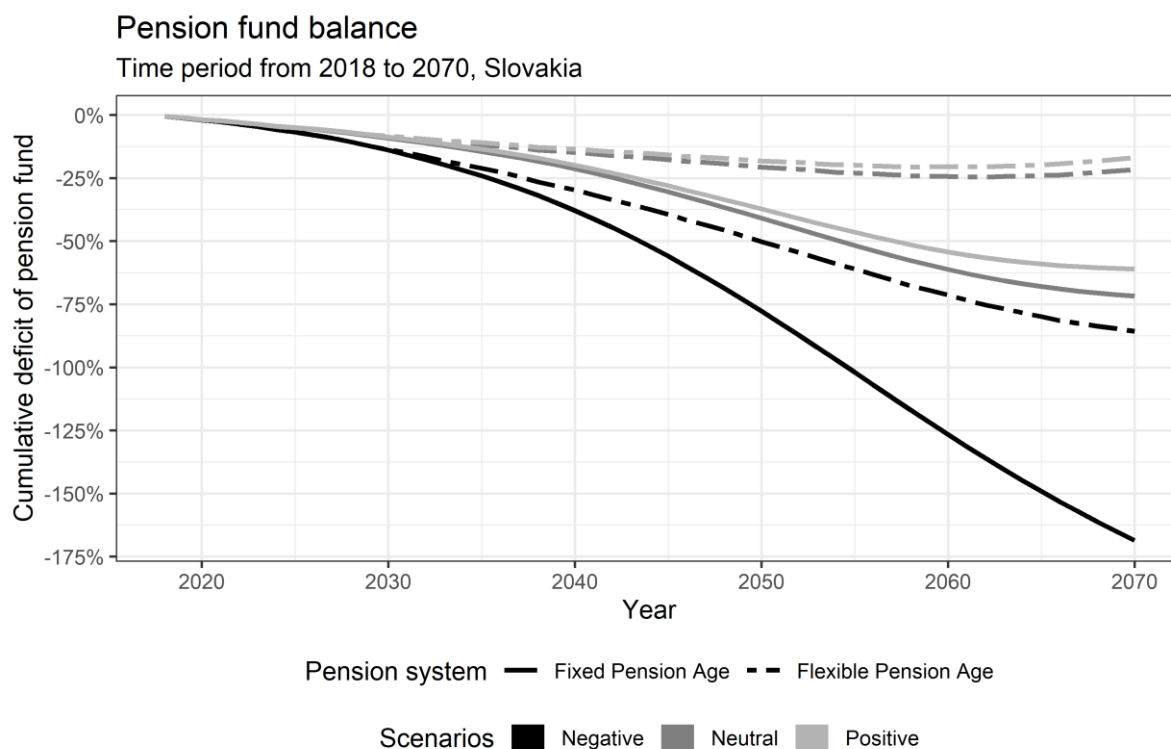


Figure 3. Pension fund balance in time period between 2018 and 2070, Slovakia

The gradually increasing retirement age system is characterized by lower deficits of the pension fund deficit compared to system with fixed retirement age during the whole selected time period. The worst scenario will generate cumulative deficit of nearly 90% of GDP at current prices by the end of the selected period with the highest increments in 2060s. Both neutral and positive scenarios will reach much lower cumulative deficit 25% of GDP at current prices around the year 2060 and the debt will slowly decrease in the following years. The critical decade in 2060s can be accounted to the strong population wave born in the 1970s.

The pension system with fixed retirement age is performing much worse and in the case of the worst scenario, it will generate cumulative deficit of pension fund of nearly 175% of GDP at current prices. The cumulative deficit in this alternative is almost doubled compared to the other pension system. The other two scenarios will generate cumulative deficits that are comparable with the worst scenario for the alternative. This is caused by the difference in the number of old-age pensioners at the end of the selected time period. The system with fixed retirement age will have around 1 million old-age pensioners versus around 600 thousand old-age pensioners in the system with flexible retirement age.

Similar research on the pension fund sustainability was conducted by Slovak Institute for Financial Policy (Institute for Financial Policy, 2020). The researchers are expecting

continuous deepening of the pension fund deficit due to increasing expenditures of the pension fund. Urbaníková and Papcunová (2016) also present negative tendencies of the future development of the pension fund balance. As main determinants of this development are mentioned retirement age and high of the pension fund contributions.

However, results of two above mentioned papers differ, in compare to our paper, in absolute values, tendencies of the future development of the pension fund balance are following similar tendencies.

To sum up the results, we can confirm the expected results from the very first chapter of this paper. The Slovak population is expected to face a significant decrease in the population lead mainly by the fall of the productive one. On the other hand, number of the old-age pensioners can follow different values according to the established pension system regulation.

In the comparison of the two selected alternatives, the fix minimum retirement age system performed worse in all considered variants. The deficits achieved significantly higher values which culminate during the critical period around 2060 and in the following decade.

On the other hand, the gradually increasing retirement age systems seems to provide better results in case of pension fund deficits. Its biggest disadvantage relates to the high old-age labours unemployment rate which shifts the burden of the pressure on the public system to different components of the social security system.

4. Conclusions

The correct setting of the social security system and its components is always a difficult task for the national government. This is even harder and yet more important when the population projection predicts significant increase in the number of old-age pensioners and simultaneously decrease in the number of people in the productive age. The incorrect pension system policy may negatively threaten not only the pension fund balance but even the whole public finance.

The new pension system changes in Slovakia will lead to higher pension fund deficits compared to the alternative system with gradually increasing retirement age. In that case, the government will be obligated to service any deficit by rearrangement of the national budget, increasing payroll taxes or reducing old-age pension.

The previous pension system with gradually increasing retirement age follows similar gradual decrease in the number of labour and old-age pensioners, but the effect of the increasing number of old-age pensioners will be suppressed by the increasing minimum pension age. Generally, this setting of the pension system will achieve lower deficits of the pension fund. On the other hand, this setting will probably generate high unemployment for people that would reach the minimum retirement age in the system with fixed minimum retirement age but not in the system with gradually increasing retirement age. Therefore, this setting will put under a pressure other component of the social security system.

Keep in mind that the results of the paper are limited by used models for population projection and pension fund financial flows. The former model is limited to closed economy

that cannot attract new worker from foreign countries and it relies on parameters like natality, survival rates or unemployment that are fixed for the whole period. Any exogenous changes in these parameters may significantly change the population projection in both ways. The latter model is just a simple balance model that is based on stable growth paths of relevant variables and does not take into account any dynamic caused by economic cycle.

To conclude, none of the compared scenarios can be announced as a winner. Both systems have their positive and negative consequences on the pension fund balance and public finance sustainability. The national government should increase the productivity, support natality to reverse the negative population projection, or liberate the labour migration to stabilize the public finance in the long run.

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