



ANALYSIS OF PRESENT VALUE OF PENSION ACCOUNT

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Abstract: The paper was to analyze the present value of pension account at two different ratios of contributions. From the results it can be deduced that the current status of contributions in the ratio 14%: 4% is preferable to the 12%: 6%, which means that the present value is lower pension account in combination 1 and 2 pillar than the very first Pillar, which does not mean that the second pillar is preferred. This means that it is advantageous for people who currently went into retirement.

In the analysis we have taken into account the performance of funds in 2013, but current results indicate an increase in performance. This is especially the unguaranteed index fund whose performance since inception has a high tempo.

Keywords: retirement account, present value, pension funds

Introduction

The pension system in the current Slovak economy is a set of objectives, tools and methods, through which the state provides income economically inactive population state. This system just does not care about pensioners, but also largely on the people who work and earn, because they will levy a certain part of their earnings share of funding for the payment of pensions.

Pension system after the reform is based on three sources of funding, so pension pillars, the first two are mandatory and the third is optional. Since the calculations focus on the first two, which are largely the main source of pension payment.

Pension fund management companies

A pension fund management company (PFMC) is a company that manages personal pension accounts of citizens, evaluates and invests the money in these accounts. It is a public limited company, having its registered office in the Slovak Republic. The capital management company must be at least 9 950 000 € and must be registered in the Commercial Register. The establishment of the company and on activities by the National Bank of Slovakia¹¹².

¹¹² Dôchodkový systém, maag.euba.sk. [cit. 2012.10.17.] Dostupné na internete: <http://maag.euba.sk/documents/pravnaupravadochsystemu.pdf>

Among the basic services that the company has to provide its customers mainly include keeping personal pension account, pension fund management, employ qualified staffs who are able to effectively manage the money accumulated in the accounts and the like¹¹³.

In Slovakia there are now six pension fund management companies¹¹⁴:

- AEGON d.s.s., a.s.;
- Allianz - Slovak pension fund management company, as;
- AXA d.s.s., OJSC (to March 2007 Winterthur d.s.s., OJSC);
- DSS Postal Bank , d.s.s., a.s.;
- ING pension fund management company, as;
- VUB Generali pension fund management company, as.

Pension funds

Pension fund consists of contributions, penalties and property. Every person within its pension fund management company must choose a pension fund, through which he wants his money to invest in personal pension account. The pension fund accumulates money from the pension account of the citizen, which is converted into such investments, stocks, bonds. Individual professional staff pension fund that money and invest appropriately valued and that their value upon leaving the citizen to the highest income. Each pension fund management company can produce 4 types of pension funds¹¹⁵:

debenture - assets may be invested only in bonds , bank deposits and into stores, which limit foreign exchange risk. Only in this type of fund remained guarantee. PFMC needs of their own money saver if you pay the 5 years investment impairment occurs. Bond Fund is for those who do not like to run the risk and want undeteriorated guaranteed deposits. 1.4.2012 to exist as a conservative pension fund;

mixed - a fund in which the combined number of financial market instruments. The fund invests in equities, bonds and money market instruments and the new may be invested in securities representing precious metals. Half of the investment must be protected against currency risk. It is designed for those who want to spread their savings. 1.4.2012 to exist as a balanced pension fund;

shared - may invest up to 80 % of assets in equities, while at least 20 % in other instruments such as bonds and money market instruments. 20 % may be invested in precious metals and fifth investments must be protected against currency risk. The fund is for those who are unable to bear the risk and the greater the yield they want to have a greater proportion invested in commodities . 1.4.2012 to exist as a growth pension fund;

¹¹³ ADSS, [cit. 2012.10.30.] Dostupné na internete: <http://www.adss.sk/Default.aspx?CatID=57>

¹¹⁴ DRUHÝ PILIER, Dôchodkové fondy. 2012. [cit. 2013.04.03.] Dostupné na internete: <http://www.2pilier.sk/skolasporitela-abeceda.htm#02>

¹¹⁵ FINANCE, Čo je doplnková dôchodková spoločnosť? finance.sk. [cit. 2012.11.10.] Dostupné na internete: <http://www.finance.sk/dochodok/informacie/doplňkova-dochodkova-spolocnost/co-je-ddska/>

index - is the youngest fund in which the performance of the pension unit corresponds approximately to the performance of the selected stock index . If PFMC is unviable, company does not compensate difference but company lost half of the fee. An index fund is not suitable for every saver. Fund exists since 1.4.2012.

From 1.1.2013 PFMC must compulsorily managed by a pension fund bond guaranteed and unguaranteed one equity pension fund. Existing mixed index and pension funds may retain or merge them with other managed pension funds. They can also create new pension funds with specific investment strategies¹¹⁶.

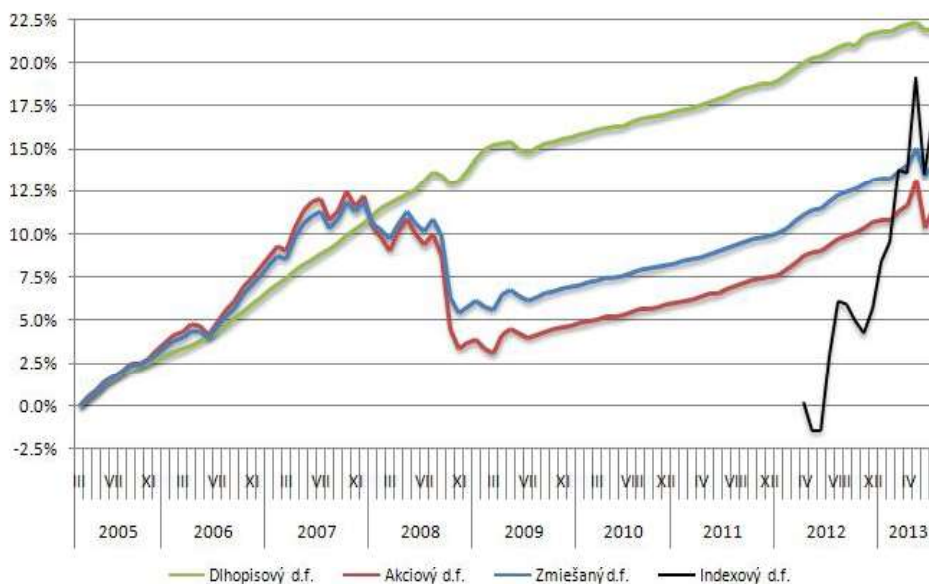


Fig. 1 Evaluation of the pension unit in pension funds to 31.7.2013

Source: <http://www.employment.gov.sk/statistiky.html> [cit. 2013.08.03].

Table 1. Nominal appreciation (pa) pension funds in different years

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Bond p.f.	3,7 %	3,5 %	4,1 %	2,8 %	1,6 %	1,2 %	1,5 %	2,5 %	0,5 %
Mixed p.f.	4,2 %	4,4 %	3,8 %	-5,2 %	0,8 %	1,2 %	1,5 %	3,0 %	1,0 %
Share p.f.	4,5 %	4,7 %	3,6 %	-7,4 %	0,7 %	1,2 %	1,4 %	3,1 %	1,4%
Index p.f.	-	-	-	-	-	-	-	6,6 %	17,6 %

Source: <http://www.employment.gov.sk/statistiky.html> [cit. 2013.08.03.]

¹¹⁶ W. Gale, J.B. Shoven, M.J. Warshawsky., *The Evolving Pension Systems: Trends, Effects and Proposals for Reform*, Brookings Institution Press, London, 2005. p. 226.

Analysis of recovery savers' deposits to retirement accounts

The source for our calculations is the actual values Performance Funds in recent years chosen PFMC. In modeling, we examined the performance of funds from PFMC. Although we examine the performance of funds in one PFMC, we present the facts for all PFMC, whereas under the Act from 1.4.2012, income must be checked every 6 months. In the table below, the following are the percentages of each fund performance.

Table 2. The actual performance of funds

Year	Bond Guarantee Fund		Mixed unguaranteed fund		Shares unguaranteed fund		Index unguaranteed fund	
	Per year in % p.a.	Since the inception in % p.a.	Per year in % p.a.	Since the inception in % p.a.	Per year in % p.a.	Since the inception in % p.a.	Per year in % p.a.	Since the inception in % p.a.
2005	*	3,55	*	4,23	*	4,50	-	-
2006	3,47	6,30	4,08	7,56	4,33	8,07	-	-
2007	3,89	3,75	4,11	4,31	4,15	4,52	-	-
2008	2,83	3,58	-5,38	1,57	-7,48	1,10	-	-
2009	1,47	3,18	1,27	1,53	1,29	1,15	-	-
2010	1,85	3,00	1,90	1,62	1,87	1,29	-	-
2011	2,05	2,91	2,13	1,72	2,12	1,43	-	-
2012	3,43	3,03	3,76	1,96	3,76	1,69	**	2,64

Source: <http://www.vubgeneralni.sk>, * fund launch day 22.3.2005, ** fund launch date 1.4.2012

Value of the pension account is calculated by simple regression model and input parameters, which are listed below.

Retirement pension is calculated by the regulation in force:

$$RP = CPV * PPI * APWP, \text{ wherein} \quad (1)$$

RP – represents the amount of the retirement pension; APWP – average personal wage point, which is calculated as the ratio between the amount of income and middle-income citizens in Slovakia; CPV – Current pension value, determined for each year is dependent on the growth of the average wage; PPI – period pension insurance.

The first pillar

Social Insurance calculates the pension calculation the value of CPV. Figure 2 gives the values of this coefficient for the years 2005 to 2013.

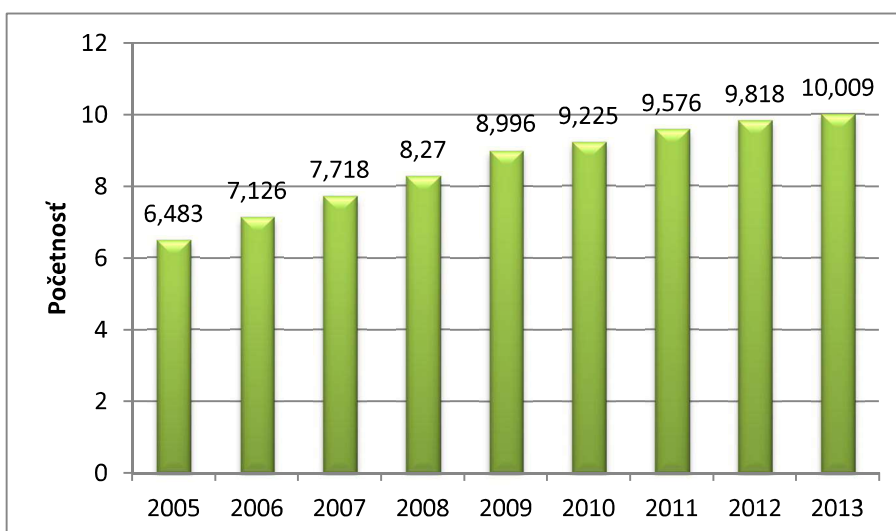


Fig. 2 Current pension value

Source: own processing

Our aim is to compare the value of retirement accounts, and therefore the modeling and prediction of future developments in the calculation, we use a simple regression model given mathematical relationship for the development of CPV values.

$$y=1049,38+0,5267*k, \quad (2)$$

where k represents the value of the variable that represents the entry in the calendar year.

In predicting the average wage, we used the same method. Outcome prediction of the average wage developments we describe the relationship

$$y=70036,9+35,22*k, \quad (3)$$

the value k again represents constant in the form of a calendar year.

The calculation of the pension account at the date of retirement

Calculations are based on the average wage and the average retirement age, which is taken into account the 2 % inflation. Value of the pension account, we recalculated the ratio of contributions 14 % : 4 % %, or 14 % of the assessment base will go to the Social Insurance Agency (1st Pillar) and 4 % levy on behalf of the saver in PFMC (2nd pillar). We model the possibility of pension account in the percentage performance of pension funds in recent years since the establishment of the fund. The percentage of the take for the average recovery of funds saver in the PFMC. We also

model the situation in changing situations, where the ratio of contributions would be 12% : 6%. Social insurance (1st pillar) will be allocated 12% of contributions from the base and on behalf of the saver in PFMC (2nd pillar) will only be 6% levy. In this case also model the possibility of pension account in the percentage performance of pension funds in recent years since the establishment of the fund. The percentage of the take for the average recovery of funds saver in the PFMC.

Calculating the ratio of 14% : 4%

The value of retirement account is the sum of the values of the two pillars, namely 1st pillar, which is proportional Evacuation duty 14 % and 2nd pillar, where the saver defers 4% levy on income. As the first pillar is not dependent on fund performance, its present value has been calculated at 84,490.88 €. Value 2nd pillar is calculated for individual pension funds in the years 2005 - 2012 in the following table and displayed in graphical form.

Table 3. The present value of the saving part of the pension account

	2005	2006	2007	2008	2009	2010	2011	2012
Bond Guarantee Fund	43 636,01	79 684,80	45 473,87	43 905,71	40 474,41	39 040,74	38 348,05	39 271,64
Mixed unguaranteed fund	50 291,73	107 451,62	51 154,66	29 682,73	29 465,56	29 957,19	30 516,26	31 858,04
Shares unguaranteed fund	53 277,72	121 711,48	53 507,39	27 259,40	27 504,31	28 205,97	28 931,80	30 277,05
Index unguaranteed fund	-	-	-	-	-	-	-	36 511,96

Source: own processing

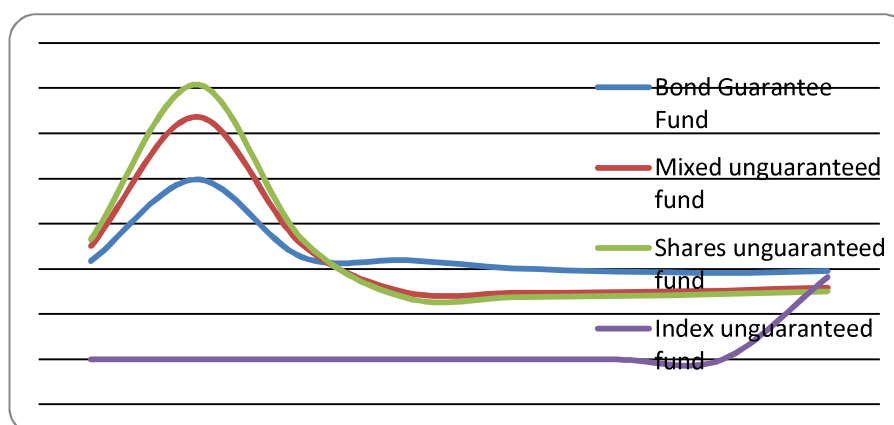


Fig. 3 Present value of saving pillar (14%:4%)

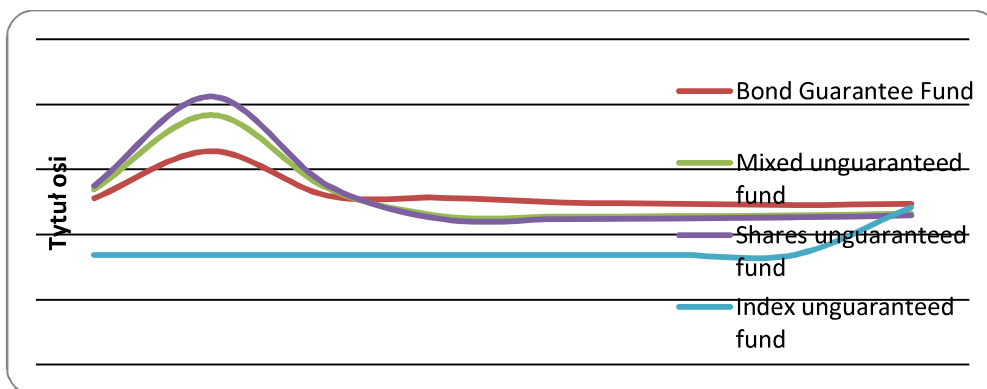
Source: own processing

The total present value of the retirement account is the Fund in the period 2005 - 2012 calculated in Table 4 and displayed in Figure 4.

Table 4. The total present value of pension account

	2005	2006	2007	2008	2009	2010	2011	2012
Bond Guarantee Fund	128 126,89	164 175,68	129 964,75	128 396,59	124 865,29	123 531,62	122 838,93	123 762,52
Mixed unguaranteed fund	134 782,61	191 942,50	135 645,54	114 173,61	113 956,44	114 448,07	115 007,14	116 348,92
Shares unguaranteed fund	137 768,60	206 202,36	137 998,27	111 750,28	111 995,19	112 696,85	113 422,68	114 767,93
Index unguaranteed fund	-	-	-	-	-	-	-	121 002,84

Source: own processing

**Fig. 4 The total present value of pension account**

Source: own processing

Calculating the ratio of 12 % : 6 %

In such a situation we find modeled the impact of a change in the relative contributions by 1st pillar, where the proportion Evacuation obligation was 12% and in the second pillar, where the saver delayed for 6% of contributions to a pension. As mentioned in the first pillar is not dependent on the performance of the fund and its present value has been calculated at 72 575,51 €. Value 2nd pillar is calculated for individual pension funds in the years 2005 - 2012 in the following table and displayed in graphical form.

Table 5. The present value of the saving retirement account (12% : 6%)

	2005	2006	2007	2008	2009	2010	2011	2012
Bond Guarantee Fund	65 454,02	119 527,21	68 210,81	65858,56	60 711,62	58 561,11	57 522,07	58 907,46
Mixed unguaranteed fund	75 437,60	161 177,43	76 731,99	44425,1	44 198,34	44 935,79	45 774,40	47 787,07
Shares unguaranteed fund	79 916,59	182 567,22	80 261,09	40889,1	41 256,46	42 308,96	43 397,70	44 419,66
Index unguaranteed fund	-	-	-	-	-	-	-	45 889,22

Source: own processing

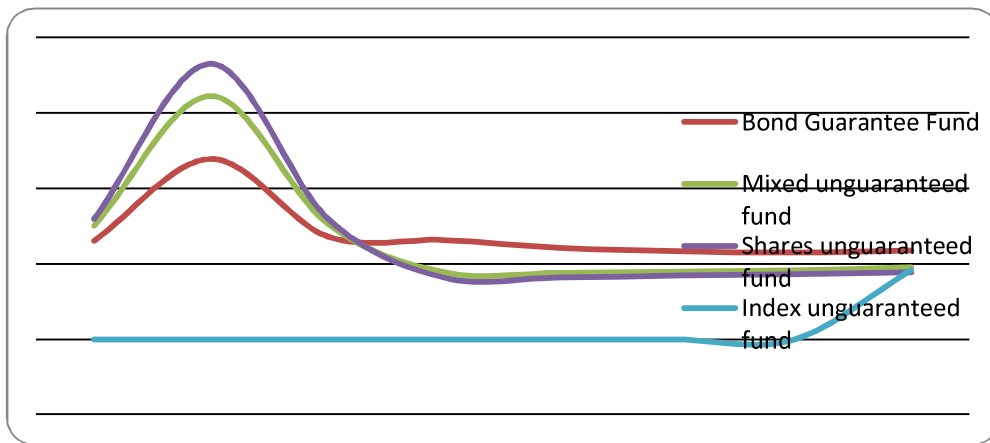


Fig. 5 The present value of the saving pillar (12%:6%)

Source: own processing

The table and the figure is calculated total present value of the retirement account contributions converted to the ratio of 12% : 6% .

Table 6. Total current value retirement account (12% : 6%)

	2005	2006	2007	2008	2009	2010	2011	2012
Bond Guarantee Fund	138 029,53	192 102,72	140 786,32	138434,07	133 287,13	131 136,62	130 097,58	131 482,97
Mixed unguaranteed fund	148 013,11	233 752,94	149 307,50	117000,61	116 773,85	117 511,30	118 349,91	120 362,58
Shares unguaranteed fund	152 492,10	255 142,73	152 836,60	113464,61	113 831,97	114 884,47	115 973,21	116 995,17
Index unguaranteed fund	-	-	-	-	-	-	-	118 464,73

Source: own processing

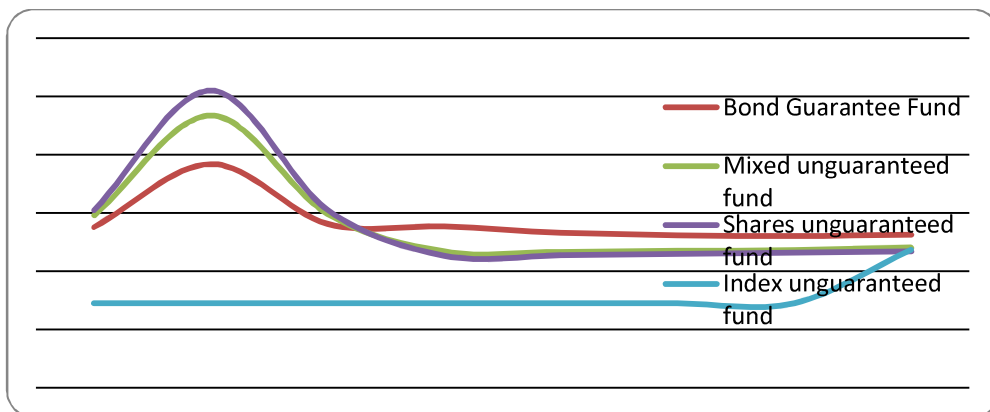


Fig . 6 The current total value of the retirement account (12%:6%)

Source: own processing

The graphs present state wedge and modeled condition is obvious that the crisis was signed at the present value of the total retirement account. Pension funds are starting to increase their performance, thereby increasing the value of retirement accounts.

Conclusion

The paper was to analyze the present value of pension account at two different ratios of contributions. From the results it can be deduced that the current status of contributions in the ratio 14% : 4% is preferable to the 12% : 6% , which means that the present value is lower pension account in combination 1st and 2nd pillar than the very first Pillar , which does not mean that the second pillar is preferred. This means that it is advantageous for people who currently went into retirement. In the analysis we have taken into account the performance of funds in 2013, but current results indicate an increase in performance. This is especially the unguaranteed index fund whose performance since inception has a high tempo.

Literature

1. ADSS, [cit. 2012.10.30.] Dostupné na internete: <http://www.adss.sk/Default.aspx?CatID=57>
2. Anderson G., Mitchell O.S., *The Future of the Public Employee Retirement Systems*, Oxford University Press, Oxford 2009.
3. Andrejkovič M., Hajduová Z., Hudák M., Adjustment of the pension system in Slovakia. In International days of statistics and economics at VŠE, Prague : conference proceedings, September 22 and 23, 2011. - Prague: University of Economics, Prague 2011.
4. Dôchodkový systém, maag.euba.sk. [cit. 2012.10.17.] Dostupné na internete: <http://maag.euba.sk/documents/pravnaupravadochsystemu.pdf>.
5. DRUHÝ PILIER, Dôchodkové fondy, 2012, [cit. 2013.04.03.] Dostupné na internete: <http://www.2pilier.sk/skolasporitela-abeceda.htm#02>
6. FINANCE, Čo je doplnková dôchodková spoločnosť? finance.sk. [cit. 2012.11.10.] Dostupné na internete: <http://www.finance.sk/dochodok/informacie/doplnkova-dochodkova-spolocnost/co-je-ddska/>
7. Gale W. Shoven J.B., Warshawsky M.J., *The Evolving Pension Systems: Trends, Effects and Proposals for Reform*, Brookings Institution Press, London 2005.
8. MPSVR SR. Štatistiky, 2011, employment.gov.sk. Dostupné na internete: <http://www.employment.gov.sk/statistiky.html>
9. MPSVR SR. Zmeny v 1. a 2. pilieri od 1.1.2013. [online]. 10.9.2012. employment.gov.sk. [cit. 2013.04.03.] Dostupné na internete: <http://www.employment.gov.sk/zmeny-v-i-a-ii-pilieri-od-1-januara-2013.html>
10. Stevens L., *Pension Systems in the European Union: Competition and Tax Aspect*, Springer, New York 1999.
11. TASR, V akciových fondoch je viac ako 3,22 miliardy eur. 30.10.2012. openiazoch.sk. [cit. 2012.11.05.] Dostupné na internete: <http://openiazoch.zoznam.sk/cl/126458/V-akciowych-fondoch-je-viac-ako-miliardy-eur>
12. VÚB Generali, Skutočná výkonnosť fondov. [cit. 2013.05.12] Dostupné na: <http://www.vubgenerali.sk>

13. Whitehouse E., *Pensions Panorama: Retirement-Income Systems in 53 countries*, World Bank Publications, New York 2006.
14. Zákon č. 43/2004 Z.z. o starobnom dôchodkovom sporení.

ANALIZA WARTOŚCI OBECNEJ KONT EMERYTALNYCH

Streszczenie: Streszczenie: Artykuł opisuje wartość konta emerytalnego przy dwóch różnych sposobach gromadzenia składek. Wyniki wskazują, że gromadzenie składek według systemu 14%/4% jest korzystniejsze względem 12%/6%, co wskazuje na gorszy wynik dla 1 i 2 filaru niż dla gromadzenia składek jedynie z 1 filaru. Sytuacja jest korzystna dla osób, które obecnie przeszły na emeryturę. W analizie wzięto pod uwagę funkcjonowanie funduszy w 2013 roku, ale aktualne wyniki wskazują na wzrost ich wydajności. Dotyczy to szczególnie indeksu funduszy niegwarantowanych, dla których w ostatnim czasie obserwujemy ciągły wzrost.

Słowa kluczowe: konto emerytalne, wartość bieżąca, fundusze emerytalne