

## II PILLAR PENSION FUNDS: HOW THE SELECTION OF FUND INFLUENCES THE SIZE OF THE OLD-AGE PENSION

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**Abstract.** *The government, in order to achieve the welfare of the citizens in the retirement age to keep pace with the working people, carried out the various pension systems transformations. The working people's welfare is growing due to the economic progress, so there is a theory of economics, which examines the existing income redistribution in time. It should be noted that in order to ensure the financial well-being in old age it is necessary to efficiently allocate the scarce resources. In Lithuania, the existing three pillar pension system allows each employee to contribute to their own financial well-being in the future. This article aims to assess the second pillar pension fund performance and how fund differences affect the amount of old age pension. The analysis made it possible to determine the correlation between the return generated by the fund and the number of participants in the fund; the spreadsheet is provided, which allows estimating the influence of the choice of different funds on the size of the retirement pension. It was found that fund return and the number of participants in the fund have a negative correlation. This shows that the part of households who raise money in fund with the lowest return will be much poorer, and the corresponding result is a smaller pension. It may be noted that the accumulation of different pension fund reserves have a significant impact on the future pension size (this difference can be as high as 230%).*

**Key words:** *pension, private pension, pension funds, retirement plans.*

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### Introduction

Recently, many discussions have been initiated in order to shape the sustainable social security environment. In particular, the attention has been paid to the old-age pension system analysis, which includes the assessment of the combination of accumulation and current payment systems and the systems based on pillars. These discussions promote the analysis and review of the existing old-age pension schemes, their reforms and structures in order to search the methods and approaches properly evaluating not only the advantages and disadvantages of them, but also the opportunities to improve the systems or their components.

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It is quite difficult for the participants to assess the second pillar pension funds because of the diversity of various indicators and the narrowness of the analysis in the scientific literature. These reasons promote the further analysis, which would not only compare the second-pillar pension fund results, but also determine the gap between future benefits during the accumulation in the funds generating the different returns. An important problem is the fact that the funds which reach the best results do not have a high number of participants or do not have large assets. This ambiguity can make a significant impact on the members of the funds because two people with the same income and the same period of accumulating can receive different annuity at the retirement age. These scientific problems encourage the search for solutions and for continuing research in this area.

The *aim* of the present article is to evaluate the activities of the II pillar pension funds of Lithuania and to evaluate how the choice of the fund determines the old-age pension. In order to solve this problem, the first part of the article analyses the issues of the old-age pension system and presents the origins and objectives of the second pillar pension funds. The second part identifies the aspects of participation in II pillar pension funds. Using the graphical analysis, the correlation between the return generated by the fund and the number of participants in the fund is indicated; the calculator is provided, which allows estimating the influence of the choice of different funds on the size of the retirement pension. Finally, the conclusions and recommendations are given.

## **The analysis of pension systems and their reforms**

Pension reforms are not a finite but an ongoing process in the whole world. As a result of demographic issues which were raised a few decades ago, the reforms were carried out. A few decades ago, the demographic issues were raised and, as their result, the reforms were carried out. However, under the influence of the crisis these reforms revealed their drawbacks and the need to revalue the pension schemes once again. Lithuania is not an exception in this context of global events. Lithuania's old-age pension system has undergone considerable changes as well: the II and III pillar cumulative pension funds were established, the retirement age was extended. Finally, at the end of 2013, the contributions to II pillar pension funds were restructured, the amounts of allowable tax deductions were reduced.

At the end of the twentieth century, the problem of the aging population problem has been raised in industrialized countries. The demographic changes such as an increased life expectancy and declining birth rates led to the discussions on the impending "old age crisis". For this purpose, Lazutka (2008) states that the parametric<sup>1</sup> and structural<sup>2</sup> reforms of old-age pensions were carried out. The author claims that the majority of

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<sup>1</sup> The partial changes of the existing pension system are made.

<sup>2</sup> The whole structure of the pension system is basically changed.

member states of the European Union engaged in the parametric reforms: raised the retirement age, changed the pension indexation mechanisms, etc. However, Croitoru (2012) points out that some of the EU countries (e.g., Estonia, Latvia, Lithuania, Poland, Hungary, etc.) basically changed the structure of their old-age pension system on the basis of the concept of a multi-stage system proposed by the World Bank. Whitehouse et al. (2009) divides six main objectives of all the reforms carried out:

- to pursue the development of the pension system combining mandatory and voluntary schemes (e.g., the voluntary third pillar pension funds, which have tax benefits, were established in Lithuania in 2004);
- to reach the adequacy of old age pension benefits (e.g., the United Kingdom and Ireland increased the basic pension);
- to ensure the financial sustainability (e.g., the pension indexation procedure was changed in Hungary);
- to ensure the economic efficiency (e.g., the retirement age was extended in Estonia);
- to pursue administrative efficiency (e.g., 133 retirement benefit schemes have been merged into 13 in Greece);
- to pursue the protection of benefits against the risks and uncertainties (e.g., the mandatory cumulative pension funds were introduced in Latvia with the purpose of the pension funding diversification).

It is worth noting that these goals may contradict each other, thus, it is very important for the state governments to find a compromise among them. For example, ensuring adequate pensions, i.e. increasing them, poses the threat to the financial sustainability, and ensuring financial stability may require reducing pensions, which is hardly compatible with the principle of adequacy. On the other hand, sometimes these objectives can help each other: increasing the retirement age increases the financial sustainability and economic efficiency.

In order to achieve the last objective derived by Whitehouse et al. (2009), the security or pension funding diversification, the World Bank defined the concept of the pension system (*Averting the Old Age Crisis*, 1994), which promoted a lot of debate in the scientific area. Some scientists (Orszag, Stiglitz, 1999; Kotlikoff, 1999; Barr, 2002) have criticized these proposals for reform by saying that they are unfounded, called them myths, but, as a result, a number of Latin American and the post-communist countries still chose to carry out the reforms according to the suggestions of the World Bank. Lithuania was not an exception, although such government's decisions were evaluated ambiguously by academics. Gudaitis (2009b) reported that in order to overcome the demographic, social and economic risks, it is significant to combine different models of financing pensions between the private and public sectors. He emphasized that the multi-age pensions system, which combines the models based on different operating principles, can be suitable

for the solution of such problems. Meanwhile, Lazutka (2008) claimed that the attempt to deal with the problem of the size of pension by changing the pension system's ownership and the method of funding without providing more funds reminds of inventing the eternal engine. Also, although Gudaitis (2009b) argues that such a system is still the most effective to ensure sustainability of pension systems, Guogis (2004) notes that solving social problems with such methods not achieves the vision of the European social protection, but, on the contrary, only makes it to lose ground. Finally, although Levišauskaitė and Malinauskas (2006) argue in their study that the reform of the pension system, launched in Lithuania in 2004, was a timely and rational step Lazutka (2007) concludes that the main motivation behind the partial privatization of the pension was not a rational step but an ideological, when the privately managed pension funds simply were trusted more than the state social insurance. Summarizing, it should be noted that, despite these discussions, Lithuania has launched an old-age pension system reform. In 2004, three pillars of the pension system started operating in Lithuania (Gudaitis, 2009b):

- I pillar –based on current payments, known as PAYG (pay-as-you-go)<sup>3</sup>;
- II pillar – partly mandatory cumulative pension funds<sup>4</sup>;
- III pillar – voluntary cumulative pension funds.

However, facing the recent financial crisis made the situation worse again. Natali (2011) points out that the area most affected by the crisis was the cumulative funds, the return on investment of which dropped sharply. Bitinas (2011) agrees that it will take a long time to repair the damage made to pensions during the crisis and restore the impaired savings of the population. In order to solve these and similar problems, a need to reconsider reforms and to search for the new solutions has aroused. Thus, the EU member states have taken up the various changes of pension systems once again. As stated by Antolín and Stewart (2009), the countries' reactions to the crisis were different; e.g., Finland has extended the retirement age; in Bulgaria the regulation was strengthened, the constant care of pension funds, the assessment of the situation were introduced in order to anticipate potential risks and crisis situations. Similarly, Bitinas (2011) mentions that Ireland has taxed the pensions, Hungary eliminated the salaries and pensions of the "thirteenth month", as well as the indexation of pensions changed according to the GDP growth. The author notes that in addition to conventional measures, such as reducing benefits and increasing contributions, the reforms of social security and labour law were implemented. However, both Antolín and Stewart (2009) and Whitehouse et al. (2009) agree that, facing the economic crisis, the government has adopted short-term practical solutions, while long-term strategic goals remained forgotten.

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<sup>3</sup> The Sodra system, which immediately distributes the collected premiums to the beneficiaries.

<sup>4</sup> The participation of accumulation in II pillar pension funds of Lithuania is not mandatory, but voluntary participation deprives of the possibility to withdraw from these funds. The resources are allocated in them by getting the part of resources from Sodra contributions.

Lithuania again was not an exception. The returns of cumulative pension funds were reduced significantly; the government reduced the Sodra pensions and introduced further reductions for working pensioners (Bitinas, 2011). In the context of these changes, a new old-age pension system began operating in Lithuania in 2014. Otherwise than in the system operating since 2004, the new system introduced a maximum accumulation, i.e. a participant is able to contribute his own funds to the part of the premiums which Sodra transferred to the appropriate account of the pension fund, thus, the incentives from the state are obtained (Lietuvos Respublikos pensijų kaupimo..., 2012). Although the maximum accumulation has become mandatory for all new subscribers of pension contracts, in 2013 the current pension fund participants had the opportunity to choose: to begin to accumulate maximally as well, to return to the Sodra system, or to stick to the old way of accumulation (Bitinas, Maccione 2014).

It can be concluded that the reform is not complete neither in Lithuania nor in the whole world. The evaluation and debates about the effectiveness of existing systems are particularly necessary in order to improve the current system and to find better solutions and new ideas.

### **The problems of evaluation of II pillar pension funds**

II pillar pension funds of Lithuania have become important to assess not only because of the long duration of activity, but also because of plenty of assessors. Klimaitė (2006) distinguishes five such groups, which consider the II pillar pension fund evaluation to be important: the potential participants of pension funds, the existing participants of pension funds, national supervisory authorities, pension accumulation companies and various financial institutions. However, participants of the pension funds can be considered as the most important part, because the amount of their pensions reflects the consequences of establishment and operation of the funds.

Klimaitė (2006) claims that the goal of the group of potential participants is to accumulate as much money as possible for old age pension, choosing the most appropriate fund for it. Still, such a statement is not entirely correct. The author herself points out that this group of participants is characterized by the fact that they have not chosen to participate in the second pillar pension funds yet. Noting that participation in the second pillar pension funds is not mandatory in Lithuania, the primary objective for such participants is to decide whether it is worth to start participation in these funds at all. According to DiCenzo (2007) the participants are often characterized by “automatic engagement”, in other words, they take into account the advice and behaviour of the surrounding people. This conclusion is supported by Knoll (2010) who states that the choice to participate, especially for the persons of smaller financial literacy, is based on friends’ or colleagues’ views and their experience, as well as on the commercials and advertisements in the mass media. Thus, it becomes especially significant to evaluate the strengths and weak-

nesses of the second pillar pension funds contained in scientific literature and to help a potential participant make a proper and reasoned decision by summarizing them.

Firstly, it is worth noting that the impact of pension funds on reducing the influence of the aging population is often mentioned as a positive aspect of pension funds (Jurevičienė, Samoškaitė, 2012). However, the reverse causality is distinguished in the European Commission's Green Paper (Adekvačios, tvarios ir saugios..., 2010). It states that demographic aging can also affect cumulative pension systems. This emphasizes that pension funds do not help to solve the demographic problems; moreover, this inevitable process can also affect them. The Green Paper (Adekvačios, tvarios ir saugios..., 2010) suggests that the potential of economic growth is reduced due to the aging population, thus reducing the rates of return, which makes the influence on financial asset prices. Accordingly, the lower potential return may imply lower benefits and the need of higher contributions as well as the capital outflows into newer markets, and, finally, considerably increase the risk. So, as Lazutka (2008) states, the economic theory does not give the positive answer about the relation between the utility of pension privatization and the aging of population.

Another frequent positive argument is the significance of pension funds in promoting capital markets and increasing savings and, thus, the investment in the country (Kaupelytė, Jankauskienė, 2009). Gylys (2002) emphasizes that the savings of participants turn into investments abroad because of the free movement of capital and, thus, the economy of foreign country is encouraged. In his article, Lazutka (2008) repeats this view by claiming that the first years of the pension reform have shown that about 90 per cent of the private pension funds were invested abroad. Furthermore, Gylys (2002) mentions that, based on the experience of other countries, the pension funds were allocated to purchase government securities rather than the promotion of the stock market. Consequently, this advantage is not sufficiently justified.

Often, the opportunity to have better pensions in the future is considered as an advantage of pension funds (Jurevičienė, Samoškaitė, 2012). Opposing to this argument, Gylys (2002) mentions the high administrative costs of pension funds and securities risk exposures when funds can be not only increased but also reduced. Talking about the reform made in 2004, Gudaitis (2009) argues that the amount accumulated in pension funds is guaranteed by neither the management company nor the state, so there is a risk that the pension can be not higher but even lower. Lazutka (2008) agrees that the loss of Sodra's part of accumulating in the pension fund in a lifetime is about 30 per cent. Therefore, there is a possibility that the pension will not increase but decrease, because of the major deductions of pension funds. Finally, Škarnulis (2013) concludes that if the participants did not agree to contribute accumulating with their own funds (i.e. they do not chose maximum accumulation), the benefits of participation in the second pillar are questionable for all age groups and length of service of the population whose income is not 3 times bigger than the country's average wage. These findings show that just the part of the transfer of social security contributions to pension funds is not a guarantee of higher pensions.

Levišauskaitė and Malinauskas (2006) mention that the positive argument to choose II pillar pension funds accumulation also is the decrease of political influence compared with the Sodra system. It is interesting to note that as stated in the Green Paper (*Adekvačios, tvarios ir saugios...*, 2010), the crisis has forced the reduction of transferred pension contributions to private pension funds in some European Union countries. This is also confirmed by the amounts of contributions presented in the third article of the Lithuanian Republic Law on Pension Reform (2002), when contributions to these funds have been reduced when the crisis has begun. Gudaitis (2010) in his dissertation states that such reductions can have a significant impact on the long-term factors. Considering these statements, it can be concluded that the accumulation of these funds is not fully protected from political influence, which increases the uncertainty and mistrust of the system.

The difficulties of Sodra and the social security budget deficit problems are often considered as the pension fund benefits (Gyls, 2002). A. Bitinas (2008) states that the Sodra budget has decreased because of the pension reform in 2003. Agreeing with this statement, Škarnulis (2013) states that the second pillar pension system should be seen as an investment which increases public spending in short-term, but will become cheaper in the long-term perspective, also making a significant positive impact on the population level of income at the old age. But, at the same time, the author concludes that, although the current system allows to expect a significant positive impact on the income replacement rate (this system probably may also become cheaper for the state in the future), however, it does not solve the existing pension system debt problems, so the appropriate decisions still have to be taken in the future. Moreover, the Green Paper (*Adekvačios, tvarios ir saugios...*, 2010) states that if the private funds cannot deliver the promises which they made, the pressure to pay for pension from the state budgeted inevitably will increase. As a negative assessment of the pension fund capabilities to help solve problems of the Sodra deficit, Gudaitis (2009a) notes that the state cannot increase pensions or social benefits for the current retirees because of the current funding retraction of Sodra. A possibility remains that the uncertainty of the return on pension funds could increase state spending for the compensation of low-income individuals. What is more, contributing to a sceptical assessment, Gyls (2002) argues that pension funds will not help reduce the deficit, but, on the contrary, will determine the strange appearance of the financial circle. He bases this argument by claiming that the state is committed to supporting pension funds, and this only increases the state's borrowing requirement, i.e. state distributed the securities in order to cover the budget deficit and the same time the pension funds increase the budget deficit because of the contribution. Thus, these funds are becoming a source of financing the public debt and, simultaneously, the support of the state is forced to increase its debt because of them. To sum up, although the modelling and predictions indicate that the latest pension reform will reduce costs in the future, it does not prevent the public debt growth, so this argument cannot be evaluated without ambiguities.



It is worth to distinguish the other advantages and disadvantages mentioned in the literature on the second pillar pension funds. The psychological aspect is distinguished as an advantage by Jurevičienė and Samoškaitė (2012): when personal funds are not reallocated to existing pensioners (as the case of PAYG) but deposited in their personal accounts. The authors also positively assessed the inheritance of collected funds, if the participant dies before reaching the retirement age. Liutvinavičius and Sakalauskas (2011) try to object to such arguments. They argue that the small financial literacy and emotions of participants determine migration between the funds due to the wrong decisions. Lazutka (2008) agrees with this argument and identifies that the public campaign had a negative impact on the participation because the participants chose the fund without assessing their real possibilities.

TABLE 1. The positive and negative aspects of participation in the second pillar pension funds with respect to a potential participant

No.	Arguments encouraging participation	Critics of participation
1	The additional funds are received from the state (to the pension fund), which leads the people to accumulate less income	The net salary decline, because the new participants are limited to a maximum accumulation (i.e. input with own funds).
2	The harsh communication between contributions and benefits. More earning individuals will accumulate larger amounts.	Women's annuities are less than men's because of the longer average life expectancy; on the contrary, gender is not considered in Sodra.
3	The diversification of pensions, the greater security (if the one system running poorly, the other will help reduce the risk).	Little office revenues do not guarantee protection of the population, in case of the lost funds.
4	All social guarantees remain: the maternity, disability to work or sickness benefits are paid.	The older people accrue the necessary funds, so it is not advisable to participate for them.
5	If the participant does not receive the retirement age, the accumulated amount is inherited by relatives.	It is no longer available to terminate the engagement and return only in a Sodra accumulation.
6	The higher pension is expected (accumulating maximum). A higher replacement rate of wage.	High inflation can destroy the accumulated funds.
7	-	Higher administrative costs than in Sodra.
8	-	The risk of financial instruments market (uncertainty of securities prices changes). Large fluctuations in return.
9	-	Annuities market risk.
10	-	The future pension from Sodra reduces.

Source: compiled by the authors based on Gylys, 2002; Levišauskaitė, Malinauskas, 2006; Lazutka, 2008; Gudaitis, 2009a, 2009b; Kaupelytė, Jankauskienė, 2009; Šimkienė et al., 2009; Liutvinavičius, Sakalauskas, 2011; Jurevičienė, Samoškaitė, 2012; Bartkus, 2012.

Jurevičienė and Samoškaitė (2012) emphasize the reduction of pensions of Sodra as a negative aspect. However, Levišauskaitė and Malinauskas (2006) point out that the accumulated funds depend on wages directly and, thus, the higher earnings will accumulate a larger part of pension. Nevertheless, Jurevičienė and Samoškaitė (2012) ar-



gue that pension funds do not consider the low-income groups. On the contrary, after doing the simulations on the size of the pensions under the new pension's reform (2013), Liutvinavičius and Sakalauskas (2011) argue that the system favours namely low-income earners. Finally, it can be seen that the many different opinions have dominated in scientific literature about pension funds; therefore, the assessment remains ambiguous.

Summarizing, it is worth to distinguish only the advantages and disadvantages that are directly relevant to the potential participant. As it can be seen in Table 1, there are more disadvantages, but the validity of the argument depends on each participant's personal decision. Although the studies have shown (Škarnulis, 2013) that participation in pension funds may provide a bigger replacement rate of wage in old age for participants, the risk remains, especially in dynamic and volatile financial markets.

### **The II pillar pension fund and return analysis and comparison with inflation**

Quite often in the public media it is declared that returns from II pillar pension funds are higher than the inflation. According to the data given in Table 2, during almost all period which is being analysed (except 2007–2008 and 2011), all 26 II pillar pension funds were ahead of inflation, so in a long-term perspective we can see that, despite financial hardships in the last decade, these funds are able to preserve the value of collected funds: the average return in the eleven years period was around 4.8 %, meanwhile the average inflation was 3.5%. The data show us that in the analysed time period return from these funds was on the average higher by 1.3 percentage point, so it can be stated that II pillar pension funds are able to preserve the value of assets.

TABLE 2. The comparison of the results of common II pillar pension funds (unit value changes) and inflation, 2004–2014

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Geometric mean, %
<b>Funds return (weighted average, %)</b>	<b>11.6</b>	<b>10.6</b>	<b>5.3</b>	3.8	-19.7	<b>17.3</b>	<b>8.8</b>	-2.9	<b>11.2</b>	<b>4.3</b>	<b>7.8</b>	<b>4.8</b>
<b>Inflation, %</b>	1.2	2.7	3.8	<b>5.8</b>	<b>11.1</b>	4.2	1.2	<b>4.1</b>	3.2	1.2	0.2	<b>3.5</b>

Source: compiled by the authors based on the Bank of Lithuania and Eurostat indicators in the database.

However, the given data reflect only the overall average which should be assessed with precaution as every individual receives returns generated from his chosen fund but not the average, so it is important to evaluate all 26 pension funds separately and compare the data with the inflation rate.

TABLE 3. The comparison of the results of conservative investment II pillar pension funds (unit value changes) and inflation, 2004–2014

Conservative investment pension funds	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Geo-metric mean, %	Return (during the period), %
<b>Finasta Conservative investment</b>	<b>4.59</b>	1.10	<b>1.19</b>	2.20	<b>4.85</b>	9.72	<b>8.33</b>	0.66	<b>11.81</b>	<b>3.22</b>	4.62	<b>4.69</b>	<b>65.62</b>
<b>Aviva-Europensija</b>	2.44	1.75	0.18	<b>2.89</b>	4.07	<b>11.82</b>	7.15	0.60	10.66	1.15	<b>7.17</b>	<b>4.46</b>	<b>61.66</b>
<b>DnB Pensija 1</b>	2.83	2.65	0.41	2.54	2.89	8.00	4.08	1.09	9.92	1.30	3.66	<b>3.54</b>	<b>46.66</b>
<b>ERGO Conservative</b>	2.98	2.70	-0.59	1.19	3.57	6.33	2.66	1.43	6.99	1.21	5.56	<b>3.07</b>	<b>39.46</b>
<b>Danske Consevative</b>	1.16	<b>3.08</b>	0.10	1.97	3.79	3.35	0.12	0.37	8.48	1.30	5.54	<b>2.63</b>	<b>33.06</b>
<b>SEB Pensija 1</b>	2.31	2.21	0.37	0.60	3.39	6.25	2.16	<b>2.45</b>	5.73	-0.09	3.49	<b>2.61</b>	<b>32.72</b>
<b>MP Stabilo II</b>								1.53	4.64	0.40	3.51	<b>2.50</b>	<b>10.40</b>
<b>Swedbank Pensija 1</b>	2.64	2.22	-0.64	1.92	0.79	8.80	1,02	0.65	2.29	0.34	0.90	<b>1.88</b>	<b>22.68</b>
<b>Inflation, %</b>	<b>1.20</b>	<b>2.70</b>	<b>3.80</b>	<b>5.80</b>	<b>11.10</b>	<b>4.20</b>	<b>1.20</b>	<b>4.10</b>	<b>3.20</b>	<b>1,20</b>	<b>0.20</b>	<b>3.48</b>	<b>45.67</b>

Source: compiled by the authors based on the Bank of Lithuania and Eurostat indicators in the database.

In the group of conservative investment pension funds (see Table 3), every year the largest returns were generated by a different fund management company, however, from the provided data it is clearly seen that “Finasta Conservative investment“ fund showed the best results compared to other eight companies – 65.62%. This company generated returns to its investors that were higher than the inflation. It is important to mention that during the analysed 11-year period almost all the funds did generate positive returns, with a couple exceptions like “ERGO konservatyvus“ (2006), “Swedbank Pensija 1“ (2006), and “SEB Pensija“ (2013). Compared II pillar pension fund returns individually to the yearly inflation rate<sup>5</sup>, it is important to note that only 4 pension fund management companies out of 8 managed to overtake the inflation rate which poses the problem to preserve the participant’s funds.

It is important to note that the participants that had the same conditions for saving but choose different funds are going to get different returns accumulated to their pension; this is due to pension fund management companies’ different return rate difference

<sup>5</sup> The right way to compare pension funds activity with inflation is only if the taken period of time is the same for both factors. So, in comparison, the calculated inflation figures for the same period the less time acting “MP Stabilo II” foundation, i.e. inflation from 2011 amounted to 8.9% of the total, while the average annual inflation was 2.2%.

growth. For example, 2.28 percentage point difference between “Finasta Conservative investment“ fund and “Swedbank Pensija 1“ average yearly returns in the last 10 years grew up to 42.49 percentage point.

Finally, it should be noted that if the assets accumulated in the II pillar pension fund scheme would have been left as cash or deposits within the banks, the value of it would have declined more than in most of other saving forms. So it can be stated that pension funds compared with other saving forms (such as deposit in banks) performs sufficiently well to fulfil their function.

TABLE 4. The comparison of the results of small equity share II pillar pension funds (unit value changes) and inflation, 2004–2014

Small equity share pension funds (up to 30 per cent)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Geometric mean, %	Return (during the period), %
<b>Finasta Augančio pajamingumo</b>	<b>25.24</b>	<b>11.98</b>	<b>8.45</b>	<b>5.58</b>	-20.31	<b>23.96</b>	<b>16.47</b>	-4.97	<b>15.20</b>	4.72	1.66	<b>7.22</b>	<b>115.31</b>
<b>Aviva Europensija plius</b>	5.44	8.94	6.61	0.93	<b>-6.46</b>	13.22	8.15	-2.93	11.29	<b>5.17</b>	7.80	<b>5.13</b>	<b>73.39</b>
<b>DnB Pensija 2</b>	2.86	5.99	4.36	3.30	-8.55	16.42	7.74	-1.84	9.93	3.51	7.32	<b>4.46</b>	<b>61.60</b>
<b>Swedbank Pensija 2</b>	4.72	7.13	3.09	3.03	-15.23	12.76	4.43	<b>1.63</b>	10.93	1.83	<b>9.05</b>	<b>3.69</b>	<b>48.92</b>
<b>Inflation, %</b>	<b>1.20</b>	<b>2.70</b>	<b>3.80</b>	<b>5.80</b>	<b>11.10</b>	<b>4.20</b>	<b>1.20</b>	<b>4.10</b>	<b>3.20</b>	<b>1.20</b>	<b>0.20</b>	<b>3.48</b>	<b>45.67</b>

Source: compiled by the authors based on the Bank of Lithuania and Eurostat indicators in the database.

All small equity share (up to 30%) pension funds reached relatively high returns and by passed inflation; for example, “Finasta Augančio pajamingumo“ fund since 2004 reform for its participant generated even 115.31% return (see Table 4). Although during financial crisis (2008–2011) pension funds suffered losses, especially in 2008 because of the impact of share part in funds, but other years the high value growth allowed funds to level the losses and generate a sufficiently high return on average.

It is worth mentioning that this fund group owns the largest return generated among all II pillar pension funds – “Finasta Augančio Pajamingumo”, which indicates that these companies fund managers during the crisis perfectly coped with conservative fund’s investments, which allowed to earn relatively high returns in these rather conservative (small equity share pension fund, up to 30 %) funds.

Medium equity in pension funds as many as 7 out of 9 funds (excluding “Aviva Europensija ekstra” and “Swedbank Pensija 4”) offers the average return ahead of the inflation and creates an additional value for those fund participants. One can distinguish the “Finasta Aktyvaus investavimo“ fund, which generated exceptionally high returns.

However, this fund has a high value fluctuation from -40.12% up 37.97%. Meanwhile, all other funds have only fluctuated between -38.4% and 24.39%. This shows that although the fund has large fluctuations (which shows exceptionally high risks) if successfully it generates and thus higher returns. In Table 5<sup>6</sup>, funds lined the average annual return in descending order and can point out that the funds operating in a shorter period have a lower position, indicating that a significant impact on investment makes the start of the operating period, when since 2004–2005 years funds generated a substantial return from the favourable market situation (with the exception of “MP Medio II”, which in 2008 avoided negative returns and thus found itself even on the second place).

TABLE 5. The comparison of the results of medium-equity share II pillar pension funds (unit value changes) and inflation, 2004–2014

Medium-equity share pension funds	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Geometric mean, %	Return (during the period) (%)
<b>Finasta Aktyvaus investavimo</b>	<b>37.97</b>	<b>21.56</b>	<b>11.64</b>	3.95	-40.12	<b>27.34</b>	<b>19.93</b>	-5.67	<b>16.76</b>	5.81	3.24	<b>7.17</b>	<b>114.10</b>
<b>MP Medio II</b>				0.57	<b>3.77</b>	12.05	14.73	-6.55	9.47	7.41	9.48	<b>6.17</b>	<b>60.47</b>
<b>DnB Pensija 3</b>	2.72	10.10	6.77	3.89	-18.12	22.08	11.32	-5.06	11.30	6.70	9.87	<b>5.10</b>	<b>72.92</b>
<b>Danske pensija 50</b>	6.56	10.69	6.38	5.44	-14.15	11.86	10.72	-5.42	10.85	5.72	8.15	<b>4.86</b>	<b>68.62</b>
<b>ERGO balans</b>	3.83	16.06	7.9	4.71	-24.11	22.70	13.28	-7.51	12.81	6.20	5.36	<b>4.78</b>	<b>67.20</b>
<b>SEB Pensija 2</b>	4.92	17.05	7.14	<b>5.80</b>	-29.17	24.67	11.01	-4.81	13.02	3.64	5.98	<b>4.44</b>	<b>61.24</b>
<b>Swedbank Pensija 3</b>	7.70	12.53	6.50	3.83	-25.05	17.32	7.87	<b>-1.41</b>	11.30	3.80	<b>9.90</b>	<b>4.31</b>	<b>59.14</b>
<b>Aviva Europensija ekstra</b>			5.38	-1.42	-17.60	18.42	9.42	-6.47	11.75	<b>9.76</b>	8.83	<b>3.68</b>	<b>38.47</b>
<b>Swedbank Pensija 4</b>		0.51	11.28	5.19	-38.40	24.39	13.51	-6.13	12.59	5.11	9.63	<b>2.23</b>	<b>24.65</b>
<b>Inflation (%)</b>	<b>1.20</b>	<b>2.70</b>	<b>3.80</b>	<b>5.80</b>	<b>11.10</b>	<b>4.20</b>	<b>1.20</b>	<b>4.10</b>	<b>3.20</b>	<b>1.20</b>	<b>0.20</b>	<b>3.48</b>	<b>45.67</b>

Source: compiled by the authors based on the Bank of Lithuania and Eurostat indicators in the database.

Finally, equity funds (see Table 6) as well as almost all exceeded inflation, but a fund has to achieve a higher than the average market return in the long-term, not just outrun inflation (which is typical of conservative funds). However, even in this category, the leading pension fund “Danske pensija 100” overall the total return period has not spared the leading mixed funds, which resulted in recession in 2008 and 2011. It is interesting

<sup>6</sup> Additional calculations showed that from 2005 the average annual inflation rate was 3.71 %, the total inflation over the year was 43.94%; in 2006, the average annual inflation rate was 3.82%, the total inflation over the year was 40.16%; since 2007, the average annual inflation rate was 3.82%, the total inflation over the year was 35.03%.

to note that the highest average return generating “Danske pensija 100” no single year has been the group leader, unlike “Finasta Racionalios rizikos” fund which shows that with a higher risk (higher volatility) not necessarily in the long term will be generated higher returns (a very importance and impact evaluation period). It is interesting to note that the annual return on these funds often exceeded 10%, but the crisis has led to a high risk of this large fund unit value loss, which reduced the average return on these funds.

TABLE 6. The comparison of the results of shares II pillar pension funds (unit value changes) and inflation, 2004–2014

Shares pension funds (up 100 per cent)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Geometric mean, %	Return (during the period) (%)
Danske pensija 100	10.50	16.13	12.62	8.48	-24.79	17.83	17.43	-9.29	13.59	9.43	9.14	6.54	100.76
MP Extremo II				0.49	3.79	10.77	14.96	-9.27	9.34	11.01	12.58	6.43	63.87
Finasta Racionalios rizikos	62.84	28.18	29.95	6.12	-68.26	34.06	27.58	-13.63	15.35	9.87	7.16	5.66	83.28
Swedbank Pensija 5								-7.75	13.92	7.46	10.32	5.65	24.58
SEB Pensija 3			7.72	9.95	-45.84	34.08	17.58	-11.57	14.13	8.27	8.30	2.02	19.68
Inflation (%)	1.0	2.70	3.80	5.80	11.10	4.20	1.20	4.10	3.20	1.20	0.20	3.48	45.67

Source: compiled by the authors based on the Bank of Lithuania and Eurostat indicators in the database.

It is worthwhile to discern and the MP Extremo II fund became operational in 2007 and had high results from 2004–2005, but avoided recession during the crisis. This enabled the average return overtake of the “Finasta Racionalios rizikos” fund. Looking at the returns over the entire period from the beginning of the fund, it can be seen that the “Finasta Racionalios rizikos” fund unit value inception even 19.41 percentage point ahead of the “MP Extremo II” fund (which is mainly determined by earned returns during the period 2004–2005 that have not had “MP Extremo II”). Meanwhile, the only fund in this group that not spared the inflation is “SEB pensija 3”. However, looking at the changes in the value of the unit it can be seen that it generates returns and almost does not lag behind other funds, only if it has rather high value fluctuations (high risk), and activities started in 2006. This fund did not have a high value in 2004–2005, which would increase its average return.

Summarizing all II pillar pension funds we should say that pension funds fulfil their role, and even difficult economic situation did not prevent the funds over 11 years to generate enough significant returns. However, valuating the funds separately the situation becomes more complicated, as some funds have generated huge returns, while others have not spared even inflation, which raises problematic issues for the second pillar pension funds operating efficiency.

## A comparison of II pillar pension funds, their results, and the participants

When comparing the results of pension funds against inflation, it has been stressed that important are not general pension fund operating results, but each of individual fund returns, which ensures to the participants the necessary funds for retirement. It may be noted that participants often do not behave rationally – the pension funds are not choosing it by assessing indicators, but under the control of the company name reliability, according to friends' and colleagues' opinions. Such statements are endorsed by Skučienė (2011) who states that “irrational, suboptimal private pension participants' behaviour can lead to low pensions for the future, which is incompatible with the pension policy objectives of increasing the welfare of the population or mentioned promises of higher future pensions from private pension schemes rhetoric”. Chybalski (2011), based on the Polish pension fund market analysis, also agreed that people are not focused on the fund's investment performance, but are exposed to management companies advertising campaigns influence. In order to assess the situation in Lithuania, the authors made a graphical analysis of II pillar pension funds, the number of participants, the return.

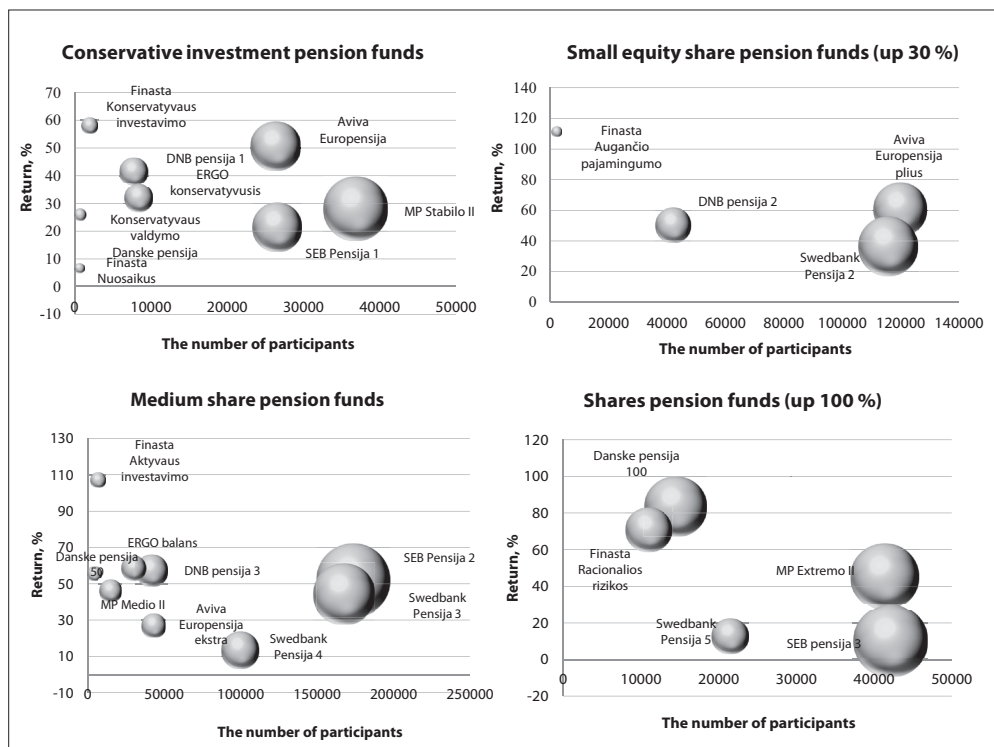


FIG. 1. A comparison of II pillar pension fund returns, the number of participants and assets portfolio in 2013

Source: compiled by the authors based on own calculations.

In conservative investment pension funds group (see Fig. 1), most participants have “SEB Pensija 1” and “Swedbank Pensija 1”. The strangest thing is that “Swedbank Pensija 1” over 10 years generated the lowest average return and has a sufficiently large number of participants, while “SEB Pensija 1” is also only in the 6th place instead of the 9th according to the average fund return, but by the number of participants it is ahead of most of its competitors. Meanwhile the “Finasta Konservatyvaus investavimo” fund is the leader in this group, although it has limited participants. Small equity share pension funds (see Fig. 1) have the similar situation: funds with large asset and participants do not generate the highest returns, while funds with the highest returns have not a lot of participants.

The medium share funds (see Fig. 1) trend continues, but could be mention one aspect: “SEB Pensija 2” and “Swedbank Pensija 3” have a relatively similar number of participants and generated a similar return (average return on the difference a half per cent), but the fund’s net asset value is different. This is due to the quality of the participants: funds have different age and different social background persons. Some of them transfer larger amounts (those with higher wages), while others do not advance anything (the unemployed, or emigrated or illegally employed persons). It can be concluded that the funds with the most participants do not necessarily have the highest asset value. This conclusion is supported by the shares of the pension funds “Danske Pensija 100” and “MP Ekstremo II” which as seen in Fig. 1, have a similar asset size but a large gap in the number of participants. This shows that “Danske Pensija 100” attracted “higher quality” customers and generating higher returns on assets is able to have a similar value as the “MP Ekstremo II”. Thus, while “Danske Pensija 100” has almost 3 times fewer customers, it generates almost two times higher returns.

This analysis is supported by the provision that it is important to choose the fund in accordance with appropriate criteria, as funds with most participants are not necessarily the best investing strategy or generating a high return. It is very important to carry out assessments and choices based on financial indicators rather than external factors (views in the media or the information contained in the trust management company name).

### **The prediction and evaluation of funds accumulated in the II pillar pension funds**

It was found that the fund return and the number of participants in the fund have a negative correlation. This shows that the part of households who raise money in fund with the lowest return will gain much less and a corresponding result as a smaller pension. The question is what the real impact has the return difference on the future cumulative amount – how much will actually be the pension lower or higher.

Liutvinavičius and Sakalauskas (2011) argue that companies offering to invest in pension funds provided the spreadsheets that not always reflect the actual performance.



Too many optimistic results may lead participants to improper decisions. In order to substantiate or refute these claims, various spreadsheets presented by pension fund management companies were analysed, after that the authors set up a new integrated spreadsheet and compare the results presented in different databases.

It was found that the DNB, SEB, Danske and Invalda presented future pension spreadsheets (SEB and DNB on their own websites), and other management companies did not present these spreadsheets or refer to official spreadsheets prepared by the Ministry of Social Security and Labour, the Bank of Lithuania, Sodra, Association of Lithuania investment and pension funds as well as the Association of the Lithuanian Life Insurance Companies. Table 7 shows what results are calculated of the future retirement pension in different pension fund management companies according to spreadsheets provided by therein permitted criteria.

TABLE 7. Pension results using different spreadsheets

	DNB		SEB		Danske		Invalda	The Ministry of Social Security and Labour, the Bank of Lithuania, Sodra, Association of Lithuania investment and pension funds, Association of Lithuanian life insurance companies	
Date of birth / age	1991.01.01		24		1991		24	1991.01.01	
Employs and compiles a pension in the II pillar fund (maximum accumulation) from:	2015								
Wages and salaries (EUR / month). Gross (b) or net (n)	677 (b)		524.33 (n)		524 (n)		677 (b)	600/750 (b)	
Wage growth rate	-		Considered		3 <sup>7</sup> %		-	-	
The Fund's annual return (%)	2.5	-2.5	High risk (6 %)	Small risk (2 %)	Risky (5 %)	Conservative (3 %)	3.8	2.5	-2.5
<b>RESULT (EUR)</b>	<b>526</b>	<b>340</b>	<b>495</b>	<b>344</b>	<b>773</b>	<b>631</b>	<b>478.67</b>	<b>402</b>	<b>287</b>
The main part of Sodra (EUR)	149	149	237	237	251	251	150.15	150	150
Additional part of Sodra (EUR)	87	87					89.28	82/102	82/102
The benefit from the fund (EUR)	290	104	258	107	522	380	239.24	170/200	55/64
Monthly revenue from current net salary (%)	101	65	94	66	148	120	91	86/78	61/55

Source: compiled by the authors.<sup>7</sup>

<sup>7</sup> It proposes to introduce the desired growth rate of the same participant.

Each of spreadsheets is based on quite different assumptions: the DnB Bank spreadsheet has not evaluated wage growth, SEB and Danske spreadsheets evaluated the growth, but in the SEB spreadsheets the size of wage growth is not specified, while Danske allows the participant to choose this size. Similarly, some spreadsheets provide a real return (after taxes and inflation adjusted), the other nominal (just after taxes). The inflation size applied in the spreadsheets is not identical, and this has an impact on the final result. Finally, the Ministry of Social Security and Labour, the Bank of Lithuania, Sodra, Association of Lithuanian Investment and Pension Funds and Association of Lithuanian Life Insurance Companies prepared a spreadsheet provided the wages which are rounded and it is not possible to enter a specific size.

By comparing the results of these spreadsheets can be seen that the most optimistic results are presented by Danske, while the most pessimistic – the Ministry of Social Security and Labour, the Bank of Lithuania, Sodra, Association of Lithuanian Investment and Pension Funds and Association of Lithuanian Life Insurance Companies spreadsheets.

In summary, it can be said that spreadsheets with different assumptions give different results, which is confusing to existing and potential II pillar pension fund participants. To this end, it aims to create a new spreadsheet and calculate the difference among the different participants in accumulating funds in accrued amounts. Therefore, the authors created a new spreadsheet and calculated the difference among the different participants in accumulating funds in accrued amounts.

Due to the persons newly entering the labour market, participation in the second pillar pension funds can only be garnering the maximum (contributing to its own funds and receiving accessory from the state budget), thus only the accrual method is used to calculate the future returns of participants. Creating a spreadsheet based on the following assumptions and conditions:

- Participate in the pension fund a person begins on January 1, 2015 (starts to transfer contributions). The calculations do not include the time log, which is formed when Sodra transfers contributions to pension funds with a certain delay. Actually transferred to a delay more than a month (this can influence the performance of the fund, because after a certain violation in the securities market can significantly worsen or improve performance), whereas this spreadsheet will not take into account the potential stock market downturns and booms.
- A person begins to gather in age of 24 years (person's birth date 01/01/1991) without previous seniority.
- The participant compiles without any breaks for 41 years every month without any work-related interruptions.
- The participant retires immediately on reaching the retirement age (65 years).
- The contribution fee in 2015 is 1 %. According to the law (Lietuvos pensijų sistema..., 2013), this amount each year must be reduced by 0.5 percentage point to

reach zero per cent, and accordingly compiled a spreadsheet used in 2015 – 1%, in 2016 – 0.5%, and finally from 2017 the fee will be discontinued.

- As the majority funds management companies applied the 0.05% transition fee (moving to another company), so it is used in this spreadsheet modelling fund participant exchange, assuming that the participant will change not in the same fund management company (in order to fully assess the potential costs for participants).
- The unit value change calculated by the pension funds management company and the Bank of Lithuania already included management fee. Because this spreadsheet as the future return on the pension fund is taken change in value per unit, the management fee will not be treated separately.
- When calculating the transfer of social security contributions, it is assumed that the participant earns an average wage of 2014 (gross wages 677.4 euros). As from this amount is calculated a 2% fee (13.55 euros) and from 2020 this fee will be increased to 3.5%. Also, from the amount of the social security contributions are calculated and an additional participation fee on their own expense (since 2015 – 1% (6.77 euros), while from 2016 – 2%).
- Calculation of the enclosed part from the state budget is based on the pension reform law, which stipulates that the enclosed part is calculated on a penultimate year before using the average gross wage of four quarters published by the Lithuanian Department of Statistics. Accordingly, this part is calculated by taking the average monthly gross wages in 2013 (6.44 euros), while from 2016 it will be increased to 2 %.
- The calculations included wage growth. During the period of 1996–2014, the average wage growth rate (arithmetic mean) was 9.1% annually (Lithuanian Department of Statistics). According to the Ministry of Finance estimates, this size in 2015 should reach 4.8%, the Bank of Lithuania forecasts 4.5%. However, based on historical data and composed the trend of wage growth, the rate should be 2.36% in 2015. In conclusion, it may be asserted that during 41 years the calculated wages will increase by 3%. This provision is based on the assumption that in the 41 years the economy will grow at a moderate pace (wage growth will be higher than inflation); also, if one period of growth would be higher, in others downturns can occur (based on the economic cycle theory).
- The average life expectancy at the age of 65. Based on the Lithuanian Department of Statistics data, the average life expectancy for men is 14.24 years, for women 19.25 years. It is assumed that this average life expectancy in 2055 will increase accordingly up to 15 years for men and to 20 years for women.
- The average inflation rate in the last 11 years was 3.4%. According to the SEB Bank spreadsheet, it is stated that “on the basis of long-term bonds linked to infla-

tion and long-term fixed-yield bond spreads, it will reach 1.77 %". The Invalda spreadsheet indicates inflation of 2%. As of the ECB the main goal is to maintain the price stability which is expressed through quantitative indicators – to achieve and maintain the 2% inflation rate, thus the calculation assumes that the average annual inflation will be 2%.

- Analysed were two different options: the funds deposited in the minimum and the maximum return. The study carries out the following prescribed fund's return:
  - Conservative funds: 4.69% and 1.88% (selected the greatest and the worsts average annual return). The conservative fund was chosen 7 years before the pension (when a person reaches the age of 58 years).
  - Mixed fund return: 7.2 % and 3 %. Most participants rarely change the fund because they fear loss of funding for transition costs. It is assumed that participants will change the fund 2 times. The mixed pension fund returns averaged: elected the best two funds in medium and small shareholding and two worst appeared and take their averages.
  - Shares of pension funds annual return will be 6.54 % and 3.84 %. This is the average between the highest and the lowest return of two funds. Equity in this fund is considered up to 35 years.

It is worth noting that the maximum return on mixed funds obtained more than stock funds, it does not substantially meet the financial logic which states assuming a greater risk in the long term, and generating higher returns. Because it has been analysed over the past 11 years Lithuania II pillar pension fund data, and thus they are based on these calculations.

**TABLE 8. The authors' created spreadsheet results**

	Men	Women
The average life expectancy	15 years	20 years
The accumulated amount (at the maximum return)	75.918.04 EUR	
The accumulated amount (at the minimum return)	33.123.76 EUR	
Accumulating at the highest return (monthly funds)	421.77 EUR	316.33 EUR
Accumulating at the minimum return (monthly funds)	184.02 EUR	138.02 EUR
Part on gross / net salary at the maximum return	44.50% / 58.55%	33.37% / 43.91%
Part on gross / net salary at the minimum return	19.41% / 25.55%	14.56% / 19.16%

Source: compiled by the authors based on own calculations.

The calculations (see Table 8) gave two amounts: the accumulated amount with a maximum return is € 75.918.04 and with the lowest return € 33.123.76. In order to identify men and women, the amount of the annuity for life (the average life expectancy respectively 15 and 20 years) should have a number of additional assumptions and calculations to simplify the accumulated amount just split the remaining years to live.

There are two amounts: accumulated amount with a minimum return on funds for men (€ 184.02) and for women (€ 138.02) and the highest for men (€ 421.77) and women (€ 316.33). It may be noted that other things being equal, the accumulation of different in pension funds reserves has a significant impact on the future pension size. As shown by the calculations, the difference reaches even 229%.

It is interesting to compare the cumulative amount and wages which, based on the chosen rate of growth, should make 2150.71 euros, but adjusted for inflation – 947.89 euros. Therefore, calculated the cumulative amount of the annuity based on this amount can show that the collection of the highest return-generating funds reaches even 58.55% and 43.91% (of net salary), while the lowest – 25.55% and 19.16%. In summary, the calculations based on the results of future pension accumulating pension funds generating different returns differ more than two times. Such difference shows that the II pillar pension system should be improved, so it is important to analyse and seek to find solutions that will allow participants to accumulate a sufficient amount of money for money livelihood.

## **Conclusion**

The analysis of scientific literature showed that the structural reforms of pension systems are evaluated ambiguously. Some authors argue that the pension funding diversification is laudable, others criticize these arguments by saying that it does not help to solve demographic problems. This indicates that the reforms are not completed and they can be considered as an on-going process that promotes assessment of both the current old-age pension systems and explores new opportunities to improve them.

Pension funds strengths and weaknesses analysis does not clearly assess the fund. However, it should be noted that given the current legal framework in Lithuania (intended to ensure the link between contributions and benefits, and the accumulated funds can be inherited, and so on) potential participants are encouraged to collect their money in pension fund reserves and thus contribute to their future well-being.

Assessing Lithuanian II pillar pension funds it is possible to state that these funds carry out their mission – over eleven years they have generated positive returns and managed to outrun inflation. However, the evaluation of an individual fund has shown that not all funds bypass the inflation rate, which poses concerns about the preservation of participants' personal funds and future pension benefits which will be influenced by differences in fund management. It is noteworthy that the determined a negative correlation between the number of participants and the generated fund returns suggests that funds with most participants do not necessarily represent the best investing or generating high results; it is important to carry out a comprehensive evaluation of the fund, based on the financial and fund management indicators.

It should be noted that the best and the worst investing funds for future accruals can vary more than 2 times. This leads to very large differences in the cost of living for future retirees. Stressing that past investment performance does not guarantee future results, limit or otherwise restrict the lower return-generating companies funds would be incorrect. Therefore, the authors propose to introduce mandatory generalized surveys of pension funds' performance, which should be sent to the participants together with their personal accrual results.

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