

Reality and expectations of old-age pension savings in the pension system of the Slovak Republic

Peter Sika, Jarmila Vidová¹

Abstract: The aim of the authors is to provide a critical statistical-analytical view of the current pension system of the Slovak Republic with special regard to old-age pension savings in its fifteen-year existence, resulting in proposals for adjustments to its operation. It includes an analysis of the sustainability of pension systems, an analysis of the age distribution of savers as well as possible investment strategies of savers and the distribution of their property savings in pension funds. We model the investment strategy of a participant in old-age pension savings. We draw attention to the evaluation of old-age pension savings in pension funds during its existence and quantify the potential loss caused by an inappropriate investment strategy of savers. The analysis showed that the Slovak participant in old-age pension savings invests mainly in conservative pension assets, which bring low volatility in the short term, which may not be optimal in the long run. In order to achieve change, we also outline the possibilities of changing the attitudes of savers to value their savings and propose reform steps that would contribute to ensuring a balance between the financial and social sustainability of the pension system.

Key words: demographic change, financing of pension systems, pension system, social security.

JEL Classification: D31, G17, G22, G28, G51, G52

Received: 8 December 2020 / Accepted: 24 September 2021 / Sent for Publication: 13 December 2021

Introduction

Social security most often includes relationships and tools by which society guarantees and provides material security to individual citizens if they are unable to work for reasons recognised by society or are in a situation where their income is insufficient to cover the increased cost of living (Matlák, et al., 2004). Krebs, et al., (2007) consider social security as a substitute system that provides relative stability and an adequate minimum level of social security and social sovereignty. There are many types of pension systems in the world. They consist of mandatory or optional parts, from 0 pillars in Chile, where pension savings are the sole responsibility of the residents themselves, to 4 pillars as in Sweden. A distinction is also made as to whether these schemes take the form of "interim

¹ Faculty of National Economy, University of Economics Bratislava, Slovakia. email: peter.sika@euba.sk, jarmila.vidova@euba.sk.

payments" or how much you have, or they are the capitalisation pillars or voluntary / supplementary pension savings that are individual. The first pillar is a key component of pension levels in most countries (Slovakia, Germany, Russia and Sweden). Many authors investigate issues of pension systems (Levine, 2002, Samwick, 2000, Perotti and Schwiendbacher, 2009, Barr and Diamond, 2009, Rievajová et. al., 2017, Vostatek, 2020).

Several authors focus on pension systems to examine the impact of the life cycle on vulnerability of savings, consumption and investment (Attanasio and Browning, 1995, Karpíš and Ďurana and Jelenčíak, 2006). Jacobs (2009) discusses the analysis of retirement and pension savings decisions. He finds that life cycles are important in explaining individual behaviour in terms of investing in human capital, retirement savings or retirement. Bodie and Detemple and Rindisbacher, (2009) examine financial decisions regarding the life cycle of consumers and outline the impact on retirement planning, the tendency to save, invest and old-age insurance. Amaglobeli et al. (2019) focus the research on the problem of national savings. They are interested in how demographic changes will affect private savings decisions, as young people borrow, economically active people save, and older people reduce their income after retirement. Ageing is likely to reduce private savings by increasing the percentage of older people in the population who will need to save more in retirement, forcing them to save during active working life (Attanasio and Weber, 2010, Attanasio et. al. 2016). Vostatek (2020) states that investment in housing is becoming increasingly important as a form of old-age security. Insufficient pension coverage may have an impact on pension savings, especially if financial markets do not offer appropriate saving instruments or may promote excessively preventive savings. Therefore, the interaction between ageing and pension systems is crucial for household behaviour.

Pension systems developed especially after World War II were initially based on a continuous system of financing. However, at present they are entering financial crises, placing ever-increasing demands on taxpayers, respectively economically active population. The number of pensioners is increasing, pensions are increasing as a result of the way they are valorised, and at the same time as the population ages, the number of those who contribute to the system is decreasing (Šebo, 2016). Many countries are currently facing the question of how to finance compulsory pension provision or insurance of the population in the future (Vidová, 2006, p. 14). Risks of financial burden, risks reducing the functionality of the pension system are a challenge for fundamental changes.

At present, individual countries do not base their pension system on a single pillar, but due to the risk of diversification, they divide it between several pillars, the main aim of which is to ensure a sufficient income in old age at an acceptable level of risk as well as to achieve greater intergenerational justice. The basic typology of the European Union pension systems consists of three pension pillars (Eichhorst, W. et al., 2011): public pensions (continuously funded system, or mandatory private funded pension systems), compulsory / voluntary occupational pensions and voluntary personal (private) pensions.

In the Slovak Republic, several fundamental changes were made to the pension system with the aim to change the previous pension system, which was based on a continuously funded pension system to an official three-pillar system (Table 1) with the option of choosing other pillars solely on a voluntary basis. At the same time, the aim was to reduce the risk of a negative impact on the number of pensions with a view of future demographic developments as well as to diversify sources of income in old age. However, the transition

to a multi-pillar pension system brings a temporary deepening of the deficit, as a certain part of resources is transferred to the capitalisation pillars, which we refer to as transformation expenses.

Table 1. Pillars of the Slovak pension system

0 pillar	Its main objective is the elimination of poverty. It includes a state of material need, state social support, social assistance as well as the so-called minimum (social) pensions. Income may or may not be tested for claims. The principle of full solidarity applies; however, the amount of the benefit does not depend on the amount of payments. Financing is provided through the tax system.
1st pillar	The aim is to secure old-age income through compulsory public social insurance, where the amount of the benefit depends on the amount of the insurance paid. It is built on the principle of merit as well as solidarity between generations, men and women, rich and poor. Financing is provided through insurance based on a continuous financing system. In the case of deficit management, it is co-financed from the tax system.
2nd pillar	It is based on a time-limited voluntary decision regarding entry into old-age pension savings. The accumulated capital is invested, and in the future forms the basis for the pension benefit. The principle of meritability applies through the binding of contributions and benefits without reductions.
3rd pillar	It is constructed as a private voluntary system, but for an employee who performs the so-called risky work, entry into the supplementary pension savings becomes mandatory within 30 days from the beginning of the performance of these works.
4th pillar	It is designed exclusively as a voluntary scheme outside the official pension scheme with access to various financial and non-financial assets (e.g. life insurance, individual investment in securities, real estate ownership).

Source: Own processing.

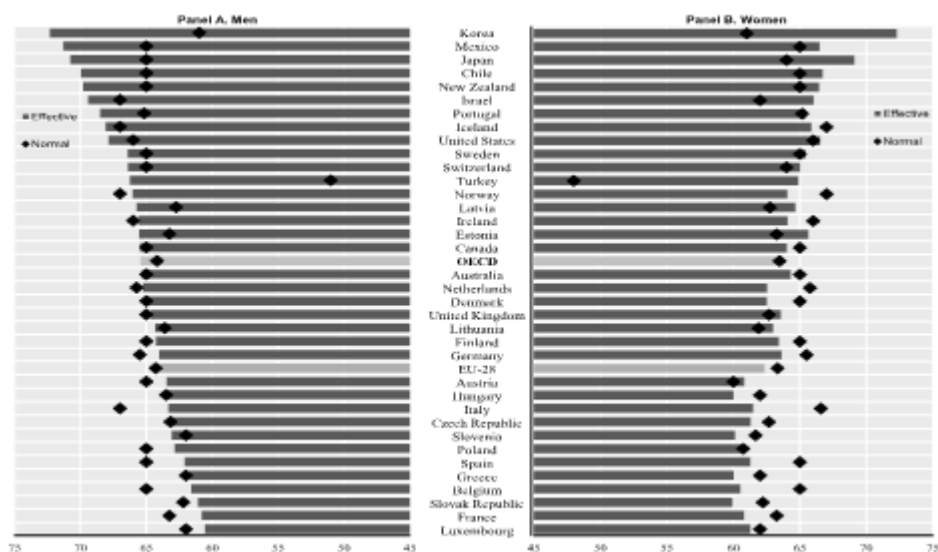
However, the reform steps that have taken place in the conditions of the Slovak Republic require constant changes and corrections in line with socio-economic developments. The aim of the authors of this article is to provide a critical statistical-analytical view of the current pension system of the Slovak Republic with special regard to old-age pension savings in its fifteen-year existence, resulting in proposals for adjustments to its operation. We analyse the existence of old-age pension savings in terms of financial sustainability of the Slovak pension system. As part of capitalization savings, we analyse the age distribution of savers as well as the investment strategies of savers and their distribution of property savings to individual pension funds. We model the investment strategy of a participant in old-age pension savings. Furthermore, we draw attention to the evaluation of pension funds of old-age pension savings during its existence and quantify the potential loss caused by an inappropriate investment strategy of savers. We draw attention to frequent unprofessional political interventions in the functioning of the system as well as to

the passive attitude of pension management companies in the management of savers' assets, which was reflected in the evaluation of pension savings.

Pension system of the Slovak Republic in the context of population ageing

The most problematic and debated part of social insurance in terms of financial sustainability is the segment focused on pension provision. The pension system is crucial for the long-term impact on public finances. In the ongoing reforms, it is necessary to look at the individual pillars systematically and examine the mutual interactions between the pension pillars. The importance of optimising pension systems has also been emphasised by the Europe 2020 strategy, which has identified the long-term sustainability of public finances as one of its main objectives, while ensuring reliable and adequate pension systems that enable individuals to maintain their standard of living in retirement (European Commission, 2010, p. 27). The Slovak pay-as-you-go pension system is characterised by a constant balance between the assets of the pension system, which take form of the mandatory contributions of all employees, and the liabilities of the system, which represent the pension entitlements of pensioners. The final management of the ongoing pillar depends mainly on the number of contributions, the dependency index in old age, the rate of compensation and the effective retirement age. The average gross compensation rate in the OECD countries is at the level of 60.8%, in Slovakia it reaches 56.4%. Compared to developed countries, Slovak men currently receive pensions comparable to the OECD average. The length of retirement for women is above the OECD average. The effective exit age from the labour market for both men and women is also one of the lowest in the OECD (Figure 1).

Figure 1. Average effective age of labour-market exit and normal retirement age in 2018

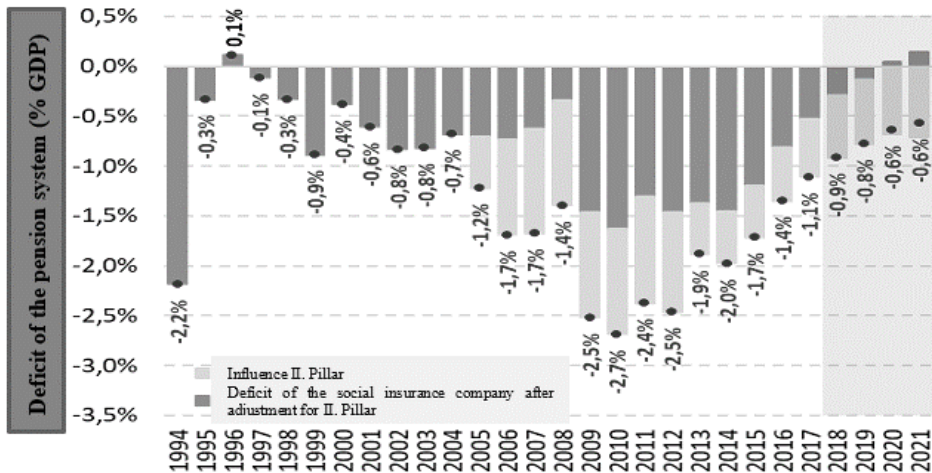


Source: *Pensions at a Glance 2019*

Continuously financed pension system regulated by the Act no. 461/2003 Coll. on social insurance, as amended in later regulations, is functional as long as pension payments can be covered from levies collected. Due to the need to cover its deficits, this pillar represents the current and future burden to public finances. As soon as pension entitlements exceed the amount of levies collected, a financial deficit and the threat of hidden debt arise. It is a debt of the pension system that will make it impossible for future generations to pay pension benefits in the future, as it will not have sufficient financial resources for these benefits due to demographic developments. Despite good demographic times, contributions from the working population have never been sufficient to cover pension costs. For the last twenty years, the pension system has been systematically in deficit, regardless of whether there are economically good or bad times (Porubský and Novysedlák, 2018), (Figure 2). The pension system would be in deficit even if the second pillar did not exist. At present, these deficits are covered by surpluses of other funds of the Social Insurance Agency and also from the sources of the state budget.

According to the theoretical and mathematical calculations of the Social Insurance Agency, the total balance of pension insurance without financial assistance from the state and covering the old-age insurance deficit from other funds was cumulatively from 2004 to 2017 at the level of -24.9 billion. € (SAO, 2020, p. 9). In most countries of the European Union, the pension system is not fully paid from the collection of insurance premiums but is co-financed from other sources such as taxes.

Figure 2. Pension system deficit in the Slovak Republic (% GDP)



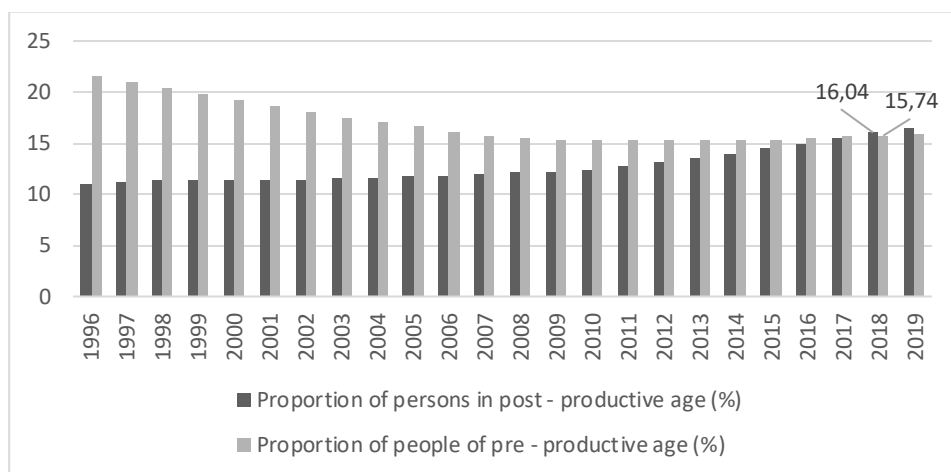
Source: Processed by the Social Insurance Agency, Council for Budgetary Responsibility.

While in 2016, 3.2 people worked for one person over the age of 65, in 2070 it is assumed that there will be only 1.5 workers. The age dependency index will increase in 2070 to 56.8% from 21% in 2016. Slovakia will become the third-fastest ageing country in the European Union, which will have significant financial implications for the pension

system. It is assumed that the number of inhabitants in the Slovak Republic aged 65 and over will increase from 870 thousand in 2018 to 1,635 thousand in 2060.

According to The Ageing Report from 2018, the number of people aged 65 and over in Slovakia per 100 people aged 15-64 (the so-called index of economic dependence of the elderly) will increase from approximately 20 in 2016 to almost 60 in 2060.² The reason for the ageing population in Slovakia is the low birth rate at the level of 1.5 to 1.8 children per woman in the next 50 years, as well as the expected prolongation of life. Figure 3 shows the development of the shares of people in the pre-productive and post-productive age in the Slovak Republic. Since 2018, the share of people in the post-productive age has been higher, which has resulted in an increase in the deficit of the pension system relative to GDP.

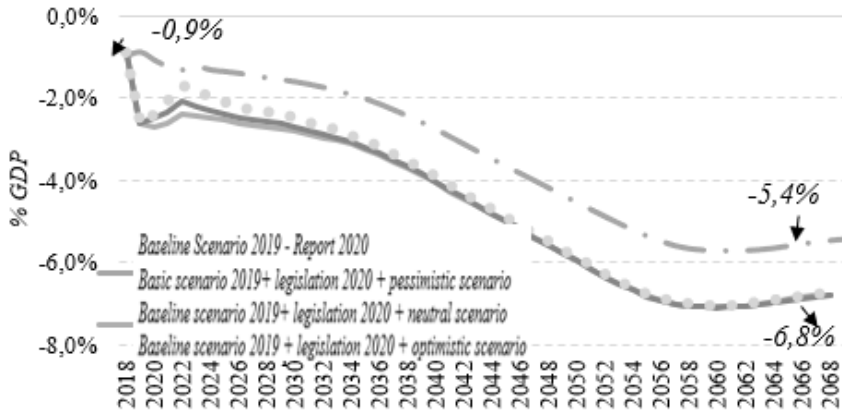
Figure 3. Development of the share of people in pre-productive and post-productive age in the Slovak Republic (%).



Source: Figure constructed on the basis of data from the Statistical Office of the Slovak Republic.

In the 50-year horizon (Figure 4), the deficit of the pension system relative to GDP increases sharply in the baseline scenario, widening by up to 4.5% of GDP compared to 2019 (from -0.9% of GDP in 2019 to -5.4% of GDP in 2069) (RRZ, 2020, pp. 16-17). This fact was mainly influenced by the measures taken during 2019: capping the retirement age, doubling the so-called Christmas allowance, an increase in the minimum pension and its link to the average wage in the national economy, a reduction in the reduction of pensions paid from the Social Insurance Agency for those people who are members of old-age pension savings.

² Index of economic dependence of the elderly – expresses the number of persons in the post-productive age (65+ years) per 100 persons in the productive age (15 – 64 years).

Figure 4. Balance of the universal pension system

Source: Council for Budgetary Responsibility (2018).

The pension system based on the capitalisation method of financing is characterised by a high degree of merit. The system of creating capital reserves, or simply called *the capitalisation method of financing*, means that the active part of the population saves its current income to finance its future needs in old age. With its savings, it thus creates a stock of capital in the form of pension assets, which are sold after retirement for a lifetime annuity.

By diverting part of the levies in favour of the private capitalization pillar, the public pension pillar loses part of its resources. The temporary loss of income in the public pension pillar will be offset in the future by savings, as participants in old-age pension savings will receive a reduced part of the pension benefit from the public interim pillar and the rest will be covered by the old-age pension benefit. Old-age pension savings can have different resulting effects on the deficit of the public pension system.

According to Kabina (2014), the amount of lost income (LI) of the public pension pillar, caused by the private capitalization pillar, can be calculated according to the formula:

$$LI = 12 \times O_2 \times AW \times (1 - Ump) \times \sum_{i=alm}^{ar} (dem_i \times pu_i),$$

where O_2 is the number of contributions to the second pillar, AW is the average monthly wage, Ump is unemployment, alm is the age of entry into the labour market, ar is the age of retirement, dem_i is demography (the number of persons aged i), pu_i is the percentage of persons aged i in the second pillar. The amount in the formula therefore expresses the number of people of working age who are savers in the second pillar. In a similar way, Kabina (2014) estimates the cost savings (SE) for future years that the second pillar will cause:

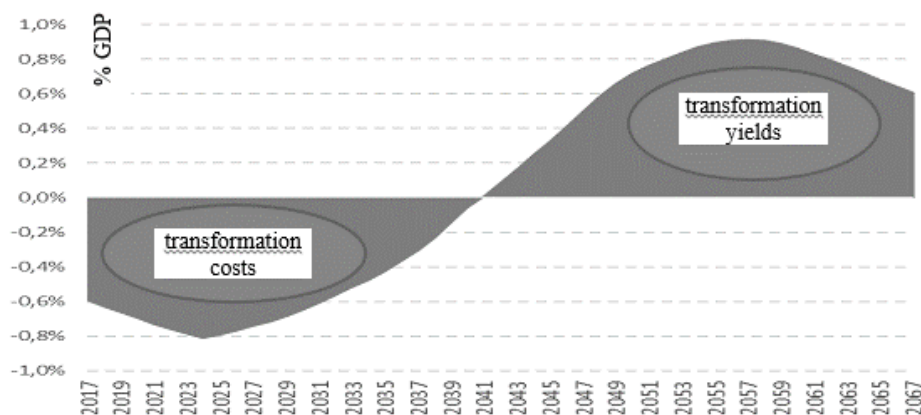
$$SE = 12 \times \sum_{i=ar}^{100} (dem_i \times pu_i \times pc_i \times doch_i),$$

where the designation of quantities is unchanged and pc_i denotes the proportion of old-age contributions that a person of age i and throughout his working career pays to the second pillar and $doch_i$ is the average pension of persons of age i (at constant prices). It follows that we can calculate the resulting deficit of the first pillar in a given year, after calculating lost income and saved expenses, as follows:

$$Deficit = Expenditure - Revenue + LI - SE$$

From the above, we can state that at the beginning of the period under review, the impact of the established second pillar is negative, which means that lost income significantly exceeds saved expenditures, as in the first years there are a small number of recipients of pension annuities from the second pillar. However, in the later period, the saved expenditures will exceed revenues, which means that the second pillar helps to reduce the deficit of the public pension pillar. This statement is also in line with the conclusions of the Council on Budgetary Responsibility (Figure 5).

Figure 5. General Government costs and revenues linked to the existence of the second pillar (% of GDP)



Source: processed by the Council for Budgetary Responsibility (2018)

Both methods of financing pension systems have their advantages and disadvantages, and therefore their use is largely dependent on the specific economic, social, demographic and political conditions of the country.

The first pillar depends mainly on the functioning of the domestic economy as well as on political influences in the pension system, and also especially on domestic demographic trends. The second pillar is largely dependent on the development of the world economy and the risks associated with long-term investment. A mixed system enables risk diversification by investing in financial assets with different geographical or sectoral structures.

These pension schemes shift most of the risks from administrators to savers. There is no doubt that relying on a single source of funding for the pension system is very risky. It follows that the combination of the two methods is not an optimal solution for financing the pension system, but it means, above all, risk-spreading.

In the Slovak pension system, there is also the so-called third pillar of pension provision in the form of voluntary supplementary pension savings, which is managed by four supplementary pension companies that invest funds in order to increase their value. The final amount of the supplementary pension savings benefit depends on the amount of funds that the participant and their employer have transferred to the supplementary pension company during the entire savings period and on the rate of their appreciation. Contributions are fully or partially deductible from the tax base. Payment of funds is made by a one-time withdrawal or in the form of annuity after meeting the minimum savings period, respectively reaching the retirement age. As of 31 December 2019, the participating base of supplementary pension savings represented 833 596 savers (Table 2). This was an increase of more than 4% compared to the end of 2018. The amount of assets under management slightly exceeded the volume of 2.288 mil. €.

Table 2. Number of participants in supplementary pension savings as of 31 December 2019

AXA d.d.s., a.s.	145 714
Supplementary pension company Tatra banky, a.s.	231 772
NN Tatrý-Sympatia, d.d.s., a.s.	327 334
Stabilita, d.d.s., a.s.	128 776
TOTAL	833 596

Source: Ministry of Labour, Social Affairs and Family of the Slovak Republic.

Note: In mid-October 2020, the Austrian insurance group UNIQA became the owner of AXA, which renamed the company UNIQA.

The average contribution of the employer increased compared to 2018 from about 28.5€ to about 30.3€ in 2019. The average contribution of participants in 2018 was about 18.0€ and in 2019 it increased by about 4.8% to about 18.9 € (MLSAF SR, 2020, p. 75). The average annual appreciation of supplementary pension funds in 2019 was 8.6% (Table 3).

Table 3. Number of participants in supplementary pension savings as of 31 December 2019

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1,9	-2,6	7,2	1,6	3,6	-1,6	2,6	3,7	-4,7	8,6

Source: Processed on the basis of data from the National Bank of Slovakia and the Ministry of Labour, Social Affairs and Family of the Slovak Republic.

The average amount saved by participants in contributory supplementary pension funds increased by 13.6% year-on-year to 2,746 €.

Evaluation of old-age pension savings in Slovakia during its existence

The reform of the Slovak pension system, which began in January 2005, was based on the conviction that a new pension system based on ongoing funding would help eliminate the effects of adverse demographic developments.

For this reason, a three-pillar pension system was launched in 2005, in which the so-called second pillar exists on the basis of Act no. 43/2004 Coll. on old-age pension savings as part of the basic pension system in the Slovak Republic.

At present, there are five pension management companies operating on the old-age pension savings market out of the original number of eight, whose main task is the professional and responsible management of citizens' pension savings:

- Allianz - Slovak Pension Management Company, a.s.,
- UNIQA d.s.s., a.s.,
- Pension Management Company of Poštová banka, a.s.,
- NN d.s.s., a.s.,
- VÚB Generali, d.s.s., a.s.

As of 31 December 2019, pension management companies managed the total volume of assets in funds in the amount of 9,324.44 million €, which is approximately 10% of Slovak GDP in 2019 (Table 4). The volume of assets corresponded to the savings of 1,564,152 participants in old-age pension savings, representing 57% of the economically active population of the Slovak Republic (www.employment.gov.sk).

Table 4. Assets in pension funds for 2019 as a percentage of GDP

Percentage of GDP	OECD member countries
up to 10 %	Austria, Belgium, Czech Republic, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Turkey
from 10 % to 30 %	Estonia, Japan, Korea, Mexico, New Zealand, Slovak Republic
from 30 % to 50 %	Denmark, Finland, Ireland
from 50 % to 70 %	Israel
from 70 % to 100 %	Canada, Chile, United States
over 100 %	Australia, Iceland, Netherlands, Switzerland, United Kingdom

Source: Own processing based on OECD data.

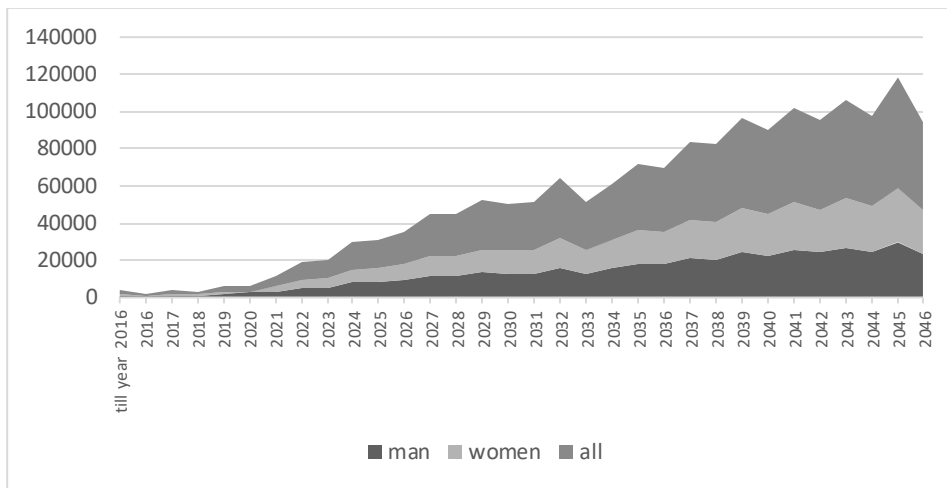
Model recalculations performed by the Ministry of Labour, Social Affairs and Family of the Slovak Republic in 2004 stated that the transition to a mixed construction of pension system will ensure the financial sustainability of the pension system after initial difficulties with transformation costs. However, it should be noted that some assumptions were not met (success in collecting premiums, recovering premiums, estimating the number of early retirement pensions, saving on disability pensions, estimating the number of old-age pension savers), which puts pressure on later amendments to social security and old-age pension savings.

The original assumption of 40% of policyholders' participation in pension savings was well exceeded, as 65% of the total number of policyholders entered old-age pension savings. After a year of existence of old-age pension savings, the number of savers was 1.2 million. The higher number of savers can be attributed not only to the massive campaign of pension management companies and the existence of the so-called intermediaries of pension savings, but also to an extensive information campaign carried out by the Ministry of Labour, Social Affairs and Family of the Slovak Republic. The Ministry of Finance

decided to realise the expectations through a study by Ódor et al. (2004), where the main recommendation was "entry into the second pillar pays off especially for women under 35 and for men under 40", but struggled with an intensive marketing campaign (Ódor, Povala, 2019, p. 5). A significantly higher number of people entering the two-pillar system, and especially in old age, has led to a higher revenue shortfall in public finances.

In the following years, the number of recipients of pension benefits from II. pillar will increase (Figure 6), which will reduce the entitlement to pension benefits exclusively from the Social Insurance Agency.

Figure 6. Number of savers who meet the conditions for payment of old-age pension from II. pillar until 2046



Source: Processed on the basis of data from the Ministry of Labor, Social Affairs and Family of the Slovak Republic

The unfulfilled assumptions envisaged for the introduction of old-age pension savings have significantly contributed to the decision to re-evaluate the original contribution rate (9%) to 4% from 1 September 2012 so that the transformation costs of introducing a new pension system are within the limits the pension system is capable of coping with. In 2021, 12.75% of the compulsory contributions to old-age pension insurance in the amount of 18% of the assessment base remain in favor of the first pension pillar and 5.25% is transferred to the benefit of the saver who is a participant in old-age pension savings.

The contribution to the old-age pension savings has been increasing by 0.25% every year since 2017 at the expense of the levy to the Social Insurance Agency, up to the final level of 6% in 2024, which is shown in the financial statement in Table 5. This change has a negative effect on the increase in savers' savings in the future. At the same time, it also has an impact on the fall in income of pension management companies from remuneration for maintaining a personal pension account.

Table 5. Impacts of the acceleration of the increase in the rate of compulsory contributions in II. pillar by 0.25% per year to a maximum of 6% (in million €)

Year	2017	2018	2019	2020
Selected contribution to SDS	490 604	544 075	603 912	670 329
Year	2021	2022	2023	2024
Selected contribution to SDS	743 389	824 411	914 263	1 013 909

Source: Ministry of Labour, Social Affairs and Family of the Slovak Republic (2021).

The percentage change in the ratio of the number of contributions also affects the amount of the old-age pension paid by the Social Insurance Agency. The amount of the old-age pension shall be reduced by the amount belonging to the period of the old-age pension savings, the determination of which depends on the period in which the saver obtained the old-age pension savings. For the period of pension savings acquired from 1 January 2005 to 31 August 2012, the amount of the saver's old-age pension shall be reduced by half the amount due to the period during which the insured person was a member of the old-age pension savings. If the saver obtained the savings in the period from 1 September 2012 to 31 December 2016, the amount of the old-age pension will be reduced by 2/9 of the amount belonging to the old-age pension savings period. For the old-age pension savings period from 1 January 2017, the value of the relative amount of the old-age pension belonging to the old-age pension savings period by which the amount of the pension is to be reduced will gradually increase every year, relative to the gradual increase in the mandatory old-age pension savings rate.³ For the period of old-age pension savings after 31 December 2023, the amount of the pension of the insured who is a saver shall be reduced by 1/3 of the proportional amount of the pension belonging to the period of old-age pension savings.

Participants in old-age pension savings also have the opportunity to pay voluntary contributions for old-age pension savings. The aim is to provide more space for individual decisions on the number of contributions paid into the personal pension account of the saver.

A new saver can opt into voluntary contributions already when signing the old-age pension savings contract, the others must conclude an addendum to the old-age pension savings contract. Their amount as well as the frequency of their payment is not limited, but Act no. 595/2003 Coll. on income tax stipulates the amount of voluntary contributions accepted for the purpose of reducing the tax base by applying the non-taxable part of the tax base.

At the same time, the multiple opening of the system reduced transformation costs, which led to the return of 424,312 savers to the pay-as-you-go pension system, but 71,317 policyholders decided to join the old-age pension savings system (Table 6). The social insurance company reported revenues from the multiple opening of the so-called II. pillar in

³ From 1 January 2017 to 31 December 2017 by 17/72; from 1 January 2018 to 31 December 2018 by one 1/4; from 1 January 2019 to 31 December 2019 by 19/72; from 1 January 2020 to 31 December 2020 by 5/18; from 1 January 2021 to 31 December 2021 by 7/24; from 1 January 2022 to 31 December 2022 by 11/36; from 1 January 2023 to 31 December 2023 by 23/72.

the amount of 1,092.0 mil. €. By allowing you to return exclusively to the pension insurance scheme, savers for whom old-age pension savings are disadvantageous have been given the opportunity to leave the scheme without penalty. At the same time, the possibility of additional entry into the second pillar was introduced for natural persons who did not participate in the old-age pension savings system.

Table 6. Number of savers entering and exiting II. pillar

Opening	Number	
From 1.1.2008 to 30. 6. 2008	Entered	22 760
	Withdrew	106 588
From 15. 11. 2008 To 30. 6. 2009	Entered	14 549
	Withdrew	69 975
From 1. 9. 2012 To 31. 1. 2013	Entered	14 720
	Withdrew	89 439
From 15. 3. 2015 To 15. 6. 2015	Entered	19 288
	Withdrew	158 310

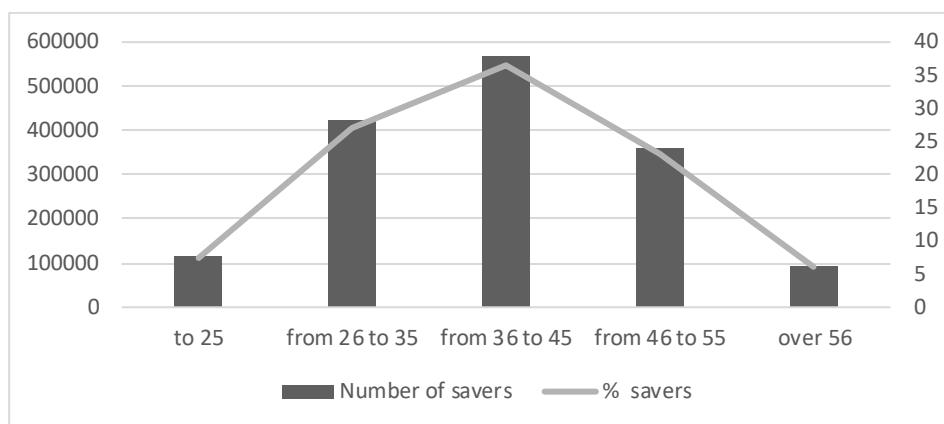
Source: own processing based on data of the Social Insurance Company.

Most people entered the second pillar at the age of 25. People who have been entering the second pillar since 2007 are most often in the age of high school graduates (around 20 years old) and university graduates (around 25 years old). Current legislation in force since 1 January 2013 allows entry into the second pillar to be postponed until the age of 35.

In the second pillar, there are only about 47% of all Social Insurance Agency policyholders. In the age group from 25 years to 45 years, it is 65% (Figure 7). Low participation in the second pillar is related to the retirement age of policyholders. This is due to the fact that the policyholders of older age remain on the labour market for a shorter period of time, therefore there is no benefit for them to enter the II. pillar. The highest share of savers in Social Insurance Agency is 35 years old. In 2015, there were approximately 75% of them (Rizman, 2017, p. 2). Postponing entry into the second pillar to higher age groups means a smaller share of pensions from the second pillar in the total pensions of savers, which is caused by a lower accumulation of savings.

In the second pillar, there are mainly above-average earning employees. One of the factors is that this group of employees does not have a reduction in the average personal salary point in the old-age pension savings system, as in the first pillar⁴, which does not reduce their pension benefit in the future.

⁴ The value of the average personal salary point exceeding the value of 3 is not taken into account. The average personal salary point of less than 1.25 is included in the full amount.

Figure 7. Age distribution of savers of old-age pension saving as of 31.12.2019

Source: Processed on the basis of data from the Ministry of Labor, Social Affairs and Family of the Slovak Republic.

Low-wage workers are less likely to enter the second pillar. Compared to low-income employees, people with a starting wage at the level of 100 to 120% of the average wage have 7.6 pp. higher probability of entering the second pillar. People with starting salaries above 180% of the average wage are more likely to enter, compared to employees with the lowest wages. However, this probability is paradoxically lower than for almost all other income groups (i.e., lower than for people who earn 20–180% of the average wage). The probability of entry also increases with the level of education attained, as people with higher than master's (or similar) education are up to 13.5 pp. more likely to enter the second pillar than people without a university degree (Rizman, 2017, p. 4). A study by Madrian and Shea (2001) showed that if people are automatically included in a pension savings system, the vast majority of them will remain in the system, but if they have to decide to join themselves, only a fifth of them will choose the option.

One of the most significant advantages of the capitalisation method of financing, from the point of view of the citizen, is the ownership right to the paid funds, which are collected and valued in the personal account of the pension savings. The right of ownership is then associated with the possibility of using the funds at one's discretion in the event that the amount is accumulated in the account, which would provide the owner with a minimum pension. However, the capitalisation method of financing also has its weaknesses, as it is exposed to turbulences on the capital markets and does not protect savers from the consequences of inflation. This phenomenon was also reflected in the evaluation of Slovak pension funds at the time of the global economic crisis.

From 2016, 68% of the value of the average personal wage point from 1.25 to 3 is included. To the average personal wage point of less than 1.0, 20% is added from the difference between the value of 1.0 and the average personal wage point in 2016 and the subsequent years.

15 years of existence of the second pillar represent a relatively short period for drawing relevant conclusions, as it represents approximately one third of the period of the total time of saving of a citizen for their future pension. The average pension savings of the saver in the second pillar amount to almost 6 thousand euros. Savers in II. pillar, when investing their savings, choose between a low-yield bond guaranteed fund and more profitable riskier funds. The average annual appreciation in the old-age pension savings sector has reached the level of 1.58% p. for the entire period of its existence and using an internal rate of return⁵ (Table 7). In the same period, the average annual level of consumer price inflation was 1.94%. The highest yield percentage was achieved by index funds, namely 5.3%, followed by equity funds with a 2% yield and mixed pension funds with a 1.5% yield. The smallest long-term appreciation in nominal terms of 1.1% was achieved by bond pension funds.

Table 7. Evaluation of old-age pension savings in pension funds in the period April 2005–May 2020 (%)

	Nominal	Real**
Total for all pension funds	1,58	-0,36
Bond	1,10	-0,84
Mixed	1,50	-0,44
Equity	2,00	0,06
Index*	5,30	3,36

* index funds were established in 2012

** inflation (1.94%) is expressed as the geometric mean of consumer inflation measured by the HICP index

Source: NBS (2020): *Správa o stave a vývoji finančného trhu za rok 2019*. Available at: https://www.nbs.sk/_img/Documents/_Dohlad/Makropolitika/Sprava_o_stave_a_vyvoji_financneho_trhu_za_rok_2019_publikovatelna_verzia.pdf.

If we use the methodology of the time-weighted rate of return, which evaluates exclusively the performance of pension management companies in investment management by abstracting from the impact of the accumulation of resources over time due to cash flows of pension funds, the performance of index pension funds is 8.1% pa, in equity 2.9% pa, in mixed 2.3% pa and in bonds 1.8% p.a.

We can state that the second pillar as a whole during its existence has brought only very low appreciation of funds, and this was also ensured mainly by index funds, which, however, have a low number of participants.

The returns of index funds were eliminated by fees that have no reason to exist for index funds, as the pension management company only copies the yield of the chosen equity

⁵ The internal rate of return is defined as the interest rate at which we pay interest on all the cash flows in a fund, we get the net asset value at the reference date. The internal rate of return represents a form of a money-weighted rate of return that is affected by an ongoing inflow or outflow of funds that are beyond the control of the fund manager.

index for index funds, and it therefore raises the question of justification and the right for retribution for valuing assets in the index pension fund.

Development trends in the pension system, caused mainly by political interventions, also cause a change in the investment strategy of both pension fund participants and pension savings managers. State interventions are not only the factor responsible for the non-optimal allocation of pension savings assets. Leaving long-term investment decisions on the shoulders of the saver leads to an inappropriate allocation of pension savings. A significant change in the structure of the distribution of savers in pension funds was the result of a provision in the law, according to which all savers who did not submit a declaration to their pension management company by 31 March 2013 that they want to remain in a mixed, equity or index non-guaranteed pension fund became from 1 May 2013 savers in a bond guaranteed pension fund. About 90% of savers found themselves in one of the bond guaranteed funds. Until March 31, 2013, due to their low financial literacy, equity and mixed non-guaranteed pension funds had savers who had an adverse attitude to the risk associated with investing, to which pension management companies adapted and set these funds largely conservatively. This fact was subsequently reflected in the level of appreciation. Losses from non-optimal asset allocation have the form of lost income. This group of savers was provided by law with the option of choosing a pension fund according to their personal preferences, which was used by a significant number of savers. This was also reflected in a change in the structure of the portfolios of mixed and equity non-guaranteed pension funds, which began to invest in riskier assets, their appreciation subsequently increased, but the risk taken also increased.

Table 8. Percentage shares of asset allocation in pension funds for all pension management companies

Date	Bond	Mixed	Equity	Index
31.3.2013	13,9 %	25,3 %	60,5 %	0,4 %
30.4.2013	90,8 %	2,0 %	6,9 %	0,3 %
31.12.2017	79,5 %	1,0 %	11,7 %	7,8 %
31.12.2019	72,2 %	1,1 %	13,3 %	13,4 %

Source: Ministry of Labour, Social Affairs and Family of the Slovak Republic (2020).

The lower appreciation of savings is due to the inappropriate investment strategy of savers, as savers invest too conservatively, which worsens the chances of better appreciation of their savings. According to the data of the Institute of Financial Policy, up to 72% of savings in II. pillar can be found in low-yield bond guaranteed funds. 13% of savings are saved in equity funds, 13% in index funds and only 1% in mixed funds (Table 8). It is true that younger, higher income earners and people living in cities tend to save in non-guaranteed funds (Fodor and Cenker, 2019, p. 1). If savers had continued to save in non-guaranteed funds in 2013, they would have had approximately one billion euros more in their pension accounts by the end of 2019.

Invisibility in the actions of people, which is a tendency to remain dormant and to maintain the so-called status quo, was confirmed by studies, e. g. Samuelson and Zeckhauser (1988), where they showed that people tend not to change the portfolio in which they invest their savings, even if the profitability of the available alternatives changes and they

potentially lose additional returns. This fact raises legitimate demands for a change in responsibility for the investment strategy of pension savings.

In the US, some investment pension companies have moved away from the traditional division of investment funds according to the degree of risk and have defined the profile of individual funds so that their structure is adapted to the retirement year of pension savers. Such profiled funds follow investment life cycle models and with the approaching retirement year of savers their riskiness decreases. Their creation simplified the decision-making of pension savers and led to an increase in participation in the pension savings system. Thaler and Benartzi (2004) showed that this effect was particularly significant for people who had no experience with investing in the financial market, for people with lower incomes and for women (Čaplánová, 2018).

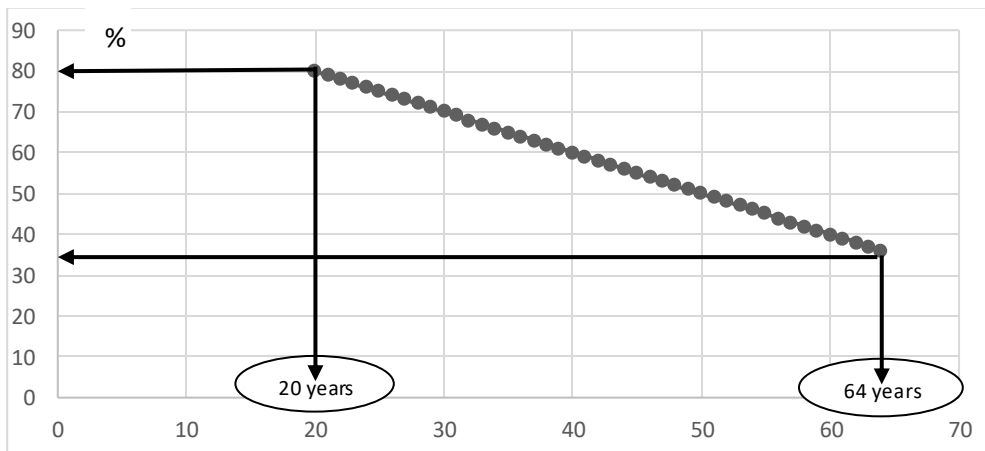
Strategies based on determining the savings ratio in relation to the age of the saver tell how much risk the saver can afford to take overtime. Blanchett (2015) states in his article that determining the right allocation ratio over time depends on age, because with older age and shorter savings periods, people become more conservative and reduce the share of savings invested in riskier financial instruments. One of the reasons for this action is the risk of volatility, which is higher in the case of equity investments than in the case of bond investments.

The first savings strategy (Figure 8) that we will test will be based on reducing the allocation of savings in equity pension funds by one percent for each life year of the saver, thus considering his current age:

$$w_y = 100 - x_y$$

where: w_y - determines the percentage of savings allocated in the equity pension fund in the year of saving y ; x - determines the age of the saver in the year of saving y , where $y \in \{1, Y\}$, where Y is the total number of years of saving.

Figure 8. Development of the allocation ratio for risk investment over time according to the age of the saver



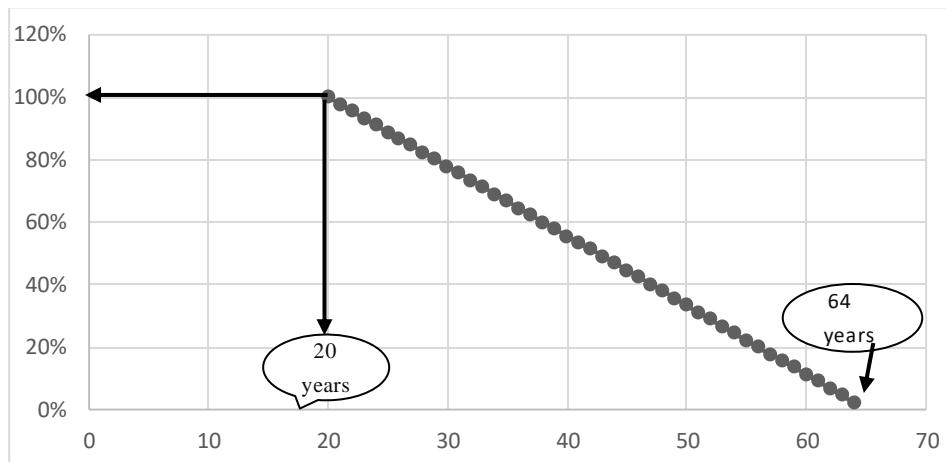
Source: Own projection.

The second savings strategy (Figure 9) we will test will be based on reducing the share of savings in equity pension funds relative to the ratio of the number of years already saved (y) by the saver to the total number of saving years (Y) in each savings scheme:

$$w_y = \left(1 - \frac{y}{Y}\right) \times 100$$

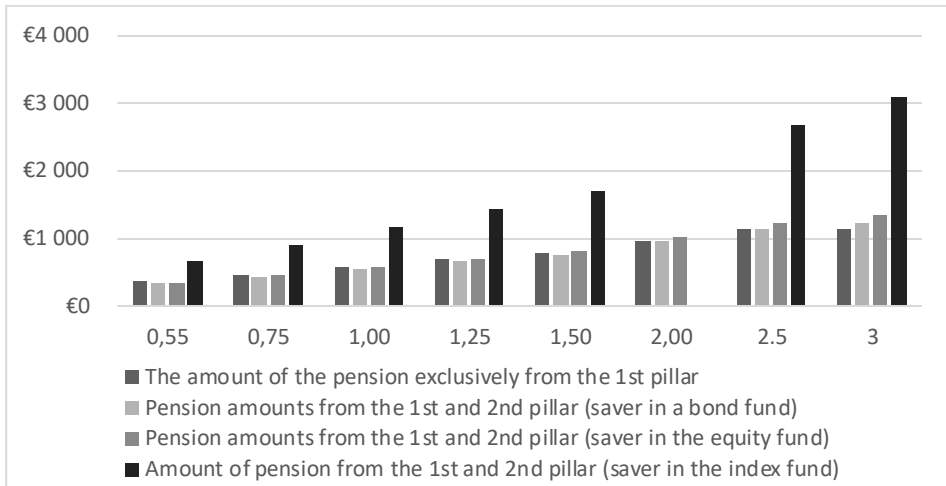
where: w_y - determines the percentage of savings allocated in the equity pension fund.

Figure 9. Development of the allocation ratio for risky investments over time according to the number of years of savings



Source: Own projection.

The decision whether to be a saver only in the I. pillar, or to be a saver also in the II. pillar, is individual. In the article, we test a model example of the appreciation of the saver's funds. We draw from the current conditions of setting up a pension system. The calculation also considers the average wage increases and the estimated increase in pensions in the future. The pension is converted to today's prices. The saver is currently 20 years old, with a high school education. The retirement age will be reached in 2062. This saver is in II. pillar from the beginning of his career. In Figure 10, we show the amount of income and the amount of pensions. Based on the findings, we can state that the most advantageous investment strategy for a model saver is saving in an index fund.

Figure 10. Comparison of investment strategies

Source: Own projection.

The structure of pension fund participants has the greatest impact on the appreciation of savers' pension savings. Slovak pension funds recorded one of the lowest nominals and real appreciation among developed countries associated in the international organisation OECD. The main reason are frequent legislative measures without impact studies. Although some changes were only slight, in seven cases there were fundamental adjustments, which causes a state of legislative instability.

The volume of savings of savers is also affected by the fee policy set. Pension management companies, on the basis of Act no. 43/2004 Coll. on old-age pension savings, may charge three types of fees for old-age pension savings, the maximum fee in each category being determined by law:

1. Remuneration for the management of a pension fund (max. 0.3% of the average annual preliminary net asset value in the pension fund) – for savers it represents the largest item in absolute numbers, as its calculation depends on the volume of the balance on savers' personal pension accounts.
2. Remuneration for maintaining a personal pension account (max. 1% of the amount of contributions).
3. Remuneration for the appreciation of assets in the pension fund (max. 10% of the appreciation) – for savers it represents the second largest range of costs. It is determined according to the formula:

$$P_t = K \times NAV_t \times \left(\frac{AHDJ_t}{maxAHDJ_{t-1}} - 1 \right)$$

where:

P_t – the amount of the fee for the appreciation of assets in the pension fund for day t ,
 NAV_t – the second preliminary net asset value in the pension fund valid for day t ,

AHDJ_t – preliminary current value of the pension unit valid for day t,
 maxAHDJ_{t-1} – the maximum current value of the pension unit achieved in the three years preceding the day t, no later than 1.4.2012,
 K – the coefficient for determining the amount of remuneration for the appreciation of assets in the pension fund, which may be a maximum of 0.1,
 t – the working day immediately preceding the calculation of the remuneration for the appreciation of assets in the pension fund.

The last fee paid by participants in old-age pension savings is 0.25% of each contribution paid and is in favour of the Social Insurance Agency. Slovak pension management companies have a high margin (Table 9). The average net profit margin has reached 37% over the last five years.

Table 9. Net profit margin of Slovak pension management companies (in%)

	2014	2015	2016	2017	2018
AEGON d.s.s., a.s.	60	48	48	44	31
Allianz – Slovak Pension Management Company, a.s.	40	31	43	46	36
AXA d.s.s., a.s.	36	0	27	31	34
The Pension Management Company	48	50	41	47	37
lof Poštová bank, a.s.					
NN d.s.s., a.s.	6	13	26	43	31
VÚB Generali, d.s.s., a.s.	62	53	58	64	49
TOTAL	40	26	38	43	35

Source: Odor, L., Povala, P. (2019, s. 29): *Sporiteľ na prvom mieste. Ako zreformovať druhý dôchodkový pilier na Slovensku?* Available at: https://www.odor.sk/download2/druhypilier_seminar.pdf.

Note: In mid-October 2020, the Austrian insurance group UNIQA became the owner of AXA, which renamed the company UNIQA.

Since January 2015, the so-called annuity amendment has been introduced, which adjusted the detailed conditions for granting pensions from II. pillar. They can be divided into five categories:

- lifetime pension of the entire amount saved,
- lifetime pension in combination with program withdrawal (from part of the amount saved) or temporary pension (from part of the amount saved),
- temporary pension of the entire amount saved,
- program withdrawal from the entire amount saved,
- a pension for savers in the "small savings" scheme, which is paid in the form of program withdrawal or as a temporary pension up to the median of the lowest monthly amounts of the lifetime pension without survivors' cover and increases that insurers are interested in paying.

Pensions are paid by life insurance companies, which take into account the saver's longevity risk when determining the amount of the lifetime annuity. There are currently only two life insurance companies operating on the pension insurance market, namely Allianz - Slovak Insurance Company, a. s. and Generali Insurance Company, a. s. Until the end of 2019, Union Insurance Company, a. s., also provided second pillar pensions, the

company, however, has ceased its activities and is currently only continuing to pay agreed pensions from concluded pension insurance contracts. The resources going to the payout phase do not represent such a volume of resources to attract a significant number of providers, which leads to a lack of market environment within the payout phase. In our opinion, from the long-term perspective, the Social Insurance Agency should take advantage of this situation and start providing pension benefits resulting from the payout phase.

In the course of 2019, 458 (approx. 22%) savers began to be paid a lifetime pension out of the entire amount saved, 45 (approx. 2%) savers began to be paid a lifetime pension and at the same time a pension was paid in the form of program withdrawal from part of the amount saved or began to receive a lifelong pension and at the same time they began to be paid a temporary pension from part of the amount saved, paid for 5, 7 or 10 years. 69 savers (approx. 3%) started to receive a temporary pension paid out of the entire amount saved and 1,317 savers (approx. 63%) concluded a program selection agreement paid out of the full amount saved, while the eligible savers were entitled to such forms of pension valid from 1 February 2018 (the sum of the pension benefit amounts is higher than the reference amount).⁶

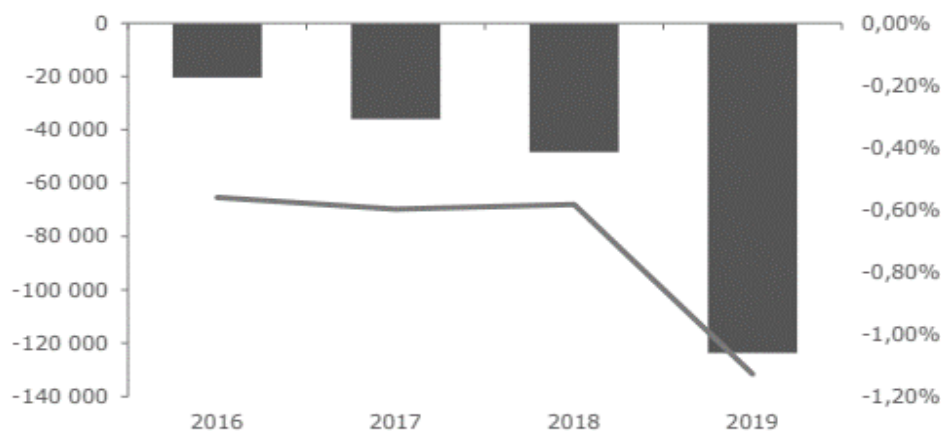
The average amount of the program withdrawal paid out of the entire amount saved reached 11,344.40 €. The pension in the "small savings" scheme started to be paid to 191 (approximately 9%) savers (MLSAF SR, 2020, p. 72). In our opinion, the setting of pension payments is not correct in the long run, both for savers and public finances. Most savings are currently paid to participants in old-age pension savings in the form of program withdrawal from the entire amount saved. However, the original intention was based on the disbursement of funds through a lifetime annuity.

An increase in applications for a life pension can be expected in the future due to the growing number of savers and the increase in the amount saved, but this increase will be conditioned by the financial literacy of the savers. The preference for program selection can also be caused by the relatively low amount of pension benefits resulting from old-age pension savings.

The low amounts of pension benefits offered by life insurance companies are also caused by an insufficient portfolio, which means that the insurance income is insufficient and even five years after the annuity amendment to the law, insurance companies providing this insurance did not make a profit (Figure 11).

The introduction of a mandatory two-pillar pension system in the Slovak Republic in 2005 represented a fundamental structural change for the entire pension system. Thanks to the possibility of Slovak savers to invest in the second pillar on global markets, the dependence of future pensions exclusively on the development of the Slovak economy has decreased. The mixed system enables diversification of this risk by investing in financial assets with different geographical or sectoral structures. Due to the fact that the money in the second pillar is deposited in the personal pension accounts of savers, a very important feature of the system is the effect of personal ownership, which comes to the fore especially in matters of inheritance.

⁶ The reference amount valid for 2019 is € 444.10; for 2020 it is € 464.60.

Figure 11. Economic results in the segment of pension payments of II. pillar

Source: NBS (2020): *Správa o stave a vývoji finančného trhu za rok 2019*. Available at: https://www.nbs.sk/_img/Documents/_Dohlad/Makropolitika/Sprava_o_stave_a_vyvoji_financneho_trhu_za_rok_2019_publikovatelna_verzia.pdf.

As the pension from the first pillar does not fully take into account the amount of the person's assessment base, an important feature of the second pillar is also a stronger element of merit, which compensates for the solidarity characteristic of the first pillar.

However, the second pillar of the pension savings system has not reached its potential in the first 15 years. The functioning of old-age pension savings in the Slovak reality was far from optimal, which was mainly due to frequent legislative changes. Act no. 43/2004 Coll. on old-age pension savings and on amendments to certain acts, as updated, was amended up to 44 times in the period 2004–2019. In the environment of such legislative instability, it has been problematic for pension management companies to implement long-term strategies that are crucial for the pension savings sector.

Conclusion

In the current European environment, it is very problematic to find the optimal construction of a pension system that would guarantee a decent standard of living in old age and at the same time be sustainable in the long run. Although several demographic processes are taking place in the Slovak Republic with time towards the most developed countries, the situation in this area is beginning to be similar. Significant changes in the demographic development have also been observable in our country since the beginning of the 1990s, which can be described as the transition to a new model of population reproductive behaviour (Bleha and Vaňo, 2007), as the birth rate is decreasing, the number of children is declining and at the same time the life expectancy is increasing. These are irrefutable facts for the coming decades, which will have serious consequences for the functioning of society, which will then be reflected in the areas of pensions, healthcare and long-term care. The old-age pension savings have become an integral part of the modern pension system applied in the Slovak Republic. The necessary legislative stability of the second pillar together with a good condition of the Slovak economy can become key guarantors of the

long-term success of the entire pension reform in the Slovak Republic. However, no one has yet been able to cope satisfactorily with the basic risks of pension provision, which are mainly fluctuations in the financial markets, fluctuations in the labour market and demographic changes in society. The current system of financing the pension system in the Slovak Republic is fiscally unsustainable without further reforms, and intergenerational equality cannot be achieved in the long run without fundamental adjustments of the pension system parameters, such as re-establishing the link between retirement age and life expectancy as well as the introduction of an automatic stabiliser for the adjustment of the current pension value. In the current pension system, with a predominance of the ongoing financing system, it is necessary to weaken its link to unfavorable demographic developments.

The introduction of the so-called automatic stabilisers into the ongoing pillar will cause a reduction in the rate of compensation with a negative impact on the living standards of Slovak pensioners. However, the first pillar will continue to play an important role in the living standards of citizens as the pension from the first pillar will in the future amount to about two thirds and the II. pillar will account for approximately one third of pension insurance income.

The second pillar will also have to undergo several changes, as it has not fulfilled the potential expected of a multi-pillar scheme during its existence. There are several reasons, but the most important is considered to be the unprofessional legislative activity, which has proved to be counterproductive over time. There are several proposals for adjusting the second pillar, but one of the main ones seems to be the persuasion of savers to start saving more in non-guaranteed funds, which will bring them a higher rate of appreciation of their saved funds. If the saver remains in the bond fund, it is very likely that their savings will not be valued as in the case of transfer to an index fund. Through this transfer, the saver can increase the fair expected value of his savings by approximately three quarters, recognising the increased risk of the asset falling. If the saving period is long enough, the fall in the value of the savings may not discourage the saver. On the other hand, if the saver is of pre-retirement age, it is necessary to reduce the allocation of savings to risky assets in order to avoid the loss of the value of assets just before the collection of saved funds.

An inappropriate choice of investment strategy for retirement savings is an international phenomenon that can be caused by low financial literacy. Deciding on retirement savings can be difficult for a regular saver without knowledge of compound interest, the difference between nominal and real returns, or portfolio diversification (OECD, 2016). Therefore, we recommend to focus state's attention on the rules setting the investment strategy of pension management companies as well as on the expansion of passive investment funds. We propose to eliminate the inversion of people's actions by changing the default investment options. If the default alternative is set appropriately, then the inversion in people's actions will cause most savers to remain in a well-established retirement savings system. Behavioural analyses of pension savings systems show that even seemingly small changes can significantly affect changes in savers' behaviour and ultimately reduce the pressure on public resources through the existing pension system.

Any measures aimed at promoting the financial sustainability of the pension system should be linked to credibility for future generations by guaranteeing an adequate level

of compensation for senior citizens, ensuring at least a basic standard of living. Therefore, ensuring the balance between financial and social sustainability of the pension system seems to be a serious issue when deciding on further reform steps. However, new approaches in economic, social, migration politics and especially in the political level will be needed to cope with the current situation.

Funding: The paper is the output of the research grant VEGA no. 1/0251/19 “Households investments in housing and the possibility of their alternative use as additional income at the time of receiving the pension benefit”.

Disclosure statement: No potential conflict of interest was reported by the authors.

References

- AMAGLOBELI, D., CHAI, H., DABLA-NORRIS, E., DYBCZAK, K., SOTO, M., and TIEMAN, A., (2019). The Future of Saving: The Role of Pension System Design in an Aging World. MF STAFF DISCUSSIONNOTE. January 2019. SDN/19/01.
- ATTANASIO, O. P., BROWNING, M., (1995). Consumption Over The Life Cycle And Over The Business Cycle. *American Economic Review*, 85(5), 1118–1137. <https://www.nber.org/papers/w4453>.
- ATTANASIO, O. P., WEBER, G., (2010). Consumption and Saving: Models of Intertemporal Allocation and Their Implications for Public Policy. *Journal of Economic Literature*, 48 (3): 693–751. DOI: 10.1257/jel.48.3.693
- ATTANASIO, O. P., BONFATTI, A., KITAO, S., and WEBER, G., (2016). Global Demographic Trends: Consumption, Saving and International Capital Flows. In *Handbook of the Economics of Population Aging*, Vol. 1., Chapter 4, 179–235, Elsevier, Amsterdam, The Netherlands, DOI:10.1016/bs.hespa.2016.09.006
- BARR, N., DIAMOND, P., (2009). Reforming pensions: Principles, analytical errors and policy directions. *International Social Security Review*, 62(2): DOI:10.1111/j.1468-246X.2009.01327.x
- BLANCHETT, D., (2015). Exploring the Optimal Equity Allocation Parh for Retirees. In *AAIL Journal*. 37(12): ISSN 0192-3315.
- BLEHA, B., VAŇO, B., (2007). *Prognóza vývoja obyvateľstva SR do roku 2025 (aktualizácia)*. Bratislava: INFOSTAT – Inštitút informatiky a štatistiky. Výskumné demografické centrum.
- BODIE, Z., DETEMPLE, J., and RINDISBACHER, M., (2009). Life-cycle finance and the design of pension plans. *Annual Review of Financial Economics*, 1 (1): 249–286
- ČAPLÁNOVÁ, A., (2018). Architektúra dôchodkového systému ovplyvňuje správanie sporiteľov. Bratislava: Rada pre rozpočtovú zodpovednosť. Dostupné na: <https://www.rozpocetvarada.sk/svk/rozpocet/384/architektura-dochodkoveho-systemu-ovplyvnuje-spravanie-sporitelov>.
- EICHHORST, W. a kol. (2011): *Pension systems in the EU – contingent liabilities and assets in the public and private sector*. Study. Brussels: European Parliament, Directorate

General for Internal Policies. Available on: <https://www.europarl.europa.eu/document/activities/cont/201111/20111121ATT32055/20111121ATT32055EN.pdf>.

Európska komisia (2010). Európa 2020. Stratégia na zabezpečenie inteligentného, udržateľného a inkluzívneho rastu. Brusel.

Európska komisia (2018). The 2018 Ageing Report: Economic and Budgetary Projections for the EU Member States (2016 – 2070). Luxembourg: Publications Office of the European Union, 2018. ISBN 978-92-79-77460-7.

FODOR, J., CENKER, J., (2019). *Čo nezhodnotíš dnes, na dôchodku nenájdeš*. Bratislava: IFP, 2019.

JACOBS. B., (2009). A Life-Cycle Theory of Human Capital Formation, Pension Saving, and Retirement. Available on: <https://personal.eur.nl/bjacobs/forwardlooks.pdf>

KABINA, T. (2014): Udržateľnosť prvého piliera dôchodkového systému na Slovensku. Bratislava: NBS, BIATEC 9/2014, ročník 22. Available on: https://www.nbs.sk/_img/Documents/_PUBLIK_NBS_FSR/Biatec/Rok2014/09-2014/07_biatec_14-09_kabina.pdf.

KARPIŠ, J., ĎURANA, R., ĎURANA, R., and JELENČIAK, M., (2006). Analýza sociálneho systému SR. Bratislava: INESS.

KREBS, V. et al., (2007). Sociální politika. Praha: ASPI, a. s., pp.504, ISBN 978–80–357–276-1.

LEVINE, R., (2002). Bank-based or market-based financial systems: Which is better? *Journal of Financial Intermediation* 11, 398–428. DOI:10.1006/jfin.2002.0341

MATLÁK, J., et. al., (2004). Právo sociálneho zabezpečenia. Bratislava, 2004. ISBN 80-7160-190-X.

MADRIAN, B. C., SHEA, D. F., (2001). The power of suggestion: Inertia in 401 (k) participation and savings behavior. *The Quarterly Journal of Economics*, 116(4), 1149–1187.

MPSVaR SR (2020). *Správa o sociálnej situácii obyvateľstva SR za rok 2019*. Available on: https://www.employment.gov.sk/files/slovensky/ministerstvo/analyticke-centrum/2020/sprava_o_soc_situacii_obyvatelstva_sr_2019.pdf.

NBS (2020). *Správa o stave a vývoji finančného trhu za rok 2019*. Available on: https://www.nbs.sk/_img/Documents/_Dohlad/Makropolitika/Sprava_o_stave_a_vyvoji_financneho_trhu_za_rok_2019_publikovatelna_verzia.pdf.

NKÚ (2020): *Správa o výsledku kontroly: Systém výberu a správy odvodov sociálneho poistenia a starobného dôchodkového sporenia*. Available on: <https://www.nku.gov.sk/documents/10157/b04928e9-1dda-41a6-bcb8-cb7a3d153523>.

https://www.rozpoctovarada.sk/download2/sustainability_report_2020.pdf

SAMUELSON, W. – ZECKHAUSER, R. J. (1988): Status quo bias in decision making. *Journal of Risk and Uncertainty*, 1, pp. 7-59

ÓDOR, L., ANTALICOVÁ, J., KRAJČÍR, Z., and NOVYSEDLÁK, V., (2004). *Vplyv dôchodkového sporenia na verejné financie a občanov*. Bratislava: Inštitút finančnej

politiky. Available on: <https://www.mfsr.sk/sk/financie/institut-financnej-politiky/publikacie-ifp/ekonomicke-analyzy/2-vplyv-dochodkového-sporenia-verejne-financie-občanov-november-2004.html>.

ÓDOR, L., POVALA, P., (2019). *Sporiteľ na prvom mieste. Ako zreformovať druhý dôchodkový pilier na Slovensku?*. Available on: https://www.odor.sk/download2/druhypylier_seminar.pdf.

OECD (2016). *OECD Pensions Outlook 2016*. OECD Publishing, Paris.

PEROTTI, E., SCHWIENBACHER, A., (2009). The political origin of pension funding. *Journal of Financial Intermediation* 18, 384–404. <https://doi.org/10.1016/j.jfi.2008.11.001>

PORUBSKÝ, M., NOVYSEDLÁK, V., (2018). *Dôchodkový vek: mýty a fakty*. Bratislava: Rada pre rozpočtovú zodpovednosť. Komentár KRRZ 2018/02. Dostupné na: https://www.rozpocetovarada.sk/vo_download/2018_02_krrz_komentar_strop_na_doch_vek_64.pdf.

RIZMAN, T., (2017). *Kto (ne)vstupuje do druhého piliera*. Bratislava: IFP, Komentár 2017/06.

RRZ (2020). *Správa o dlhodobej udržateľnosti verejných financií za rok 2019 (apríl 2020)*. Bratislava: Rada pre rozpočtovú zodpovednosť. Available on: https://www.rozpocetovarada.sk/download2/sustainability_report_2020.pdf

SAMUELSON, P., (1958). An Exact Consumption-loan Model of Interest with or Without the Social Contrivance of Money. *Journal of Political Economy*, 66(6): 467–482

SAMWICK, A., (2000). Is pension reform conducive to higher saving? *Review of Economics and Statistics*, 82(2): 264–272. DOI:10.1162/003465300558777

ŠEBO, J., (2016). Slovensko čakajú dve krízové vlny dôchodkov. Available on: <https://www.asdss.sk/4169>.

THALER, R.H., BENARTZI, S., (2004). Save More Tomorrow™: Using Behavioral Economics to Increase Employee Saving. *Journal of Political Economy*, 112(51): 164–187.

VIDOVÁ, J., (2006). Prierez dôchodkovými systémami v vybraných krajinách. *Ekonomické spektrum*, 1(3): 14–19. ISSN 1336-9105.

VOSTATEK, J. (2020): Český důchodový (ne)systém vyžaduje zásadní reformu. *Forum sociální politiky*, roč. 14. (č. 1/2020), 2–10. ISSN 1803-7488. Available on: <https://www.vupsv.cz/download/forum-socialni-politiky-1-2020/?wpdmdl=7754&refresh=606dda928186f1617812114>.

Zákon č. 595/2003 Z. z. o daní z príjmov v znení neskorších predpisov.

Zákon č. 43/2004 Z. z. o starobnom dôchodkovom sporení v znení neskorších predpisov.

www.employment.gov.sk

www.statdat.statistics.sk