

Pension System in Poland: Performance of Pension Funds

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ABSTRACT

The significant increase of the old-age-dependency ratio in Poland after the collapse of the centrally planned economy required transformation of the retirement system to adopt it to the current situation. Therefore the essential reform of the pension system in Poland took place in 1999, when the one-pillar – pay as you go system was replaced by the three-pillars system consisting of mandatory, pay-as-you-go pillar; mandatory, fully funded pillar; and voluntary, funded pillar. However problems concerning budget deficit in Poland caused that the Polish government introduced essential changes concerning distribution of the pension contribution between both mandatory pillars and in the pension funds' portfolio composition in 2011 and 2013. The aim of the research is to analyze the performance of the pension system in Poland in the years 2000-2013. The performance of private pension funds will be evaluated and compared to the “performance” of so-called national scheme.

Keywords: Pension System, Open Pension Funds, National Scheme, Performance.

El Sistema de Pensiones en Polonia: Rendimiento de los Fondos de Pensiones

RESUMEN

El gran incremento experimentado por la ratio tercera edad-dependencia en Polonia tras el colapso de la economía de planificación centralizada exigió la transformación del sistema de jubilación para su adaptación a los tiempos actuales. Así, la imprescindible reforma del sistema de pensiones polaco se llevó a cabo en 1999, cuando el régimen de pensiones de un único pilar, el reparto, fue sustituido por el sistema de tres pilares consistente en el pilar de reparto obligatorio, el pilar de capitalización obligatorio y el pilar de capitalización voluntario. Sin embargo, los problemas de déficit presupuestario en Polonia llevaron al gobierno polaco a la introducción de importantes cambios en lo relativo a la participación de los dos pilares obligatorios en la contribución al régimen de pensiones, así como en la composición de la cartera de los fondos de pensiones en 2011 y 2013. El objetivo de este artículo es el análisis del comportamiento del sistema de pensiones en Polonia en el periodo 2000-2013, así como el “rendimiento” de los fondos de pensiones privados y su comparación con el denominado sistema nacional.

Palabras Clave: Sistema de pensiones, fondos de pensiones abiertos, sistema nacional, rendimiento.

Classification JEL: G11, G23, H55, J26, J32

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1. INTRODUCTION

Changes in the demographic situation caused by declining fertility rates and the rise in life expectancy lead to a significant increase of the old-age-dependency ratios¹ in the majority of OECD countries. This required reforms of the retirement systems and so many European states had to introduce significant changes to make their pension systems more financially viable. In Europe, where the pension system was on the government's agenda for at least a decade, the recent economic crisis of 2007-2009 has increased the need for a decisive action. In order to make its system financially feasible and sustainable, the government had to give priority to long-term considerations over the short-term ones.

The main changes in retirement system involved increasing retirement age and introducing a funded system instead of a Pay-As-You-Go system (PAYG). One of the most important reasons for this particular choice is the apparently superior performance of the capital markets in comparison to low rates of return on PAYG pension contributions (Sinn, 2000; Feldstein, 1997). By now it is widely accepted in most countries that pension systems and rules need to be changed over time. These changes, however, vary from country to country. There are six key objectives concerning pension reform, which took place in 34 OECD member countries between January 2009 and September 2013 (Pension at a Glance, 2013, p. 18):

(1) pension system coverage in both mandatory and voluntary schemes, (2) adequacy of retirement benefits, (3) the financial sustainability and affordability of pension promises to taxpayers and contributors, (4) incentives that encourage people to work longer years and thus save more while being employed, (5) administrative efficiency to minimize pension system running costs, (6) the diversification of retirement income sources across providers (public and private), the three pillars (public, industry-wide and personal), and financing forms (PAYG and funded).

Ensuring coverage of employees through one or more pension plans is fundamental to fighting income poverty in old age. All OECD countries have set up mandatory or quasi-mandatory pension plans, either public or private, to achieve quasi-universal coverage. However, mostly in low-income countries, there is still a significant share of the society not covered by public or national schemes.

Policies to diversify and secure retirement savings have taken four main forms (Pension at a Glance, 2013, p. 25):

1. Voluntary pension plans to improve investment options for workers and

¹ Old-age-dependency ratio is the population age 65+ divided by population age 15-64 (Eurostat).

increase competition among funds. Canada, the Czech and Slovak Republics, Poland and the United Kingdom have introduced such schemes.

2. Regulations that allow individuals greater choice over the way their retirement savings are invested in private plans. Canada, Estonia, Hungary, Israel, Mexico and Poland, for example, have adopted this policy, supported by measures to move people automatically into less risky investments as they get closer to retirement, a policy recommended in earlier OECD analysis.
3. The relaxing of restrictions on investment options to foster greater diversification of pension funds' portfolios. Chile, Finland, Switzerland and Turkey have followed this path, with Chile and the Slovak Republic allowing pension funds to take larger shares in foreign investments in order to hedge the risk of national default.
4. Action to improve pension funds' solvency rates. Canada, Chile, Estonia and Ireland have introduced stricter rules on investment in risky assets in order to protect pension plans' members more effectively. In Canada and Ireland, states' direct interventions helped financially insolvent funds to recoup losses in their asset values caused by the financial crisis. Finally, Finland and the Netherlands temporarily relaxed solvency rules to allow funds a longer time to recover.

Perhaps, the most hotly debated aspect of pension systems in OECD countries is the minimum retirement age. Because the life expectancy has increased in most countries, it became important to align women's retirement age with men's and increase the minimum retirement age for both genders. In fact, many OECD countries have done precisely that. Since it required only an administrative decision, it was the easiest element of the pension scheme to change. As a result, the majority of OECD countries will have a retirement age of at least 67 years by the middle of the 21st century (see Pension at a Glance, 2013).

Recently, the high membership costs of private pension plans have become a policy concern for many OECD countries, especially in the states where systems are mandatory or quasi-mandatory. However, administrative efficiency is also a policy priority in voluntary plans. High fees discourage workers from joining voluntary plans and make mandatory ones very costly. In fact, cost inefficiency is one of the major threats to the financial sustainability of retirement plans in OECD states (Pension at a Glance 2013, p.24).

The main reform of the pension system in Poland was introduced in 1999. The new system consisted of three pillars: two mandatory pillars (PAYG and a fully funded one) and a voluntary (funded) one. In the recent years the Polish government has introduced several more changes. These included the following:

- The increase in the minimum retirement age from 60 for women and 65 for men to 67 years old, for both sexes. Partial benefits were made available to those who choose to retire earlier (the retirement age has been increasing by 3 months each year, effective since January 2013).
- Changes of the proportion of the contribution of earnings that is saved in both mandatory pillars (in 2011).
- The mandatory funded pillar became voluntary (effective since July 2013).
- Regulations regarding pension funds' portfolio composition were introduced. In particular, pension funds were prohibited from investing in debt securities issued and guaranteed by the State Treasury (effective since 2014).

The aim of our research² is to analyze pension system in Poland and its performance in the years 1999-2013. We pay special attention to the changes introduced by the Polish government in recent years. The performance of private pension funds is evaluated and compared to the so-called national scheme (which is, in fact, a PAYG system). The rest of the paper is organized as follows. The next section discusses transformation of the “new” (i.e. introduced in late nineties of the twentieth century) pension system in Poland that took place in recent years. The following section presents the development of the pension funds operating in Poland in the years 1999-2013. The section that follows describes the results of simulations of the pension savings, collected by future pensioners on different accounts. The simulations are provided according to the actual changes introduced by Polish government recently. The last section concludes.

2. THE “NEW” PENSION SYSTEM AND RECENT CHANGES INTRODUCED BY THE POLISH GOVERNMENT IN YEARS 2011-2014

Transformation of the Polish economy, which started in 1989, affected the demographic situation because the collapse of the traditional economic branches and uncertainty on the labor market caused dramatic decline in the fertility rate from 2.33 in 1985 to 1.99 in 1990 and to 1.37 in 2000. However after the difficulties during the first years of the transition have passed, the standard of life of the average Polish citizen has improved. This led to a rise in life expectancy of both genders. Life expectancy for men increased from 66.5 in 1985 to 69.7 in 2000 and to 72.1 in 2010. For women, it increased from 74.8 in 1985 to 78.0 in

² Presented results represent the fragment of the research funded by the grant “*Analysis of Open Pension Funds Market as Compared to the Open Investment Funds Market Functioning in Poland*” 2013/09/B/HS4/00493 financed by National Science Center.

2000 and to 80.6 in 2010. As a result, the old-age-dependency ratio in Poland increased³ from 15.4 in 1990 to 17.5 in 2000 and to 20.1 in 2013⁴. Under such circumstances, PAYG system became inefficient.

Table 1 presents some key indicators for Poland and OECD. These indicators show that while average wages in Poland are only 30% of the OECD average and only 21.6% of the population in Poland is over age 65, compared to 25.5% of the population in the OECD, Poland's public pension spending is 50% higher than in OECD.

Table 1
Key indicators in 2012

| Indicators | Poland | OECD average |
|---|--------|--------------|
| Average employee earnings [USD] | 12 600 | 42 700 |
| Public pension spending [% of GDP] | 11.8 | 7.8 |
| Life expectancy at birth | 76.3 | 79.9 |
| Life expectancy at age 65 | 17.1 | 19.1 |
| Population over age 65 [% of working- age population] | 21.6 | 25.5 |

Source: Pension at a Glance, 2013, p. 313.

The pension system reform, which took place in Poland in 1999, was a symptom of new and complex thinking about social policy and economy as integrity instead of treating them as two opposite matters. The original reform replaced the one-pillar (PAYG) system by a three-pillar funded system. This new system is based on a general rule that expected discounted sum of withdrawals from the system equals discounted sum of contributions and returns from the capital invested by pension funds. Such system is to provide pensioners with income according to the level of wages earned during labor market activities. This program for pension system reform was called "Security through Diversity" (Security, 1997).

This general reform of the pension system included two important changes of the system. The first one was adding a funded scheme to the mandatory system. The second one was a replacement of a defined benefit system by a defined contribution system. Before 1999, the pension benefit was an ex ante known proportion of wages, which had been received before retirement. After 1999, pension consists of individual stock of saving divided by one's remaining lifetime. In order to implement the defined contribution scheme, the legislation specified the "initial capital" which was computed for all individuals based on

³ In addition, when Poland became a member of the European Union, many young Poles decided to live and work abroad thanks to the possibility of the labor force migration inside EU.

⁴ Data come from Polish Statistical Office - GUS (Google call: GUS Poland-in-Figures-2012) and Eurostat (Google call: tsdde510).

their individual employment tenure, with algorithms differentiated across genders and education levels. There were no savings in Social Insurance Institution (in Polish, *ZUS*) but this calculation permitted to evaluate pensions for the cohorts who were born too early to participate in the new pension system. Individuals who collected pensions in 1999 and being less than 10 years ahead of the official retirement age were exempt from the new system (Hagemejer *et al.*, 2013).

The new scheme was introduced as a system of notional accounts. People under 30 (born in 1969 and after) at the time of the reform had also to participate in the funded scheme. People aged 30-50 (born between 1949 and 1968) could choose the funded option. However, the choice had to be made in 1999 and it was irrevocable, with the exception of those who could retire early.

Under the system introduced in 1999, pension benefits consisted of three pillars. Two pillars were universal and mandatory, and the third one - voluntary. The first pillar remained to be PAYG financed, whereas the second and the third pillars were funded. PAYG system was downsized and converted to a "notional defined-contribution" system, forming the new first pillar. In both, the first and the second (funded) pillar, contributions were registered in individual accounts, and the pension benefit depended on contributions paid, not contributions that were due⁵.

The mandatory second pillar was based on Open Pension Funds (in Polish, *OFE*), which were to be chosen by all employees. The *OFE* members were able to change funds with no charge or penalty after a statutory minimum 12 months period of contribution to a fund. Each person could select only one fund. There was a free choice between the funds, which were not permitted to refuse entry or restrict the right to transfer to other funds (either directly or indirectly, through the imposition of charges). Pension funds operate alike any other open-end mutual funds. However, due to introduced regulations, pension funds operating in Poland are required to guarantee a minimum rate of return on their investments (Kominek, 2006). Pursuant to the Act on the Organization and Operation of Pension Funds, the mandatory minimum rate of return was set every quarter as the lower of the (1) half of weighted average return of all pension funds for the past two years, and (2) 4 points below the sector average return in the past two years⁶.

⁵ Detailed description of the pension reform can be found in (Góra and Rutkowski, 2000; Hausner, 2002) among others.

⁶ The approach was somewhat modified in April 2004 when the Polish Insurance and Pension Funds Supervisory Commission started computing the minimum required return on the basis of three and not two years of past returns and restricting maximum participation of each fund in the benchmark portfolio at 15 per cent, regardless of its actual share in net assets of the pension system. The rates are published at the end of March and September each year.

A contribution of 12.22% of the earnings (or 19.52% for workers born between 1949 and 1968 who did not choose the funded tier) was credited to individuals' notional accounts, while 7.3% of the earnings were to be transferred to the pension funds. The ceiling to contributions and pensionable earnings was set at 2.5 times the average monthly earnings projected for a given year in the state budget law.

When the pension system reform was introduced, the minimum retirement age was 65 for men and 60 for women. However, since 2013 the retirement age has been increasing by a month in January, May and September each year until it reaches 67 for both genders (i.e. the change will be phased in for men by 2020 and for women by 2040). For the minimum pension, 25 and 20 years' contributions are required for men and women, respectively. Early retirement (at 62 for women and 65 for men) has been made possible with pension benefits reduced by 50%.

Table 2
Pension contributions to the national and funded scheme after the changes

| New regulations establishing date | Period | Contribution of earnings [%]: Total = 19.52 | | |
|-----------------------------------|--|--|-------------|---------------------|
| | | National scheme (ZUS) | | Funded scheme |
| | | Notional account | Sub-account | Pension funds (OFE) |
| 2011 | To April, 30, 2011 | 12.22 | - | 7.3 |
| | May, 1, 2011 - December, 31, 2012 | 12.22 | 5.0 | 2.3 |
| | January, 1 - December, 31, 2013 | 12.22 | 4.5 | 2.8 |
| | January, 1 - December, 31, 2014 | 12.22 | 4.2 | 3.1 |
| | January, 1, 2015 - Dec., 31, 2016 | 12.22 | 4.0 | 3.3 |
| | From January, 1, 2017 | 12.22 | 3.8 | 3.5 |
| 2013 | February, 1 - June, 31, 2014 | 12.22 | 4.38 | 2.92 |
| | From July, 1, 2014 for OFE members | 12.22 | 4.38 | 2.92 |
| | From July, 1, 2014 for individuals who are not OFE members | 12.22 | 7.3 | 0.0 |

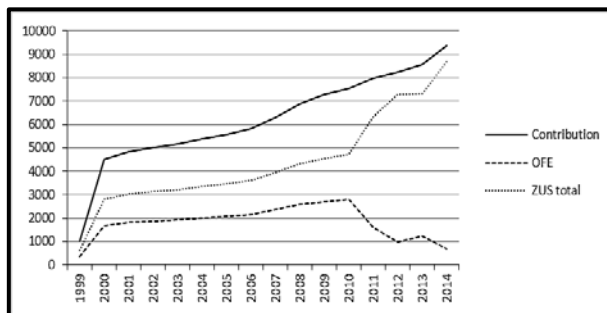
Source: Pension at a Glance, 2013, p. 315, www.emerytura.gov.pl

Pension benefits are subject to periodic indexation to account for inflation. As of 2008, the pension indexation has been carried out annually, based on the fixed indexation rate. The indexation rate is an average annual index of consumer goods and services in the preceding calendar year, increased by at least 20% of real growth of average monthly earnings in the preceding calendar year. The indexation rate increase is subject to annual negotiations within the framework of the Tripartite Commission for Socio-Economic Issues. In the new pension scheme a minimum pension is about 25% of average earnings, and the minimum retirement guarantee is financed by state budget and paid when total

mandatory old-age pension is lower than the minimum. *ZUS* also valorizes annually retirement contributions and “initial capital” due to the indexation rate published by the Ministry of Labor and Social Policy (as it is presented in the last column in Table 3).

The original pension reform was a subject of several changes introduced by the Polish government. First, in 2011, the contribution⁷ to pension funds was diminished from 7.3% to 2.3%. The remaining 5% was placed in a special individual sub-account created in *ZUS*. These amounts have to be valorized by the average annual GDP growth rate (in current prices) of the last five years. The share of contributions allocated in the sub-accounts was supposed to be changing until 2017, when it was planned to reach 3.8% and 3.5% (for *ZUS* and *OFE* accounts, respectively). However the regulations introduced in 2013 changed this scheme in 2014 (see Table 2).

Figure 1
Distribution of pension contribution (annually in PLN)



Source: Authors' calculations.

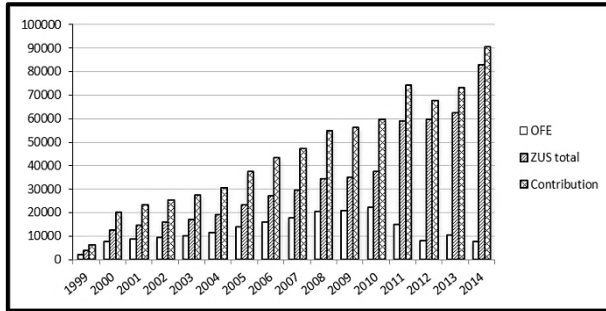
Figure 1 presents the distribution of pension contributions to the national and funded scheme in the period 1999-2014. The total contribution is a sum of the annual transfer of money to *ZUS* and *OFE* of the average employee in Poland⁸. Contribution collected annually by the whole pension system created by the *OFE* members⁹ is presented in Figure 2.

⁷ The pension contribution is paid fifty-fifty by employees and employers. The accumulated capital can be inherited.

⁸ Data from Polish Statistical Office <http://www.wskazniki.gofin.pl>. Average wage in the year 2014 is estimated, and in 1999 only the fourth quarter is taken into account.

⁹ Employees born between 1949 and 1968 might not choose funded pillar. Therefore, *ZUS* have been receiving more contributions than it is shown. Calculations for 2014 are based on the predicted data and for the years 1999-2013 are based on the data from Polish Statistical Office - GUS and Polish Financial Supervision Authority - PFSA (<http://www.knf.gov.pl/>).

Figure 2
Contributions collected by the pension system in Poland
(annually in million PLN)



Source: Authors' calculations.

The new law, which came into force in February 2014, shifted 51.5% of the assets held by the *OFEs* (about 150 billion PLN¹⁰) to the state-run PAYG pension system (*ZUS*). This included all debt securities issued and guaranteed by the State Treasury. According to the new regulations, pension funds were no longer obligatory, with each employee having four months every four years to decide whether 2.92 percent of his/her income goes to a chosen private fund or to *ZUS*. This option was implemented first in 2014 when all employed had to decide till the end of July if they stay in their private pension funds or not. Employees who did not specify their choices were automatically excluded from *OFE*. The overhaul of the pension system also included the changes in the *OFEs*' investment portfolio since private pension funds were no longer allowed to invest in government bonds. That leaves the pension funds with most of their assets held in shares of companies listed on the Warsaw Stock Exchange and give them a peripheral role in the future retirement benefits of Poles.

OFEs can experience further shortage of funds due to the following factors: (1) gradual transfer of the retirement funds managed by *OFE* to *ZUS*, which will start ten years prior to the individual's official retirement; (2) automatic transfer of retirement contributions to *ZUS* out of *OFE*, unless an individual *OFE* member files a declaration (first time-slot was between 1 April and 31 July 2014, the next will be in 2016, then every 4 years) requesting his/her contributions be transferred to *OFE*; (3) decrease of the maximum fee *OFE* can charge from contributions from 3.5% to 1.75%; (4) value of certain categories of assets in *OFEs* portfolio (i.e. investment certificates issued by closed-end funds, units of open-ended funds or specialized open-ended funds, or units issued by foreign collective investment undertakings of the closed or open-ended type) will not be

¹⁰ Approximately it is about 40-45 billion USD or 35-38 billion EUR.

included in the overall value of total net assets managed by *OFE*, which means that *OFEs* may not charge a management fee on these assets.

Because the worldwide financial crisis of 2007-2009 slowed down the GDP growth in Poland, the government budget deficit has increased. Therefore the government considered the changes that were introduced in 2011 and 2014 to be absolutely necessary, as they had a potential to decrease the deficit. These changes are called a “significant step backward”¹¹, un-privatizing the pension system¹² or even the most drastic nationalization of private assets since the Soviet time¹³.

3. OPEN PENSION FUNDS IN POLAND

Total assets of the world’s largest 300 pension funds reached US\$14.9 trillion in 2013. North America remained the largest region in terms of assets under management, accounting for 41.4% of the total worldwide assets. Europe was the second largest region (29.5%), followed by Asia-Pacific (24.7%). In 2013, the largest pension funds worldwide in terms of total assets were Government Pension Investment in Japan (\$1,221,501 mil), Government Pension Fund in Norway (\$858,469 mil), ABP in Netherlands (\$415,657 mil), National Pension in South Korea (\$405,521mil) and Federal Retirement Thrift in USA (\$375,088 mil). The largest sovereign pension funds (i.e. established by national authorities for the meeting of pension liabilities) in 2013 were Government Pension Investment, Government Pension Fund and National Pension (which were already mentioned) together with Canada Pension (Canada) with total assets 206,173 US\$ million and National Social Security (China) - 205,168 US\$ million¹⁴.

Pension funds started to operate in Poland in 1999 creating the second mandatory pillar of the “new” pension system. At the beginning, there were 21 *OFEs* but at the end of 2013 only 13 open pension funds were operating in Poland, and one more pension fund disappeared from the market after last regulations introduced by the Polish government in 2014.

As it is shown in Table 3, in the years 1999-2013 the number of participants and the value of assets were steadily growing. At the end of December, 2013 there were more than 16.3 million of participants and the value of *OFEs*’ assets

¹¹ David McMillan, chief executive of AVIVA Europe in London, which manages a private pension fund in Poland with 17.5 billion euros in assets (Bilefsky and Zurawik, 2013).

¹² See Hagemeyer (2013).

¹³ However, Poland’s Prime Minister Tusk claimed “it is no more than a bookkeeping change in the way to handle the public’s retirement money” (Bilefsky and Zurawik 2013).

¹⁴ Pensions & Investments / Towers Watson 300 analysis.

was more than 299 billion PLN¹⁵. Due to OECD Global Pension Statistics, the share of investment of autonomous pension funds in Poland increased from 2.4% of GDP in 2001 to 18.6% of GDP in 2013. However, due to the new law, the contribution to the pension funds has declined slightly, from 15.7% of GDP in 2010 to 15% in 2011.

Table 3
Basic characteristics of *OFE* in the years 1999-2013

| Year | Net assets [billion PLN] | Contributions [billion PLN] | Members [million] | Accounting unit weighting average [PLN] | Annual rates of returns generated by <i>OFE</i> | Annual indexation of savings by <i>ZUS</i> |
|------|-----------------------------|--------------------------------|----------------------|---|--|--|
| 1999 | 2.3 | 2.3 | 7.0 | n.a. | n.a. | n.a. |
| 2000 | 9.9 | 7.6 | 10.3 | n.a. | 20.24% | 12.72% |
| 2001 | 19.4 | 8.7 | 10.6 | n.a. | 7.17% | 6.68% |
| 2002 | 31.6 | 9.5 | 11.0 | 15.80 | 16.76% | 1.90% |
| 2003 | 44.8 | 10.3 | 11.5 | 17.58 | 11.27% | 2.00% |
| 2004 | 62.6 | 11.4 | 12.0 | 20.08 | 14.22% | 3.63% |
| 2005 | 86.1 | 14.0 | 11.7 | 23.09 | 14.99% | 5.55% |
| 2006 | 116.6 | 16.2 | 12.4 | 26.88 | 16.41% | 6.90% |
| 2007 | 140.0 | 17.7 | 13.1 | 28.55 | 6.21% | 12.85% |
| 2008 | 138.3 | 20.5 | 13.8 | 24.51 | -14.15% | 16.26% |
| 2009 | 178.6 | 21.0 | 14.3 | 27.88 | 13.75% | 7.22% |
| 2010 | 221.3 | 22.4 | 14.9 | 31.10 | 11.55% | 3.98% |
| 2011 | 224.7 | 15.1 | 15.5 | 29.56 | -4.95% | 5.18% |
| 2012 | 269.6 | 8.0 | 15.9 | 34.39 | 16.34% | 4.68% |
| 2013 | 299.3 | 10.5 | 16.4 | 36.88 | 7.24% | 4.54% |

Source: <http://www.mpips.gov.pl/>, <http://www.zus.pl/> and <http://www.knf.gov.pl/>

After the changes introduced at the end of September 2014, the private pension funds equaled only 159 billion PLN and only 2.5 million of *OFE* members¹⁶ were reported i.e. 15.2% of employed decided to stay in pension funds, considered as very good result in comparison with 5% forecasted. Due to the Polish Financial Supervision Authority, the value of total contribution to the pension funds in September 2013 was 1050.8 million PLN, while in September 2014 - only 254.3 million PLN¹⁷.

Open pension funds were subject to the conservative investment restrictions¹⁸ (in the original, introduced in 1999, reform *OFE*'s investment in deriva-

¹⁵ http://www.igte.com.pl/files/notowania/Dane_OFE_12_2013.pdf

¹⁶ <http://www.analizy.pl/fundusze/wiadomosci/17222/aktywa-funduszy-emerytalnych-%28wrzesien-2014%29.html>

¹⁷ http://www.knf.gov.pl/opracowania/rynek_emerytalny/dane_o_rynku/rynek_ofe/Dane_miesieczne/dane_miesieczne_ofe.html

¹⁸ See Pelc (2010).

tives was forbidden, and the foreign investment was restricted to 5% of their assets), therefore losses generated by *OFEs* were not as significant as those of the pension funds in other countries, which were much more affected by the subprime crisis. Poland, however, had experienced some serious problems during the financial crisis. Firstly, open pension funds lost a major part of the profits earned for their members before the crisis. Secondly, slower GDP growth caused the increase of the public deficit and the public debt in relation to GDP. As a result, Poland was no longer in line with the Maastricht criteria.

Table 4
The structure of *OFEs* portfolios in November 2013

| Financial assets | Percentage shares |
|--|-------------------|
| Other dematerialized debt securities | 1 |
| Other debt securities of public companies | 2 |
| Deposits, bank securities (in Polish currency) | 5 |
| Bonds issued by Bank Gospodarstwa Krajowego | 6 |
| Treasury bonds, treasury bills | 42 |
| Shares listed on a stock exchange | 43 |
| Other instruments | 1 |

Source: <http://www.mpips.gov.pl/>

The new regulations, introduced in 2014, lead to a change in the composition of assets' portfolios managed by *OFEs* not only due to the forced transfer of assets to *ZUS* but also due to new rules applicable to *OFE* investment activities. According to Polish Financial Supervision Authority¹⁹, shares of Treasury bonds and equity instruments in the *OFEs*' portfolios in 2013 were the highest among all instruments and nearly equal i.e. 42% and 43%, respectively (see Table 4). Because at present pension funds are not allowed to invest in Treasury bonds, they have to find alternative financial instruments.

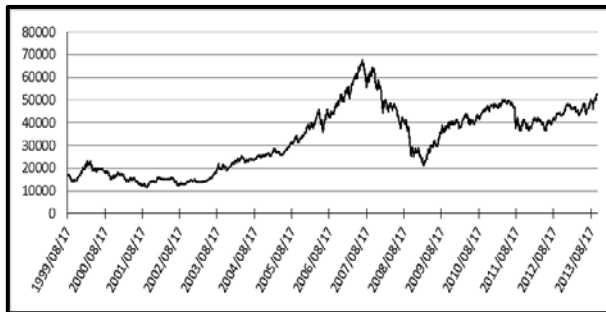
The management of the fund determines the performance of the investment portfolio. However the volatility of the Warsaw Stock Exchange during the period of 1999-2013 has also affected the returns of the investment portfolio (Figure 3).

It is worth reminding that capital markets were created in the post-communist countries in late nineties of the twentieth century, thus pension funds in these states are less developed than the ones in the market oriented economies. Therefore the comparison of the pension funds performance should be made among transitional states. Analyzing the performance of mandatory pension

¹⁹ Source: <http://www.mpips.gov.pl/ubezpieczenia-spoleczne/ubezpieczenie-emerytalne/skladka-na-ubezpieczenie-emerytalne/>

funds in Central and Eastern Europe, one can notice that in Poland the efficiency of pension funds (measured by annual real returns) is the highest among European transitional states where this pillar is mandatory (Table 5).

Figure 3
Plot of Warsaw Stock Exchange Index WIG in years 1999-2013



Source: http://www.money.pl/gielda/indeksy_gpwwig/

Table 5
Mandatory pension funds in CEE region: Annual real rates of return

| States | 2002-2007 | 2002-2012 | States | 2002-2007 | 2002-2012 |
|-----------|-----------|-----------|----------|-----------|-----------|
| Bulgaria | 4.0 | 0.5 | Poland | 10.8 | 6.4 |
| Croatia | 5.0 | 3.2 | Russia | -3.1 | -2.7 |
| Estonia | 3.1 | 0.1 | Romania | n.a. | 5.1 |
| Lithuania | 3.2 | 0.8 | Slovakia | 0.8 | -12.0 |
| Latvia | -2.0 | 1.3 | Hungary | 4.2 | n.a. |
| Macedonia | 2.6 | 2.4 | | | |

Source: Lewicka-Banaszak, 2014.

In Poland, there was lack of price and investment competition between Open Pension Funds because of a high market concentration, which is typical for developing countries with the pension system based on the Latin American model (Hadyniak and Monkiewicz, 1999; Kominek, 2006), and the fact that funds acquired new members and additional contributions every month. In 2011, the *OFEs*' commission equaled 553 million PLN while wages for management totaled 981 million PLN²⁰. This was the reason pension funds were widely criticized. As a result of the widespread resentment, Polish government introduced the new pension law. It was estimated that the transfer of 51.5% of *OFEs*' assets would lead to a decrease of public debt in Poland from around 55% GDP to 47% GDP. The deficit reduction rather than provision of financial

²⁰See Forbes (2012).

security for retirees was the main short-term purpose of the reform (Mrowiec and Mruk-Zawirski, 2014).

By 2013 the private funds held assets worth about \$92 billion, i.e. more than one-fifth of Poland's gross domestic product, and were among the biggest investors on the Warsaw Stock Exchange (Bilefsky and Zurawik, 2013). Since the increasing capitalization of pension funds makes them one of the most important institutional investors in Poland, it is important to understand their effect on the country's capital markets. Open pension funds contributed 16% - 22% to the Warsaw Stock Exchange trading volume, among all institutional investors in the years 2005-2010 (Marcinkiewicz, 2011). Significant changes in contributions to the pension funds would lead to a substantial volatility in the capital markets. Because the new regulations increased the maximum allowed share of the investment in foreign assets, pension funds sought for more investment abroad. In December 2013 (the last month when pension funds could invest no more than 5% in foreign companies), the value of such investment was 4.3 billion PLN. By September 2014 (when the limit of foreign investments increased to 10% of the whole portfolio) the value of foreign investment was over 6.6 billion PLN (Rynkiewicz, 2014).

In 2015, the legal ceiling was increased to 20%. This raised some serious concerns. What if pension funds abandon Polish capital markets and invest in international assets only? (Bilefsky and Zurawik 2013). In addition, lack of Treasury bonds (risk-free instruments) in the pension funds' portfolios may increase the risk exposure of the *OFEs*' investments.

4. METHODOLOGY AND EMPIRICAL RESULTS

The aim of this research is to analyze the performance of private pension funds in the period of 2000-2013 and compare it to the performance of the national PAYG system. We consider annual rates of return from the weighted accounting units of private pension funds that operated in Poland in the entire period of analysis. The returns on the assets in this portfolio were used as a benchmark to evaluate the open pension funds' performance. We also analyze the "returns" on the assets in the national scheme *ZUS* assuming that annual indexation of *ZUS* accounts can be treated as rate of return from savings collected by *ZUS* [similar approach is presented by Otto and Wiśniewski (2013)].

To analyze the performance of the pension funds, we construct several hypothetical portfolios employing aggregate measures of equity, money and bond markets. These are represented by WIG (Warsaw Stock Exchange Index), WIBOR (Warsaw Interbank Offered Rate) and Treasury Bonds, respectively. These portfolios (Table 6) are treated as market benchmarks in the evaluation of the pension funds' performance. We are investigating the effect of the changes in the structure of the pension fund portfolio composition due to regulations

during the period of 1997-2013. In addition, the goal of the research is to determine an optimal structure of the portfolio.

Table 6
The structure of the hypothetical portfolios

| Asset representative | Structure of the portfolios <i>OFE</i> due to | | | |
|-----------------------------|---|---------------|------------------------------------|-------------|
| | The regulation from | | Optimal from simulation in Table 6 | |
| | 1997 | Dec., 6, 2013 | | |
| | Portfolio 1 | Portfolio 2 | Portfolio 3 | |
| Bond market: Treasury Bonds | 42% | - | 30% | |
| Equity market: WIG | 46% | 79% | 70% | |
| Monetary market: WIBOR | 12% | 21% | - | |
| | Portfolio 4 | Portfolio 5 | Portfolio 6 | Portfolio 7 |
| Bond market: Treasury Bonds | 35% | 100% | - | - |
| Equity market: WIG | 35% | - | 100% | - |
| Monetary market: WIBOR | 30% | - | - | 100% |

Source: Authors' calculations.

The first portfolio is constructed to reflect the regulations passed in 1997²¹. The second one reflects the regulations²² introduced after December, 6, 2013 (a ban on Treasury Bonds.) The third portfolio, optimal, is constructed on the assumption that it has only two types of assets, i.e. shares and bonds²³. The fourth portfolio consists of nearly equal shares of equity, money, and bond instruments. Other portfolios contain only one type of instruments.

Table 7 presents the results of the simulation conducted to determine if the structure of the portfolio 3 is optimal. The criterion of the portfolio optimization is maximization of its value in the year 2013. Our experiments are provided for actual real annual rates of returns obtained from WIG, Treasury bonds and *OFE* (as weighted average) in the years 2000-2013, assuming that the structure of portfolio is constant during whole period and superannuation in the first year equals 5 thousands PLN and it is rising by the actual inflation rate. Results of the simulations suggest that in the changing situation on the financial markets, lack of Treasury Bonds caused deterioration in the performance of the investment portfolio. The best results are obtained for the portfolio containing 30% of bonds, while *OFE* (in terms of performance) kept the 3-th place in the ranking.

²¹ Act of 28.08.1997 on the organization and operation of pension funds, Dz.U. 1997/139 pos. 934.

²² [http://orka.sejm.gov.pl/opinie7.nsf/nazwa/1946_u/\\$file/1946_u.pdf](http://orka.sejm.gov.pl/opinie7.nsf/nazwa/1946_u/$file/1946_u.pdf).

²³ In provided experiments (Kompa, 2014; Kompa, Wiśniewski, 2014) for the different composition of the portfolio, the criterion of optimization is maximization of the portfolio value in the year 2013, assuming that superannuation in the first year equals 5 thousands PLN and it is rising by 4% annually and taking into consideration actual nominal annual rates of returns generated by WIG and Treasury bonds in the years 1999-2013.

Table 7
Simulation of the portfolios' performance in the year 2013

| Percentage share of portfolio | | Value of portfolio [PLN] | Percentage share of portfolio | | Value of Portfolio [PLN] |
|-------------------------------|-----|--------------------------|-------------------------------|-----------|--------------------------|
| Treasury Bonds | WIG | | Treasury Bonds | WIG | |
| 100 | 0 | 97287.57 | 40 | 60 | 113460.72 |
| 90 | 10 | 101194.15 | 30 | 70 | 113719.52 |
| 80 | 20 | 104751.46 | 20 | 80 | 112992.05 |
| 70 | 30 | 107861.73 | 10 | 90 | 111172.61 |
| 60 | 40 | 110421.86 | 0 | 100 | 108161.27 |
| 50 | 50 | 112324.72 | <i>OFE</i> | | 112377.23 |

Source: Authors' calculations.

Table 8 presents the hypothetical portfolios' annual rates of return and the geometric average of the actual returns generated by *OFE*. Table 9 presents the hypothetical portfolios' cumulative returns obtained in the whole analyzed period on the basis of actual contributions transferred to *OFE* and the actual real returns on the bond, equity and money markets in Poland.

Table 8
Real annual rates of return [%] generated by constructed portfolios

| Year | <i>OFE</i> | Number of portfolio | | | | | | |
|---------|-------------|---------------------|--------|--------|--------|-------|--------|------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2000 | 9.21 | -0.91 | -6.38 | -5.23 | 1.30 | 6.72 | -10.36 | 8.57 |
| 2001 | 1.97 | -6.67 | -18.97 | -14.91 | -3.37 | 10.47 | -25.78 | 6.64 |
| 2002 | 14.58 | 4.03 | 2.05 | 2.92 | 4.31 | 6.77 | 1.27 | 4.99 |
| 2003 | 11.47 | 22.72 | 35.54 | 32.10 | 18.39 | 4.86 | 43.77 | 4.57 |
| 2004 | 9.74 | 12.16 | 19.29 | 17.19 | 9.96 | 2.22 | 23.61 | 3.05 |
| 2005 | 14.38 | 15.83 | 24.93 | 22.57 | 12.65 | 3.13 | 30.91 | 2.45 |
| 2006 | 15.40 | 20.15 | 32.41 | 29.06 | 16.07 | 3.07 | 40.20 | 3.09 |
| 2007 | 1.69 | 4.68 | 6.71 | 5.94 | 4.24 | 1.85 | 7.70 | 3.00 |
| 2008 | -17.52 | -23.63 | -41.62 | -36.70 | -17.66 | 1.44 | -53.04 | 1.35 |
| 2009 | 11.22 | 19.40 | 33.12 | 29.41 | 14.80 | 0.29 | 41.89 | 0.13 |
| 2010 | 7.93 | 7.74 | 12.66 | 11.29 | 6.13 | 0.88 | 15.76 | 1.03 |
| 2011 | -8.47 | -11.07 | -18.94 | -16.90 | -8.33 | -0.10 | -24.10 | 0.45 |
| 2012 | 12.09 | 10.42 | 17.28 | 15.48 | 8.06 | 0.87 | 21.74 | 0.50 |
| 2013 | -0.86 | -1.35 | -4.17 | -3.23 | -0.60 | 2.58 | -5.72 | 1.68 |
| Average | 5.48 | 4.44 | 4.13 | 4.38 | 4.25 | 3.18 | 3.37 | 2.94 |

Source: Authors' calculations.

Our results show the cumulative returns of the portfolios 1-4 and *OFE* were quite similar although the average rate of return was the highest for *OFE* (5.48%). The performance of the portfolios (5) and (7), containing bond or money markets instruments, was similar but their performances were the worst

among all considered portfolios (the difference between cumulative returns from portfolios (3) and (7) equals 15.6%). While the portfolio representing equity market (6) did not generate the highest returns (although during 14 years of analysis there were only 4 years when it incurred losses). Portfolios 2 and 6, which did not have Treasury Bonds, were very sensitive to the financial market volatility. This supports the idea that the new regulation of the portfolio composition did not help to safe-guard the savings of future pensioners.

Table 9
Cumulative returns generated by the constructed portfolios

| Year | OFE | Portfolio | | | | | | |
|------|--------|-----------|--------|---------------|--------|--------|--------|--------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2000 | 8300 | 7531 | 7115 | 7202 | 7699 | 8111 | 6813 | 8252 |
| 2001 | 17334 | 15149 | 12815 | 13532 | 15847 | 18570 | 11514 | 18077 |
| 2002 | 30748 | 25641 | 22772 | 23704 | 26439 | 29971 | 21280 | 28952 |
| 2003 | 45757 | 44108 | 44825 | 44919 | 43496 | 42229 | 45403 | 41047 |
| 2004 | 62724 | 62258 | 67072 | 66001 | 60362 | 54820 | 70213 | 54049 |
| 2005 | 87753 | 88328 | 101284 | 98061 | 83768 | 70977 | 110241 | 69715 |
| 2006 | 119960 | 125592 | 155557 | 147468 | 116034 | 89853 | 177271 | 88569 |
| 2007 | 139991 | 149995 | 184880 | 174983 | 139406 | 109547 | 209975 | 109452 |
| 2008 | 132371 | 130203 | 119902 | 123745 | 131674 | 131919 | 108225 | 131710 |
| 2009 | 170584 | 180543 | 187564 | 187311 | 175269 | 153362 | 183353 | 152902 |
| 2010 | 208297 | 218652 | 236556 | 233394 | 209790 | 177304 | 238173 | 177113 |
| 2011 | 204483 | 207872 | 203984 | 206504 | 206150 | 192219 | 192238 | 193079 |
| 2012 | 238182 | 238373 | 248608 | 247699 | 231414 | 201957 | 243762 | 202088 |
| 2013 | 246532 | 245519 | 248312 | 249853 | 240474 | 217932 | 239713 | 216169 |

Source: Authors' calculations.

Finally, we compared the performance of pension funds (*OFE*) and the Social Insurance Institution (*ZUS*). We evaluated cumulative retirement saving on the basis of the actual contributions transferred to the both institutions (see Figure 2), actual rates of return generated by *OFE* and indexation rates used by *ZUS* (see Table 3). Using these data, we evaluated the rates of return on the savings in the whole considered period. The results, presented in Table 10, show that the real returns on the "savings" in *ZUS* were negative. Also, the rate of return on the total contributions (collected by *ZUS* and *OFE*) was negative and equaled -1.87. The last two columns in Table 10 present retirement savings, which would have been collected by *ZUS* and *OFE* if the distribution of contribution had been made due to the regulations that were introduced after 1999 (see Table 2). Although the rates of returns decreased for *OFE* and increased for *ZUS*, the total savings from both pillars were higher and the real returns from the total savings was -1.52.

Table 10
Cumulative savings in *OFE* and *ZUS*

| Year | <i>OFE</i> | <i>ZUS</i> | Year | <i>OFE</i> | <i>ZUS</i> | <i>OFE</i> | <i>ZUS</i> |
|--|------------|------------|------|------------|------------|---|------------|
| 1999 | 2300 | 3850 | 2006 | 135286 | 160739 | Hypothetical retirement saving if their distribution had not been changed in 2011 i.e. <i>OFE</i> – 7.3 and <i>ZUS</i> –12.22 of earnings | |
| 2000 | 11903 | 18680 | 2007 | 162490 | 214831 | | |
| 2001 | 22081 | 35465 | 2008 | 157096 | 289658 | | |
| 2002 | 36874 | 52343 | 2009 | 202584 | 348263 | | |
| 2003 | 52488 | 70977 | 2010 | 250968 | 401113 | | |
| 2004 | 72974 | 93329 | 2011 | 252893 | 484165 | 264954 | 470819 |
| 2005 | 100011 | 123245 | 2012 | 303522 | 569523 | 337786 | 537347 |
| Rates of return | | | 2013 | 336759 | 660926 | 391601 | 609648 |
| for the whole period (nominal) | | | | 72.52 | 46.12 | 61.71 | 50.40 |
| for the whole period (real) | | | | 9.87 | -6.94 | 2.99 | -4.22 |
| Annual average (nominal) | | | | 3.97 | 2.75 | 3.49 | 2.30 |
| Total retirement saving in years 1999-2013 | | | | | | | |
| | | | | | | 997684 | 1001248 |
| Real rates of return | | | | Nominal | Real | Nominal | Real |
| from the whole period | | | | 54.08 | -1.87 | 54.40 | -1.52 |

Source: Authors' calculations

5. CONCLUSIONS

The pension system in Poland has been reformed drastically since 1999. First, the new regulations replaced the Pay-As-You-Go system (with defined benefits) by the three-pillar partly funded system (with defined contribution). Second, the acts passed in 2011 and 2013 significantly limited influence of the mandatory funded pillar. It is therefore important to explore how the introduced changes influenced the retirement savings system in both mandatory pillars of the pension system. The results of our analysis indicate that diversified portfolios can protect better pensioners' interests than portfolios containing only one type of financial instruments. In addition, we found evidence that the prohibition of investing in debt securities issued and guaranteed by the State Treasury did not improve the performance of the pension funds. Also, our results suggest that shifting more money to Social Insurance Institution (beginning from the year 2011) did not increase the value of total retirement saving. Thus we conclude that new regulations of the pension system introduced by Polish government were more likely to reduce budget deficit rather than to protect future pensioners.

The effects of the law, which went into effect in February 2014 and shifted 51.5 of the assets held by the *OFEs* to the state-run PAYG pension system (*ZUS*), and drastically decreased the open pension funds' membership could not be analyzed because of the lack of data. It should be the subject of further investigation.

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