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SOCIAL SECURITY ISSUES: THE EFFICIENCY OF THE LATVIAN PENSION SYSTEM

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Abstract. Pension system efficiency is very sensitive topic to every citizen of the country. It is very common to criticize established pension systems in search for better solutions. The authors in the present research paper attempt to find out whether the criticism is deserved by evaluating the efficiency of Latvian pension system from the future pensioner's point of view in the context of the state pension financed from two sources: state pension and state funded pension. Additionally, the authors highlight a number of aspects of pension system the sustainability in Latvia. Private pension is not considered.

Keywords: Latvian pension system, state funded pension, efficiency, sustainability

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JEL Classifications: J32, H55

1. Introduction

The paper addresses the efficiency of Latvian pension system focusing on the 1st (state pension) and 2nd (state funded pension) pillars. The main aim is to find out the efficiency of pension system operation assessing how well it complies with the pension system's main principles. Pension indexation is being compared to the inflation, life expectancy and G coefficient are being put in the context of demographic situation and pension payments. The authors also consider the efficiency of Latvian pension capital management institutions, which jointly managed 1.6 bn EUR (as of 31.08.2015) – pension capital of 1.2 mn pension funds' participants. The investment performance of the funds is compared to the inflation rate and to the peers.

2. Main assumption and measurement of efficiency

There can be at least two points of view on the efficiency of the pension system: the government can estimate how efficiently a pension system works according to state social policy, while a private person can estimate efficiency taking into account own interests. In this paper, the authors follow the main assumption that the pension system has to protect the interests of tax payers, therefore, efficiency of the Latvian pension system is estimated from a private person's point of view.

From a private person point of view, the authors can define the following parameters, which can be used for the estimation of the functioning of the pension system:

- *protection against inflation.* The main interest of a private person in the context of the pension system is related to accumulation of pension capital keeping its purchasing power at least at the same level. Thus, pension capital growth should be compared to the inflation rate.

- *accessibility of the pension system to the taxpayers.* The existence of the pension system is not sufficient condition to ensure old age in the future. It is possible that the pension system can eliminate the opportunity to get the benefits of the pension system, i.e. to take advantage of accumulated pension capital. To check this statement it is necessary to compare pension age and duration of life in the country.
- *distributive justice.* The pension system might work against the interests of future pensioners, and previously accumulated capital is paid out unfairly. To answer this question, pension payments should be compared with accumulated pension capital and its availability for a pensioner.

3. Brief description of Latvian pension system

Latvian pension system is based on three pillars giving an opportunity to accumulate pension capital divided into state and private:

- 1st pillar is compulsory for all tax payers and financed by a part of the state social security mandatory contributions (in 2015 it constituted 15% of gross income). This capital is not physically accumulated but used to finance today's pensioners. A special record in the State Social Insurance Agency compiles the statistics on contributions over the whole taxpayer life. Based on this information state pension is calculated. Thus, the first pillar works as solidarity program when today's tax payers finance today's pensioners, and further the future tax payers will finance the future pensioners according to their state social security mandatory contributions made today. This pillar is regulated by the Law "On State Pensions". The accumulated capital in the first pension pillar is not heritable.
- 2nd pillar is compulsory for all tax payers and also financed by a part of the state social insurance mandatory contributions (in 2015 it constituted 5% of gross income). This amount of money is transferred from the state budget to the account of a licensed pension fund chosen by a taxpayer who has the right to change the pension fund each six months and asset manager – once a year. The main idea of this pillar is to help the taxpayers to accumulate more by investing in financial instruments with the help of the pension fund. This pillar is regulated by the Law "On Funded State Pensions". The accumulated capital in this pillar is not heritable.
- 3rd pillar is voluntary and financed only by future pensioner's capital. He has the right to receive back the rate of the tax on personal income (in 2005 - 23%) of committed payments but not more than the one tenth of the annual gross income. This pillar is regulated by the Law "On Private Pensions". The accumulated capital in the third pension pillar is heritable.

4. The efficiency of the 1st pension pillar

a. Protection against inflation

The 1st pension pillar works since 1996 and, as it was mentioned above, it is financed by the state social insurance mandatory contributions to ensure state pensions for today's pensioners. According to the law, accumulated capital in the 1st pension pillar is indexed to cover inflation costs. To check the hypothesis whether the indexation covers inflation, it is needed to compare annual indexes, which are changed on annual basis, with inflation rate. The Figure 1 shows the dynamics of indexation of pension capital accumulated in the 1st pension pillar against inflation rate in Latvia from 1996 to 2014.

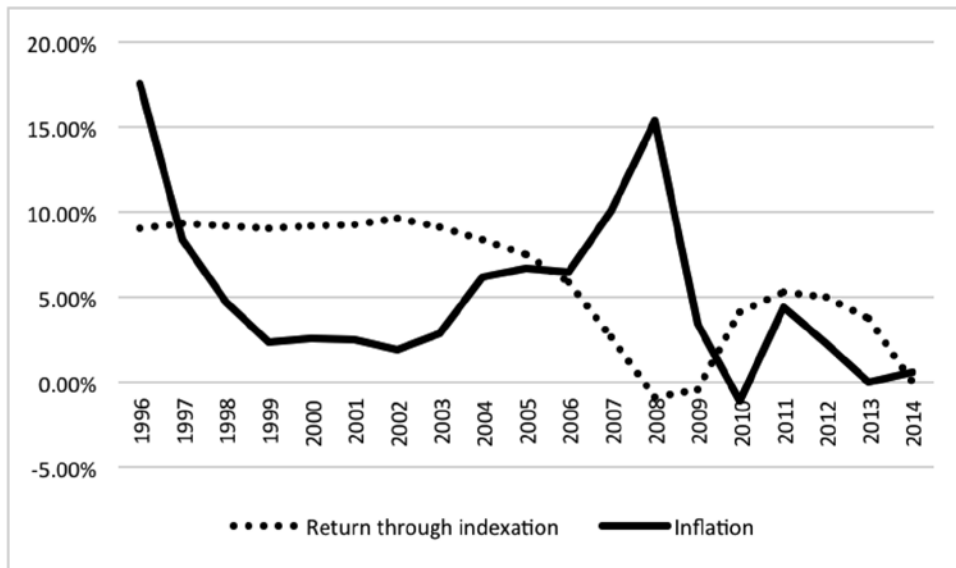


Figure 1. Indexation of pension capital accumulated in the 1st pension pillar vs. inflation rate from 1996 to 2014

Source: State Social Insurance Agency, EuroStat

It is clearly seen that there are some periods with higher and lower inflation rates. To finance budget deficit during the financial crisis in 2008 the government set the negative indexes.

To compare indexation and inflation mathematically, it is necessary to compare geometric means of indexation and inflation calculated by the following formula:

$$\mu = \sqrt[n]{\prod_{i=1}^n (1 + r_i)^i} - 1 \tag{1}$$

where μ – the geometric mean;
 r_i – the rate of changes in the i^{th} year;
 n – the number of years.

Applying the formula (1) to the statistical data on indexation and inflation, the authors got the following results (see in the Table 1). As seen in the Table 1, the indexation works well and covers the inflation rate in Latvia as well as in the EU and euro area (for comparison).

Table 1. Average inflation and rate of return from 1997 to 2015

	Latvia	Euro area	European Union
Average inflation rate	4.31%	1.85%	1.98%
Average rate of return through indexation		5.83%	

Source: authors' calculations

From this point of view, the 1st pension pillar works effectively without considering the personal income tax which is used for taxation of state pension over 235 EUR per month. The personal income tax for pension over monthly 235 EUR is 23%, which was created to finance the budget deficit after the financial crisis in 2008. In average, this tax decreases the efficiency of the 1st pension pillar down to negative value. The higher number of state pensions exceeds 235 euros per month, the less efficient is the first pension pillar system. Solving the problems of the social budget directly at the accumulated capital's expense can stimulate tax payers to optimize their tax payments, thus, developing the shadow economy. Transparency and honesty of the pension system in the context of accumulated capital has an impact on the level of confidence in the pension system. This might

lead to the decrease in level of social protection, which can stimulate the shadow economy (Caurkubule, Rubanovskis 2014). More accurate impact of the personal income tax on the state pension can be estimated in further research.

b. Accessibility

Statistics on life expectancy can be used to test the accessibility of the 1st pension pillar to the taxpayers. According to *EuroStat* data (see in Table 2 and 3) the average age of men is about 68.7 years and for women – 78.3 years, and both values grow constantly. In comparison with the EU and euro area these values lag behind average expectancy by ca. 10 years (Figure 2).

In the context of accessibility of the 1st pension pillar to the population of Latvia, there are two different situations across men and women. The pension age in Latvia from 2025 is 65 years, and the current pension age is being constantly increased each year by 6 month to the final 65 years. In these circumstances men can use the benefits of the 1st pension pillar only during 3-4 years, but women – 13-14 years (Figure 3). It is clearly seen that the 1st pension system is not very favourable for the male population in Latvia as they are not able to use the larger part of the accumulated capital. Women have better access to the pension capital as they live longer than men by 13-14 years.

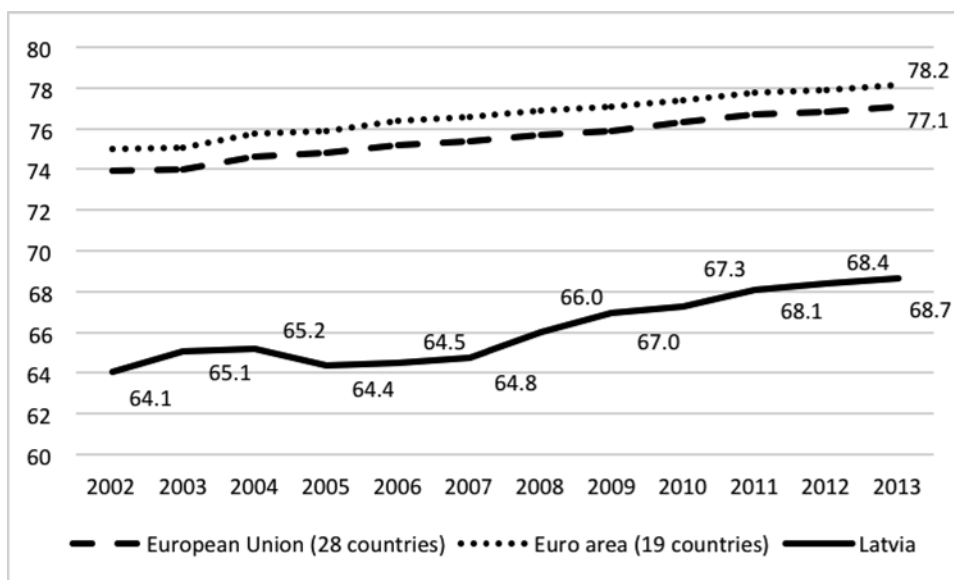


Figure 2. Life expectancy for men in Latvia, EU and euro area from 2002 to 2013

Source: EuroStat

More accurate analysis of the accessibility of the 1st pension pillar in the context of population group separation can be performed in further research.

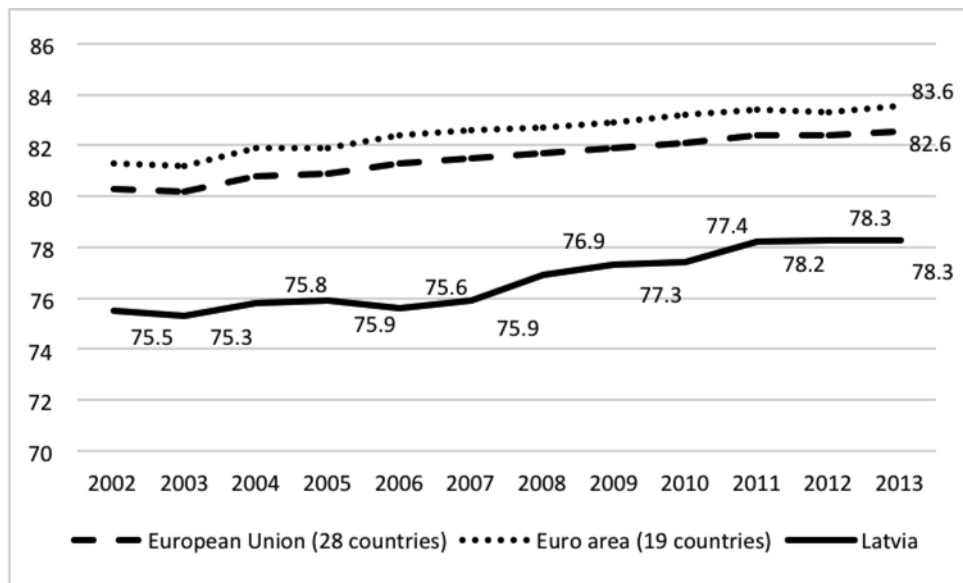


Figure 3. Life expectancy for women in Latvia, EU and euro area from 2002 to 2013

Source: EuroStat

c. Distributive justice

According to the Law on the state pension, the state pension is calculated by the following formula:

$$P = \frac{K}{G} \quad (1)$$

where P – the annual state pension;

K – the accumulated capital in the 1st and 2nd pension pillars;

G – special coefficient which is recalculated each year according to demographic forecasting.

The main idea is to check how much of the accumulated capital in the 1st pension pillar a taxpayer can use through getting the state pension. This analysis corresponds to the insight discussed earlier when the life expectancy was used to check the accessibility of the 1st pension pillar to the population.

According to the rules of the cabinet of the ministers of Latvia the coefficient G was equaled as follows (Table 2). The minimal record of service must be 20 years to get the state pension. It is clearly seen in the Table 2, that a man can use a very small part of the accumulated capital because his life expectancy is about 68-69 years (see in the Figure 2), but a woman can use her capital almost completely because her life expectancy is about 78-79 years (Figure 3).

Table 2. Coefficient G according to the age when the state pension is calculated in 2014

Age	G	Age	G
65	16,45	76	9,59
66	15,81	77	9,03
67	15,16	78	8,47
68	14,52	79	7,91
69	13,87	80	7,35
70	13,23	81	6,90
71	12,61	82	6,45
72	12,00	83	6,00
73	11,38	84	5,56
74	10,77	85	5,11
75	10,16	86	4,76

5. The efficiency of the 2nd pension pillar

a. Pension funds vs. the Benchmark

The efficiency of the state funded pension scheme can be evaluated by comparing the returns of the pension plans among each other or comparing to the relevant benchmark. Unfortunately, the benchmark is not set by the pension funds' managers. However, a number of asset management companies charge performance fee comparing the fund performance to the benchmark set in the Republic of Latvia legislation - 3M Euribor, which appears to be a questionable measure particularly considering 30% allocation to equities in case of active pension plans.

Common practice in the asset management is the comparison of the reported investment returns to the consumer prices index. Pension plan participants have to be sure that their pension capital is not eroded by the inflation rate, increasing the importance of the positive real returns.

The authors of the research made a short insight into the relative performance of the pension funds managed by the foreign asset managers, concluding that in many cases the pension funds tend to underperform.

G. Impavido (2008) in his extensive study of the pension system in Bulgaria notes that gross real returns were not increasing challenged by the high inflation increase, but notes that the Bulgarian pension funds performed better than the funds in most other countries considered in the review (e.g. Hungary, Estonia, Poland, Croatia) and were comparable to the funds managed in Latin America.

The research on Dutch pension fund (Huang, Mahieu 2012), which employed z-score as risk-adjusted performance measure, proved that the pension funds are not able to consistently beat their self-selected benchmarks. Besides, it was discovered that the largest funds tend to outperform the smallest pension funds.

Large geography coverage regarding the pension funds investment performance is provided by the OECD paper (Antolin 2008). Analyzing the investments results of the pension funds in Latin American and CEE countries as well as several developed nation, the author comes to the conclusion that in the majority of cases excess returns of nominal benchmarks returns are negative.

Ammann and Zing (2008) proved that Swiss pension managers possess superior skill in selecting and right timing of investments in international bonds, but they state that other asset classes underperform the risk-adjusted benchmark returns.

Aiming to assess the performance results and therefore the management skills of Latvian pension fund managers, the authors of the present research conducted comparative analysis of Latvian pension funds, which covers last 9 years from 1.09.2006 to 31.08.2015, therefore including also the financial crisis and post-recovery period. Another period analyzed was last 5 years to understand the performance character in the after-crisis phase. Main investment risk and return ratios were calculated according to the standardized calculation methodology of performance evaluation ratios.

b. Real return and risk profile of pension plans

Pension Funds' Returns

Most popular according to the number of participants and asset base are active plans. In the long-term these plans are supposed to provide the highest returns compared to the less risky peer funds – balanced and conservative. However, in the last 9 years only half of them managed to beat inflation, providing average performance below the consumer price index in Latvia during this period: 3.6% vs. 3.7% p.a. (Figure 4). During more recent period, which excludes abnormally high consumer price inflation in Latvia and setback caused

by crisis, the asset managers provided returns by more than two times exceeding inflation: 3.7% vs. 1.4% p.a. (Figure 5.).

Balanced plans are not very popular among the asset managers and the asset providers in Latvia as there are only 4 plans and they are not that crowded by the assets and the number of the participants despite the lower fees of 1%-1.5% as require less active management. Similar to the case with the active funds, only half of the fund managers were able to exceed the rate of inflation for the last nine years.

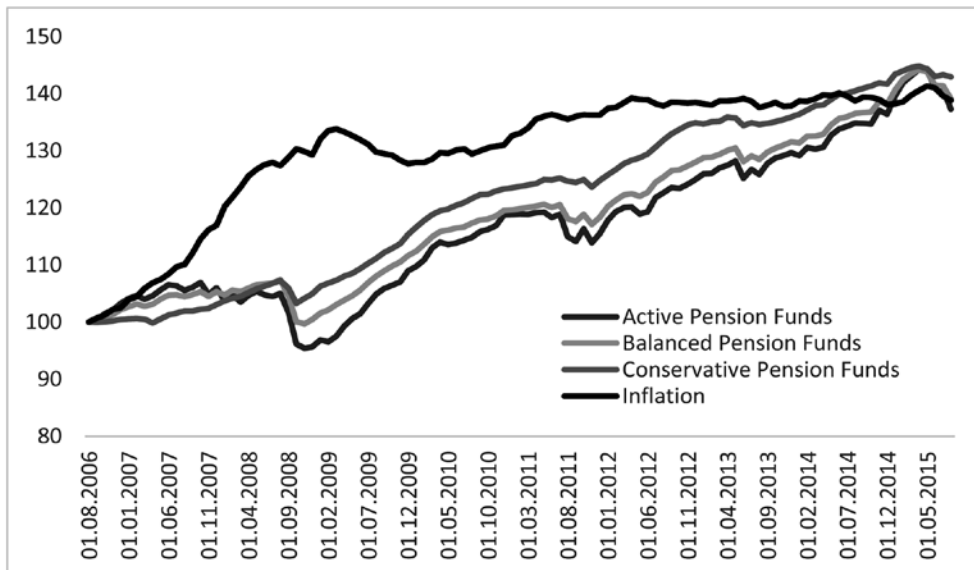


Figure 4. 9Y Average pension plans performance vs. CPI

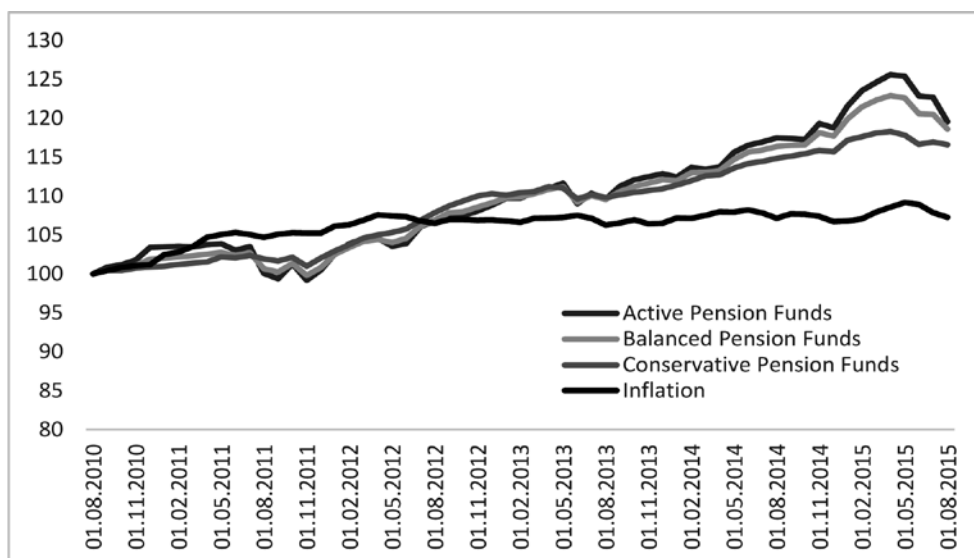


Figure 5. 5Y Average pension plans performance vs. CPI

Conservative plans possibly seem to be the best investment choice during the longer term period analyzed as the performance in average was better compared to the performance of the active and balanced funds (4.1% vs. 3.6% and 3.7% respectively) supported by the lowest management fees of ca. 1% and conservative investment strategy, which provided a certain hedge during the total sell-off in 2008. In the shorter time period of 5 years, conservative funds perform very well versus the inflation rate, while the conservative funds average annual performance is not significantly different from the performance of the more aggressive investment plans: 3.1% (conservative) vs. 3.5% (balanced) vs. 3.7% (active).

Pension Plans' Risk Profile

The riskiness profile of the active pension funds does not look dramatic in absolute figures. The largest active pension fund obviously suffered significantly during the financial crisis, and therefore has annual volatility of 7.1%, while beta is 1.6 in case the benchmark is the active fund sample (Table 4, Appendix). It is worth noticing that despite its not very appealing risk-return characteristics, the fund is the leader in terms of the asset base indicating that the future Latvian pensioners are not very active in monitoring their assets managed. This might be an indication of inertia, which is status quo bias - a behavioural bias very common for the defined contribution (DC) plan participants. Majority of US investors in DC plans make no fund switches as found by Samuelson and Zeckhauser (1988) and Ameriks and Zeldes (2000).

Average volatility figures of the balanced pension plans naturally are lower. In case of the balanced funds BF 1 has the most attractive performance indicators – alpha, Sharpe ratio and Information ratio, making it a viable investment choice.

The volatility of the conservative plans, indeed, is rather low. Only for half of the conservatively managed pension funds (CF4, CF5, CF6) information ratio appeared to be in the positive zone, indicating the consistency of the outperformance of the funds (Table 6-9, Appendix).

Table 3. Risk and Returns of the Pension Plans

Pension Plans	9 Years			5 Years		
	Annual performance	Annual volatility	Sharpe ratio	Annual performance	Annual volatility	Sharpe ratio
Active	3.6%	4.2%	-1.7%	3.7%	4.1%	0.31
Balanced	3.7%	3.0%	2.7%	3.5%	2.7%	0.38
Conservative	4.1%	1.8%	21.3%	3.1%	1.7%	0.42

(Sharpe ratio risk-free rate for 9Y is 0.3%; for 5Y is 0.2%)

Considering the risk-return characteristics of the available second pillar pension funds, the reasonable investment choice is offered by the conservative pension plans as the returns are not significantly different from the active or balanced strategies, but the associated risks are significantly lower benefitting the clients during the market downturns. Sharpe ratios as indicated in Table 3 are the highest for the conservative pension plans for both periods analyzed.

To sum up, it might be stated that the global financial crisis was a painful probe for the majority of the second pillar pension funds managers as some funds posted drastic declines, which obviously should have been minimized in the pension fund management. The abnormally high inflation in Latvia and financial crisis caused a significant drag on the performance of the pension funds, causing them to generate negative real returns.

Overall two problems can be associated with the pension plan management in Latvia – absence of the comparable benchmark and rather high fees. The main reason of selecting the benchmark stated in the legislation (3M Euribor), is common understanding of the index. However, it does not comply with the majority of criteria for the valid index: investable, appropriate, reflective of current investment opinion and accountable (Fong, Guin 2015). The recommended benchmark is not comparable to the pension funds' returns considering the composition of the pension plans' portfolios. D. Blake (2003) mentions several possibilities of benchmarks for the pension funds:

- market index,
- other pension fund managers (the aim is to be in the first quartile of performance),
- inflation (not to deteriorate the dedicated capital of the future pensioners),
- wage inflation.

The second problem associated with the pension fund management in Latvia – relatively high fees, taking into account the fact that active management (equity investing), which requires the largest effort and, therefore, charges the highest price, is minimized. For example, Latvian state-funded scheme were criticized in the FT article (September 27, 2015) for charging very high fees and therefore generating negative returns despite very positive equity and bond markets. On average Latvian pension fund managers charge 1.5% per annum. To compare, BrightScope/ICI (2014) provided data shows that US retirement plan fees are ca. 0.4% for plans over 500 mn USD, while for funds having assets below 50 mill USD plan costs are 0.85%. The issue on costs charged by the Latvian pension fund managers needs to be studied further to get a more objective view, but it is obvious now that they have to become as efficient as possible to provide higher returns to future Latvian pensioners.

6. Sustainability of the Latvian pension system

Sustainability of the pension system plays a significant role in economic security and social sustainability that are faced by the European Union (Mačiulis, Tvaronavičienė, 2013). As it was mentioned above, the state pension in Latvia is formed from two financial sources decreasing the total risk of the sustainability of the pension system. The funded part of the state pension is represented by the real accumulating capital managed by a licensed pension fund outside the state budget. In this case the situation with the state budget does not have any impact on this capital. On the other hand, non-funded part of the state pension has the largest weight in the total state pension. This capital is represented by the virtual accumulating capital, which exists as a special record in the state data center. Today's pensioners are financed by collected taxes from today's tax payers. Despite of the rising demographic and economic risks for the state budget there are a lot of instruments for the government to strengthen the sustainability of the pension system:

- Retirement age is usually used to make the social budget balanced. The increase of the retirement age decreases the number of potential pensioners; therefore, the social budget deficit is being decreased.
- Minimal social insurance period is also widely used by the government to stimulate taxpayers to work more.
- Pension taxation is an innovation in Latvian taxation, which also stabilizes the social budget by decreasing paid out pensions almost by 23%.
- Capital indexation also can be changed by the government in the force majeure situations as it was experienced by the pensioners in 2008 and 2009 during the financial crisis.
- Coefficient G is being changed each year to follow the demographic situation in the country. This coefficient, as a key variable in pension formula, has direct impact on the state pension.
- Change in the state social insurance mandatory contributions is commonly used by the government to stabilize the social budget by decreasing the proportion, which is transferred to the licensed pension funds outside the state budget.
- The rate of the state social security contributions is another way how to balance social budget.

7. Conclusions

1. Latvian pension system provides an opportunity to all tax payers to accumulate pension capital for the pension age. The volume of the state pension largely depends only on the income of a tax payer.
2. In the context of keeping the purchasing power of the accumulated pension capital the first pension pillar works efficiently because capital indexation covers the inflation rate both in Latvia and lower inflation rate in the Eurozone, too. The second pension pillar does not cover the inflation rate in long-term perspective, yet.
3. In the context of the accessibility of the state pension to the population of Latvia, the pension system works more efficiently for female citizens than for the males due to the longer women life expectancy in Latvia. According to the pension calculating formula, the accumulated capital must be spent during 19 years. In this case, one might discuss the possibility of demographic discrimination.
4. Implementation of the pension taxation significantly decreases efficiency of the pension system for those Latvian inhabitants who have state pension over 235 euros per month.
5. To be able to more objectively judge the efficiency of the pension capital management by the private asset managers, it would be necessary to discuss the possibility of the relevant customized benchmark creation.

The fees level charged by the pension fund managers in Latvia are obviously among the highest in Europe, so it could be another important topic for further research.

Acknowledgements

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References

- Ameriks, J.; Zeldes, S. 2004. *How Do Household Portfolio Shares Vary with Age?*, Working Paper, Columbia University.
- Ammann, M.; Zingg, A. 2008. Investment Performance of Swiss Pension Funds and Investment Foundations, *Swiss Journal of Economics and Statistics* 144 (2): 153–195.
- Antolin, P. 2008. *Pension Fund Performance*, OECD Working Paper on Insurance and Private Pensions 20, doi:10.1787/240401404057.
- Blake, D. 2003. *Pension Schemes and Pension Funds in the United Kingdom*. Oxford University Press. 754 p.
- Blake, D.; Timmermann, A. 2005. Returns from active management in international equity markets: Evidence from a panel of UK pension funds, *Article in Journal of Asset Management* 6(1): 5-20.
- BrightScope/ICI. 2014. Defined Contribution Plan Profile: A Close Look at 401(k) Plans, (Dec. 2014). Available from Internet https://www.ici.org/pdf/ppr_14_deplan_profile_401k.pdf.
- Caurkubule, Ž.; Rubanovskis, A. 2014. Pension system development and the sustainability of the principle of generation solidarity, *Entrepreneurship and Sustainability Issues* 1(3): 173–186. DOI: [http://dx.doi.org/10.9770/jesi.2014.1.3\(6\)](http://dx.doi.org/10.9770/jesi.2014.1.3(6))
- Financial Times article on 27.09.2015: *High fees hurt pension savings for millions of Europeans*. Available from Internet <<http://www.ft.com/intl/cms/s/0/864b5eca-62ca-11e5-9846-de406ccb37f2.html#axzz3qFu5WwWo>>.
- Fong, G; Guin, L.D. 2015. *Fixed-Income Portfolio Management – Part I*. Wiley/CFA Institute. CFA program curriculum, level 3 (4) : 5-54.
- Huang, X.; Mahieu, R.J. 2012. Performance Persistence of Dutch Pension Funds, *De Economist* 160: 17–34, doi: 10.1007/s10645-011-9176-3.
- Impavido, G. 2008. *The Efficiency and Performance of Bulgarian Private Pensions*, IMF Working Paper, WP/08/268, Available from Internet <<https://www.imf.org/external/pubs/ft/wp/2008/wp08268.pdf>>
- Law on State Pensions. Latvijas Vēstnesis, 78/87 (1989/1998), (Mar 8, 2000), <http://likumi.lv/doc.php?id=38048>.
- Law on State Funded Pensions. Latvijas Vēstnesis, 182 (465), (Nov 23, 1995), <http://likumi.lv/doc.php?id=2341>.
- Mačiulis, A.; Tvaronavičienė, M. 2013. Secure and sustainable development: Lithuania’s new role in taking the Presidency of the EU, *Journal of Security and Sustainability Issues* 3(2):5–13. [http://dx.doi.org/10.9770/jssi.2013.3.2\(1\)](http://dx.doi.org/10.9770/jssi.2013.3.2(1)).
- Pension funds data available from Internet <<http://www.manapensija.lv/>>, <<http://www.fktk.lv/>>
- Samuelson, W; Zeckhauser, R. 1988. Status Quo Bias in Decision Making. *Journal of Risk and Uncertainty* 1(1): 7-59.
- Grozījumi Valsts fondēto pensiju likumā*, (Amendments to the Law on the State Funded Pension: the initial impact assessment report (summary).) (27.05.2015) Available from Internet <http://www.lm.gov.lv/upload/tiesibu_aktu_projekti_2/lmanot_270513_pensijas.pdf>
- Noteikumi par pensijas aprēķināšanai piemērojamo plānoto vecuma pensijas izmaksas laika periodu*. (Rules for calculating pension benefits applicable to the planned retirement pension payment period. Latvijas Vēstnesis, 250 (5056), (Dec 20, 2013) Available from Internet <http://likumi.lv/doc.php?id=263195>

Period: 1.09.2006-31.08.2015; BM – benchmark

Table 4. Active Funds

Name of pension fund	Total performance	Annual performance	Annual Volatility	Sharpe ratio	BM - Average performance			BM - Inflation		
					Alpha	Beta	Information R.	Alpha	Beta	Information R.
AF 1	26.8%	2.7%	7.1%	-0.14	-0.2%	1.57	-20.8%	0.5%	-0.70	-9.8%
AF 2	33.7%	3.3%	4.4%	-0.09	0.0%	0.96	-16.4%	0.3%	-0.14	-6.8%
AF 3	43.4%	4.1%	4.0%	0.11	0.1%	0.81	21.1%	0.4%	-0.25	8.2%
AF 4	28.9%	2.9%	4.6%	-0.17	0.0%	0.86	-23.9%	0.4%	-0.40	-13.4%
AF 5	46.7%	4.3%	4.7%	0.15	0.1%	0.98	34.7%	0.4%	-0.09	12.8%
AF 6	43.6%	4.1%	3.8%	0.12	0.1%	0.83	30.7%	0.4%	-0.12	8.9%
Average Performance	37.3%	3.6%	4.2%	-0.02				0.4%	-0.28	-1.2%
Inflation	38.9%	3.7%	2.4%	0.02	0.3%	-0.09	1.2%			

Table 5. Balanced Funds

Name of pension fund	Total performance	Annual performance	Annual Volatility	Sharpe ratio	BM - Average performance			BM - Inflation		
					Alpha	Beta	Information R.	Alpha	Beta	Information R.
BF 1	46.7%	4.4%	3.1%	0.23	0.1%	0.87	35.2%	0.4%	0.87	15.8%
BF 2	40.2%	3.8%	3.5%	0.05	0.0%	0.96	5.1%	0.4%	0.96	3.0%
BF 3	31.7%	3.1%	3.9%	-0.14	-0.1%	1.21	-34.8%	0.3%	1.21	-11.1%
BF 4	37.7%	3.6%	3.2%	-0.01	0.0%	0.97	-8.4%	0.3%	0.97	-1.8%
Average performance	39.2%	3.7%	3.0%	0.03				0.4%	1.00	0.9%
Inflation	38.9%	3.7%	2.4%	0.02	0.3%	-0.11	-0.9%			

Table 6. Conservative Funds

Name of pension fund	Total performance	Annual performance	Annual Volatility	Sharpe ratio	BM - Average performance			BM - Inflation		
					Alpha	Beta	Information R.	Alpha	Beta	Information R.
CF 1	41.8%	4.0%	2.0%	0.15	0.1%	0.78	-6.4%	0.3%	-0.05	6.9%
CF 2	38.8%	3.7%	3.6%	0.02	-0.1%	1.30	-10.5%	0.4%	-0.28	0.6%
CF 3	32.0%	3.1%	3.2%	-0.16	-0.2%	1.38	-41.6%	0.3%	-0.16	-12.8%
CF 4	49.5%	4.6%	2.2%	0.42	0.1%	0.85	32.5%	0.4%	-0.03	24.6%
CF 5	51.9%	4.8%	1.7%	0.63	0.2%	0.71	52.4%	0.4%	-0.01	32.6%
CF 6	43.5%	4.1%	2.1%	0.21	0.0%	0.97	4.2%	0.3%	-0.04	11.0%
Average Performance	43.0%	4.1%	1.8%	0.21				0.4%	-0.09	9.7%
Inflation	38.9%	3.7%	2.4%	0.02	0.4%	-0.16	-9.7%			

Period: 1.09.2010-31.08.2015; BM – benchmark

Table 7. Active Funds

Name of pension fund	Total performance	Annual performance	Annual Volatility	Sharpe ratio	BM - Average performance			BM - Inflation		
					Alpha	Beta	Information R.	Alpha	Beta	Information R.
AF 1	25.4%	4.6%	4.9%	0.45	0.0%	1.14	61.0%	0.3%	0.37	63.7%
AF 2	16.9%	3.2%	4.8%	0.16	-0.1%	1.13	-42.5%	0.2%	0.53	38.0%
AF 3	19.5%	3.6%	3.5%	0.34	0.1%	0.72	-5.0%	0.2%	0.47	62.0%
AF 4	13.3%	2.5%	2.6%	0.04	0.1%	0.46	-41.9%	0.2%	0.11	37.5%
AF 5	24.5%	4.5%	5.5%	0.37	0.0%	1.31	45.2%	0.3%	0.58	55.8%
AF 6	17.7%	3.3%	3.9%	0.23	0.0%	0.90	-34.2%	0.2%	0.50	49.2%
AF 7	22.3%	4.1%	5.7%	0.30	-0.1%	1.34	25.6%	0.3%	0.43	48.1%
Average Performance	20.0%	3.7%	4.1%	0.31				0.3%	0.43	54.6%
Inflation	7.3%	1.4%	1.6%	-0.65	0.1%	0.06	-54.6%			

Table 8. Balanced Funds

Name of pension fund	Total performance	Annual performance	Annual Volatility	Sharpe ratio	BM - Average performance			BM - Inflation		
					Alpha	Beta	Information R.	Alpha	Beta	Information R.
BF 1	22.6%	4.2%	3.7%	0.47	0.0%	1.26	50.6%	0.3%	1.26	71.4%
BF 2	16.8%	3.2%	1.7%	0.42	0.1%	0.47	-17.5%	0.3%	0.47	73.4%
BF 3	19.4%	3.6%	3.2%	0.37	0.0%	1.04	10.8%	0.3%	1.04	66.2%
BF 4	15.4%	2.9%	3.5%	0.14	-0.1%	1.23	-45.9%	0.2%	1.23	42.1%
Average performance	18.6%	3.5%	2.7%	0.38				0.3%	1.00	68.5%
Inflation	7.3%	1.4%	1.6%	-0.65	0.1%	0.10	-68.5%			

Table 9. Conservative Funds

Name of pension fund	Total performance	Annual performance	Annual Volatility	Sharpe ratio	BM - Average performance			BM - Inflation		
					Alpha	Beta	Information R.	Alpha	Beta	Information R.
CF 1	16.9%	3.2%	1.9%	0.39	0.0%	1.05	6.9%	0.3%	0.07	70.7%
CF 2	12.5%	2.4%	1.7%	-0.02	0.0%	0.81	-63.4%	0.2%	0.12	43.2%
CF 3	19.9%	3.7%	1.7%	0.73	0.1%	0.79	47.1%	0.3%	0.18	100.0%
CF 4	17.8%	3.3%	1.9%	0.48	0.1%	0.60	11.6%	0.3%	0.02	75.4%
CF 5	21.0%	3.9%	2.0%	0.71	0.0%	1.07	74.5%	0.3%	0.11	94.2%
CF 6	17.1%	3.2%	2.1%	0.37	0.0%	1.18	10.7%	0.2%	0.25	71.6%
CF 7	11.1%	2.1%	2.9%	-0.10	-0.2%	1.50	-57.9%	0.2%	0.01	22.5%
Average Performance	16.6%	3.1%	1.7%	0.42				0.2%	0.11	75.2%
Inflation	7.3%	1.4%	1.6%	-0.65	0.1%	0.09	-75.2%			

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