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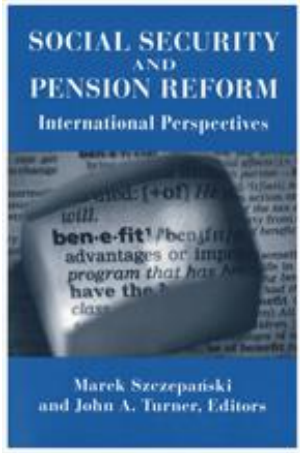

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International Perspectives

Marek Szczepański
John A. Turner
Editors

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Pension Reform and the Measurement of Risk in Occupational Pension Plans in Poland

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Poland belongs to a relatively small group of European countries that, in the late 1990s and early 2000s, introduced comprehensive, structural reforms, changing the whole structure of their pension systems. Earlier structural pension reforms had been introduced in Sweden (1998) and Hungary (1998). In Poland, this took place in 1999, and it was followed by Bulgaria (2000), Latvia (2001), Croatia (2002), and Estonia (2002). Recommendations contained in a World Bank report (1994) have had a significant impact on the shape of structural pension reforms. A representative of the World Bank in Poland was even directly involved in introducing the pension reform. The basic element of structural pension reform was the introduction of a capital-financed segment into social security systems (privately managed individual accounts), which in effect meant the partial privatization of the pension system (Żukowski 2006).

Despite the similarities between these structural reforms, there were also significant differences. One of them was the underdevelopment of the third-pillar, employer-provided supplementary pension systems in all the reformed pension systems of the postsocialist countries. In this respect they differ, for example, from the Swedish model. In Sweden, occupational pension plans play an important role in securing the fi-

nances of future retirees, covering the majority of employees due to widespread collective bargaining agreements.

In 2011, Poland made a partial reversal from the original reform that involved the diversification of risk between the PAYG and the fully funded segments. Funded second-pillar pension plans are mandatory in Poland, following the original reform, and cover nearly the entire labor force. Since June 2011, the mandatory second-pillar pension funds—the individual account pension funds, managed by private financial institutions—have been funded with contributions of only 2.3 percent of wages. Previously, the fully funded segment had received contributions of 7.3 percent. In 2013, the 2.3 percent was raised to 2.8 percent. The total mandatory pension contributions is 19.55 percent of pension of wages, which was not changed. The difference between 2.3 or 2.8 percent and 7.3 percent is transferred to the Polish Social Security fund (ZUS), which provides social security benefits through a notional defined contribution plan.

While the reform of the public pension system in Poland since 1999 has been the subject of many studies in Poland and abroad (see Góra [2009] and Góra and Palmer [2004]), the operation of supplementary pension systems, and especially the still underdeveloped voluntary employer-provided occupational pension system, has not received such interest, with a few exceptions (see Szczepański [2011]). Only a few researchers have tried to explain why the potential hidden within the occupational pension plans has not been utilized in Poland.

With these plans, benefits cannot be taken before retirement age. Contributions are made on an after-tax basis. The plan must be offered to more than 50 percent of the employees of the company. The employer is required to contribute to the plan, with a maximum employer contribution of 7 percent of the employee's wages. Employees can voluntarily contribute. Voluntary employer-provided pensions cover only a small percentage of the labor force. This chapter attempts to explain why. It focuses on the conceptual and empirical identification of different types of risk involved in employer-provided individual account (defined contribution) pension plans. It examines the state of risk awareness on behalf of the employer-sponsors related to the investment of funds accumulated in occupational pension plans. It compares the investment performance of Employees' Pension Funds investment with the results of other types of investment funds operating on the Polish

financial market, and uses risk as an explanation for why most of Polish employers have not adopted pension plans for their employees.

RISK CLASSIFICATION OF OCCUPATIONAL PENSION PLANS

The economic literature defines risk, for which there are many types, as an event with the possibility of different results achieved with a certain probability. Risk is most broadly classified depending on the outcome of an event (Fabozzi and Modigliani 2009, pp. 23–31; Monkiewicz and Gąsiorkiewicz 2010, p. 35): pure risk refers to situations in which a random event occurs and results in loss or no loss, and speculative risk exists when the result of an event is a loss or gain in relation to initially assumed expected outcome.

Operation of occupational pension plans is subject to risk of bankruptcy, break of contract, or an event insured within Employees' Pension-Insurance Fund (such as occupational disease or accident). Such funds operate in many countries (such as the United States and Germany), but not in Poland. More speculative risk factors of occupational pension plans include, for example, the risk of political and legal regulations, investment risk, and financial or business risk.

The classification of risk factors into systematic and specific ones remains important from the point of view of risk management (Fabozzi and Drake 2009, pp. 555–574; Monkiewicz and Gąsiorkiewicz 2010, p. 36). Systematic risk concerns events a company cannot alter because they result from the macro environment. In the case of an occupational pension plan, these factors include

- demographic risk, especially the longevity of employees in a company pension plan;
- political risk due to legal regulations and their frequent changes to which pension institutions have to adapt;
- interest rate risk affects investment performance;
- currency risk, which affects the results of foreign investments and revenues of an enterprise importing or exporting goods;

- risk of market valuation of asset class and the associated economic risks;
- risk of purchasing power due to the uncertain future rate of inflation;
- risk related to market liquidity of assets; and
- risk related to market conditions for reinvestment (market reinvestment risk).

Table 8.1 summarizes the systematic (macroeconomic) and specific (microeconomic) business risks of occupational pension plans according to their operational and financial-investment activity.

Specific risk concerns a single occupational pension plan and is thus called micro risk here. The following factors of this risk have been distinguished:

- Business risk, including market-demand risk of business activity of an enterprise with a pension system and an entity that manages it.
- Management risk, which is conditioned by an improper management of an enterprise and its pension system and capital. This risk can be limited by public supervision of pension institutions.
- Breach of contract risk—the source of its origin is the failure to meet conditions agreed between the parties to the transaction and written in the contract.
- Risk of insurance event regarding participants in the occupational pension plan in the form of life insurance.
- Liquidity of assets risk results from the investment strategy, just as other factors.
- Risk of the investment preferences of participants regards an approved return rate and its term structure tailored to the age of the insured.
- Risk of a financial instrument valuation is a problem with risky investment efficiency in terms of the ratio of expected return and its volatility measured with, for example, standard deviation.

Table 8.1 Risk Classification of Occupational Pension Plans

Business risk	Systematic risk (macroeconomic)	Specific risk (microeconomic)
Operating risk	Demographic (especially longevity)	Business
	Political	Management
		Breach of contract
		Insured event
Risk of financial and investment activities	Interest rate	Liquidity of assets
	Currency	Investment preferences of beneficiaries
	Market conditions on asset class	
	Inflation and purchasing power	Valuation of financial instruments (investment efficiency)
	Market liquidity of assets	
	Conditions for reinvestment	Financial (financial status)
		Bankruptcy
		Reinvestment strategy

SOURCE: Authors' study based on Fabozzi and Drake (2009, pp. 555–574)

- Market reinvestment risk due to assets durability and time horizon of portfolio of given fund.
- Financial risk associated with interest and repayment of borrowed foreign capital and its liabilities, which in the case of occupational pension plans relates to pension disbursement.
- Risk of bankruptcy. It may result in a company's bankruptcy caused by two previously described types of risk, the risk of contract breach and the financial risk.

A SURVEY ASSESSING OCCUPATIONAL PENSION PLAN RISK IN POLAND

The risk of occupational pension plans is a complex concept, which consists of all the previously mentioned factors. Occupational pension plans in Poland have operated since 1999, which is a relatively short time period (the tradition of employer sponsored plans, which is longer

than that of social security, reaches the era of industrial revolution). Most of the employers do not have enough experience with investments of pension funds and do not understand all aspects of risk connected with pension savings. Lack of experience and knowledge about risk management of pension plans has a significant impact on whether employers introduce such a plan. Of course, there are also other important reasons why there are very few occupational pension plans in Poland (for example, complicated registration procedures, not enough tax incentives for pension plans' sponsors, and situation on labor market).

The Financial Supervision Commission is obligatorily provided by occupational pension plans with information on such risk factors, such as the rate of return. Others, such as currency risk, depend on the investment strategy of the fund. Yet other factors, such as business risk or the risk of the investment preferences of participants, can be judged best by business enterprises providing occupational pension plans to their employees.

For this reason, an indirect risk assessment has been chosen in the form of a survey of company representatives providing occupational pension plans. In February 2011, 1,099 companies were running occupational pension plans. The survey included 100 companies that were selected using stratified random sampling. There were three strata of pension plans concerning different legal forms (capital fund, capital-insurance fund, employees financial program). The strata fraction in the sample was proportionate to the fraction in the population. The survey was done by telephone, with an answer rate of about 90 percent.

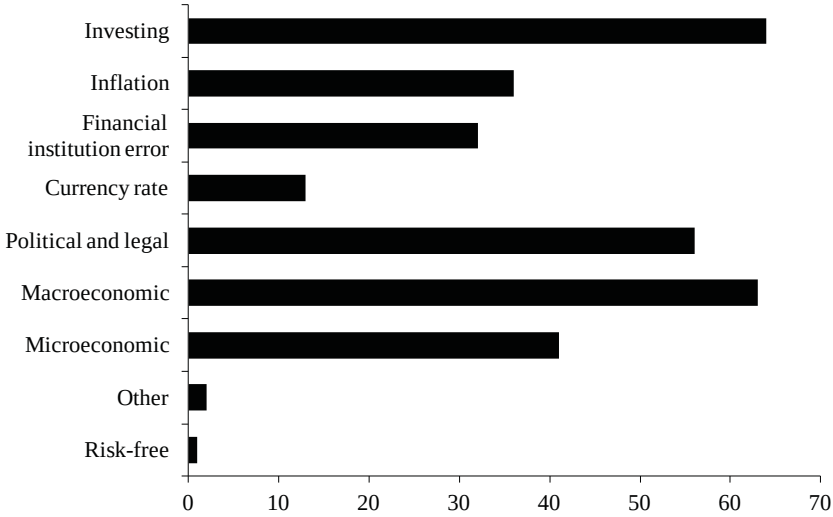
Responses were measured using the following scales:

- Binomial scale—yes/no in order to assess the most important risk factors and recommendations for regulators.
- Ordinal scale to assess the level of risk (rating scale: low, medium, high, and hard to tell).
- Ordinal scale to assess communication, risk reduction tools, and system design (rating scale: definitely yes, probably yes, it's hard to say, probably not, definitely not).
- Nominal scale to assess appropriate strategies for investors with different preferences toward risk (rating scale: the level of risk and income corresponding to the majority of participants, etc.).

The most important risk factors are listed in Table 8.1. Figure 8.1 shows the proportion of respondents that recognized the individual risk factors as the most important. This is a multiple-choice question in which one can indicate any number of factors as the most important: it can be one, several, or all of the risk factors. Only 17 percent of respondents indicated one most important factor, which indicates high importance of several factors. Among other respondents, the most numerous group was the one that indicated two most important factors (31 percent), while 17 percent marked three factors. Four and five factors were selected by 13 percent of respondents; more factors were selected by the remaining 9 percent of respondents.

Investment risk was recognized as the most important factor for most (63 percent of respondents). It is understood as an uncertainty of the rate of return. Sixty-two percent of respondents indicated the macroeconomic risk of the situation on the financial markets and the economy as a whole, while 41 percent of respondents indicated a microeconomic risk of an enterprise's activity.

Fig. 8.1 Respondents' Percentage Indicating Importance of Chosen Factors of Risk

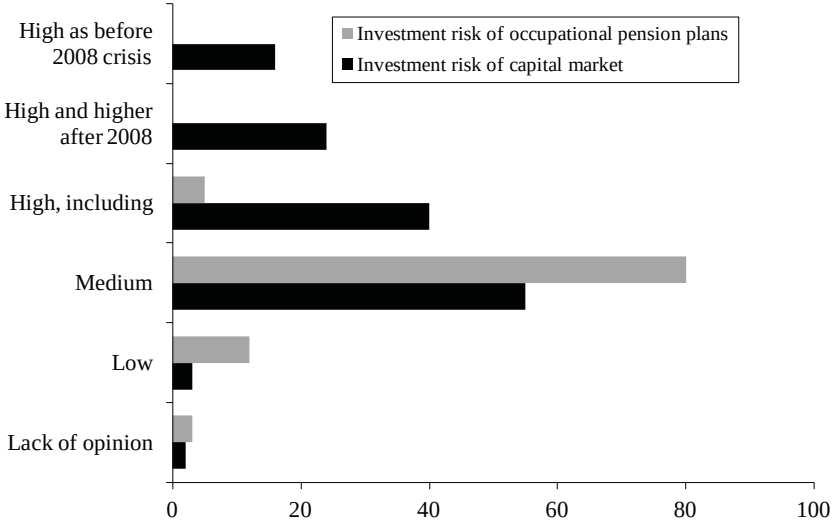


SOURCE: Authors' calculations.

A significant proportion of the companies surveyed (as many as 56 percent) pointed to the importance of legal-political risk. About one-third of all companies considered inflation and financial institutions settling accounts of occupational pension plans as important risk factors. Thus, they referred to external risk management. Only 12 percent of the surveyed companies confirmed that foreign exchange risk poses a threat to pension plans, and only 2 percent indicated other important risk factors and mentioned manipulation and the lack of knowledge.

Because the representatives of companies identified investment risk as the greatest source of risk, another question regarded the assessment of its level in the financial market and in pension plans. Figure 8.2 shows that the risk of financial markets is rated as average for more than half of the respondents and high for the remaining 40 percent. Twenty-four percent of respondents indicated a high level of risk in financial markets, noting that it has been higher after the crisis, while 16 percent of respondents said that although this risk is high, it has not increased as a result of the crisis. However, the perceived level of risk of occu-

Figure 8.2 Assessment of Investment Risk Level of the Occupational Plans and Whole Capital Market (% of Positive Answers)



SOURCE: Authors' calculations.

pational pension plans is lower than the risk of the financial market. Eighty percent of respondents believe that it is of an average level, and 12 percent believe that it is actually low.

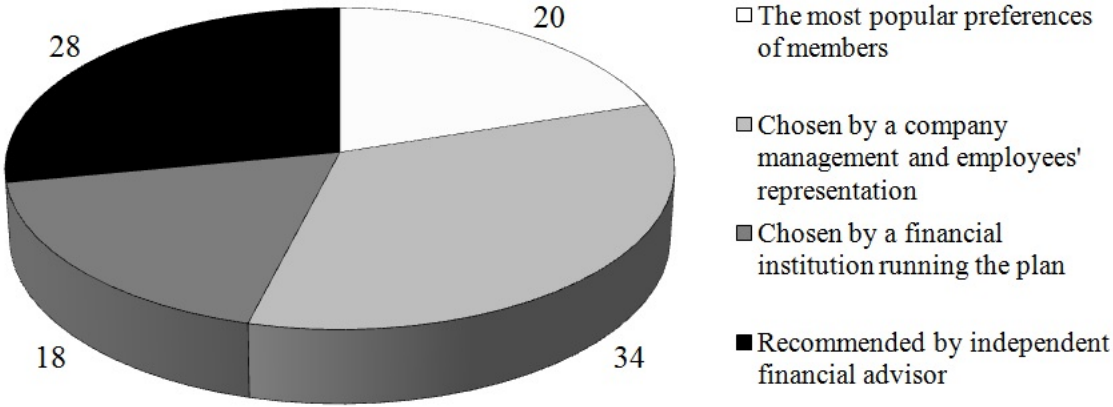
The risk of the investment preferences of pension participants covers a mismatch between the level of risk aversion of the pension plan and its participants due to a single investment pool. In Poland, participants of occupational pension plans can choose one of the investment funds offered by the financial institution that manages their pension plan (for example, fund investing in securities or treasury bonds). They have the right to move their assets from one fund to another.

With the exception of one form of pension plan (the occupational pension fund, which does not have to be managed by an external financial institution), workers do not have any influence on investment strategy of a given pension fund. Therefore, we asked representatives of employers offering pension plans about how they select plan risk preferences (see Figure 8.3). Most respondents chose strategies accepted by a company's management in consultation with representatives (34 percent) or strategies that were the most popular among participants. Both of those choices are irrational because they lack finance and investment education and experience—some people's preferences even appeared to resemble gambling, which was observed during the stock market boom (Griffin, Harris, and Topaloglu 2003). That means that plans should take into account the risk of mismatch and irrational pref-

Figure 8.3 Risk-Return Preferences in Occupational Pension Plans

Recommended by independent financial adviser

SOURCE: Authors' calculations.


20
28
18
34
The most popular preferences of members
Chosen by a company management and employees' representation
Chosen by a financial institution running the plan
Recommended by independent financial advisor

erences. The most rational preference strategy is that recommended by an independent consultant (chosen by 28 percent of enterprises). The least frequently chosen option was the risk-return strategy recommended by the financial institution managing the occupational pension plan (18 percent). Once again, results suggest a lack of confidence by employers in financial institutions as agents of the occupational pension plan (principal-agent conflict). Risk preferences should be matched to the diverse age structure of participants and its dynamics in time.

We now evaluate the management of occupational pension plans regarding the information provided to participants about the risks and protection against them, as well as the principles of the design of occupational pension plans. Figure 8.4 shows consecutive percentage stakes regarding the distribution of responses by the representatives of employers to the following six questions:

1) Do you believe that employees/participants of the program and their employers are aware of all the risks associated with a given pension plan? Most of the companies and their insured employees are informed about the risks, according to the representatives of the employers. Only 20 percent believe that communication from occupational pension plans or their managing institutions remains insufficient.
2) Does the current pension plan structure provide their participants with adequate protection against the risk of investment and other risks associated with the financial market? Most companies indicate very little protection against such risks.
3) Occupational pension plans in Poland are defined contribution plans. All the risks rest on the participants. Is this the right solution?
4) Defined benefit pension plans predetermine pension amounts in proportion to wages. If such occupational pension plans were available in Poland, would you be willing to offer them to your employees, being aware of the additional financial obligations?
5) In mixed (hybrid) programs, part of the investment risk is assumed by the employer, and the employee also bears some of it (i.e., a program with a defined contribution but a guaranteed minimum benefit). If such occupational pension plans were

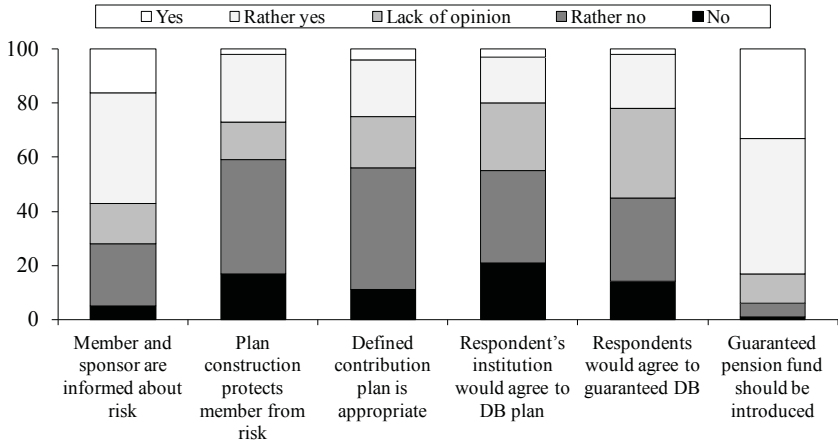
available in Poland, would you be willing to offer them to your employees, being aware of the additional financial obligations?

6) Do we need to introduce a pension guarantee fund?

Replies for questions 3–6 are shown in Figure 8.4 and indicate that the majority of companies involved in occupational pension plans in Poland consider the plans with a defined contribution as imperfect, but they are not willing to accept plans where the risk is carried onto them. They do call for the introduction of a pension guarantee fund, which would take over the obligations of an occupational pension plan if the company went bankrupt. In another question, respondents indicated that the guarantee fund should be financed jointly by employers and the state (38 percent), employers and employees (36 percent), employers only (13 percent), the Treasury (9 percent), or only by the workers (4 percent).

For questions about changes in regulation of occupational pension plans, the majority of business representatives surveyed did not support any changes, including an increase in the Financial Supervision Commission's control over occupational pension plans, an implementation

Figure 8.4 Respondents' Opinions on Risk Management and Plan Construction (%)



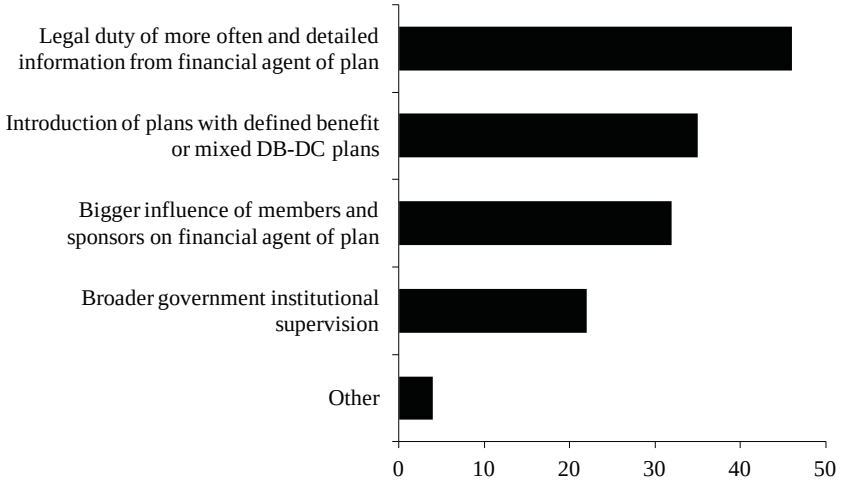
SOURCE: Authors' calculations.

of pension plan design choice, or an increase in the role of employers and employees in the investment strategy (see Figure 8.5). Almost 50 percent of business representatives noted the need for regulation by obliging an agent managing an occupational pension plan to provide information more frequently.

INVESTMENT EFFECTIVENESS OF OCCUPATIONAL PENSION PLANS IN POLAND

Efficiency refers to the results-to-effort ratio. Converted into percentage it becomes the rate of return. In the case of an investment activity, the rate of return itself is not an appropriate indicator of performance because it does not include effort in the form of volatility risk valuation of a financial instrument or its stock market price. Valuation risk of a financial instrument is related to operational and financial risk of an issuer (and, in the case of the stock exchange instruments, of li-

Figure 8.5 Respondents' Recommendations for System and Regulation of Pension Occupational Plans (%)



SOURCE: Authors' calculations.

quidity risk and the situation on the capital market). Therefore, the rate of return of a fund is calculated per unit of measure of risk and compared to this ratio value calculated for the Polish financial market. The risk of actively managed portfolios is measured in one way (the classic measure is the standard deviation of the rate of return), and in another for passively managed portfolios, which eliminates the specific risk. There are also a few methods to conduct a comparison with market effectiveness.

A number of performance measures of capital investment have been developed, and we will briefly describe the three most versatile and widely used ones. Each ratio has its own interpretation, as well as pros and cons. These ratios assume the calculation of efficiency under conditions of multiple market valuation of financial instruments or other investment assets, which is usually satisfied in the case of instruments listed on a stock exchange or other regulated markets.[1]

1) The Sharpe ratio is the average rate of return attributable to one percentage point of the variation of the rate of return, measured by standard deviation (see Fabozzi and Modigliani [2009, pp. 162, 191]; Ostrowska [2007, p. 252]). An investment that obtains the highest value of this ratio is considered the most efficient strategy. The construction of this index assumes that the portfolio rate of return exceeds the risk-free rate of return. Otherwise, the index loses its ability to assess the efficiency of the portfolio (see Brzęczek [2004, p. 7]; Węgrzyn [2006 p. 11]).
2) The Treynor ratio determines the rate of return for taking the average market risk (see Fabozzi and Modigliani [2009, pp. 157, 191]; Ostrowska [2007, p. 249]). Portfolio bonus for the risk taken (excess portfolio return over the risk-free rate) is divided by its market risk measure/coefficient β (see Fabozzi and Modigliani [2009, p. 195]). The Treynor ratio calculated for the evaluated portfolio is compared to the surplus market rate of return. As in the previous case, the higher the ratio, the more efficient the portfolio. This ratio takes into account only the market risk of the portfolio, so it is useful for the assessment of well-diversified portfolios. Like the Sharpe ratio, it can be used if the bonus for portfolio risk remains positive.

3) Jensen's Index, or Jensen's alpha, refers to the rate of portfolio return relative to the market risk taken, as well as to the market return rate (see Fabozzi and Modigliani [2009, p. 203]; Ostrowska [2007, p. 249]). The efficiency of investment is evaluated by comparing the index to zero. Positive values indicate that the fund is performing better than the market, and negative values indicate a weaker result than the market average. Generally, the higher the ratio, the better the portfolio's management.

The Sharpe, Treynor, and Jensen ratios cannot be compared because the first two convert surplus return per unit of risk of different type, and the third compares it to the market rate of return.

Table 8.2 lists two groups of institutions. Occupational pension plans in the form of Employees' Pension Funds are separate funds managed by enterprises; financial institutions are only agents for them. The second group, mutual open pension funds, is only financed by enterprises, but is fully managed by investment fund corporations, including insurance management companies. Therefore, the evaluation of the efficiency of investments was made separately in both groups. An average monthly rate of return from employee and mutual pension funds was calculated along with its standard deviation for the years 2009–2011. The risk-free monthly rate of return was calculated on the basis of the interest rates on three-year retail Treasury bonds during the analyzed period per month (6.35 percent / 12 = 0.53 percent). On this basis, the Sharpe, Treynor, and Jensen ratios were determined. The results are presented in Table 8.3.

The monthly rate of return for employee pension plans is 0.55 percent and is only slightly higher than the interest rate of Treasury bonds. The rate of return from the WIG index (the index of broad market of basic shares of the Warsaw Stock Exchange in Poland) was much higher, and the highest rate of return was achieved by investment fund corporations. However, the analyzed period begins after the slump of 2008, which significantly improves the performance of risky assets funds. The second difference is the level of risk for strategies listed in Table 8.3. Total risk measured with standard deviation from the rate of return is far smaller for occupational pension plans than for mutual pension funds and WIG index. Similar proportions are maintained between the

Table 8.2 Authorities Managing the Occupational Pension Plans Grouped by Form of a Plan

Management entity	Number of occupational pension plans managed
Inter-Company Employee Pension Institution PZU SA	1
Employee Pension Institution NESTLE SA POLAND	6
Employee Pension Institution "New World" SA	19
Employee Pension Institution of Polish Telecom	3
Employee Pension Institution UNILEVER POLAND SA	7
Investment Fund Institution BPH	16
BZ WBK AIB SA Investment Fund Corporation	2
Aviva Investors SA Investment Fund Corporations	10
Investors SA Investment Fund Corporation	8
ING SA Investment Fund Corporation	62
KBC SA Investment Fund Corporation	3
Legg Mason SA Investment Fund Corporation	40
Pioneer Pekao SA Investment Fund Corporation	7
PKO SA Investment Fund Corporation	7
TREASURY SA Investment Fund Corporation	3
Allianz Polska SA Investment Fund Corporation	4
PZU SA Investment Fund Corporation	104
Spółdzielcze Kasy Oszczędnościowo-Kredytowe S.A. Investment Fund Corporation	24
Union Investment SA Investment Fund Corporations	1
Aviva SA Life Insurance Company	133
Generali Życie SA Insurance Company	36
Nordea Poland SA Life Insurance Company	3
Pierwsze Amerykańsko-Polskie Towarzystwo Ubezpieczeń na Życie i Reasekuracji Amplico Life S.A.	41
PZU SA Life Insurance Company	472
Sopot Life Insurance Company Ergo Hestia SA	1
Allianz SA Life Insurance Company	99
Warta SA Life Insurance Company	4
Total	1,116

SOURCE: Financial Supervisory Commission reports, accessed November 20, 2012.

Table 8.3 Investment Efficiency of Employee Pension Plans, 2009–2011 (per month)

Measure	Occupational pension funds[a]	Asset management company associated within IZFiA[b]	Capital Market Benchmark WIG index
Average rate of return (%)[c]	0.55	1.35	1.13
Standard deviation of return (%)	2.15	2.95	6.96
Sharpe Ratio	0.01	0.28	0.09
Coefficient ß	0.30	0.37	1.00
Treynor ratio (%)	0.07	2.25	0.60
Jensen index (%)	−0.16	0.01	0.00

[a] The monthly rate of return and performance indicators were calculated on the basis of valuation of shares of all five employee pension funds (source: Financial Supervision Authority and the Warsaw Stock Exchange Bulletins 2012, 2011, 2010).

[b] The calculations for investment funds are based on their net assets and managed capital flows (source: Statistics of IZFiA–Chamber of Fund and Asset Management).

[c] Average rate of return of the analyzed group of entities, in the case of employee pension funds is not a weighted value of the assets of entities (the results would seek one pension fund with by far the largest assets), while in the case of investment funds, the weighted value of assets.

SOURCE: Authors' calculations.

amounts of market risk measured by the beta coefficient. Calculating the rate of return on its percentage point variation (Sharpe ratio), employee pension funds turn out to be less efficient than the Polish capital market represented by the WIG index. Mutual pension funds appear to be much more efficient than the market.

In conclusion, employee pension funds are characterized by low risk but do not offer a higher rate of return than Treasury bonds. This suggests that the continued operation of this form makes sense only in the form of bond funds. An alternative is to transfer these funds to mutual funds, which are much better prepared for global investing.

CONCLUSION

Four general conclusions can be drawn from the replies of employers offering employee pension plans in Poland:

1) Respondents point to investment performance and economic conditions as the most important risk factors for occupational pension plans. They note, however, other important political and business risk factors for the sponsors of employee pension funds.

2) The perceived risk of financial markets is high, while the investment risk of employee pension plans regarding their investments remains on an average level. Replies suggest the existence of the agent-principal problem (the so-called theory of agency costs). Only 20 percent of enterprises with occupational pension plans chose an investment strategy recommended by financial agents of the program. The respondents note a significant risk of error of an agent.

3) The current design of occupational pension plans is not considered optimal by the majority of respondents. In their opinion, the only major change needed is the introduction of a guarantee fund. The vast majority of respondents are in favor of a guarantee fund for the payment of benefits under occupational pension plans, as is the case in Germany (the fund protects against the risk of insolvency of the employer-sponsor of the program). In Germany both defined benefit and defined contribution plan types are found, as well as hybrid types, although even defined contribution plans are legally required to have some sort of guarantee to workers, such as return of contributions. Such a solution could be implemented in Poland, where all occupational pension plans are defined contribution plans. From the other side, the same guarantees, if they were implemented, could be treated as another obligation for employers and stop at least some of them from creating pension plans in their companies. It is always easier to declare some safety measures than finance them. And such a guarantee fund most likely would be financed by employers and not the state. There is also a need to better inform both employers—the sponsors—and employees (participants of pension plans) on the level of risk associated with the investment strategies used by financial institutions managing a program (i.e., selected to support the investment fund companies, life insurance companies, or em-

ployee pension funds). This confirms the previously indicated agent-principal problems.

4) Employee pension funds are characterized by low risk but do not offer a higher rate of return than Treasury bonds. This suggests that the continued operation of this form makes sense only in the form of bond funds. An alternative is to transfer these funds to investment funds, which are more prepared for global investment and as a sector have been more effective than the Polish capital market. This shows that there are benefits to large-scale investments, which are not available for employee pension funds.

These findings may constitute a starting point for discussion on the institutional framework to reduce the risk for employee pension plan participants, but also for the companies that offer such programs to their employees.

Note

1. The selected set of performance indexes was considered sufficient. For specific purposes other indexes are used: information, Sortino, M2, etc. (see Węgrzyn [2006, pp. 53–62]).

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