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Czy warto rezygnować z OFE? Stopa zwrotu i ryzyko kapitałowej części systemu emerytalnego w Polsce w latach 1999-2013

Streszczenie

Otwarte Fundusze Emerytalne są jednym z trzech filarów polskiego systemu emerytalnego zreformowanego w 1999 roku. Comiesięczne składki pobierane z wynagrodzenia stanowią kapitał inwestowany przez Fundusz, głównie w obligacje skarbowe i akcje notowane na Giełdzie Papierów Wartościowych w Warszawie. Funkcjonowanie OFE na rynku kapitałowym może wiązać się zarówno z prawdopodobieństwem krótkoterminowego spadku wartości składek, jak i długoterminowym wzrostem ich wartości. Od 2014 roku OFE stał się instrumentem dobrowolnym. Każdy pracujący i odprowadzający składki emerytalne może zdecydować, czy chce skorzystać z usług funduszu. Zmiany w systemie OFE wzbudziły szereg pytań i kontrowersji wokół przyszłości kapitałowego filaru emerytalnego w Polsce. Celem głównym niniejszego opracowania jest weryfikacja różnic stóp zwrotu OFE oraz próba oszacowania ryzyka kapitałowej części systemu emerytalnego w Polsce. Zgodnie z wyżej zdefiniowanym celem pracy postawiono główną hipotezę badawczą, zgodnie z którą z punktu widzenia klienta OFE nie ma znaczenia wybór otwartego funduszu emerytalnego pod względem jego rentowności. W celu weryfikacji hipotezy posłużono się analizą korelacji liniowej, regresji liniowej, analizy ANOVA oraz testów na normalność rozkładu stóp zwrotu OFE. Horyzont badawczy obejmuje lata 2000-2013.

Słowa kluczowe: system emerytalny, kapitał, fundusze emerytalne, stopa zwrotu

Is it worth abandoning OFE? The rate of return and the risk of the capital part of the pension system in Poland in 1999-2013

Abstract

Open Pension Funds (OFE) are one of the three pillars of the Polish pension system which was reformed in 1999. Monthly dues collected from the remuneration are to be the capital invested by the Fund, mostly in Treasury bonds and shares listed on the Warsaw Stock Exchange. The functioning of the funds on the capital market can be associated with both the probability of short-term decline in the value of contributions, as well as a long-term rise in value. Since 2014, OFE have become an unsolicited instrument. Everyone who works and makes contributions can decide whether they want to use the services of the fund. Changes in the OFE system have raised a number of questions and created controversy over the future of the capital pension pillar in Poland. The main objective of this study is to verify the differences in rates of return created by OFE and attempt to estimate the risks to the capital part of the pension system in Poland. In line with the aforementioned objective, the hypothesis of this paper states that from the point of view of a client, the choice of an open pension fund is irrelevant as far as profitability. The hypotheses were verified through the use of linear correlation analysis, linear regression, ANOVA and tests for normality distribution of OFE return rates. The scope of the research covers the period of 2000-2013.

Keywords: pension system, capital, pension funds, rate of return (return rate)

JEL CODE: G23, G28, H55, H61

Introduction

One of the three pillars of the Polish pension system reformed in 1999 is Open Pension Funds (Polish: *Otwarte Fundusze Emerytalne*, OFE). Funds invest capital primarily in government bonds and shares listed on the Warsaw Stock Exchange. The functioning of open pension funds in the capital market may be related to both the probability of a short-term decline in the value of premiums as well as its long-term increase. As of 2014, OFE became a voluntary instrument, which means that every working person who pays pension contributions can decide whether to use the services of the fund or not. Changes in the OFE system raised a number of questions and controversies about the future of the capital pension pillar in Poland. The main objective of this article is to verify the differences in OFE return rates and attempt to estimate the risk of the capital part of Poland's pension system. In line with this objective, the main research hypothesis was put forward, according to which, from the standpoint of the OFE client, the choice of the open pension fund is irrelevant in terms of profitability. Three auxiliary hypotheses were also proposed for the purpose of this work. These were: (1) Annual return rates of pension funds depends on the economic circumstances of the country (2) OFE annual return rates depend on the capital market situation (3) OFE cumulative return rates have retained an upward tendency. In order to verify the hypotheses, the analysis of linear correlation, linear regression, analysis of variance (ANOVA) and tests for the normality of the OFE return rate distribution were used. The research horizon covers the period of 2000-2013. The historical values of OFE accounting units published by KNF (Polish Financial Supervision Authority), stock exchange quotations of the WIG index as well as data on GDP dynamics published by GUS (Polish Central Statistical Office) were used for the research. The study covered the period of 2000-2013.

Changes in the Polish pension system

Until 1999, the pension system in Poland worked on the pay-as-you-go basis. It was based on the principle of an intergenerational contract consisting in the fact that the employee pays contributions that are intended to cover current pension schemes (Antonów 2002, p. 2, Golinowska 1997, Wiktorow 1996). The contemporary labor market - marked by very low economic activity, high unemployment, a significant share of people working in agriculture and increasing dynamics of economic emigration among young people – has provided grounds to change the current social security system. The necessity of further increases in the premium rate for balance reasons would consequently lead to a further decline in the competitiveness of the Polish economy and an increase in the likelihood of companies falling into the "gray zone" (Grzebieniak 2007, pp. 97-105). In addition, retirement privileges and early retirement facilitation schemes resulted in the increased number of post-working age population and the decreased share of economically active people. Also the aging process of the population was becoming evident in the meantime, having been aggravating this disproportion ever since (Bugaj 2004, pp. 22-24).

The reform of the Polish Social Insurance System Act, implemented on January 1, 1999, identifies three pillars of what was once a uniform system (Olejnik 2009, pp. 77-85). It reflects the so-called mixed model, under which the premium is directed to the pay-as-you-go system as well as to the capital system. The main premise of the solution adopted in Poland was the limitation of the risk arising from dependence on the demographic situation for the capital part, and from adverse changes in the capital market for the pay-as-you-go part[9]. In

[9] According to some critics of the capital model in the pension system, the introduction of privately managed pension funds did not solve the problem of the impact of demography on the long-term liquidity of pension systems, or it even proved harmful (see more in: Orenstein 2013). E.g. A. Oręziak (2014) even argues the people can in no way be considered beneficiaries of the introduction of open pension funds. According to that author, the development of the private pension sector has a clear anti-social bearing.

addition, the mixed model was hoped to stimulate economic growth, including through the development of the financial market (Kołodko and Tomkiewicz 2014, p. 5).

For this reason, the basis of the first of the pillars is FUS (Polish Social Insurance Fund), obligatory for all employees with the exception of the agricultural sector. The second pillar consists of OFE, i.e. open pension funds. In the third pillar, in addition to the group form of saving for retirement under PPE (Employee Pension Programs), there are two forms of individual capital savings supported by tax incentives. These are IKE (Individual Pension Accounts) and IKZE (Individual Pension Security Accounts) (Łuszczyk 2015, p. 46).

OFE – Open Pension Funds

OFE are to "accumulate funds and invest them in order to pay the members of the pension fund after they have reached retirement age (...) (*Act of 1997, art. 2, sec. 2*). Those born after December 31, 1968 were legally obliged to participate in an OFE, while the insured population born after December 31, 1948 and before January 1, 1969 (with the exception of people who were already retiring) were given free choice in that respect by the legislator (*Act of 1998, art. 111, sec. 2-3*).

The rules for the distribution of contributions to open pension funds have been subject to changes since the entry into force of the pension reform. From January 1, 1999 to April 30, 2011, 12.22% of the pension contribution included a pay-as-you-go part transferred to ZUS. 7.3% of the premiums accounted for the entire capital component of the OFE (Wieteska 2011, pp. 37-49). The Act of 25 March 2011 amending certain acts related to the functioning of the insurance system introduced changes regarding the method of its division.

As of 1 May 2011, the contribution part of the contribution transferred to OFE has been invested in the capital sub-account of ZUS (Table 1). Such measures were primarily aimed at improving the ratio of the deficit and public debt to GDP.

Table 1. Division of the OFE capital contribution under *Act of 31 December 2011* (in %)

Period of payment	OFE	ZUS
May 2011 to December 2012	2,3	5,0
January-Dicember 2013	2,8	4,5
January-Dicember 2014	3,1	4,2
May 2015 to December 2015	3,3	4,0
From January 2016	3,5	3,8

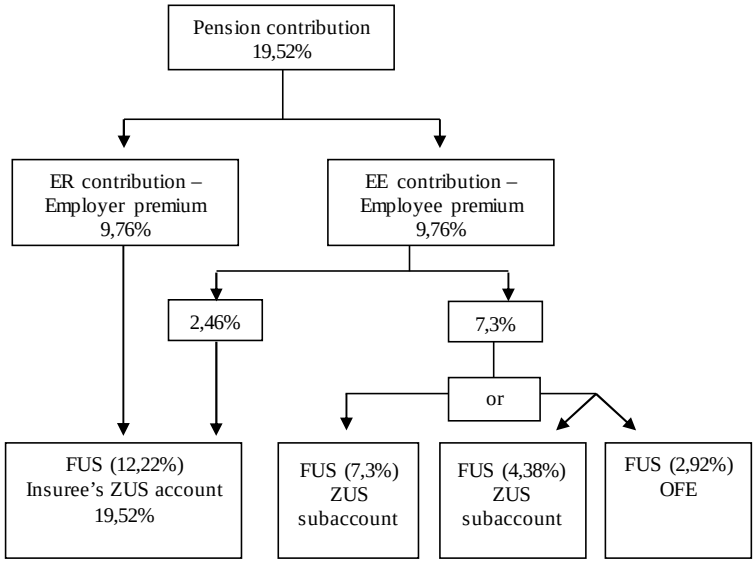
Source: own study based on: *Act of 2011, art. 21-22*.

In 2014, far-reaching changes in the functioning of OFE were made. The most significant relates to the cancellation by OFE of 51.5% of the settlement units recorded in the account of each member of the open pension fund as of January 31, 2014 and the transfer to ZUS of assets with the value corresponding to the sum of the value of redeemed settlement units. The legislator also normalized activities regarding assets transferred to ZUS (Olejnik 2009, pp. 77-85). The latter, taking the form of Treasury securities (bonds issued by the State Treasury), were submitted by ZUS to the State Treasury in exchange for a guarantee of payment from ZUS of retirement benefits corresponding to the value of these assets recorded on subaccounts. The remaining group of transferred assets was transferred by ZUS to FRD (Polish Demographic Reserve Fund) (Nowicki 2014, p. 15).

Pursuant to the Act (of 2013, art. 11, sec. 1-2), voluntary participation in OFE was also introduced. On the basis of the declaration on the selection of the Open Pension Fund filed by the insuree, 2.92% of the contribution basis is paid by ZUS to OFE, while 4.38% is recorded on the subaccount in ZUS (Act of 2013, art. 5, sec. 3, item (a)). An important change resulting from the Act of 2013 is also the so-called security slider. In the period of 10 years before re-

tirement age of an OFE member, the funds accumulated in the Funds are to be gradually transferred to ZUS (Act of 2013a, art. 4, sec. 12). The Act also prohibits investment by OFE in government bonds and other debt instruments guaranteed by the State Treasury. This means that the Funds will be able to invest to a greater extent, among others, in shares, local government bonds, road and corporate bonds.

Figure 1. Pension contribution breakdown under *Act of 13 December 2013*



Source: own study based on: *Act of 6 December 2013, art. 5*.

Amendments under the aforementioned Act of 25 January 2013 also concerned the policy and investment limits of OFE. The legislator gave Funds the opportunity to invest more *aggressively*. The limits of the total value of OFE assets invested in shares are presented in Table 2. In addition, new restrictions were introduced on Fund investments in assets denominated in foreign currency. Some of these assets invested in such instruments could not exceed 10% of the value of the Fund's assets until December 31, 2014 and 20% in the period from January 1, 2015 to December 31, 2015.

Table 2. Share of shares in the values of OFE assets under *Act of 25 January 2014*

Period	Share (in %)
until 31 December 2014	< 75
until 31 December 2015	< 55
until 31 December 2016	< 35
until 31 December 2017	< 15

Source: own study based on: *Act of 6 December 2013, art. 35*

In relation to the investment policy of OFE, modified were also the rules concerning the reference index (benchmark) the results of individual Funds are compared with. In addition, the Act does not provide for any minimum rate of return on investment. OFE should, however, specify in the information prospectus a declaration of investment policy principles, an investment objective and indicators to which their rates of return will be related. The lattermost, together with the account balance, information on investment risks and the amount of fees, must be sent to members of the Funds. Published information about the lattermost should present their financial situation in a comprehensible, objective and reliable manner (see *Act of 2013, art. 28, items 1-5*).

The above remarks clearly indicate that further legislative changes in the pension system limit the share of its capital part. Consequently, the operation of OFE is also marginalized. In the debate on the validity of the coexistence of both pillars, there are voices hinting at the possibility of withdrawing from the OFE model and improving the pay-as-you-go system based on intergenerational solidarity.

For this reason, the subsequent part of this article attempted to analyze OFE annual return rates depending on the economic circumstances of the country and the situation on the capital market.

Analysis of OFE return rate differences

First, an attempt was made to analyze the differences between the rates of return of OFE assets, as shown in Table 3. Analysis of variance (ANOVA) was used for this purpose. To verify the hypothesis on the normality of the distribution of OFE return rates in individual years, the Kolmogorow-Smirnov (K-S) test, Lilliefors test and the Shapiro-Wilk test were carried out for the analyzed Funds.

Table 3. OFE annual return rates in 2000-2013 (w %)

OFE	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Allianz Polska OFE	15	7	14	11	12	11	6	7	–12	13	11	–4	18	6
AEGON OFE	13	3	13	10	14	13	15	6	–13	14	10	–5	16	5
Pekao OFE	10	9	7	10	17	12	21	7	–14	14	11	–5	16	7
OFE Pocztylion	17	2	10	10	14	15	17	5	–13	13	11	–6	15	8
AXA OFE	15	8	10	10	16	14	16	6	–13	14	10	–3	15	6
Amplico OFE	11	2	13	12	15	16	16	7	–14	14	11	–5	17	8
Generali OFE	16	6	13	12	15	15	18	6	–13	15	9	–4	15	7
ING OFE	16	8	17	11	14	16	17	5	–15	14	12	–5	17	8
OFE WARTA	18	1	10	12	16	14	17	4	–14	13	11	–4	16	7
OFE PZU Złota Jesień	10	10	14	12	14	14	17	7	–14	14	11	–5	16	7
PKO BP Bankowy OFE	8	4	17	11	16	12	15	4	–14	15	11	–5	16	8
Aviva OFE Aviva BZ WBK	13	10	12	10	13	15	15	7	–15	13	11	–5	17	6
Nordea OFE	10	10	15	11	13	14	15	6	–13	13	12	–4	18	8

Source: own study based on KNF data.

In the vast majority of cases (except for 2006 in the Shapiro-Wilk test and 2010 in the Lilliefors test), the analyzed rates indicate there is no reason to reject the hypothesis on the normality of the distribution of OFE return rates in individual years (Table 4).

Table 4. Results of tests on the normality of OFE return rates in 2000-2013

Year	K-S	Lilliefors	W	p
2000	p > ,20	p > ,20	0,951711	0,624435
2001	p > ,20	p > ,20	0,877875	0,066745
2002	p > ,20	p > ,20	0,974209	0,938918
2003	p > ,20	p > ,20	0,932455	0,366820
2004	p > ,20	p > ,20	0,967400	0,861434
2005	p > ,20	p > ,20	0,975708	0,951849
2006	p > ,20	p > ,20	**0,831882**	**0,016726**

2007	p > ,20	p > ,20	0,915604	0,218699
2008	p > ,20	p > ,20	0,983895	0,993211
2009	p > ,20	p > ,20	0,964600	0,822612
2010	p > ,20	**p < ,01**	0,894274	0,111611
2011	p > ,20	p > ,20	0,972801	0,925301
2012	p > ,20	p > ,20	0,960958	0,768382
2013	p > ,20	p > ,20	0,948367	0,573768

Source: own study based on KNF data.

As a consequence, a homogeneity study was carried out on the distributions of return rates for individual funds based on the Levene and Brown-Forsythe tests. They indicated the values of p=0.99, thereby confirming the homogeneity of the distribution of return rates in the analyzed periods. In turn, the F test was used, giving the result of 0.06. ANOVA showed no significant differences between the considered average OFE return rates ($p = 1.0 > \alpha = 0.05$). The average rates of return for individual OFE do not differ significantly either. Therefore, there is no one OFE pair among the 13 subjects whose rates of return would assume significantly different values. The hypothesis referred to differences in profitability between individual Funds should therefore be rejected.

It should be emphasized that the ANOVA result stems from the applicable legal provisions. The investment policy of open pension funds limited the investment restrictions before the changes introduced in 2014, strictly defining the type and number of financial instruments directly related to the risks associated with placing funds in specific groups of instruments. The minimal acceptable profitability of investments was provided by the mechanism of the minimum required rate of return. The former was the rate of return 50% lower than the weighted average rate of return for all funds, or by four percentage points, depending on which of these values was lower. The weighted average rate of return for all Funds in the last 36 months is published by the Commission at the end of each final month of the quarter. In a situation where the rate of return of the Fund was lower than the minimum required, the shortfall was covered first by funds from the reserve account created for this purpose (to which funds from PTE were transferred), and second from PTE's own funds.

Analysis of the relationship between OFE return rates and the economic and capital market situation

In order to verify the existence of the relationship between the rates of return and the economic situation, the analysis of linear regression and Pearson's correlation of OFE return rates and GDP dynamics in the period 2000-2013 was performed. The changes in GDP are presented in Table 5. Correlation analysis indicated the lack of a linear dependence of OFE return rates on changes in the GDP level in the analyzed period. The obtained results indicated a correlation of 0.012 in the absence of its significance by determining the value of $p (0.87) > \alpha$. Therefore, there is no linear correlation of the condition of the economy measured by GDP change with the rate of return generated by OFE. The linear regression analysis also showed no dependence of the above variables, indicating $p (0.87) > \alpha$ and the directional coefficient of the regression function at 0.05. In connection with the results obtained, the hypothesis on the dependence of return rates on the economic situation should be rejected.

Table 5. Change in GDP and WIG index in 2000-2013 (in %)

Year	GDP change	WIG return rate
2000	2,40	–3,47
2001	0,20	–26,94
2002	2,20	9,68
2003	4,70	38,99

2004	4,00	38,56
2005	4,40	20,22
2006	6,60	28,43
2007	6,50	–0,87
2008	2,90	–56,79
2009	3,30	42,39
2010	4,70	22,03
2011	4,90	–26,74
2012	0,70	–0,66
2013	1,60	16,54

Source: own study and calculations based on GUS and Warsaw Stock Exchange data.

The analysis of the dependence of OFE return rates on changes in the WIG index indicated their strong correlation at 0.79, with p (0.00) < α. The linear regression analysis for the level of 295.58 confirms the hypothesis that the change in OFE return rates accompanies the corresponding change in WIG return rates. In addition, the regression coefficient of the regression function was 0.24, which means that the rise/decline in the WIG index by one percentage point would increase/decrease the value of OFE assets by 0.24 percentage points. Table 6 shows the cumulative rates of return of individual OFE in 2000-2013[10].

Table 6. Cumulative OFE return rates in 2000-2013 (in %)

OFE	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Allianz Polska OFE	15	23	41	56	74	94	125	140	111	140	166	154	200	219
AEGON OFE	13	16	31	45	65	87	116	129	99	127	149	137	176	191
Pekao OFE	10	20	29	42	66	86	125	141	106	134	159	145	185	206
OFE Pocztylion	17	19	31	44	65	89	121	131	102	129	155	139	176	197
AXA OFE	15	24	36	50	74	98	130	144	114	143	168	159	198	216
Amplico OFE	11	12	27	42	64	90	120	136	103	133	159	147	189	212
Generali OFE	16	23	38	55	79	105	143	157	123	157	181	170	210	231
ING OFE	16	24	45	62	84	114	150	163	124	155	186	173	218	245
OFE WARTA	18	20	32	48	72	96	130	140	106	133	159	148	188	210
OFE PZU Złota Jesień	10	21	38	54	77	101	135	152	116	145	173	158	199	220
PKO BP Bankowy OFE	8	12	31	46	69	90	119	126	95	124	149	137	176	198
Aviva OFE Aviva BZ WBK	13	24	39	52	73	99	130	147	109	136	163	150	192	210
Nordea OFE	10	21	40	55	75	98	129	141	110	136	163	153	197	222

Source: own study based on KNF data.

In accordance with the data presented in Table 6, it should be noted that OFE generated positive cumulative return rates in each of the analyzed periods. In addition, linear regression analysis was used to determine the trend of the cumulative return rate. For confidence level at

[10] The studies on cumulative return rates presented in this article do not refer to the value of the unit assigned to each insuree, but to the value of the OFE investment portfolio. Therefore, the analyzed rates of return are the same for every OFE participant, including new insurees. It is worth noting that the rates of return represent historical values, so for a given period they present the same information for the insuree or the person joining the insurance scheme.

0.95, empirical value of the t-tests at 14.48 and the F-test at 259.83, it should be recognized that the change in OFE return rates retained an upward tendency. The linear regression coefficient of the linear regression function was estimated at 0.149 (adjustment of the regression function R2 was 0.96).

Linear regression confirmed that open pension funds generated positive cumulative return rates in each of the analyzed periods. It was also examined whether there are statistically significant differences between OFE return rates in periods of WIG index decline and increase. The performed Kolmogorow-Smirnow and Lilliefors tests, along with the Shapiro-Wilk test, indicated the lack of normality of distributions in both groups of return rates. The Kruskal-Wallis test was applied and indicated the significant differences between changes in the value of OFE assets depending on the capital market condition (p=0.00). The Levene and Brown-Forsythe tests indicating p=0.00 confirmed the lack of homogeneity of the distributions of return rates for individual funds. Subsequently, the Welch test was used, giving the result of 49.5. ANOVA indicated the existence of significant differences between the considered average OFE return rates (p 0.0 > α=0.05). The latter in the periods of WIG increase were significantly higher than OFE return rates in the years of WIG value decline. Furthermore, the average return rates of open pension funds were always positive, i.e. in the periods of WIG value increase, they were 12.5% on an annual basis, and 3.9% for the decline periods. Taking into account all these results, it should be concluded that the cumulative OFE return rates retained an upward tendency in the analyzed period.

Conclusions

In light of the obtained significant and unambiguous research results on the rates of return of open pension funds (OFE) and their risk in the period of 2000-2013 conducted on a group of 13 funds, it should be stated that:

- Open Pension Funds generated positive cumulative rates of return in 1999-2013,
- average rates of return of individual OFE do not differ significantly,
- changes in OFE return rates do not depend on the economic situation expressed in changes in GDP,
- changes in rates of return depend on changes in the prices of shares listed on the Warsaw Stock Exchange, but they do occur with four times less strength,
- changes in the rates of return in the periods of WIG value decline and increase were on average 4% and 12.5%, respectively.

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