

Occupational pension schemes vs. pension funds in Central Europe. Efficiency and investment risk in the years 2012-2014

Tomasz BRZĘCZEK, Maciej SZCZEPANKIEWICZ¹
Poznań University of Technology, Faculty of Engineering Management

Abstract. The article presents calculations of pension scheme sector's efficiency in 2012-2014 in the Czech Republic, Poland, Slovakia and Hungary. Comparisons are made within a given country (for Poland and Slovakia) and are followed by an international comparison of efficiency. The international comparison of efficiency regarding the pension schemes sector was performed using the measures of effectiveness relative to the performance of this sector's domestic capital market. The international comparison is backed up by similar politico-economic history of the surveyed countries at the turn of the XX century. International results have proved inconclusive. In contrast, such a comparison in Slovakia showed that the sector of pension funds remains inefficient, as it is characterized by a lower rate of return and higher risk than the sector of semi-occupational pension funds based on voluntary employer-employee agreement. In Poland, both sectors have proved to be effective. The sector of pension funds has been characterized by both a higher rate of return and a higher risk.

Keywords: occupational pension schemes, pension funds, investment efficiency, rate of return and risk.

JEL codes: H55, G23, J26.

1. Introduction

Are occupational pension schemes more effective than pension funds? What kind of supplementary pensions should be pursued by post-socialist countries of Central Europe, which lag behind in this field? In 1990s, Poland and Hungary introduced occupational pension schemes, relevant regulations and fiscal measures based on

¹ Contact with authors: Tomasz Brzęczek, Poznań University of Technology, Faculty of Engineering Management, Chair of Economic Sciences, ul. Strzelecka 11, 60-965 Poznań, Poland, e-mail: tomasz.brzeczek@put.poznan.pl; Maciej Szczepankiewicz, Poznań University of Technology, Faculty of Engineering Management, Chair of Economic Sciences, ul. Strzelecka 11, 60-965 Poznań, Poland, e-mail: maciej.szczepankiewicz@put.poznan.pl. Research was financed due to National Science Center grant decision no. DEC-2011/03/B/HS5/00599.

a model from Western Europe. Then both countries also introduced pension funds schemes, but in Hungary the scheme was abolished in 2010. In the years 2012-2014 in Poland there still existed a personal scheme of Open Pension Funds, but the obligation to participate was abolished in mid-2014. From January 2006 in Slovakia, there were two sectors of pension funds. One of them was typical and consisted of compulsory (with PAYG alternative) open funds managed by Pension Fund Management Companies (PFMC). The second sector of funds was managed by Supplementary Pension Management Companies (SPMC) and was based on voluntary employee and employer agreement [Act on the supplementary pension scheme, 2016]. However, the Czech Republic decided not to implement occupational schemes, but only the personal ones with the option of subsidizing employees' pension fund by employers. This seems to fit the Western Europe's tendency to reduce the role of the employer to the function of pensions' sponsoring instead of running occupational pension plan. There are fewer and fewer occupational pension schemes, where the employer guarantees pension amount (Defined Benefit formula). Can the fact that employers mediate in concluding, accounting and supervising pension savings plan or that they finance it, lead to an increased investment efficiency? It is possible to compare Slovakia and Poland in the years 2012-2014, where occupational pension schemes existed along with the pension funds. The results of pension funds in the Czech Republic and OPS in Hungary serve here as a good benchmark for such an assessment, particularly when it turned out that the results of Czech pension funds would be the worst, and Hungarian occupational schemes - the best.

The initial part of this paper quotes demographic and economic indicators in the analysed countries and characterizes their occupational pension schemes and pension funds in 2012-2014. Then the paper describes the principles of calculating the efficiency of investment on the basis of the sectoral balance of net assets in pension schemes. Then the data, which was required to calculate efficiency, is matched. The results are then subjected to comparative analysis. The results have been used to verify the following hypothesis:

- Contributions to occupational pension schemes and employer's contributions to pension funds are invested more efficiently than capital in pension funds.

The hypothesis is justified by institutional differences between various schemes and the resulting benefits. Occupational schemes are subject to supervision and administration by employers. Additional supervision increases risk aversion and the investments with lower expected rate of return are selected. However, such a rate of return is also less risky. It is a strategy for a high rate of return per unit of risk, which is particularly effective in times of economic stagnation and slump capital. The second reason for higher efficiency may, therefore, be seen in the form of a collective agreement for the management of occupational pension schemes or for common financing of contributions. Collective negotiating of the terms of management should increase the bargaining power and lead to lower rates of costs and fees for investment companies. These costs are usually trade secret and they are known only to a given fund and its participant.

2. Demographic and economic indicators of the studied countries at the end of 2014

Some general social factors (demographics, the level of economic development, the situation on the capital market and friendly legal and institutional framework) determine the effectiveness of actions and the risk of capital pension sector.

Table 1. Demographic and economic indicators in the following surveyed countries: the Czech Republic, Poland, Slovakia and Hungary at the end of 2014

Determinant	Czech Republic	Poland	Slovakia	Hungary
The fertility rate	1.46	1.29	1.35	1.46
The percentage of the working age population	72.90	67.00	64.70	72.90
GDP per capita (% of EU average in PPS)	83.00	67.00	67.00	83.00
Unemployment rate (%)	7.00	10.30	10.20	7.00
The annual average rate of return of the Broad Market Index in the period 2009-2014 (%) ²	4.73	16.01	4.73	16.15

Source: on the basis of [Eurostat 2016; EIOPA 2016; OECD 2015].

These macro determinants prove difficult to be controlled by governments, and remain outside the sphere of influence of managing authorities (investment companies and insurance companies), the founders (employers) and participants (employees) of pension schemes. The level of demographic, economic and pension indicators in the surveyed countries at the end of 2014 is presented in Table 1.

In the surveyed countries these factors did not show significant variation at the end of 2014. It had been similar at the end of 2010 [see Brzęczek 2013]. Such a conclusion is also confirmed by a ranking of country development prepared by the United Nations: United Nations Development Programme in 2014. On the list of highly developed countries the Czech Republic ranks 28, Poland - 35, Slovakia - 37 and Hungary - 43.

The number of differences in the structure of pension schemes in the surveyed countries decreased in the years 2009-2014. In Poland the coercion to save capital in personal pension funds has been abolished. The Czech Republic withdrew state subsidies for voluntary contributions to pension funds.

The years 2009-2014 were marked by a deepened consolidation of legal regulations in the European Union. The European Commission forced the regulation regarding

² Each respectively for the Czech PX, the Polish WIG, the Czech PX, the Hungarian BUX.

the right of an employee from each EU member state to participate in pension schemes of their employer in place in another EU country [Directive 2003/41/EU of the Parliament and the Council of Europe, 2003]. After numerous lawsuits of the surveyed countries before the European Court of Justice, such a possibility has been introduced [Rzeczpospolita 16th June 2011]. Even the Czech Republic where occupational pension schemes do not exist, had to define the rights and obligations of employees enjoying the right to participate in pension plans of employers conducted in other EU countries [Constitutional Observer 25th June 2013].

European Union regulations define occupational pension schemes as legal agreements of Employer Arranged Pensions (EAR). There is, among them, an institutionalized form called Institutions for Occupational Retirement Provision (IORP). The institution of a pension scheme is defined in the Directive “on the activities and supervision of institutions for occupational retirement provision” [Directive 2003/41/EU of the Parliament and the Council of Europe, 2003]. According to this definition, institution of occupational pension scheme is an institution, regardless of its legal form, operating on a funded basis, regardless of the institutions financing its activity (employer), to provide retirement benefits in the context of work on the basis of individual or collective agreements or contracts between employers and employees. One of the conditions for an institution is the creation of technical provisions which constitute a value calculated by an actuary, and obliging employers to guarantee the amount of benefits.

Defined benefit pension scheme institutions operate in countries of the so-called “old” member states and are called a defined benefit scheme, because the absolute amount of the benefit or the amount of the average worker’s wage is guaranteed by employer who is the founder of the institution of the scheme [Chybalski 2013; Rutecka 2012].

In Poland quite a similar form of the occupational scheme exists. Namely, an employee pension fund. However, these funds are not intended for actuary risky commitments, so they cannot guarantee any amount of benefits. The Polish Act on pension funds provides only a possibility of requesting from life assurance services a calculation of reserves and accepting contributions in order to guarantee benefits. In 2011 there were only 5 employee pension funds in Poland. These were the following: Nestle Polska, Nowy Świat CDM Pekao, Słoneczna Jesień, Telekomunikacja Polska, Unilever Polska. Other occupational pension schemes took the form of an agreement with investment funds or a group life insurance with insurance capital funds. The benefits of Polish schemes are defined by the amount of total contributions and gains or capital losses from their investment. In analysed countries, a defined benefit occupational plan is allowed but all legal and economic mechanisms should be defined by a collective agreement between employer and employees. Hence, DB schemes are unpopular, unlike in the United States [Munnell, Aubry, Crawford 2015].

3. Pension schemes in the surveyed countries in the years 2012-2014

Table 2 summarizes occupational pension schemes operating in the surveyed countries in 2012-2014.

Table 2. Characteristics of occupational pension scheme sectors in Poland, Slovakia and Hungary in 2012-2014

Feature	Poland	Slovakia	Hungary
National name of the scheme and the institution	Pracowniczy program emerytalny (PPE)	Dopolnkova dochodkova spolocnost	Foglalkoztatoinyugdij (biztostas/szolgaltatas)
English name of the scheme	Employee Pension Fund	Supplementary Pension Savings System	Employer arranged pension IORP – Institution of Occupational Retirement Provision
Financial form	Investment fund, insurance, employee pension fund	fund	fund, insurance
Managing authority	According to the form of financing: investment, insurance or employment company	supplementary pension management company (SPMC)	insurance or employee company

Source: based on [EIOPA 2013; Insurance Europe 2013; OECD 2012, p. 105; OXERA 2012, p. 248].

Polish occupational pension schemes gave employers the right to register such schemes, provided that at least half of employees exercise the right to participate due to their age and the representatives of employees and employers voluntarily join the scheme [Occupational Pension Scheme Act of 20th April 2004]. Occupational pension schemes came in a vast choice of forms (investment fund, group life insurance with insurance capital fund, employee pension fund, and foreign management). The form of foreign management is provided for employees working in Poland who would like to participate in their employer's occupational pension scheme (registered and operating in another EU country). An incentive for employers to run OPS was primarily an exemption from social security contributions. Exempted are contributions paid for employees of up to 7% of gross salary. Analogous systems used to operate in Hungary and Slovakia. Analysing the number of participants in Table 4 and the average annual rate of participation in Table 5, one can see that none of the occupational pension schemes was widespread in its own country.

Table 3. Characteristics of pension funds' sectors in the Czech Republic, Poland and Slovakia in the years 2012-2014

Feature	Czech Republic	Poland	Slovakia
Name of the national scheme	Doplňkové penzijní spoření	Otwarte fundusze emerytalne (OFE)	Dochodková spoločnosť
English name of the scheme	Supplementary pension system with state contribution (SPFS)	Open Pension Funds	Retirement pension savings
Financial form	fund with an option of employer's voluntary contributions	fund	fund
Managing authority	pension society	investment company	investment company, Pension Fund Management Company (PFMC)

Source: based on [EIOPA 2015; Insurance Europe in 2013; Narodna Banka Slovenska, access 18th May 2016; OECD 2012; OXERA 2012].

In the surveyed countries pension funds used to be more common than occupational schemes. Table 3 presents a comparative analysis of the pension funds' sectors in the studied countries. In the Czech Republic there was a pension funds' pillar voluntary system with an optional but popular participation of employers. Due to a significant involvement of employers in its financing, this system can be called a mixed one, but in terms of legal structure, it is a personal system. In Slovakia operates a special sector of pension funds (SPMC) that is based on collective agreements between employer and employees [Soltes, Modrakova 2013]. In Poland there existed a scheme of Open Pension Funds. In 2012 mandatory contributions for this program got limited and in mid-2014 the obligation to participate in this scheme was abolished. Similarly to the Polish scheme, the Slovak PFMC's sector was mandatory. In the years 2012-2014, the percentage rate of contributions to the fund in Slovakia was reduced.

4. Methodology and evaluation of performance

Efficiency is, by definition, the ratio of the effect to the effort. In the case of equity investments, they are measured with a rate of return, which is a percentage growth of capital. To calculate the rate of return of country's all plans we have to know the rate of return of each plan and then they should be weighted with net assets of plans. Such data is unavailable. Therefore, the r_t rate of return of the pension sector in a given country in period t is calculated here on the basis of data on the state of net assets at the end of period t and at the end of the previous period $t-1$, and the amount of net contributions paid in period t , using the following formula:

$$r_t = \frac{\text{net assets}_t - \text{net assets}_{t-1} - \text{contribution}_t + \text{benefits}_t}{(\text{net assets}_{t-1} + \text{net assets}_t)/2} * 100$$

The contribution is understood here as a net value, i.e. after the deduction of commission payments and funds liabilities. Net assets refer to the market value of investment funds denominated in the national currency. Using these formulas requires data about contributions paid into and benefits paid out by funds. Benefits data is hardly available in public statistics. Hence, we assumed benefits are equal to zero. For some examined pension plans it is true. Membership in Polish personal pension plans (OFE) was allowed for the young and middle-aged workers so they should save for at least 15 years. The small number of participants has been receiving benefits since the year 2015. So examined period was spent for savings accumulation. If any benefits were paid by other plans, it was not a significant amount. Data in Table 4 for most plans shows raising number of participants which is typical of accumulation phase. Only in Czechia and Hungary the number of participants was slowly declining. The below formula also shows the decomposition of the rate of assets' growth:

$$\frac{\text{net assets}_{t+1}}{\text{net assets}_t} = (1 + r_t) \left(1 + \frac{\text{contribution}_t - \text{benefits}_t}{\text{average net assets}_t} \right)$$

The geometric mean (complex) annual rate of return over 3 years was calculated using the following formula:

$$\bar{r} = \sqrt[3]{\prod_{t=1}^3 (1 + r_t)} - 1$$

While the average rate of return assuming continuous capitalization has been calculated in the audited period of 3 years using the following formula:

$$\bar{r} = \frac{1}{3} \ln \prod_{t=1}^3 (1 + r_t)$$

Summary data on net assets and contributions required to determine the rates of return are presented in Table 4. The amount of assets is deliberately given in national currencies for the analysed schemes. If converted to the euro, the rate of return would depend also on shifts in the exchange rate of national currencies on the international currency market. For participants who remain retired in their home country, the current market value of contributions in the national currency is important.

The average annual rate of return has been calculated on the basis of the formulas presented above and listed in Table 4 - data on the assets and net contributions. The results are presented in Table 5. The ranking of the sectors by decreasing average annual rate of return is as follows:

- Poland open pension funds (OFE),
- Poland occupational pension schemes (PPE),

- Slovakia pension funds with employer agreement (SPMC),
- Czech pension funds (SPFS),
- Hungary occupational schemes (EAR / IORP),
- Slovakia pension funds (PFMC).

In the case of capital investment, the evaluation of effectiveness from the perspective of the amount of average annual rate of return is not sufficient, because its growth along the level of risk is well known. It is not different in the case of pensions, even though they have their own specificity.

Table 4. Data on sectors of the analysed pension sectors in: The Czech Republic, Poland, Slovakia and Hungary in 2011-2014

Variable	Czechia pension funds (SPFS)	Poland occupational schemes (PPE)	Poland pension funds (OFE)	Slovakia funds with employer agreement (SPMC)	Slovakia pension funds (PFMC)	Hungary occupational schemes (EAR / IORP)
Net assets '11	247 605	6 597 700	224 720 127	1 213 939	5 216 000	835 885
Net assets '12	273 200	8 350 900	269 596 467	1 301 100	5 478 460	846 137
Net assets '13	297 400	9 407 300	299 272 473	1 416 988	5 738 000	925 618
Net assets '14	339 200	10 259 500	149 054 602	1 468 000	6 402 350	1 006 288
Contribution '12	31 400	1 113 700	8 410 296	no data	823 000	74 914
Contribution '13	39 800	1 154 300	11 054 379	no data	414 000	76 145
Contribution '14	38 200	1 209 000	8 325 309	no data	438 000	83 680
No. of participants '12	5 134 862	358 100	15 942 282	731 578	1 475 746	1 226 629
No. of participants '13	4 886 675	375 000	16 377 714	730 334	1 455 874	1 185 022
No. of participants '14	4 585 149	381 000	16 621 686	727 618	1 464 833	1 169 625

Currency units: the Czech Republic - million crowns, Poland - thousand PLN, Slovakia - thousand euro, Hungary - million forints.

Source: [KNF 2016, access 23th May 2016; Narodna Banka Slovenska, access 18th May 2016; The Association of Pension Funds Management Companies, access 29th May 2016; Magyar Nemzeti Bank, access 20th April 2016].

Barr and Diamonds [2014, pp. 57-58] state that the risk of investment funds is significant, and its level affects the level of the average rate of return. The risk of capital

investments of pension savings derives from the fluctuations in the market value of financial assets and erroneous decisions of managements regarding the level of risk. Banks and Emmerson [2000] have demonstrated the usefulness of regulations limiting investment risk, which affect the pension capital of participants approaching retirement age. This is an especially important precaution in the event of being able to choose the level of risk.

Table 5. Evaluation of the effectiveness and equity risk of the analysed sectors of pension capital in the years 2012-2014

Efficiency parameter	Czechia pension funds (SPFS)	Poland occupational schemes (PPE)	Poland pension funds (OFE)	Slovakia funds with employer agreement (SPMC) ³	Slovakia pension funds (PFMC)	Hungary occupational schemes (EAR / IORP)
Return rate '12(%)	-2.2	8.6	14.8	4.4	-10.5	-7.7
Return rate '13(%)	-5.5	-1.1	6.5	-2.5	-2.7	0.4
Return rate '14(%)	1.1	-3.6	-3.7	-1.1	3.7	-0.3
Avg. annual geometric rate (%)	-2.2	1.1	5.6	0.2	-3.3	-2.6
Avg. continuously compounded annual rate of return (%)	-2.3	1.1	5.5	0.2	-3.4	-2.6
Annual standard deviation (%)	2.7	5.3	7.5	3.0	5.8	3.7
Coefficient β	0.02	0.48	0.66	0.62	-1.06	-0.34
Jensen index (%)	-4.30	-6.56	-3.44	-0.35	-11.22	-11.09
Avg. participation rate of people of working age (%)	68.03	1.46	63.99	18.87	37.89	17.97
Avg. annual growth rate of participation (percentage points)	-3.14	0.06	1.86	0.02	-0.002	-0.28

Source: own elaboration.

³ The return rates of the Slovakia funds with an employer agreement have been calculated as a weighted average of net assets of SPMC returns (the data after the SPMC Association), because there was no collected data on the amount of contributions (see Table 4).

In Table 5 the height of investment risk of funded pensions sectors is indicated by the standard deviation of annual returns. The measure of market risk is coefficient β (see Table 5). For both Polish sectors and the Slovak pillar with occupational agreement (SPMC) the coefficient is positive and amounts to 0.66 at most. This means that these sectors' funds were invested in the equity markets defensively, because their risk was lower than the risk of the entire market. Czech funds' β coefficient is close to zero, which means they did not invest much on the broad stock market. On the other hand, Slovak pension funds (PFMC) achieved higher standard deviation of the return than the Czech pension funds and capital market. In this case, a large influence came from the ratio of the euro to Czech crown. Hungarian occupational schemes also recorded a negative β coefficient, so probably they primarily invested in government bonds.

It has turned out that the level of the average rate of return for each sector is not always proportional to the level of risk taken, measured by the standard deviation of returns. It has appeared that the highest rate of return is in the sector with the greatest level of risk (Polish open pension funds), and the second highest risk level appears in the sector with the lowest average rate of return (Slovakia pension funds).

Therefore, to assess the effectiveness through the prism of the rate of return and risk, it is necessary to use an indicator of the amount of the average return per one unit of risk for such an investment (Sharpe Ratio) or per unit of risk of capital market (Treynor Ratio) [Chybalski 2009]. Sharpe and Treynor ratios have not been calculated because they lead to erroneous conclusions when the rate of return on assets is negative or lower than the risk-free rate, as it happened in some of the studied cases.

An alternative indicator of profit to risk is a contribution relative to the market rate of returns and market risk (Jensen's alpha). On the other hand, Jensen's alpha requires the market rate of return to exceed the risk-free rate. The condition has been fulfilled (see Table 1) and, therefore, Jensen's alpha α_i for sector i has been calculated using the following formula:

$$\alpha_i = \bar{r}_i - \beta_i(\bar{r}_{mi} - r_{fi}) - r_{fi}$$

where:

- \bar{r}_i – the geometric mean rate of return of the analysed pension sector i ,
- β_i – risk ratio of market return of the analysed pension sector i , which was calculated on the basis of correlation with the rate of return of the stock index in the country, in which i -sector operated (see the list of indices in Table 1),
- \bar{r}_{mi} – the average market rate of return of the stock index of the country, in which i -sector was located (see the list of indices in Table 1),
- r_{fi} – risk free interest rate in the country of the i -sector on the basis of the annual average yields of government long-term bonds by the Maastricht criterion [Eurostat access 23th May 2016].

5. Conclusions

The analysis of the results obtained in Table 5 has led to the following conclusions:

Investment efficiency of the analysed pensions sectors, assessed on the basis of Jensen's alpha, is far below the efficiency of the stock market. This means that even the sectors with positive average rate of return brought lower income for the risk incurred than the stock market.

In Poland, a higher level of Jensen's alpha efficiency was present in the pension funds sector, while the occupational pension scheme sector scored lower. It is possible that better outcome of pension funds sector resulted from its much larger scale of operation. On the other hand, the occupational pension scheme sector cannot be considered inefficient, because it has brought lower, but positive returns and incurred less risk than the sector of open pension funds.

In Slovakia, a higher level of Jensen's alpha appeared in pension funds based on agreement with employers (SPMC), whereas in the sector of typical pension funds (PFMC) it was lower, unlike in Poland. At the same time, the PFMC sector experienced a lower rate of return and incurred a higher risk. It proved ineffective in relation to the sector of SPMC.

International comparison of Jensen's alpha does not allow to positively verify the hypothesis about higher efficiency of occupational pension schemes.

References

- Act on the supplementary pension scheme*, 2016, The National Council of the Slovak Republic, <http://www.nbs.sk/en/financial-market-supervision1/legislation/slovakia-legal-acts-and-other-documents>, (access: 20th July 2016).
- Barr N., Diamond P., 2014, *Reformy systemu emerytalnego. Krótki przewodnik*, Polskie Towarzystwo Ekonomiczne, Warszawa.
- Banks J., Emmerson C., 2000, *Public and Private Pension Spending: Principles, Practice and the Need for Reform*, Fiscal Studies 21(1).
- Brzęczek T., 2012, *Wpływ filarów na ryzyko polskiego systemu emerytalnego*, [in:] M. Szczepański (ed.): *Ekonomiczne i społeczne aspekty reform emerytalnych. Polska i świat*, Wyd. PP., Poznań, pp. 85-94.
- Brzęczek T., 2013, *Demograficzne, ekonomiczne i instytucjonalne determinanty funkcjonowania kapitałowych programów emerytalnych w Europie a porównywalność badań*, [in:] Szczepański M. (ed.), *Reformowanie systemów emerytalnych – Porównania i oceny*, Wyd. PP., Poznań, pp. 251-260.
- Chybalski F., 2009 (ed.), *Otwarte fundusze emerytalne w Polsce*, C.H. Beck, Warszawa.
- Chybalski F., Marcinkiewicz E., 2013 (ed.), *Współczesne zabezpieczenie emerytalne. Wybrane aspekty ekonomiczne, finansowe i demograficzne*, Monografie Politechniki Łódzkiej, Wydawnictwo Politechniki Łódzkiej, Łódź.
- Dyrektywa 2003/41/UE Parlamentu Europejskiego i Rady, 2003.
- EIOPA, 2013, Database of pension plans and products in EEA, https://eiopa.europa.eu/fileadmin/tx_dam/files/publications/Pensions_Register/EIOPA-BoS-13-054_Database_of_pension_plans_and_products_in_EEA_, (access: 21st April 2014).

- EIOPA, 2016, Database of pension plans and products in EEA, https://eiopa.europa.eu/fileadmin/tx_dam/files/publications/Pensions_Register/EIOPA-BoS-13-054_Database_of_pension_plans_and_products_in_EEA_, (access: 21st May 2016).
- Eurostat, 2013, www.epp.eurostat.ec.europa.eu, (access: 11th June 2013).
- Eurostat, 2016, www.epp.eurostat.ec.europa.eu, (access: 11th April 2016).
- Insurance Europe, 2013, *Tax treatment of 2nd and 3rd pillar pension products 2012*, Brussels, <http://www.insuranceeurope.eu>, (access: 12th April 2013).
- Insurance Europe, 2015, *Insight briefing: Addressing Europe's pensions challenge*, Brussels, <http://www.insuranceeurope.eu>, (access: 12th April 2016).
- KNF, Komisja Nadzoru Finansowego, http://www.knf.gov.pl/opracowania/rynek_emerytalny/index.html, (access: 21st May 2016).
- Magyar Nemzeti Bank, <https://www.mnb.hu/>, (access: 20th April 2016).
- Ministry of Finance of the Czech Republic, Report on Financial Markets Development, 2011-2014, <http://www.mfcr.cz/en/statistics/financial-market-analyses>, (access: 25th April 2016).
- Munnell A.H., Aubry J.-P., Crawford C.V., 2015, Investment Returns: Defined Benefit vs. Defined Contribution Plans, http://crr.bc.edu/wp-content/uploads/2015/12/IB_15-211.pdf, (access: 5th December 2016).
- Narodna Banka Slovenska, 2016, <http://www.nbs.sk/en/financial-market-supervision/pension-saving-supervision>, (access: 18th May 2016).
- Obserwator Konstytucyjny 25th June 2013, <http://www.obserwatorkonstytucyjny.pl/swiat/ets-czechy-zaplaca-kare-za-niewykonanie-wyroku/1/>, (access: 18th May 2016).
- OECD, 2012, *Pensions Outlook 2012*, Paris.
- OECD, 2014, *Pensions Outlook 2014*, Paris.
- OECD, 2015, *Pensions at a Glance 2015*, Paris.
- OXERA, 2013, *Study on the position of savers in private pension products*, www.oxera.com, (access: 12th September 2013).
- Rutecka J., 2012, *Zakres redystrybucji dochodowej w ubezpieczeniowym systemie emerytalnym*, Wyd. SGH, Warszawa.
- Ostrowska K., 2011, Komisja Europejska pozywa Polskę w sprawie PPE, Rzeczpospolita 16th June 2011.
- Social Protection Committee of EU, 2008, *Privately Managed Funded Pension Provision and Their Contribution to Adequate and Sustainable Pensions*, Brussels.
- Soltes M., Modrakova E., 2012, Analysis of pension system development in Slovak Republic, *Procedia Economics and Finance*, vol. 3 (2012), pp. 1238-1242.
- The Association of Pension Funds Management Companies, 2016, www.adss.sk, (access: 29th May 2016).
- United Nations Development Programme, Human Development Report 2014, <http://www.undp.org>, (access: 17th May 2016).
- Ustawa z dnia 20 kwietnia 2004 r. o pracowniczych programach emerytalnych, Dz. U. 2004, Nr 116 poz. 1207.
- Whitehouse E., 2006, *Comparing Retirement Saving across Countries: an Economic Perspective*. Paris, 28th International Congress of Actuaries.

*Pracownicze programy emerytalne
a fundusze emerytalne w Europie Środkowej.
Efektywność i ryzyko inwestycyjne w latach 2012-2014*

Streszczenie. W artykule zaprezentowano wyliczenia efektywności sektorowej programów emerytalnych w latach 2012-2014 w Czechach, Polsce, na Słowacji i na Węgrzech. Porównania następują w obrębie systemu danego kraju (dla Polski i dla Słowacji), a następnie wykonano porównanie efektywności inwestycji programów pomiędzy krajami. Porównania międzynarodowe są uzasadnione tylko na poziomie wyników relatywnych w stosunku do efektywności rynku kapitałowego poszczególnych krajów. Za porównaniem międzynarodowym przemawia też podobna historia polityczno-gospodarcza badanych krajów na przełomie wieków XX i XXI. Analiza wskaźników rozwoju gospodarczego, sytuacji demograficznej oraz społecznej krajów wykazuje ich znaczne podobieństwo. Dla kontrastu, przykład Słowacji pokazał, że sektor funduszy emerytalnych pozostaje nieskuteczny, gdyż charakteryzuje się niższą stopą zwrotu i wyższym ryzykiem niż sektor pracowniczych funduszy emerytalnych, opartych o dobrowolną umowę między pracodawcą a pracownikiem. W Polsce oba sektory okazały się skuteczne. Sektor funduszy emerytalnych cechuje zarówno wyższe stopy zwrotu jak i wyższe ryzyko.

Słowa kluczowe: pracownicze programy emerytalne, fundusz emerytalny, efektywność inwestycji, stopa zwrotu i ryzyko.

Kody JEL: H55, G23, J26.