OCCUPATIONAL PENSION SCHEMES
AND THE GLOBAL FINANCIAL CRISIS
— POLAND AND THE WORLD

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1. INTRODUCTION – APPROACH TO A RESEARCH PROBLEM, METHODOLOGY, PRESENTATION OF RESULTS

1.1. Cognitive goal

A cognitive goal of the project was to study the influence of a global financial crisis in 2008-2009 on the functioning and development perspective of occupational pension schemes in Poland and abroad (in European Union countries and in selected countries from outside Europe, in which the occupational pension schemes subjectively comprise the majority of a population of working people (mainly in the USA, where the market of occupational pension schemes is the largest in the world).

A basic research problem, set by the authors, was finding an answer to a question: what are (already identifiable) short-term consequences of the global financial crisis for the participants of occupational pension systems, financial institutions offering those programs (so-called providers) and employers organizing, and usually also financing, this type of pension schemes in Poland and in the world? What consequences can be expected in the mid-term (5–10 years) and long term (30–40 years) perspective?

Occupational pension schemes cannot be considered in isolation from the entire system of retirement security in the country. Therefore the authors attempted to identify the factors which affected the power of the influence of the global financial crisis on the public, and supplementary (corporate or individual) pension schemes in the surveyed countries. Despite the diversity of legal regulation and institutional structure of pension systems in different EU countries and non-European countries which were the subject of the study, many of the problems faced by pension schemes and their participants are common. The global financial and economic crisis was a kind of “stress test” for the pension system, including – occupational pension schemes, it highlighted and sharpened the common threats and mutual relationship (including those resulting from the fact that pension funds invest the money entrusted to them in the global financial market). On the other hand however – the impact of the crisis was very diverse – in some countries the value of pension assets decreased slightly, in others there has been a sharp decline, in extreme cases reaching up to one third in 2008. The subsequent recovery from the crisis, the gradual recovery of financial assets belonging to the public and private pension funds had also a very diverse character in different countries. This different impact of the global financial and economic crisis on pension systems in
individual countries, including occupational pension plans, require a thorough examination and explanation.

Two hypotheses were verified, considering main reasons of the diversification of impact of the global crisis of 2008-2009 on pension schemes in various economically developed countries:

- **Hypothesis 1 (H1):** one of the main causes of the studied phenomenon was the diversity of institutional arrangements in different countries, in terms of institutions understood as both formal and informal norms.
- **Hypothesis 2 (H2):** An important cause of the studied phenomenon was the age of particular groups of a pension system participants during crisis.

Additionally, the authors intended to examine whether or not and to what extent, the legal regulations and standards of corporate governance used to limit the risk and protect the interests of occupational pension schemes’ participants used in Poland and other countries have proven themselves in the conditions of the global financial crisis and if there is a need for new adjustment measures that would in future allow for the reduction of the negative consequences of turbulences in the financial markets for employees participating in collective forms of saving for additional retirement fund at their workplaces.

Considering the current state of development of the occupational pension schemes in Poland, which, after 13 years of implementation of the pension reforms, are only available for some 2% of the employees, the research also sought to answer the question, whether as a result of the global financial crisis the awareness of the risks of investing on the financial market of the funds accumulated in these programs increased, both on the side of employers offering occupational pension schemes in Poland and the employees-program participants. And if such a phenomenon actually occurred, whether or not it will be another barrier to development of occupational pension schemes (unless specific legal and institutional changes are introduced that reduce the level of risk).

**1.2. Application goal**

The application goal of the project was to develop proposals of solutions that enhance safety of the participation in the occupational pension schemes, which could be introduced not only in Poland but also in the entire European Union. Very helpful in achieving this goal can be good practices of countries having solutions which increase the safety of these programs’ participants (such as guarantee funds in Germany and the USA).
1.3. The scope and time of research

The study focused on the qualified occupational pension schemes, that is, those which in particular countries enjoy certain economic and fiscal incentives (mainly – tax reliefs for employers or employees who participate in the programs). Occupational pension schemes cannot however be analyzed in isolation from the entire pension system, which is why it was necessary to investigate the impact of the global financial and economic crisis also on the public pension system in Poland and in the world (regarding selected countries).

The time range of research consisted of two periods: the years 2008-2009 (the period of the global financial crisis followed by the crisis in the real economy, called the Great Recession), and 2010-2011 (the period immediately following the crisis). Medium and long-term forecasts of the consequences of the global crisis were also formulated.

1.4. Used research methods

A starting point for determining the theses (problem questions) is the general knowledge of the research problem. The meaning of terminology used in a research question should be as precisely defined as possible. Therefore, the entire chapter 2 of this study is devoted to defining what occupational pension schemes are and based on what criteria they are distinguished, as well as to the classification of these types of programs.

Once basic concepts related to occupational pension funds and identification of their place and role in the entire pension system (which also includes public systems and supplementary individual pension schemes) were discussed, in the subsequent parts of this study the author used methods of description (mainly: description of the construction of national pension systems, with particular emphasis on occupational schemes), explanation and empirical research: questionnaire method and statistical methods to interpret the data obtained from questionnaires (described in detail in Chapter 3).

A questionnaire method was used to examine the opinion of a representative group of employers running occupational pension schemes for employees (OPS) in Poland on the risks associated with gathering additional retirement savings in the workplace in the context of the global financial and economic crisis of 2008-2009. The empirical studies of employers aimed at determining whether the aversion to risk occurs, what is the acceptable level of risk, what potential security measures are considered to be sufficient or necessary), and indicating possible directions for
modification of OPS system, which would comply with the expectations of employers and employees.

In addition to examining the views of employers (sponsors of occupational pension schemes, paying the basic contribution to the program) an analysis of the investment efficiency of selected occupational pension schemes during the global financial crisis (2008) to the end of 2011 was made.

In the studies of the impact of the global financial crisis on occupational pension schemes in selected countries around the world, the description, explanation and statistical methods were also used (to process data coming from databases such as Eurostat and the OECD), along with the comparative method and the case study method. The latter was used in the study of occupational pension schemes in the United States.

Based on the conducted research, detailed conclusions were made in the particular chapters of this work (3 and 4) and general conclusions, including conclusions resulting from the verification of research hypotheses, were presented in the summary of this work (Chapter 5). This elaboration also includes (also in Chapter 5) proposals and postulates regarding the practice – recommendations aimed at increasing the resilience of occupational pension schemes to the possible effects of the financial and economic crises that may arise in the future.
2. NATURE AND OBJECTIVES OF OCCUPATIONAL PENSION SCHEMES

2.1. Criteria defining the occupational schemes

Occupational pension schemes constitute a separate segment, a subsystem within the retirement insurance system. They belong to the group forms of saving, which purpose is to provide additional pensions to its participants (employees) (Martyniec 2003: 124). According to the terminology and classification used in OECD scientific publications and legal directives, occupational pension schemes belong to a broader category of plans, or pension schemes (interchangeably used terms: pension plan or retired income plan, pension arrangement or pension scheme). A pension plan is defined as a legally binding agreement, which subject is a (explicitly defined) pension, or – for tax reasons or based on any other terms and conditions – other retirement benefit equivalent to pension (under another name), which cannot be paid before reaching the statutory retirement age (Pensions Glossary 2005: 12). Early payment of funds accumulated in a program is associated with a significant penalty, that is with a financial loss. In addition to the explicitly expressed subject of the contract, which is the future pension, pension plans may offer additional services and benefits for its participants, such as benefits in the event of disability or illness, or benefits to the beneficiaries.

The OECD typology distinguishes public pension plans, administered by the government and private pension plans, administered by other type of institutions – nongovernmental. Private plans can be further divided into personal pension plans and occupational pension plans.

OECD suggests a typology of pension schemes (see Figure 2.1), in which occupational pension schemes fall within the broader set of retirement plans known as private pension plans. This classification is based on subjective criteria (the originator of savings – a company or a household) and the legal and institutional criteria (mandatory or voluntary nature of participation). Including occupational pension schemes in private plans can however be misleading, because in many countries there are pension schemes organized by government agencies for its employees.
Occupational pensions systems are not only a component of retirement security system. They also play a role of a personnel policy instrument, more specifically – they are a non-financial element of a remuneration system. These two aspects of OPS are closely related.

Diversity of occupational pension schemes is a consequence of different institutional traditions in different countries (in terms of both public and supplementary pension schemes), differences in economic and political development, as well as the diversity of ideologies and political and legal doctrines prevailing in particular countries, represented by the governing parties.

The basic criterion of distinction of occupational schemes is that they are organized, and usually also initiated, by employers for their staff or for selected groups of employees (Golinowska 1994: 22). This distinguishes them from other layers (pillars) of retirement security – social systems organized by the state and the individual schemes, in which participation is a proof of individual foresight and entrepreneurship, not related to the workplace. Due to a very large diversity of subjective scope of organizational and legal forms and methods of financing of occupational pension schemes in different countries, it seems that the criterion of organizing retirement security by the company (employer) is sufficient and covers all retirement savings systems within the workplace (Żukowski 1997: 20-21). Not all occupational pension schemes, in fact, have the characteristics attributed to them, such as equity financing or private character (public institutions can also organize their occupational pensions; there are also occupational pension schemes that are not equity financed). Typically, occupational schemes are classified as supplementary pension schemes (in addition to the individual systems), but there are countries in which they constitute the basis for old age financial security (base system), and
the public system organized by the state has only a complementary role (e.g. Switzerland and Japan). Normally, participation in them is optional, but there are countries in which they are mandatory, such as the UK and the Scandinavian countries.

Occupational pension schemes in different countries have different subjective scope: from a single company to a group of companies (within the concern or holding) to the entire section of the economy (e.g. construction) or property sector (e.g. the entire public sector). Needless to say, they have the widest subjective scope in the countries in which the participation in them is mandatory.

The percentage of employees covered by the occupational pension schemes is also diversified, including the European Union countries, even in countries with a similar level of economic development and similarly organized base systems.

S. Böhm, who classifies occupational schemes as the supplementary pension schemes (using the term betriebliche Ergänzungssysteme), points to the need of including in the definition of such systems not only the institutionalized systems of saving for retirement in private companies, but also pension schemes organized for specific groups of employees in the public sector, and even benefits for the disabled and for the families of the victims of accidents at work, if their payment is associated with the employment (Böhm 1997).

As for the Polish occupational pension schemes, which operate under the name of “pracownicze programy emerytalne” (PPE), the easiest solution could be recourse to the statutory definition. Unfortunately, although the PPE Act of 1997 and its subsequent amendments start with an extensive dictionary, it lacks a clear and precise definition of what the employee pension program is (other than an indication that the legislator understands the term program as the company program or intercompany program¹. An opinion formulated in the work of B. Hadyniak and J. Monkiewicz titled Fundusze emerytalne II filar [Second pillar pension funds] on the original concept of the third pillar, resulting from legal acts implementing the pension reform in the years 1997-1998, is still valid after subsequent amendments to the OPS act. The authors stated as follows: “The third pillar is poorly defined. It is often referred to as the area of voluntary retirement security. Therefore we can include in it a number of different solutions: systematic saving in bank accounts or cash deposits, individual investments in securities, disability insurances, investments in mutual funds, etc. These securities are not only voluntary but also very liberal. The owner can at any time resign from savings and spend them on current goals. Such definition is not appropriate” (Hadyniak, Monkiewicz 1999: 19). According to the cited authors, the third pillar should be distinguished by a long-term nature of the accumulated savings for retirement purposes and the fact that they can use a special tax policy of the state. This definition does not include the basic feature of OPS – connection with a company and employment,

however attention was drawn to the significant differentiator of supplementary pension schemes, which should always be the long-term nature and the specific purpose: gathering additional financial resources for the old age. In addition, the history of occupational pension schemes shows that they have developed earlier than the public systems and not have always enjoyed the tax preferences.

T. Gruszecki notes that definitional issues concern not only occupational pension schemes (which are only one form of supplementary pension schemes), but also the understanding of the third pillar of the Polish pension system. He proposes to include in the distinctive qualities the following (Gruszecki 2000: 13-14):

- The clear purpose of saving – for old age.
- Voluntary nature for the employer (offering) and employee (participating).
- Closed the nature of savings (available only upon reaching the retirement age).
- The complementary nature of the benefits in relation to basic benefits (regardless of what we consider a base solution in the country).
- General association of saving with employment, with the employee being a beneficiary.
- Generally assumed state aid (promotion – tax incentives, discounts for contributions in basic benefits, etc.).
- Legal institutionalization (control) and certain degree of supervision”.

These are indeed very important characteristics of supplementary pension schemes, but a definition based on them would be excessively complex, would not encompass the solutions found in other countries and would not accommodate individual retirement accounts, introduced in Poland in September 2004, not associated with employment.

It seems that the main criterion in co-funding occupational pension schemes is the association with the workplace and employment and the specific role of an employers who create a OPS for their employees; the subsidiary criteria can include a long-term nature of the savings and clearly defined retirement purpose.

2.2. Place of the occupational pensions schemes in the three layer system of retirement security

The location of the occupational pension schemes in multi-layer systems of retirement security and their place and role in the entire pension security systems in the country requires closer consideration. Even in countries with a similar level of economic development, pension schemes have a very diverse construction and differ in subject, and their importance in the entire financial security system for old age varies. These differences arise from the diversity of legal systems, social conditions, policies of governing parties, social and demographic structure, as well as tradition and cultural differences. Regardless of the diversity of specific solutions concerning retirement age, manner of financing, or the legal and institutional
framework, it is possible to identify a number of common features of pension schemes in different countries. In the description of the retirement security systems in European Union member countries, the most commonly used is the three pillars (segments) model of the pension system (multi-pillar system).

However, we should pay attention to different classification criteria. Classic presentation of a pension system is mainly based on the subjective criterion of division. The individual pillars are distinguished, taking into account the entities responsible for a given segment of the system. Entities which show initiative and care for retirement security include: (1) state, (2) the employer (a company), and (3) future pensioner’s household. In addition to that, we take into account the income criterion, and so, we determine how much retirement income is generated in the various segments of the pension system, which incomes form the basis (so-called base) of a retirement security, and which play a complementary role (Szumlicz 2004: 13).

Based on the main subjective criterion and the income criterion, we can distinguish in a three pillar model:

• pillar I, organized by the state, constituting a public (base) part of the system, compulsory and typically covering the entirety of active labor force; it expresses the state’s care to ensure standard retirement benefits, and guarantee certain level of financial security in old age;

• pillar II, initiated by the employer (company); in this part of the pension system, additional pension funds are gathered for employees; it is usually voluntary, but in some countries the participation in occupational pension schemes is mandatory;

• pillar III is collecting additional savings for old age in a household; normally it is complementary and voluntary in character, it is an expression of individual foresight, often supported by the state (including support in form of tax reliefs or other incentives); it is a systematic saving with a use of employee or individual pension programs, offered by investment fund companies, insurance companies, banks or (rarely) brokerage houses.

References to the three pillar model can be found in documents of International Labor Organization (ILO), as well as in numerous documents of the European Union. Since, in practice, the primary segment of the pension system is its public part (basic, compulsory, organized by the state), so taking into account the size differences and diverse significance of particular pillars, many authors prefer to use other terms to define components of pension systems. For example, M. Żukowski proposes a very transparent three-stage model (three-layer). In this model (see Figure 2.2) first degree (first layer) is the social security pension organized by the state (called a base). The criteria of its distinction are: public nature (regulated by public law), universality and mandatory character. Universality can mean that the system covers all employees. In some countries, the subjective scope of this level of security is broader – entitled to pensions are all inhabitants based on a citizenship or permanent residence in the country. The second solution relates to the sup-
ply systems, funded from general taxes and not the pension contributions paid by the generation of working people.

The second degree (second layer) consists of occupational pension schemes organized by employers (firms) for their employees. As aptly noted by T. Szumlicz, reasons why employers’ get involved in the organization of occupational pension schemes are changing. As much as previously these programs were a form of binding the employee with a workplace, strengthening loyalty, preventing excessive staff fluctuations and stabilizing the personnel, in modern human resource management strategies a greater flexibility and mobility of employees is assumed (Szumlicz 2002: 354). The third stage (third layer) are individual pension programs. The criteria distinguishing this layer are: individual character and manner of financing (capitalization of contributions) (Żukowski 1997: 20-21). The third layer of the pension system is complementary in nature. The option of systematic saving and investing with a view of an old age requires more foresight and specific knowledge of a pension system. For various reasons (lack of interest in the problems of old age, recklessness, shifting responsibility for retirement security only on the state, demanding attitudes, etc.) some people do not participate in the third pillar of the pension system. Hence, this layer is typically the narrowest.

A classic three-pillar model is shown in Table 2.3. It is worth mentioning that in the traditional three-pillar model, which was a good description of the structure of pension systems in the EU countries in the 90s of 20th century, the first pillar (base, public) had a pay-as-you-go nature, which means that the pension payments were financed from contributions of current employees, which in turn gained in this way rights to future pensions, as part of an unwritten contract between generations.

However, in the late 90s of the twentieth century and early twenty-first century in several European countries structural pension reforms were implemented: in Sweden and Hungary (1998), Poland (1999), followed by Bulgaria (2000), Latvia (2001), Croatia and Estonia (2002). These reforms were based on the experience of Latin American countries, especially the precursor of structural pension reforms –
Chile (Kołodziejczyk 2004). The basic element of the structural pension reforms carried out at the turn of the twentieth and twenty-first century was the introduction of a segment of equity pension schemes, which meant in fact a partial privatization of pension plans (Żukowski 2006: 60), or – using the terminology of K. Kołodziejczyk – partial transition from the pay-as-you-go system to the capitalization (Kołodziejczyk 2004). A new structure of a multi-layer pension system emerged this way. To describe this new structure, a three-pillar model can be used, but with a changing location of individual segments. Occupational schemes, unlike in traditional classic three-pillar model, as a result of structural reforms are no longer the second, but the third layer of retirement security.

Table 2.1

A three-pillar model of a retirement system – classic construction

<table>
<thead>
<tr>
<th>Criteria of division</th>
<th>Pillar I</th>
<th>Pillar II</th>
<th>Pillar III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>state</td>
<td>work establishment</td>
<td>household</td>
</tr>
<tr>
<td>Income</td>
<td>standard pension</td>
<td>additional retirement funds</td>
<td>additional retirement funds</td>
</tr>
<tr>
<td>Parts of the system</td>
<td>base</td>
<td>supplementary</td>
<td>supplementary</td>
</tr>
</tbody>
</table>


The shape of structural reforms introduced in Europe at the end of 20th century was highly influenced by the famous report of the World Bank of 1994, titled *Averting the Old Age Crisis*, postulating the introduction of a mandatory segment of capital in form of pension funds (*Averting...* 1994). According to a concept of a “multi-pillar pension system” contained in this report, a postulated model of a pension system, which was to replace the traditional pension systems based on repartition, consisted of three elements: (1) mandatory PAYG system of flat-rate or means-tested pensions preventing poverty, (2) mandatory, privately managed fund system, ensuring the replacement of existing incomes, (3) voluntary occupational schemes or individual saving systems for additional retirement.

As a result of the radical reform of the pension security system carried out in Poland in 1999, a three-pillar structure of pension system was introduced, taking largely into account the proposals of the World Bank² (see Table 2.3).

²The legal basis of the new system are: Ustawa z dn. 28 sierpnia 1997 r. o organizacji i funkcjonowaniu funduszy emerytalnych (DzU nr 139, poz. 934 z późn. zm.), Ustawa z dn. 22 sierpnia 1997 r. o pracowniczych programach emerytalnych (DzU nr 139, poz. 932 z późn. zm.), Ustawa z dn. 13 października 1998 r. o systemie ubezpieczeń społecznych (DzU nr 162 z późn. zm.) i Ustawa z dn. 17 grudnia 1998 r. o emeryturach i rentach z Funduszu Ubezpieczeń Społecznych (DzU. nr 162, poz. 1118 z późn. zm.).
Table 2.2

A structure of the Polish three-pillar pension system

<table>
<thead>
<tr>
<th>Description and classification</th>
<th>Pillar I</th>
<th>Pillar II</th>
<th>Pillar III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character</td>
<td>primary (basic), public</td>
<td>primary (basic), public</td>
<td>supplementary</td>
</tr>
<tr>
<td>Initiating subject</td>
<td>state</td>
<td>state</td>
<td>employer (PPE), future pensioner, a natural person (IKE)</td>
</tr>
<tr>
<td>Participation</td>
<td>mandatory</td>
<td>mandatory</td>
<td>voluntary</td>
</tr>
<tr>
<td>Source of financing</td>
<td>a contribution of an insured person and an employer</td>
<td>a contribution of an insured person</td>
<td>a contribution paid by an employer or an insured person (PPE) a contribution paid by a natural person (IKE)</td>
</tr>
<tr>
<td>Financing system</td>
<td>PAYG</td>
<td>equity</td>
<td>equity</td>
</tr>
<tr>
<td>Benefits</td>
<td>standard pension</td>
<td>standard pension</td>
<td>supplementary pension</td>
</tr>
<tr>
<td>State guarantee</td>
<td>regarding the minimum amount of retirement fund (from both pillars together)</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>State</td>
<td>private companies</td>
<td>private companies or employers (PPE), financial institutions including insurance companies (IKE)</td>
</tr>
<tr>
<td>Size of benefits</td>
<td>defined benefit</td>
<td>defined benefit</td>
<td>one-time payment or monthly installments</td>
</tr>
<tr>
<td>State supervision</td>
<td>strict, direct</td>
<td>financial (indirect)</td>
<td>financial (indirect)</td>
</tr>
</tbody>
</table>

Based on Jędrasik-Jankowska 2003.

In more recent publications of the World Bank, a new proposal of a pension system appeared, this time based on five pillars (see Table 2.3). According to its authors – R. Holzmann and R. Hinz – it guarantees better protection against various types of risk inherent in the pension system and take into account the experience of countries that have already introduced the three-pillar system, previously postulated by the World Bank. In comparison with the previous, three-pillar concept of the World Bank, this system would include two new elements:

- a base, or “zero” pillar of a retirement security, addressed primarily to people achieving low incomes throughout their entire lives (lifetime poor) and unable to earn (through the payment of pension contributions) the right to pensions protecting from poverty, and to the workers of an informal sector;
- non-financial, fourth pillar of retirement security, including family support, access to health care and other social programs.
### A five-pillar model of a pension scheme

<table>
<thead>
<tr>
<th>Pillar</th>
<th>Target groups</th>
<th>Main criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lifetime poor</td>
<td>characteristic participation</td>
</tr>
<tr>
<td></td>
<td>informal sector</td>
<td>universal or residual</td>
</tr>
<tr>
<td>0</td>
<td>X X X</td>
<td>“base” or “social” pension, at least a social support (universal or discretionary, based on the incomes test)</td>
</tr>
<tr>
<td>1</td>
<td>public pension scheme, managed by public institutions (a defined contribution or defined benefit system)</td>
<td>mandatory</td>
</tr>
<tr>
<td>2</td>
<td>X</td>
<td>occupational or individual pension scheme (equity financed defined contribution or defined benefit system)</td>
</tr>
<tr>
<td>3</td>
<td>x X X</td>
<td>occupational or individual pension scheme (partially or totally equity financed defined contribution or defined benefit system)</td>
</tr>
<tr>
<td>4</td>
<td>X X X</td>
<td>access to informal support (family), other formal social programs (health care) and other financial and non-financial assets (real estate ownership)</td>
</tr>
</tbody>
</table>

* People with low incomes, also working, but receiving low-wages throughout their entire working life, who without the support of public institutions are at risk of poverty in old age, because they cannot develop sufficient retirement capital (in the public pension system, let alone the supplementary pension schemes). Pillar “zero” is to guarantee these people basic income support for old age, a protection against poverty.

Notice: A manner of writing the “x” character (size and font) reflects the importance of each pillar for each target group in the following (ascending) order: x, X, X.


In a five pillar model, which is not meant to become a universal standard for all countries, but only a postulated state of affairs, the frame of reference (benchmark) for pension systems reform, occupational pension schemes can play a role of
a third, mandatory pillar, or a fourth pillar, voluntary in nature. Whether occupational pension schemes will form a part of the mandatory pension insurance segment, or will be located in the voluntary sector, depends on the specific economic, social, cultural and institutional conditions of a country. While the existence of a base (“zero”) pillar in every pension system is justified by a necessity of a reasonable protection against poverty in old age for the largest possible part of the country’s population (including the poor and those receiving incomes in the informal sector), the additional pillars (individual or occupational) are to provide a higher level of financial security in old age.

In richer countries, with a higher national income per capita and a sufficiently developed financial market and an administrative system prepared to supervise the complex structure of the pension security system, it is possible to introduce all five pillars or a certain combination of them. Countries which are less well-off should provide its citizens at least with an access to the base “zero” pillar (public and mandatory, protecting against poverty) and for those with higher incomes they should create an opportunity to participate in additional pension schemes (occupational or individual), enabling to reduce the gap in incomes and guarantee the consumption smoothing after finishing the professional life and reaching a certain age. Holzmann R. and Hinz R. speak in favor of voluntary and additional character of occupational pension schemes toward public segment (pillar) of a pension system and suggest that they should be equity financed and structured flexibly enough not to impede the mobility of the employees in the labor market: “We should avoid creating separate pension schemes organized on the basis of employment or occupation, because it blocks the mobility in the labor market and can lead to expensive and, in the longer perspective, unsustainable subsystems for particular professional groups. Pensions of government officials, often being the oldest pension systems in the country, should be integrated and harmonized with public pension systems (covering three main target groups – the poor, formal sector workers and informal sector workers – ed. M.Sz.)” (Holzmann, Hinz 2005: 12). Occupational schemes should not therefore replace public, mandatory pension segment, but supplement it.

It is worth noting that based on rich comparative data from various countries and continents, the authors of the concept of five-pillar retirement security appreciate the importance and development prospects of occupational pension schemes in the twenty-first century. In the five-pillar concept, occupational schemes can be used as a part of both the mandatory (third) and voluntary (fourth) pillar of the pension system, which indicates that once properly adapted to the new social and economic conditions, they can and should – as suggested by the experts of the World Bank – play important role in multi-layer systems of pension security also in this century.

Generally speaking, the shape and level of development of occupational pension schemes in a country is affected by mutual relationships of three groups of interest: employees (individual participants, as well as the entire crew represented by its agents, usually the trade unions), employers (groups, or even the entire association of employers in case of occupational schemes covered by collective agreements)
and the state (Martyniec 2003: 214-215). The interest of employees is to obtain additional income after terminating work, hence the development of occupational pensions systems depends largely on the replacement rate, or the ratio between net pension and the last net pay, guaranteed by the base (public) system. In countries, where the replacement rate of last earnings by the retirement benefits is relatively high (60–70%), including continental European countries with developed insurance base system (such as Germany), higher incomes workers are more willing to join the occupational schemes. In countries, where social and state pension systems are established (e.g. in the UK, Ireland, most of the Scandinavian countries), providing uniform pensions at a lower level which protects only against poverty, participation in occupational systems is beneficial for majority of employees. It makes it possible, through an additional occupational pension, to increase the level of pension security and adjust the amount of incomes received from all layers (pillars) of the pension system to the level of previous earnings. We need to keep in mind however, that even in the countries in which social and state pension systems exist, some of the low income workers cannot afford to participate in additional, voluntary pension systems – occupational or individual. In most occupational schemes, payment of contributions to the pension system reduces the current net incomes and is a form of collective savings for a specific purpose. As such – it requires giving up some of the current consumption in favor of future benefits (additional incomes and greater opportunities for consumption in retirement age). People with low incomes are forced to spend them entirely on current needs.

A factor that largely affects the place and role of occupational group retirement savings in multi-layer pension systems, is the social and economic policy accepted by the state. We can observe (also in EU countries) a large diversification in this regard of legal and institutional solutions and the accompanying system of incentives to create and participate in occupational pension schemes as well as the development of applied solutions regarding these systems in particular countries along with their socio-economic development.

2.3. Organization and financing of occupational pensions

The relative importance of particular occupational pension schemes in the entire retirement security systems are very diverse. In some countries they play a marginal role, in other they form complex institutions encompassing the predominant part of the employees. In most countries certain steps are taken to accelerate the development of occupational pensions, however the effects of these projects are often unsatisfactory (OECD ... 2009), except of course the countries where the participation in the occupational pension scheme is mandatory.
Beside the differences in the role and significance of occupational pensions in pension systems there are also differences in their organization and financing. Occupational pensions systems operating in different countries have a number of unique features. The most significant differences concern (Leiber 2005; OECD 2009):

• the degree of customization of participation in the system (is the participation in the program a result of an individual employee’s decision, his prudence and foresight, or is it a result of the collective labor agreement, containing a pension plan);
• the level of a program funding (the amount of the contribution made by the employer, employee or both sides, the ratio between the employer’s and employee’s contribution);
• the role of social partners in the management of the program (such as trade unions);
• the manner of defining the amount of the pension benefits;
• the influence of employers, employees and pensioners (beneficiaries) on the functioning of the program.

These differences result from the different institutional tradition and level of economic development and the social, cultural and political specificity. The differences concern in fact the entire structure and principles of functioning of pension systems in particular countries, which parts (subsystems) are occupational pension schemes. Moreover, even in the countries with a similar level of economic development and geographical location, different solutions are used in regard to saving for occupational retirement. However, due to the integration processes, actions are undertaken aiming to establish common principles and to introduce progressive unification of the methods of organization and financing (including the management of different types of risk) of the occupational pension security systems. Examples of such activities include legal regulations accepted in the European Union, such as Directive 2003/41/EC of the European Parliament and the European Council of 3 June 2003 on the activities and supervision of institutions for occupational retirement provision, which goal is not only to develop specific, internationally respected minimum standards in this area. Some authors even postulate the introduction of a reformed, coordinated pension system of a pan-European character, taking into account the common solutions regarding different layers of retirement security, including also the occupational schemes. Some of the experts of the World Bank speak in this spirit (Holzmann 2003).

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3 The historical development of occupational schemes – c.f. point 2.3.
4 As an example may be used neighboring countries with a similar level of economic development and similar size – France and Germany. In France, occupational pension schemes are mandatory, in Germany generally – voluntary.
5 On the influence of the European integration process, including legal regulations, on the development of occupational pension schemes in Poland – see point 5.3.3.
Despite the diversity of legal regulations, organizational forms and particular financial solutions, we can identify common elements of occupational schemes, allowing to classify and distinguish them from other layers of retirement security (public and individual).

According to D. Cooper, an author of comparative studies regarding legal regulations and functioning of the occupational schemes in the U.S. and EU countries, these programs are financed in many ways, which can be reduced to three main types (Cooper 2005):

- book reserve systems, financed internally;
- PAYG (pay as you go) systems; this method of financing, typical for the traditional public pension systems, is rarely used in occupational schemes; pension payments are financed from contributions paid by current employees of the company (or group of equity-linked companies), sometimes small reserves are also created;
- equity funded schemes, in which retirement capital is separated form funds managed directly by the employer (also known as the sponsor of the program); equity financed systems can be systems with a defined (stated in advance in the pension agreement) amount of benefit, usually determined as a proportion of last salary (known as defined benefit, shortly: DB) or systems with a defined contribution (a subject of a pension agreement between the employer and the employee participating in the system is the amount of contribution, and not the amount of the benefit; the amount of future pension depends on the value of paid contributions and effects of investments in the financial market, and so it is not known in advance).

Occupational schemes can be classified with regard to more criteria than simply the method of financing, such as coverage, a manner of management of the funds accumulated in the program or the method of calculating the amount of benefits (see Figure 2.3 and Table 2.4). When describing occupational pensions we should also take into account the specific issues related to the possibility of making investments (e.g. allowable share of investment in the foreign financial markets, possibility to use certain financial instruments for speculative purposes and risk diversification – e.g. derivatives⁶), the supervision of the state institutions, and the various risks and ways of managing them associated with particular types of occupational pension schemes.

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⁶ Derivatives are financial instruments which value depends on the value of some other financial instrument (primary instrument) on which the derivative is issued (Michalski 2004: 28).
Fig. 2.3. Classification of occupational pension schemes based on the manner of financing
Based on Cooper 2005

Table 2.4

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Type of scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity managing the finances</td>
<td>book reserve occupational pensions schemes,</td>
</tr>
<tr>
<td></td>
<td>financed internally</td>
</tr>
<tr>
<td></td>
<td>occupational pension schemes managed</td>
</tr>
<tr>
<td></td>
<td>by external financial institutions</td>
</tr>
<tr>
<td>Method of financing</td>
<td>equity financing</td>
</tr>
<tr>
<td></td>
<td>pay-as-you-go financing</td>
</tr>
<tr>
<td>A method of determining the amount of benefits</td>
<td>defined contribution systems</td>
</tr>
<tr>
<td>(pension formula)</td>
<td>defined benefit systems</td>
</tr>
<tr>
<td>System coverage</td>
<td>systems covering one enterprise</td>
</tr>
<tr>
<td></td>
<td>multi-company or industry-specific system</td>
</tr>
</tbody>
</table>

Own work.

All different organizational, legal and financial solutions used in occupational pension schemes have their pros and cons, relatively well described in the literature, albeit not always well-known to employers initiating the creation of pension plans and their participants. These issues are noteworthy not only in course of organizing concepts or accepting a specific typology of occupational pension schemes (which by itself already holds a cognitive value in face of the wealth of forms and specific legal, organizational and financial solutions in the area of occu-
pational retirement security), but also as a starting point to analyze occupational pension schemes in Poland.

Using the criteria presented in Table 2.5 as a basis for classification, we can describe different types of occupational schemes on the principle of opposition.

**Internally financed systems versus systems managed by external financial institutions**

Pension systems managed and financed internally are a form of a promise made by an employer, who agrees to pay employees the retirement after a specified number of years of work. This promise may occur in the form of (Golinowska 1994: 25) an obligation not recorded in the accounting books or a liability accompanied by the creation of an appropriate reserve in a balance (hence the name of this type of system: book reserve). Such arrangements are common in some countries (for example in Germany), but in others they are prohibited by law (e.g. in the UK). Internally financed systems without creating a book reserve are definitely more risky, as it may turn out that in the future, the employer will not have adequate funds to pay pensions to his former employees, despite previously made promises. Including in the balance sheet the liabilities from promised retirement benefits does not guarantee their future payments either, but makes the commitment more credible and easier to control externally (e.g. by an auditor examining the company’s books or by institutions appointed in a country to regulate and supervise occupational pension schemes). For the employer, an advantage of internally financed pensions is that until the moment the benefits payments come due the resources can be freely disposed and used, for instance, to finance current operating activities. These are usually low-interest reserves and therefore they can serve as a cheap source of capital. From the perspective of an employee however, it poses additional risk. In an event of company’s bankruptcy, the participants of the pension scheme have no priority to pursue their claims over other employees or external company creditors. In many countries, companies that run internally funded pension schemes, are legally obliged to reinsure these funds in insurance companies, but usually this reinsurance is not full because of the high costs.

Externally funded occupational schemes are usually conducted in a form of a contract to locate the resources in a separate retirement fund managed by – depending on the institutional tradition – a life insurance company, investment fund companies (also known in some countries as mutual funds), mutual insurance companies, pension funds working for one company or a group of companies and having their own legal personality.
Pay-as-you-go (PAYG) systems versus fully-funded systems

Pay-as-you-go is not a typical method of financing occupational schemes because financing occupational pensions by the next generation of professionally active employees may prove a relative risky option. While in the public pension system, the succession of generations working and receiving benefits is a natural phenomenon, the companies operating in a competitive market economy may cease to exist, be transformed, be acquired by other businesses, make the crew reduction due to scientific and technological progress and the implementation of a new technology requiring smaller number employees to operate the equipment, etc. In fact, only in the public sector institutions, where business continuity is guaranteed (such as government offices), the funds paid into an occupational pension scheme can be spent on an ongoing basis on the payment of occupational pensions for employees who, after having worked a specific number of years, earned the rights to them7.

Externally financed occupational pension schemes are usually equity funded, rather than on PAYG basis (intergenerational contract). Contributions in the occupational schemes (premiums or other forms of contributions) are collected in special individual and collective accounts, creating the funds which are invested in the financial markets (Golinowska 1994: 23). Resources designed for the occupational pensions are therefore the sum of collected premiums (contributions made to the system) and the effect on the investments in the financial market.

At this point, it is necessary to clarify the concept of the pension fund, which collects and invests funds as a part of an occupational pension scheme. It turns out that the concept of the fund, widely used in economics (including the science of finance and social policy) has a number of connotations and is used in many different meanings. In finance, it is an ambiguous concept; it means an organizational form of funds collected for a specific purpose, especially to cover certain expenses (Gluchowski (ed.) 2001: 90). Also in the social policy science, the concept of the fund, and the pension fund in particular, has various definitions. As rightly observed by P. Kurowski, many authors of works devoted to the issue of pension reforms implicitly accepts that the institution of the pension fund is commonly known and understood (Kurowski 2006: 30). In the countries with advanced capitalism, such assumption is taken for granted and often used, especially in studies devoted to the financial management of pension funds (see Ambachtsheer, Don Ezra 2001; Ambachtsheer 2007). In Polish literature regarding social policy the term pension fund is used in narrow and broad meaning. In a narrow meaning (sensu stricto) it refers to entities operating within the supplementary pension schemes (occupational or individual). In a broad meaning (pension funds sensu largo) it means “all forms of raising funds for the current or future retirement benefits” (Szumlick 1998: 15). Such un-

7 Not surprisingly, the PAYG occupational pension schemes function in France in the public sector.
derstanding seems to be also supported by terminology adopted in the Polish reformed pension system, where pension funds occur both in the compulsory public layer (pension fund accumulated in the Social Insurance Fund and open pension funds, that is a so-called second pillar of pension system implemented since 1999) and supplementary layer, non-mandatory (third pillar – funds accumulating resources under occupational pension schemes, but also separate funds in financial institutions managing individual retirement accounts – IRA). The pension fund has specific economic objectives (e.g. efficient allocation of pension contributions, accumulation of capital, reduction of financial and investment risk) and social objectives (e.g. providing the fund members with financial resources in old age to protect them from the risk of insufficient livelihood after retirement).

In this paper, the term “pension fund” will be used in the narrower sense – referring only to the supplementary pension schemes. Very useful can be the definition proposed by P. Kurowski, according to which a pension fund is a “financial intermediary institution\(^8\), being at the same time a component of the pension system, which collects and invests the funds of its participants on a collective basis to provide additional future pension benefits” (Kurowski 2006: 33). The advantage of this definition is sufficient semantic capacity, and yet the possibility of operationalization, translating into categories usable in empirical research.

It can therefore be assumed that, despite the diversity of organizational forms, the vast majority of occupational pension schemes existing today operate in the form of a pension fund\(^9\). Such fund, collecting resources in occupational pension schemes can operate in numerous organizational and legal forms (as an investment company, public company, non-profit entity, etc.) The fund can be managed internally (managing institution assigned exclusively to a particular fund, for example, in Poland, the employee pension society managing the employee pension fund) or externally (financial institution that manages a number of pension funds – for example, an investment company, an insurance company, a bank). With regard to the nature and scope of participation, pension funds operating in the companies may in turn be divided into voluntary and universal (mandatory), single- or multi-facility (also industry specific).

\(^8\) A financial intermediary is a person, who collects funds from natural and legal persons, who in a given period dispose of free financial resources, in order to lend these resources (under defined and agreed upon conditions) to other natural or legal persons, who at that time need cash (Głuchowski (ed.), 2001: 225).

\(^9\) There are some exceptions – for example, internally managed pension system of a book reserve type, where the future occupational pension is promised by the employer, who may choose to create adequate reserves for this purpose (recorded in the balance sheet on the liabilities side). The pension fund does not play here the role of financial intermediary who invests money from premiums in the financial market.
Defined benefit (DB) systems versus defined contribution (DC) systems

A defined benefit (DB) program differs from a defined contribution (DC) program in terms of a possibility to determine in advance the amount of future pension benefits. The difference lies in the element of the contract between employer and employee which is defined in quantitative terms: the amount of benefits to be paid in the future (in proportion to a salary) – in the defined benefit system, or only the amount of a pension contribution (contributions to the system) – in a defined contribution system. In the latter case, the amount of future benefits is not known in advance, and depends on the effects of investing in the financial market the resources allocated to occupational pensions. This distinction is important because it results in different rights (claims supported by law) of employees (Golinowska 1994: 31).

Occupational defined benefit pension schemes are also called in English literature a final salary schemes or salary related schemes. Employees participating in such a scheme make payments during the period of employment in return for a benefit, promised in the contract of an occupational pension scheme, of a specific height predictable in advance. Usually the contributions of employees saving for retirement in the workplace are supplemented by the premiums paid by the employer. The amount of occupational pension in such system usually depends on the number of years worked with the employer and the amount of earnings from this period (Averting ... 1994: 169-170). It is similar to the pensions paid from public pension schemes based on defined benefit. The calculation of an occupational defined benefit pension is based on a product of a certain part of the employee's salary and number of years worked. For example, a pension benefit set at 1.5% per year, multiplied by 35 years effectively worked by the employee, is the basis for calculating an occupational pension (defined benefit) in the amount of 52.5% of his annual incomes. Initially, an average income from entire period of employment was used in calculations, but with time, it evolved toward a solution more favorable for the employee, where the pension is calculated based on the average of the best or the last few years of work (Ambachtsheer, Don Ezra 2001: 215).

The amount of occupational pension in a defined benefit system can also be calculated in a slightly different way, taking into account three parameters:

• duration of employment (pensionable service),
• earnings in the period preceding the retirement (final pensionable salary),
• accepted in a given pension scheme the “growth rate” (accrual rate).

If the rate accepted in the company’s pension scheme is for example 60, the participant will receive a 1/60 of final salary for each full year of service. The benefit can thus be calculated according to the following formula:

Occupational pension (type DB) = number of full years of employment × final salary before retirement / 60
The way of determining the amount of pension in relation to a salary in the defined contribution system has an impact on the functionality of the occupational scheme and its usefulness to the employer. The basis for the calculation of pension can be seniority, wages from the last period before retirement (final salary), the average salary or pay grade. As rightly noticed by S. Borkowska, each of these solutions entails certain consequences and may reflect different remuneration policy conducted by the employer (see Borkowska (ed.) 2006: 409). If seniority is to be the basis for the calculation of benefit size, the rate of retirement is not related to wages and is formed independently of them. What matters is how long the employee is bound with a given employer. This means that the company prefers employees with long seniority, experienced, older, and rewards loyalty toward the employer. Linking a defined benefit occupational pension with a final salary, often used in countries with developmentally advanced capitalism, is more expensive to the employer than other options. However, it is very motivating, as it prefers highly qualified people, receiving adequately higher remuneration. The benefit, which size is determined on the basis of average earnings, plays in turn rather a social role. It is more beneficial for people with lower-qualifications and respectively lower-wages. Therefore accepting certain parameters regarding the occupational scheme (for example, the above-mentioned issue of determining the amount of benefit based on program participant’s earnings, the method of contributions payments, their relationship to the total gross income, the proportion between the real current and deferred income, etc.) has significant influence on whether and to what extent these programs can be used as instruments in the strategy of the human resource management.

The financial structure of occupational pension schemes based on a defined benefit poses a number of problems for both employers and employees. For employers they represent obligations for a very long time. In conditions of a competition and market economy it is difficult to assume in advance that every employee participating in the occupational pension scheme will be useful for the company for the next 30 years or so. Therefore, employers usually reserve the right to dismiss employees, temporarily suspend the payment of premiums in the event of significant deterioration of the financial situation, or to convert from a defined benefit to a defined contribution program (Averting ... 1994: 169). Additionally, in many defined benefit systems, the time necessary to acquire rights to the resources accumulated in program is defined (vesting), usually from one to few years and in extreme cases up to ten years (Cooper 2002), after which it is possible to transfer (portability) funds to another occupational pension scheme when changing the workplace. If workers change the place of employment before the end of that period or are laid off, they lose entitlement to the funds accumulated in a defined bene-

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10 On the use of occupational pension schemes as an nonfinancial instrument of remuneration and an element of human resource management strategy – see section 5.1.4 of this paper.
fit program. Also changing place of employment after having worked the minimum number of years required by a pension contract, qualifying for benefits, is normally associated with losing part of the benefits. This way the occupational defined benefit schemes play a traditional role of binding the worker with a workplace (“golden handcuffs”).

In defined benefit systems, employer bears the investment risk. Occupational pension contracts are concluded for long periods: a worker can be employed in the company for up to 30–40 years, and the obligations arising from this contract may concern payments for the next 20 years. During this time a number of difficult to predict turbulences may happen in the financial markets, in which money collected in the occupational pension fund is invested; also the company’s financial situation may deteriorate as a result of increasing competition, the emergence of new technologies, or unforeseen events in the company and its environment. J. Stewart and B. McNally, analyzing the risk factors in occupational pension schemes in Ireland, draw attention to the existence of institutional risk. It concerns the investment policy carried out by the occupational pension fund (managed internally), but also the risk associated with activity of external financial institutions managing funds accumulated in the occupational program – such as mutual funds, insurance companies (Stewart, McNally 2003). Moreover, a pension fund, managed both internally and by a specialized financial institution may invest in financial instruments managed by other financial institutions (sub-providers). The final result of the investment is thus determined not only by the competence of the people managing the pension scheme, but also the quality of management of other participants of financial market, whose services these people use. Additionally, the investment risk is not only present in the phase of accumulating the capital, but also in the phase of benefits payment. It may, for example, turn out that a pension fund in the company had failed to gather sufficient funds to cover liabilities arising from payments of occupational defined benefit pensions. The money accumulated in the fund may also be transferred to the insurance company in exchange for the buyout of lifetime pensions for employees (annuities). In such case, in turn, part of the risk is taken over by the insurance company, but the employees still have certain claims against the employer. In longer perspective, even insurance companies, institutions well prepared to manage the risk, can get into financial trouble. This type of risk cannot be entirely eliminated.

On the other hand, for employees participating in the defined benefit program, a basic risk is that they will not receive benefits promised in the occupational pension agreement. Not paying the benefits by the employer may be caused by many factors – not just the deterioration of the financial situation of the employer result-

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11 For example, British Telecom was forced to spend 1.6 billion pounds to cover the deficit in defined benefit occupational pension system. Similarly, the British company Chubb had to include in their financial plans an additional payments to the defined benefit pension program amounting to 15 million pounds sterling for 15 years (Stewart, McNally 2003).
ing from the economic downturn in the market and the increase in competition, but also, for example, the criminal actions of the company management or a pension fund related to it. The participant of a defined benefit pension program is also saddled with the risk of losing all or part of the funds collected in the program as a result of changing the workplace (job mobility risk) prior to becoming entitled to benefits resulting from working a certain number of years for the employer (the already mentioned vesting).

The most important features of occupational defined benefit schemes can be characterized as follows (Green Paper on Pensions 2007):

• defined in advance amount of future pension benefits determines other parameters (including the value of the contributions), which must be adjusted to it;
• the value of contributions varies; in many countries it is adjusted to the results of a systematically conducted demographic forecasts and actuarial accounts;
• participants can predict the amount of pension they will receive from the DB system, directly before their retirement, as a proportion of the final salary;
• the greater the return on investment of funds accumulated in a defined benefit system, the lower the required premium; this principle works both ways however;
• the lower the income from investments, the more you need to increase premiums in order to achieve level of benefits agreed upon in occupational pension agreement;
• the amount of the employee’s premium is usually fixed at a constant level; periodical supplementing of contributions to the amount guaranteeing payment of future benefits is usually made by the employer;
• a defined contribution system is particularly beneficial for those employees who remain employed with the employer until retirement age; employees who change their place of employment before retirement may receive much less benefits, and in this sense the DB fulfills the traditional function of binding the employee to stay with the employer, through additional benefits of long-term employment.

The fact that the defined contribution schemes, which have previously been regarded as stable, predictable and useful, lost their advantages for part of the employers and employees and are being gradually replaced by other systems of collective saving for additional retirement, was determined by many factors, of which four appear to be particularly important (Ambachtsheer, Don Ezra 2001: 216-217).

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12 There are numerous examples of misappropriation of funds allocated in occupational pension schemes, or loosing money accumulated in these funds as a result of bankruptcy of the company, which was the consequence of criminal offences committed by managers (for example, an American company Enron in the energy sector).

13 Such systematic demographic studies and actuarial accounts are carried out, for example in Ireland. In Poland there is no official institution of national actuary for the pension system; financial institutions run this type of accounts on their own, and the results are usually not published.
With the increasing mobility of the workforce and changes in legal regulations (the required minimum periods for gaining benefits are getting shorter and shorter, the issue of rewarding employees with an occupational pension scheme for the long-term work is gradually losing its importance.

Increasingly better educated workers are paying more and more attention to the possibility of exercising control over the funds accumulated in pension schemes, over how they are invested and the results of their management.

It is accompanied by increased interest in greater transparency of relationships with employers, especially in regard to remuneration systems (occupational pension schemes are an important element of the remuneration policy, under which the employer offers a variety of financial and non-financial benefits, other than a basic salary).

Since occupational defined benefit pension schemes become a standard offer of employers, a number of regulations was introduced regarding their operation (concerning retirement, tax, and even divorce laws), as well as detailed rules regarding the implementation and administration of the program in the workplace, carrying out an investment policy, disposing of financial surplus, etc.

The intention of these regulations was to protect the interests of employees, but for employers they have become increasingly onerous.

A growing share of small and medium-sized enterprises in the labor market of advanced capitalist countries caused that companies in this sector could not or did not want to bear the burden associated with the need to adjust to the changing legal requirements and to cover the rising operating costs of occupational defined benefit pension schemes.

Also, the investment risk associated with a defined benefit scheme was more noticeable for smaller firms than for larger companies disposing of greater capital and able to generate higher financial reserves.

The same problems occur in developing countries, where occupational pension schemes are much less developed. Additional difficulties arise from the lack of or poor development of the technical infrastructure and regulations necessary for the proper functioning of the defined benefit schemes. Employers conducting such programs should have qualified staff, including specialists in the field of actuarial calculations. Their training takes time, just like the creation of coherent and precise legal regulations.

Listed below are some of the factors which reduce the attractiveness of the defined benefit system compared to defined contribution system (Green Paper on Pensions 2007).

- Risk aversion on the employers side.
- Large fluctuations and volatility in the financial markets, rising costs of defined benefit pension schemes and a strong awareness of the financial risks faced by the company, associated with the introduction of international accounting standards, may cause a decrease in contributions (premiums) paid to pension
schemes by employers and the desire to reduce the level of long-term commitment to their employees.

- Increased labor mobility of employees associated with the development trends of modern post-industrial economy, which is dominated by the service sector, and a primary source of competitive advantage is knowledge, access to it and the ability to use it (knowledge-based economy – NBO, also known as new economy).

- Defined contribution programs are more attractive to those employees, who wish to work in a company for a shorter period of time or cooperate with it using flexible forms of employment offered by the modern labor market, as well as for those who appreciate more control over allocation of assets gathered in the pension system.

- Rationalization of choice of a form of long-term saving.

- Internationally observed higher profit growth in the capital market (but also greater possible losses, often underestimated during prosperity periods) compared to the limited increase of wages, causes that more and more people prefer to determine their future pensions based on the expected capital profits than on the value of last salary.

In many countries, part of the investment risk borne by employers conducting programs of DB type is transferred by taxpayers to the financial guarantee institutions (for example, in the U.S. this role is played by a government institution – Pension Benefit Guaranty Corporation). However, they can only protect against the effects of crises or bankruptcy of individual companies, but not against the larger scale risk, concerning entire industries or the national economy (Clark, Whiteside 2003: 234). The increasing globalization\(^\text{14}\) of economies and financial markets makes such guarantees even more dubious.

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\(^{14}\) In the literature of Macroeconomics and Finances there is a wide variety of definitions of globalization. It is a dynamic and multidimensional process. In fact, we are dealing with a number of interrelated processes, occurring with different dynamics: the globalization of markets, the globalization of the international division of labor in the area of production and exchange of goods and services, the globalization of entire economies, and finally, the globalization of financial markets. From an economic point of view, globalization should be combined with the increasing interdependence of national economies expressed by the growing exchange of goods and services and flow of capital. In a globalized world, the flow of goods, services and capital will occur smoothly, as it happens currently within the national economy. When a single global market for goods, services and labor and a common financial market will come into being it will be fully possible to use economies of scale. Then the population of the entire planet can be treated as one potential market. One of the more astute critics of globalization, Joseph E. Stiglitz, an American Nobel Prize winner of 2001, who once served as chief economist of the World Bank, argues that globalization is a "closer integration of the countries and people of the world, caused by a huge reduction of the cost of transport and telecommunication and the removal of artificial barriers in the flow of goods, services, capital, knowledge, and (to a lesser extent) people from
Some of the defined benefit schemes are not equity based, but are funded internally or based on intergenerational contract (PAYG). In case of internal financing (book reserve) the problem of proper recognition of employer's obligations toward the pension plan participant occurs. According to International Accounting Standards, they should be recorded in the company's balance sheet as liabilities, although not all companies comply with this rule. However, defined benefit programs, which are equity financed (with a separate pension fund) are also considered to be less financially transparent, especially from the employee's perspective (the fund is managed as a whole and employees do not have separate retirement accounts, where they could keep track of the effects of investments).

In countries of advanced capitalism, defined benefit programs prevail, but gradually, since the 80s of the Twentieth century, they lose popularity in favor of an alternative form of retirement savings (ie defined contribution programs). In some countries (e.g. USA and Canada) at the end of the last century, the number of defined contribution programs and value of funds accumulated in them exceeded the number and value of assets of the defined benefit schemes. In these countries, defined contribution schemes (DC) always prevailed among small employers (Ambachtsheer, Don Ezra 2001: 218). Also in European countries occupational defined contribution schemes are becoming more and more common. In some countries (e.g. the United Kingdom and Ireland), many occupational defined benefit schemes have been made unavailable to new participants (new employees of the company).

In defined contribution systems, collective saving was combined with individual retirement accounts (Golinowska 1994: 33). These accounts accept contributions paid by employers, employers and employees, or solely by employees (Averting ... 1994: 172). In many countries, employees who declare investing part of their remuneration in occupational pension schemes, benefit from tax incentives.

one country to another” (Stiglitz 2007: 26). Leszek Balcerowicz, defines globalization as “the reduction of the difficulties in concluding contracts and transactions between people in different parts of the world and as a result – growing, on a global scale, mobility of products, services, people, capital, ideas, images, etc.” (Balcerowicz 2005).

15 For example, in the U.S. the number of participants of defined contribution occupational pension schemes (42.4 million) exceeded the number of participants of a defined benefit programs (39.5 million) in 1991, and the value of assets held in DC schemes exceeded the value of DB plans’ assets only at the end of the last century, in 1997 (Clark, Whiteside 2003: 234). In the U.S., government employees (federal) mandatory participate in the three pillars of the pension system: public, defined benefit and defined contribution. In the private sector the most popular are defined contribution programs, known as 401(k), derived from the number of section of the Revenue Act of 1978 (Revenue Act of 1978) (see Stewart, Mc Nally 2003).

16 For example, in the UK in 2007, approximately 75% of the active participants of occupational pension schemes (in the retirement capital accumulation phase) in the private sector participated in defined benefit programs (Office for National Statistics, 2007).
Without analyzing the technical details, it is worth indicating their significant advantages for both employers and employees, as well as risks they entail.

Defined contribution occupational pension schemes are often referred to as money purchase pension schemes, because in return for invested premiums, recorded in the personalized retirement accounts, the program participant will in future receive certain cash benefit, which value will depend on the contributions made and the result of investments. In this system, the amount of future benefits is not pre-defined and depends largely on the effects of investment in the financial market. Needless to say, also in a defined contribution scheme the amount of future pension is essentially determined by the value of contributions made to a pension scheme, and can be predicted with reasonable accuracy. It requires certain financial simulations, making assumptions regarding the profitability of investments, situation of the national and global economy, and in the financial markets, etc. However, the amount of future benefits is not guaranteed by the occupational pension contract in proportion to the remuneration, as in defined benefit schemes.

In many DC pension plans, payment of the “purchased” in this way occupational pension is divided into two parts: first part is a one-time payment of a sum of gathered pension capital (lump sum), usually exempt from tax, and the remaining part forms a constant stream of payments (annuities) coming from the resources left in a pension fund or from benefits purchased with these resources, provided by third parties (mainly the insurance companies)\(^{17}\).

Defined contribution occupational pension schemes are usually fully funded. In such systems, the real money is invested in the financial markets (Averting \(\ldots\) 1994: 172). Very often the DC systems are managed by external financial institutions (insurance companies, mutual funds, banks).

In general, it is assumed that these systems are safer for an employer, who is not required to pay in future a pension of a predetermined value. Investment risk is largely passed on the employee. In exchange for risk allocation from employer to employee, program participants can count on certain benefits. They often have the choice between several investment funds and at least a partial influence on investment strategies (for example, what percentage of the premiums paid to a pension scheme is to be invested in stocks, bonds or other financial instruments). Defined contribution schemes are more transparent to employees, who can systematically track the status of their individual savings account in a given program\(^{18}\). Typically, the defined contribution schemes are not subject to so many restrictions regarding the time required to gain rights to the resources accumulated in the program (vesting) or the transferability of funds to different pension schemes, as it is in case of

\(^{17}\) These types of solutions are used for example in some occupational pension schemes in the UK and Ireland.

\(^{18}\) In DC schemes, managed by external financial institutions, such as mutual funds, thanks to the Internet, participants can keep track of the value of the units of the fund, and thus determine the current value of the investment in their savings and investment accounts.
defined benefit schemes. However, there are a number of risks regarding defined contribution equity funded pension schemes, which their participants are not always aware of (see Table 2.5).

Table 2.5

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market risk</strong></td>
<td>The value of investments reported on the individual account of a pension scheme participant may fluctuate and decline significantly due to adverse financial market conditions (e.g. slump on the stock exchange).</td>
</tr>
<tr>
<td><strong>Economic risk</strong></td>
<td>The real rates of return on investments (rate of return above inflation) may prove to be unsatisfactory due to the difficult conditions in the economy or bad economic policy, for example, due to inflation or low economic growth.</td>
</tr>
<tr>
<td><strong>Default risk</strong></td>
<td>Investments made on behalf of the participants of an occupational pension scheme can bring effects later than proposed time limits of return on investment or lose value due to the financial difficulties of the institutions managing the program, such as an insurance company.</td>
</tr>
<tr>
<td><strong>Management risk</strong></td>
<td>Managers may prove incompetent, and sometimes even commit a criminal offence while managing the fund.</td>
</tr>
<tr>
<td><strong>Interest rate risk</strong></td>
<td>The value of the benefit which can be purchased with the sum of the accumulated premiums paid into the program and the interest on the capital investments will mainly depend on the interest rates on the financial markets at the time of ending the saving phase and converting accumulated savings into lifetime benefits (annuity).</td>
</tr>
<tr>
<td><strong>Longevity risk</strong></td>
<td>The increase of average life expectancy and the associated extension of the benefits receiving period are taken into account in the calculations (based on actuarial calculations) of financial institutions, in which lifetime benefits are purchased with the resources accumulated in DC (e.g. insurance companies) and they have impact on the amount of those benefits (annuities). If participants of an occupational pension scheme have the opportunity to make a one-time withdrawal of the entire sum accumulated in it, they also assume the risk of longevity, that is exhausting the funds in the old age exceeding the average life expectancy for the population (cohort) of retirees.</td>
</tr>
<tr>
<td><strong>Operational risk</strong></td>
<td>Managers of pension fund may lose the capability of adequate control at the operational level (current investing of funds gathered in the individual accounts of program participants). This phenomenon may be caused by the lack of necessary information following natural disasters, failure of an IT system or other random events.</td>
</tr>
</tbody>
</table>
### Table 2.5 contd

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insolvency risk</strong></td>
<td>The company managing the pension program or providing pensions</td>
</tr>
<tr>
<td></td>
<td>from the funds accumulated in the program (e.g. insurance company)</td>
</tr>
<tr>
<td></td>
<td>may become insolvent and file for bankruptcy. Consequences of</td>
</tr>
<tr>
<td></td>
<td>bankruptcy may vary for program participants, depending on the</td>
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<td></td>
<td>legal and institutional solutions adopted in the country (in</td>
</tr>
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<td></td>
<td>many countries there are legal protections – such as compulsory</td>
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<td></td>
<td>insurance of funds accumulated in the program, insurance from</td>
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<tr>
<td></td>
<td>bankruptcy, reinsurance of insurance companies involved in the</td>
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<tr>
<td></td>
<td>payment of annuities for participants of pension schemes, etc.)</td>
</tr>
<tr>
<td></td>
<td>The cost of administering pension scheme or accepted level of</td>
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<tr>
<td></td>
<td>remuneration (commission) for the managing institution may prove</td>
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<td></td>
<td>too high and unfairly passed on fees collected from program</td>
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<td></td>
<td>participants’ savings accounts (e.g. assets management fee,</td>
</tr>
<tr>
<td></td>
<td>distribution fees)</td>
</tr>
<tr>
<td><strong>Fiscal risk</strong></td>
<td>The government may change the tax rules for occupational pension</td>
</tr>
<tr>
<td></td>
<td>schemes, reducing the rate of return on investment in such</td>
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<tr>
<td></td>
<td>programs (e.g. withdrawing the previously granted tax</td>
</tr>
<tr>
<td></td>
<td>incentives or reducing their level).</td>
</tr>
<tr>
<td><strong>Regulatory risk</strong></td>
<td>Institutions supervising the occupational pension schemes may</td>
</tr>
<tr>
<td></td>
<td>not see in time the risk in the manner of managing of a</td>
</tr>
<tr>
<td></td>
<td>particular pension fund or on the contrary – revoke the license</td>
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<tr>
<td></td>
<td>of the management institution, causing perturbations to its</td>
</tr>
<tr>
<td></td>
<td>participants.</td>
</tr>
<tr>
<td><strong>Political risk</strong></td>
<td>The government may directly interfere with the operations of</td>
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<td></td>
<td>pension funds, change the rules of paying contributions,</td>
</tr>
<tr>
<td></td>
<td>investing the collected funds, impose investing in government</td>
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<tr>
<td></td>
<td>debts or in economic undertakings generating lower rate of</td>
</tr>
<tr>
<td></td>
<td>return than could be achieved when freely investing in the</td>
</tr>
<tr>
<td></td>
<td>financial market.</td>
</tr>
</tbody>
</table>

Based on Daykin 2002.

From the perspective of an institution managing the resources accumulated in the defined contribution pension plan (pension fund) or external financial institution providing occupational pensions in exchange for resources from the pension fund (e.g. an insurance company) it is important to distinguish between protected pension plans and unprotected pension plans.
Table 2.6
Comparative analysis of the basic features of defined benefit (DB) and defined contribution (DC) occupational pension schemes

<table>
<thead>
<tr>
<th>Defined benefit systems (DB)</th>
<th>Defined contribution systems (DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The amount of benefits is determined in advance. Benefits independent of the rate of return on investment, or the interest rates in the financial markets (neither during the capital collecting period nor during benefits payment phase).</td>
<td>The amount of retirement benefits is not known in advance. It depends on the rate of return on investment, the amount of contributions made and costs of pension payments (annuities).</td>
</tr>
<tr>
<td>Employers cover the majority of the costs of future pension benefits for their employees. If the rate of return on investment of contributions made to the program is too low or there is an increase in administrative costs of operating the program, then in the event of a deficiency of funds needed to pay pensions at a predetermined level, the employer is forced to increase the amount of his contributions (premiums) or make a one-off payment to guarantee a predefined amount of benefit.</td>
<td>The program participant (employee) bears the investment risk associated with investing contributions to the financial market. If the premium paid by him is not increased in periods when investments yield worse results, occupational pensions benefits will be correspondingly lower.</td>
</tr>
<tr>
<td>The employer bears the financial risk (although the program participant/employee bears the risk of employer’s bankruptcy)</td>
<td>The program participant (employee) bears the financial risk.</td>
</tr>
<tr>
<td>Programs designed for employees who collect money in them for a long time and whose salaries are gradually increasing. Difficulties of moving funds to other pension schemes (portability).</td>
<td>The construction of these programs is beneficial for employees paying contributions (and employed in the company) for a shorter period of time, whose earnings are subject to large fluctuations. Ease of transferring funds to other pension plans in case of changing place of employment.</td>
</tr>
</tbody>
</table>

Based on Gennard, Hayward 2005.

In the unprotected pension plans there are no guarantees from either the pension fund or from a financial services provider as to the rate of return on investment, or other obligations regarding the entire pension plan. The protected pension plans, on the other hand, offer such guarantees – for example, the return on investment not lower than the yield of safe debt securities, or higher than the rate of inflation or other benchmark indicator.
Comparison of basic features of defined benefit (DB) and defined contribution (DC) occupational pension schemes can provide a basis for evaluation of the advantages and disadvantages of such programs to employers and employees (see Table 2.7).

<table>
<thead>
<tr>
<th></th>
<th>Defined benefit systems (DB)</th>
<th>Defined contribution systems (DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>employer</td>
<td>employee</td>
</tr>
<tr>
<td>D*: Investment risk</td>
<td>A**: Guaranteed benefits</td>
<td>A: No investment risk</td>
</tr>
<tr>
<td></td>
<td>(the amount known in advance, easy to calculate in proportion to earnings; easy evaluation of the adequacy of the benefit to anticipated needs, the possibility of relatively precise planning of retirement incomes from different sources)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D: The risk of a possible increase of program operational costs (related to its sustainability)</td>
<td>D: Risk of employer’s insolvency</td>
</tr>
<tr>
<td></td>
<td>A: Ability to bind employee with a company for longer period of time (early withdrawal from the program entails measurable losses for employee)</td>
<td>D: Difficult to transfer funds accumulated in the program, reduced occupational mobility</td>
</tr>
<tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>D* – factors which are disadvantageous for the employer or the employee (participant). Z** – factors which are advantageous for the employer or the employee (participant).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on *Second Pillar Schemes* 2005: 4.
An attempt to overcome the limitations of defined contributions and defined benefit plans are so-called hybrid pension schemes. They can be defined as pension schemes, which are neither entirely defined contribution systems nor the contracts, in which a defined element is the level of contribution (DC), but which combine elements of both these solutions. The main goal of creating hybrid systems regarding occupational pension schemes is the apportionment of risk between the employer and the employee and the achievement of certain additional benefits (mainly fiscal, but also related to the remuneration policy).

Hybrid programs are usually dominated by components of defined benefit schemes, but the difference lies in the method of determining the amount of future pension benefits. While in traditional DB pension schemes, the amount of future pension is tied by a specific calculation formula with the value of incomes of program’s participant, in case of hybrid programs other solutions are possible (Blommenstein et al. 2008: 9). Discussed below are the most popular types of hybrid systems (Wesbroom, Reay 2005).

- Sequential hybrid scheme can contain a component of a defined contribution scheme (e.g. for participants under 45 years of age) and a component of a defined benefit program (for those over that age limit). This type of program facilitates the transfer of collected funds for younger, more occupationally mobile workers.

- Combination hybrid scheme combines two elements: retirement in defined benefit system (calculated as the proportion of a certain limit of incomes (e.g. basic salary without any additives) and the retirement in defined contribution system (calculated from the salary above that level).

- Underpinning agreements. In practice, two types of such programs are used: First – the defined contribution occupational pension scheme with an accompanying DB agreement. It guarantees payment of benefits not lower than what the employee would have received under the defined benefit scheme in the event that investments in defined contribution system yielded poor results. Second – it is a defined benefit (DB) pension plan with an “underpinned” defined contribution (DC) program. It guarantees workers a value of pension corresponding to the value of the contributions and returns on investments. This also applies to employees changing jobs early, who can withdraw their collected contributions along with interest (as in a classical defined contribution program).

- Cash balance scheme is a defined benefit program, in which however (as in a defined contribution program) the contributions are recorded on participant's individual account. A level of contribution and return on investment is defined in the program (independent of the actual investment results of the program, but usually associated with market parameters – such as the rate of return on safe investments in bonds or treasury bills), which determine the personal account
interest rate for program’s participant. The sum of the participant’s retirement savings accumulated in the program is used to buy a life-time pension benefit (annuity). From the employee's perspective this type of a pension plan resembles a defined contribution system, except that it is less risky, as it guarantees a certain rate of return on investment and reduces the potential effects of the downturn in the financial markets, in which contributions are invested. From the point of view of the employer however, it means – on the principle of symmetry – taking over the part of the investment risk. Programs of this type are sometimes referred to as a shared risk schemes. They are the most popular hybrid pension schemes in the United States.

- Targeted benefit schemes are defined contribution pension schemes, but with a predetermined amount of benefit (such as in defined benefit schemes). This means that, if necessary, the amount of premiums may be changed and adjusted to the desired level of retirement (while in regular DC program, contributions are set at a constant level, for example, as a percentage of salary, and the amount of future benefits is not predetermined, and depends solely on the obtained results of investments).

- Career average plans are defined benefit (DB) pension programs offering retirement benefits based not on final salary (as in regular DB program) but on the earnings from entire period of participation in the program. Earnings from particular years are subject to valorization when the final calculation is made. This way they undergo the revaluation, that is why this type of programs are also called CARE plans – career average revaluated earnings plans or index pension plans. Of course, these programs are less beneficial for employees (normally the last salary is higher than the average earnings from the entire period of work), but they are safer for employers.

- Final salary lump sum plans in which the amount of benefits is expressed in relation to final salary but paid as a one-time payment and not in form of pension (life annuity).

- Self-annuitizing plans – programs, in which an employer offers transformation of resources gathered in the program into the lifetime pension (life annuity) paid also from the program resources, and not into the lifetime benefit purchased from an external financial institution.

Types of hybrid pension schemes characterized above obviously do not represent all of the opportunities created by the dynamic development of the financial markets (subject to the process of globalization), and innovative, increasingly sophisticated financial instruments. It can be concluded that hybrid pension schemes, which combine elements of defined contribution schemes with defined benefit schemes, can at least partially reduce the weaknesses of the traditional DB and DC
schemes; in particular they allow risk sharing between employers and employees participating in the program (see Figure 2.6)\(^{19}\).

Analyzing the division of selected types of risk in occupational pension schemes, we can distinguish various possible combinations of its distribution. An example of the division, taking into account only the three common types of risk, is

\(^{19}\) Solution regarding organization and functioning of occupational pension schemes adopted in Poland are presented in detail in Chapter 4. At this point it should be pointed out that in comparison to hybrid pension plans, under which the allocation of risk between the employee and the employer, the principles of organization and funding of occupational pension schemes adopted in Poland, are relatively uncomplicated. PPE are fully funded, are organized on the basis of defined contribution (DC), and the entire investment risk is passed to the employees (participants). The payment of PPE in Poland is a one-time (lump sum) event, and not the regular payments spread over time (annuities), as in most European Union countries. This creates an additional risk for the employee of value loss of accumulated retirement capital due to inflation in the phase of consumption of that capital, as well as a very real temptation to use the money for other purpose than additional retirement security.
presented in Table 2.10. The table lists several types of risk associated with pension plans (see McCarthy 2005).

- **Investment risk** – if the base for future pension payments will be the value of assets, in which pension contributions were invested (return on investment plus the sum of the contributed retirement capital), there is a risk that the downturn in the financial market will cause a decrease of this value, resulting in a lower level of occupational pension. Investment risk, typical defined contribution (DC) systems, makes it impossible to determine in advance a level of benefits satisfactory to program participants.

- **Annuity conversion risk.** Conversion of capital accumulated in the pension system into the flow of periodical, regularly paid benefits. In some occupational pension schemes, resources are disbursed to participants at once, after passing the specified age limit equal to the applicable statutory retirement age in the country or close to it. As a rule, however, the beneficiaries must purchase a lifetime pension (life annuity), using the resources gathered in the occupational pension system, usually in one of the life insurance companies providing such services. The time to do this type of conversion of pension equity into life annuity is limited, which may cause that it will happen in adverse circumstances (e.g. slump in the stock market), and will result in a decrease of the value of accumulated pension assets, and consequently, the reduction of lifetime services purchased with them. Method of payment of funds accumulated in the program also affects the so-called longevity risk (above average life expectancy of the beneficiary), which may burden the employer, the sponsor of the program, or the participant (reduction of benefits). In general, the risk of conversion can be reduced to a lack of certainty as to whether the conversion of accumulated retirement capital (usually paid as a lump sum or a stream of lifetime benefits) will guarantee its relevance to the needs and expectations of the system participant and, in case of lack of such relevance – as to who will bear the financial consequences of this situation (employer, paying extra for occupational pensions when they come due, or the employee).

- **Salary risk and inflation risk.** Occupational pensions can be defined in relation to the last earnings from the period immediately preceding retirement, but also with no relation to their level. The second solution is more risky for the employer – a participant of the program. In addition, the majority of occupational pension schemes are burdened with inflation risk, because unlike the benefits from the universal (public) pension system they are usually not a subject to periodical valorization.
Poland adopted a variant of occupational pension schemes, has a fairly simple structure compared to the above-characterized, often very sophisticated solutions to ensure the distribution of risk between the employer and the employee – participant of the pension scheme. They are organized on the principle of defined contribution (DC), and the benefit is paid once the participant reaches the age limit of 60, or after acquiring pension rights earlier. Program participant (employee) bears the full investment risk, which is typical for a defined contribution programs. Also, a one-time payment of occupational pension that is not converted into a stream of lifetime payments (for example, into life annuity bought out in an insurance company), is quite risky for employees. They bear the conversion risk, inflation risk (employer is not liable for the amount of occupational pension, it is not known in advance, but is a resultant, depending on the effects of investments in the financial market and program’s operating costs, on which the employees have, in fact, no influence; pensions from PPE are not subject to valorization considering inflation index in the benefit payment phase), as well as other risks typical of DC schemes. In this situation, it is difficult to predict whether the participation in occupational pension schemes, in an event of the continued downturn in the financial market, will allow
for the gathering sufficient additional retirement capital, which will close the financial gap between the incomes from the period of professional work and the standard of financial security in old age offered by the public mandatory pension system.

2.4. Management of occupational pension schemes assets and financial markets

Occupational pension schemes evolve from solutions based on defined benefit in the amount guaranteed by the employer, to a defined contribution system and the mixed hybrid solutions. This trend is particularly visible in Anglo-Saxon countries (USA, UK, Ireland), but the most recent comparative studies show that in the first decade of the twenty-first century it is already present in most European countries (see Workplace Pensions ... 2010: 2-3). Occupational pension schemes and services offered by them are increasingly dependent on the situation in the financial markets and the quality of management of pension funds’ assets by financial institutions (financial service providers). On the other hand, the decisions of institutional investors, including financial institutions operating pension funds collected in occupational programs, significantly influence the situation in the global financial market (Clark 2006). Periodically emerging financial crises – such as a so-called “dot com crisis” in the 90s of twentieth century and the global financial crisis in 2008-2009 originating in the mortgage banking market in the U.S. in 2007 – resulted in a drastic drop in the value of pension funds’ assets, especially in defined contribution programs. This of course could have had a negative impact – and in case of people approaching retirement age, having no time to make up for investment losses it indeed had – on the amount of future occupational pensions. Risks associated with investing in the financial markets exists of course also in defined contribution systems, but – as already mentioned – it is assumed by an employer. This does not mean that the defined benefit schemes are completely safe for employees. They bear the risk of insolvency of their employer (if it was not ceded to the state authorities or special insurance institutions or guarantee funds, to ensure the payment of benefits in the event of employer’s insolvency). Also occupational schemes based on internal financing within the workplace (for example, the so-called book reserve systems) are not independent of the economic situation or indirectly of the situation on financial markets. However, the value of obligations toward employees in these types of systems is not subject to such rapid fluctuations in the value of the assets of occupational pension schemes invested directly in the financial markets.

In the world literature regarding social policy and finance, the issue of efficient investing of pension funds’ assets and reducing the associated risks is vividly discussed. A number of interesting works have been written about the principles of
effective management (cf. Ambachtsheer, Don Ezra 2001; Clark, Whiteside (eds.) 2003: 7-13; Barr 2002; Ambachtsheer 2007). The review of the literature on this topic is beyond the scope of this paper. However, it seems important to identify a number of key issues related to the investment of occupational pension schemes’ assets in the financial markets.

International financial institutions promoting multi-pillar systems with mandatory or voluntary capital segment (known as funding or prefunding), such as the World Bank, suggests that the balance of costs and benefits in the case of equity financing is positive, but it entails additional costs, mainly due to the increased investment risk and higher transaction costs, including fees and commissions of institutions managing the assets in the financial markets (see Holzmann, Hinz 2005: 44-45). The exact determination of costs and benefits associated with the management of the occupational pension schemes is difficult, because it would require a detailed analysis of the actual commissions and management fees charged by all providers of financial services for pension funds in the country. These values often change, are usually negotiated, are normally trade secrets and may vary significantly in different occupational pension schemes in one country, let alone international scale. What’s more, the very simple comparison of the costs and effects of a pension fund using simple statistical methods (e.g. increase in the net value of the participation units in the pension fund during the year, calculated after deduction of withholding distribution costs and the cost of asset management, in absolute or real terms – after taking into account the rate of inflation) does not give the full picture. In general, to evaluate the effectiveness of investments in the capital market, more sophisticated financial analyses models are being used.

As aptly noted by Gordon L. Clark, the management process of pension funds’ investments is usually considered in two cognitive perspectives: based on empirical studies of specific activities of financial institutions and from the perspective of certain financial markets theory formulated on the grounds of Finances Sciences (e.g. effective financial markets hypothesis), using models, accepted on the ground of these theories, representing the frame of reference in the analysis of what actually happens in practical management of pension funds’ assets. Without going into details of model theories and solutions regarding efficient portfolio management, extensively described in the literature of Finances, there are three principles that – in the light of the results of studies conducted in English-speaking countries – are mostly used as guidelines by the managers of occupational pension schemes’ assets (Clark 2000: 79-89):

- striving to balance periods of duration (maturity) of invested financial instruments with time when participants of pension plans acquire rights to benefits in shorter and longer time perspective;
- managing risk through diversification of the investment portfolio.

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20 Extensive literature on the subject can be found in the bibliography of the work: Clark, Whiteside (eds.) 2003.
• managing costs by using market mechanisms (competition between issuers of financial instruments and financial institutions operating in the financial markets).

In the international literature, the most frequently mentioned are three groups of factors that determine the investment activities of pension funds (including occupational pension schemes): legal regulations concerning investment activity, applied standards and practices and the ability to diversify the investment portfolio by investing abroad. Both in the regulatory area and in practice of management of pension funds’ assets, there are large differences between countries, even within the European Union. It can be said that in countries with advanced capitalism, the level of freedom of activity and deregulation in the field of managing pension funds’ investments is higher than in the former socialist countries, where regulations on the activities of financial institutions involved in the market of pension funds are more restrictive. For example, pension fund managers in Anglo-Saxon countries have more freedom of choice of financial instruments than managers of occupational pension schemes’ assets in the post-socialist countries (e.g. Poland and Hungary) where strict limits are set on investing in certain types of financial instruments. These investment restrictions do not have to inevitably lead to worse outcomes of management of pension investments. The interesting comparative analysis of the results of pension funds’ investments (both public and occupational) in the post-socialist countries (Poland, Hungary) and in more developed countries with less regulations (USA, UK) between 1999 to 2005 shows that in Poland, where investment limits (pertaining to obligatory, open pension funds) were the most restrictive, management results in this period provided a greater return on equity than in the markets with less regulations (see Bohl, Lischewski, Voronkowa 2008: 13). This study, based on extensive empirical material and advanced methods of investment efficiency valuation used in the Finances Sciences, contradicts the theses formulated by other authors (Chan-Lau, Gravelle 2005), who argue that the effects of management of pension fund assets in financial markets subjected to fewer limitations and restrictions regarding the manner of investing, are generally better than the more regulated markets, subjected to more restrictions and safeguards.

On the other hand, in countries with advanced capitalism there are a number of regulations related to the management of investment risk, not present in the post-socialist countries. For example, in the UK there are requirements to maintain a certain minimum amount of capital in form of liquid (capable of being quickly converted into cash) financial assets, necessary to cover current liabilities toward participants of the pension fund, who in a given year gain rights to occupational pensions (minimum funding requirement).

The investment policy depends also on the age structure of the program participants: In pension schemes being in the early stage of development – in the retirement capital accumulation phase, in which the majority of participants will acquire pension rights in the longer run (e.g. 20 years), a more aggressive investment poli-
ey can be used, based on choosing an investment portfolio consisting of higher level of risk assets, which however can provide a considerably higher profits (for example, a large share of stocks). As programs mature, where after many years of savings a significant portion of participants are approaching retirement age and the payment of benefits, the aim is generally to reduce investment risk by investing in safe securities (usually in debt securities issued or secured by the State Treasury).
3. RISKS OF OCCUPATIONAL PENSION SCHEMES IN POLAND

3.1. Classification of risk of occupational pension schemes

In the literature, the risk is defined as an event with various results, achieved with a certain probability. There are many classifications of risk. Most generally, risk is classified according to the outcome of an event:

- pure risk – refers to situations, in which the result of an event is either the loss or lack of loss,
- speculative risk – refers to a case, in which an outcome of an event, different from the initial assumptions, is positive or negative.

Operation of occupational pension schemes is subject to pure risks of bankruptcy, breach of contract or an insurance event, in case of occupational pension plan in the form of capital insurance fund.

Speculative risk factors are much more common in occupational pension schemes, including: political-legal regulations risk, investment risk, financial risk or business risk.

Very important from the perspective of risk management is the classification of risk factors into systematic and specific. The systematic risk is related to events that are beyond the risk-taker's control, because they result from the state of macro-environment. In the case of an occupational pension scheme, these factors receive the following interpretation:

- demographic risk, especially the longevity of employees in a corporate pension scheme,
- political risk resulting from a number of legal regulations and their frequent changes, to which the retirement institutions have to adjust their operations,
- interest rate risk affects investment performance,
- currency risk affects the results of foreign investments and revenues of a company importing or exporting goods,
- risk of market evaluation of the asset class and associated risk of economic situation,
- the risk of purchasing power results from the uncertain future rate of inflation,
- market liquidity of assets,
- the conditions for reinvestment.
Table 3.1 summarizes the systematic (macroeconomic) and specific (microeconomic) business risks of occupational pension schemes, according to their operational and financial-investment activity.

<table>
<thead>
<tr>
<th>Activity risk</th>
<th>Systematic risk (macroeconomic)</th>
<th>Specific risk (microeconomic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational activity risk</td>
<td>demographic (particularly the longevity)</td>
<td>business</td>
</tr>
<tr>
<td></td>
<td>political</td>
<td>management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>breach of contract</td>
</tr>
<tr>
<td></td>
<td></td>
<td>insurance event</td>
</tr>
<tr>
<td>Financial and investment activity risk</td>
<td>interest rate</td>
<td>liquidity of assets</td>
</tr>
<tr>
<td></td>
<td>currency</td>
<td>investment preferences of insured</td>
</tr>
<tr>
<td></td>
<td>market conditions for asset class</td>
<td>valuation of financial instruments (investment efficiency)</td>
</tr>
<tr>
<td></td>
<td>inflation and purchasing power</td>
<td>financial (financial state)</td>
</tr>
<tr>
<td></td>
<td>market liquidity of assets</td>
<td>bankruptcy</td>
</tr>
<tr>
<td></td>
<td>the conditions for reinvestment.</td>
<td>the strategy of reinvestment</td>
</tr>
</tbody>
</table>

Source: own study based on (Ubezpieczenia w zarządzaniu… 2010, p. 35-36).

Specific risk relates to a single occupational pension scheme and therefore it is called a microeconomic risk here. The following factors were distinguished:

- business risks, including the market-demand risk of economic activity of a company operating occupational pension system and institution managing it,
- management risk – is conditioned by improper management of the company and occupational pension scheme; the risk is limited by public supervision of retirement institutions
- breach of contract risk – the source of this risk is failure to meet the conditions agreed upon between the parties of the transaction and written in the contract,
- Insurance event risk, regarding the insured in an occupational pension system in the form of life insurance,
- assets liquidity risk results from the adopted investment strategy, just as the following factors,
- risk of investment preferences of the insured, relates to accepted risk of rate of return and its time structure, tailored to the age of the insured,
- risk of valuation of financial instrument or an asset is a problem of risky investment efficiency in terms of the ratio of expected return and its volatility measured e.g. with standard deviation,
- reinvestment risk – specific to a situation in which money from one investment are reinvested,
• financial risks is associated with interests and repayment of borrowed foreign capital or incurred liabilities, which in case of occupational pension schemes relates to the payment of pensions,
• bankruptcy risk – it may result in the bankruptcy of the company caused by the two previously described types of risk, i.e. breach of contract risk and financial risk.

3.2. Assessment survey of occupational pension schemes' risk in Poland

The risk of occupational pension schemes is a complex notion, which consists of all the previously mentioned factors. Some factors, such as the rate of return, have to be provided by occupational pension schemes to the Financial Supervision Commission. Others, such as the currency risk, depend on investment strategy of the equity fund entrusted with contributions and on the share of the company operating the occupational pension scheme in the international economic exchange. Yet other factors, such as business risk, or the risk of investment preferences of the insured, can best be assessed by companies operating occupational pension schemes. For this reason, an indirect study of risk was chosen, in form of surveys distributed among competent representatives of companies engaged in occupational pension schemes. Response measurement was made on the following scales:
• binomial yes/no, in order to assess the most important risk factors and recommendations for regulators,
• ordinal in order to assess the level of risk (grading scale: low, medium, high and hard to tell),
• ordinal, in order to assess communication, risk reduction instruments and structure of the system (grading scale: definitely yes, rather yes, it is hard to tell, rather not, definitely not),
• nominal, in order to evaluate the strategy appropriate for investors with different preferences towards risk (grading scale: the level of risk and incomes acceptable for most participants, etc.).

Identification of the most important risk factors was conducted out of the selected factors from Table 3.1. Figure 3.1 illustrates the percentage of respondents who considered particular risk factors as the most important. This was a multiple-choice question, in which respondents could indicate any number of factors as the most important: one, several or all risk factors. Only 17% of respondents marked only one most important factor, which indicates the high importance of several factors. Of the remaining respondents, the most numerous were those indicating two factors as most important (31%), three factors were marked by 17%, and 4 and 5 factors marked by 13% of respondents; more factors were marked by the remaining 9% of respondents. Most frequently recognized as the most important factor
(63% of respondents) is the **investment risk** understood as uncertainty of rate of return. 62% of respondents indicated the **macroeconomic risk** of situation on the financial markets and the entire economy, while the **microeconomic risk** of business activity was indicated by 41%. It turned out that the greater risk pertains to the effects of pension schemes than the costs associated with enterprises’ operating activities, although some enterprises running OPS face a significant risk in its operational activity. A significant percentage of the surveyed companies, as many as 56%, pointed to the importance of the **political and legal risks**. An important risk factor for about one third of enterprises is considered to be inflation and mistakes of financial institutions settling the OPS, which are the risks of external management. Only 12% of surveyed companies confirm the threat to pension schemes posed by the currency risk. Only 2% named other important risk factors, such as manipulation and lack of knowledge.

![Fig. 3.1. The percentage of respondents considering occupational pension scheme risk factors as very important](Own work)

Because the representatives of companies recognized the investment risk as the greatest, the next question concerned the assessment of its level in the financial market and for the pension scheme operated by them. Figure 3.2 tells us that the risk of a financial market is medium for more than half of the respondents and high for 40% of respondents. 24% of respondents indicated a high level of financial markets risk, noting that it is higher after the crisis, while 16% of respondents believed that financial market risk is high, but has not increased as a result of the
crisis. The perceived level of risk of occupational pension schemes is lower than the financial market risk. 80% of respondents believe that it is medium, and 12% that it is low.

Fig. 3.2. Assessment of the level of investment risk in the financial market and in OPS conducted by the surveyed companies (% of respondents)

The risk of investment preferences of the insured includes the maladjustment of the investment strategy to the level of risk aversion of the insured and their investor’s profile. The risk is attributable to the shortcomings in education of finances and investments and the lack of financial experience of the insured, who have difficulties with making rational decisions concerning risk and incomes. It is also a result of the diversified age structure of the insured and its dynamics in time, which is reflected in the volatility of investment preferences. A company running and co-financing an OPS must decide whether to accept irrational preferences of some of the insured toward the risk-return relationship (e.g., preferences close to gambling standards during the stock market boom), as well as take into account the other expectations of average or very low risk. We asked about a way of solving this problem. It turns out that respondents most willingly chose the strategy accepted by the company’s management, in consultation with representatives of the employees or the strategy recommended by an independent consultant (see Figure 3.3). The least frequently
chosen risk-return strategy was that recommended by the financial institution managing the OPS and strategy of average of the preferences of all insured. Once again, the results imply a lack of confidence in financial institution, which is the agent of OPS.

![Fig. 3.3. Investment strategies adopted by respondents (%) in the case of differentiated preferences of OPS participants toward risk and income](image)

The object of the further study was the assessment of the management of OPS with regard to informing the insured about the risk and protection from it, as well as the principles of occupational pension schemes structure. In Figure 3.4, subsequent bars of percentage distribution of answers concern the following questions:

(1) Do you believe that employees-program participants and employers are well informed of all types of risks associated with the pension scheme? Majority of companies and their insured employees are informed about the risk. Only 20% of respondents reported insufficient informing by OPS or managing financial institutions.

(2) Does the current structure of pension schemes provide their participants with adequate protection against the investment risk and other risks associated with the financial market? Majority of enterprises indicate insufficient protection from risk of OPS system.

(3) In Poland, occupational pension schemes have a defined contribution formula, and so the size of future benefits is not known in advance and depends on the effects of investing funds in the financial market. All the risk is borne by the program participant. Is it the right solution?

(4) In defined benefit pension schemes, the amount of pension is pre-determined in proportion to salary. If this type of OPS was available in Poland, would you be willing to offer it to your employees, being aware of the additional financial obligations?

(5) In the mixed (hybrid) programs, part of the investment risk is assumed by the employer and part is taken up by the employee (such as a defined contribution
scheme, but with a guaranteed minimum benefit). If this type of OPS was available in Poland, would you be willing to offer it to your employees, being aware of the additional financial obligations?

(6) Should a pension guarantee fund be introduced?

Fig. 3.4. OPS management assessment with regard to informing and protecting its participants from the risk and the attractiveness of used and alternative structures of OPS in the surveyed enterprises (%)

Responses in Figure 3.4 to questions (3)–(6) indicate that majority of companies involved in OPS consider the used in Poland structure of a defined contribution OPS to be imperfect, but are not willing to accept the structure forcing them to take on the risk. Instead they postulate the implementation of a guaranteed pension fund, which would take over the OPS obligations in the event of bankruptcy of the company running it. In the next question, respondents indicate that the guarantee fund should be jointly financed by employers and the state (38%), or employers and employees (36%), optionally only employers (13%), the State Treasury (9%) or only employees.
In questions about changes in regulations regarding the functioning of occupational pension systems, the majority of surveyed did not support the increase of the FSC control over OPS, the freedom of choice of OPS structure, nor the increase of the influence of employers and employees on the investment strategy, nor other changes (see Figure 3.5). Nearly 50% of company representatives see the need for regulation in form of obligation of more frequent information from the agent responsible for OPS.

![Figure 3.5: The percentage of surveyed enterprises conducting OPS and supporting regulatory changes of their functioning](image)

### 3.3. Evaluation of the investment efficiency of occupational pension schemes 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 price if it is listed on the stock exchange. 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 liquidity 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 market efficiency measure calculated in the same fashion. The risk of actively managed portfolio is measured in one way (classic measure is the standard devi-
tion of the rate of return), and in another for passively managed portfolio, that eliminates the specific risk. There are also a few methods to conduct a comparison with market efficiency. This means that a number of performance measures of capital investment have been developed, and the most versatile and most widely used ones will be briefly described. These are the ratios of Sharpe, Treynor and Jensen. 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.

**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, Modigliani 2009, p. 162, 191; Ostrowska 2007, p. 252). An investment which 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).

**Treynor ratio** determines the rate of return for taking the average market risk (see Fabozzi, Modigliani 2009, p. 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 $\beta$ (see Fabozzi, Modigliani 2009, p. 195). 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 reaches, 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.

The third index used was **Jensen index $\alpha$** (Fabozzi, Modigliani 2009, p. 203; Ostrowska 2007, p. 249). It refers the rate of portfolio return to the market risk taken, as well as to the market return rate. 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 indicate a weaker result than the market average. Generally, the higher the ratio is the better the portfolio’s management.

The ratios of Sharpe, Treynor and Jensen 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.

---

1 The selected set of performance indexes was considered sufficient. For specific purposes other indexes are used: information, Sortino, $M^2$ etc. (see Węgrzyn, 2006, p. 53-62).
Table 3.2 lists two groups of institutions: the occupational pension plans in the form of Employees’ Pension Fund and mutual open pension funds managed by investment fund corporations, including those managed by insurance companies. Therefore the evaluation of the efficiency of investment 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 in the years 2009-2011. The risk-free monthly rate of return was calculated on the basis of the interest rates on

<table>
<thead>
<tr>
<th>Managing entity</th>
<th>Number of managed OPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Międzyzakładowe Pracownicze Towarzystwo Emerytalne PZU SA</td>
<td>1</td>
</tr>
<tr>
<td>Pracownicze Towarzystwo Emerytalne NESTLE POLSKA SA</td>
<td>6</td>
</tr>
<tr>
<td>Pracownicze Towarzystwo Emerytalne „Nowy Świat” SA</td>
<td>19</td>
</tr>
<tr>
<td>Pracownicze Towarzystwo Emerytalne Telekomunikacji Polskiej SA</td>
<td>3</td>
</tr>
<tr>
<td>Pracownicze Towarzystwo Emerytalne UNILEVER POLSKA SA</td>
<td>7</td>
</tr>
<tr>
<td>BPH Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>16</td>
</tr>
<tr>
<td>BZ WBK AIB Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>2</td>
</tr>
<tr>
<td>Aviva Investors Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>10</td>
</tr>
<tr>
<td>Investors Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>8</td>
</tr>
<tr>
<td>ING Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>62</td>
</tr>
<tr>
<td>KBC Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>3</td>
</tr>
<tr>
<td>Legg Mason Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>40</td>
</tr>
<tr>
<td>Pioneer Pekao Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>7</td>
</tr>
<tr>
<td>PKO Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>7</td>
</tr>
<tr>
<td>SKARBIEC Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>3</td>
</tr>
<tr>
<td>Towarzystwo Funduszy Inwestycyjnych Allianz Polska SA</td>
<td>4</td>
</tr>
<tr>
<td>Towarzystwo Funduszy Inwestycyjnych PZU SA</td>
<td>104</td>
</tr>
<tr>
<td>Towarzystwo Funduszy Inwestycyjnych Spółdzielczych Kas Oszczędnościowo-Kredytowych SA</td>
<td>24</td>
</tr>
<tr>
<td>Union Investment Towarzystwo Funduszy Inwestycyjnych SA</td>
<td>1</td>
</tr>
<tr>
<td>Aviva Towarzystwo Ubezpieczeń na Życie SA</td>
<td>133</td>
</tr>
<tr>
<td>Generali Życie Towarzystwo Ubezpieczeń SA</td>
<td>36</td>
</tr>
<tr>
<td>Nordea Polska Towarzystwo Ubezpieczeń na Życie SA</td>
<td>3</td>
</tr>
<tr>
<td>Pierwsze Amerykańsko-Polskie Towarzystwo Ubezpieczeń na Życie i Reasekuracji Amplico Life SA</td>
<td>41</td>
</tr>
<tr>
<td>Powtórny Zakład Ubezpieczeń na Życie SA</td>
<td>472</td>
</tr>
<tr>
<td>Sopockie Towarzystwo Ubezpieczeń na Życie Ergo Hestia SA</td>
<td>1</td>
</tr>
<tr>
<td>Towarzystwo Ubezpieczeniowe Allianz Życie Polska SA</td>
<td>99</td>
</tr>
<tr>
<td>Towarzystwo Ubezpieczeń na Życie Warta SA</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 116</strong></td>
</tr>
</tbody>
</table>

Source: Financial Supervision Commission reports available 11/20/2012.
3-year retail Treasury bonds during the analyzed period per each month (6.35% / 12 = 0.53%). On this basis the Sharpe, Treynor and Jensen ratios were determined. The results are presented in Table 3.3.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Employee pension funds</th>
<th>Investment Fund companies associated in IZFiA</th>
<th>Benchmark of capital market WIG index (Warsaw Stock Exchange Index)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average rate of return (%)</td>
<td>0,55</td>
<td>1,35</td>
<td>1,13</td>
</tr>
<tr>
<td>Standard deviation of rate of return (%)</td>
<td>2,15</td>
<td>2,95</td>
<td>6,96</td>
</tr>
<tr>
<td>Sharpe’s ratio</td>
<td>0,01</td>
<td>0,28</td>
<td>0,09</td>
</tr>
<tr>
<td>β coefficient</td>
<td>0,30</td>
<td>0,37</td>
<td>1,00</td>
</tr>
<tr>
<td>Treynor’s ratio</td>
<td>0,07</td>
<td>2,25</td>
<td>0,60</td>
</tr>
<tr>
<td>Jensen’s ratio (%)</td>
<td>–0,16</td>
<td>0,01</td>
<td>0</td>
</tr>
</tbody>
</table>

*Average rate of return in a surveyed group of entities, in case of PFE not weighted with the value of the entities’ assets (it would have tended to results of one PFE with largest assets), but in case of TFI weighted with value of assets.

Source: own work Monthly rates of return and efficiency indexes were calculated based on valuation of participation units of all five PFE (Source: KNF and the Warsaw Stock Exchange Bulletins 2012, 2011, 2010), calculations for TFI based on their net assets and managed capital flows (source: statistics from IZFiA – Chamber of Fund and Asset Management). Sources available on 11/20/2012.

The monthly rate of return for employee pension plans is 0.55% and it is only slightly higher than the interest rate of Treasury bonds. The rate of return from WIG index was much higher, and the highest rate of return was achieved by investment fund corporations. It is worth noting, however, that 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 3.3. 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 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 appeared to be much more efficient than the market. In conclusion, employee pension funds are characterized by a 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.
3.4. Summary

The results of the discussed above opinion surveys of employers offering OPS in Poland lead to some general conclusions:

- Respondents definitely find the most important risk factors for occupational pension schemes in investment performance and economic conditions. They notice, however, other factors important for the system of political risk and business risk of OPS sponsors.
- The perceived risk of financial market is high, and so the OPS investment risk is average in comparison.
- Responses suggest the existence of a principal-agent problem (so-called theory of agency costs). Only 20% of enterprises running OPS select investment strategy recommended by the program’s financial agent. The respondents note a significant risk of agent’s mistake.
- The current structure of OPS is not considered optimal by the majority of respondents, but the only acceptable change is the introduction of a guarantee fund. The vast majority of respondents speak in favor of introduction of – based on the example of Germany – a guarantee fund for the payment of benefits from occupational pension schemes (which protects against the risk of insolvency of the employer-sponsor of the program).
- Respondents also perceive a need of better informing of both employers – the program sponsors and employees (OPS participants), about the level of risk associated with the investment strategies used by financial institutions managing the program (i.e. the investment fund companies, life insurance companies or employee pension fund selected to operate the program). This confirms the previously indicated principal-agent problem.
- As far as investment results, occupational pension funds are characterized by low risk, but do not offer a higher rate of return than state treasury bonds. This suggests that further operation of this system makes sense only in form of bond funds. An alternative is to transfer these funds to investment funds (TFI), which are much better prepared for global investing and as the entire sector were more efficient than Polish capital market. This shows that there are benefits of a large scale investing activity, impossible to use by PFE.

These findings may be a starting point for discussions on the institutional changes designed to limit the risk for OPS participants, but also for the companies offering such programs to their employees.
4. PENSION SCHEMES AND GLOBAL FINANCIAL AND ECONOMIC CRISIS

4.1. Introduction – the nature and course of the crisis

The global financial and economic crisis of 2008-2009 can be seen as a kind of “stress test” for the pension systems. It touched both mandatory (public) and additional (voluntary) pension systems – corporate and individual. It appears however, that the impact of the crisis on retirement savings and the situation of the pension systems participants in different countries varied greatly. Some authors (Pino, Yermo, 2010, pp. 5-8) argue that it is necessary to distinguish between the impact of the global financial crisis of 2008, on the funded segments of public pension schemes as well as occupational and individual schemes, and the consequences of a related economic crisis that occurred in 2009 and has also affected the traditional public pension systems financed on the PAYG basis (generational contract).

The fact of different impact of the financial crisis and the economic crisis on pension systems in economically developed countries, including the OECD countries, requires in-depth research and clarification. It is not only about the explanation of historical events and socio-economic processes, but also about formulating proposals allowing to, at least, reduce the negative consequences for retirement security systems of the global financial and economic crises. Occurrence of such crises in the future is, in fact, highly probable (Globalizacja, kryzys ... 2010, p. 14).

The answer to the main question (research problem): what determined the power of impact of the global financial crisis on the public and additional (occupational and individual) pension systems of selected OECD countries, will be possible after clarifying the following specific issues:

- What were the short term, direct consequences of the crisis for public and supplementary pension schemes and what are the long-term consequences of this process?

---

1 There are many classification of pension systems, based on different criteria. Regarding the criterion of participation in the pension system, we can distinguish mandatory and supplementary pension schemes. Given the nature of the entity managing the pension system, we can identify privately and publically managed pension systems (public systems can also be entirely or partially managed by private institutions, such as the Polish second pillar.
Which groups of pension systems participants have been affected by the global financial and economic crisis and to what extent?

To explain the diverse impact of the global crisis of 2008-2009 on pension systems in various economically developed countries, two research hypotheses were formulated:

• Hypothesis 1 (H1): one of the main causes of the studied phenomenon was the diversity of institutional arrangements in different countries, in terms of institutions understood as both formal and informal norms.

• Hypothesis 2 (H2): An important cause of the studied phenomenon was the age of particular groups of a pension system participants during crisis.

This paper makes use of the preliminary results of studies conducted within the project, which aim was to investigate the impact of the global financial crisis on occupational pension schemes in Poland and around the world2. The analysis encompassed also the selected issues related to the impact of the crisis on public pensions.

4.2. Direct, short-term impact of the global financial crisis on privately managed pension schemes

One of the consequences of the global financial crisis of 2007-2008 was the decline in value of assets of privately managed pension funds in economically developed OECD countries in 2008 in the average of 5.4 trillion $, that is about 23% (Pensions ... 2009, p. 9). It was partially compensated by an increase in the value of assets in 2009, but not all groups of pension schemes’ participants could use that later increase in equal measure.

In the corporate and individual systems as well as in capital segments of public pension systems existing in some countries (e.g. in Sweden and Poland), the impact of the crisis depended largely on the construction of these systems and the degree of involvement in the more profitable, but associated with a higher risk, financial assets (especially stocks). As can be seen in comparative analyzes [8, p. 33], the value of assets of privately managed pension schemes in 2008 dropped the most in countries with large involvement of pension investments in the ownership securities (shares and related subscription rights, warrants, etc.). For example, in the United States – the world’s largest pension fund market (corporate and individual), heavily involved in investing in the stock market, the value of assets of these funds in the crisis year 2008 dropped by more than 25%, as in Australia. Among the Eu-

2 The study was conducted within the research project. “Occupational pension schemes and the global financial crisis – Poland and the world” (No. N N114 184638), financed by the Ministry of Science and Higher Education and the National Science Centre.
European countries, a record decline in the value of investments, and consequently – pension assets, was reported by pension funds in Ireland: amounted to as much as 38%. At the same time, occupational pension schemes in Germany lost much less, averaging only at about 7% of the value of their assets (see Figure 4.1).

One of the main reasons of this diversity of pension investments effects was a way of investing, the investment portfolio of pension funds, which is affected by legal-institutional solutions applicable in particular countries (e.g. allowable investment limits for individual financial instruments), but also different traditions (informal institutions). For example: in Ireland, where a record drop in the value of pension investment portfolio was reported, the acceptable level of involvement in shares was up to 2/3. At the other extreme, there are countries such as the Czech Republic, Slovakia, Mexico and Germany, where the investment portfolios of pension funds were dominated in 2008 (and still are) by the relatively safe debt securities, mainly government bonds. In this group of countries, the fall of the value of pension assets in the crisis year 2008 was at a level of 6–12%. Undoubtedly, it was also influenced by a different approach to saving and investing in Anglo-Saxon countries (for example, traditionally big share of risky, but potentially more lucrative, investments in stocks in Anglo-Saxon countries vs. attachment to safe investments, especially in the area of retirement savings, for example, in Germany.
Beside the components of the investment portfolio and its institutional conditions, an important element of the pension systems' structure is a model (base) of benefit’s calculation, i.e. the pension formula. In general, we can distinguish:

- **defined contribution (DC) pension schemes**, in which the base for calculating the benefit is the sum of accumulated contributions (retirement savings) plus the rate of return on investment (calculated for further life expectancy of the beneficiary);
- **defined benefit (DB) pension schemes**, in which the amount of benefit is predetermined, established on the basis of such parameters as the amount of salary, the number of years worked, etc.;
- **hybrid systems**, a combination of the DB and DC systems (e.g. DC system containing some elements of the defined benefit system, such as a guaranteed minimum retirement after a specified number of years of work).

The global financial crisis affected, of course adversely, the funded (through investments in financial markets) defined contribution pension schemes. This type of formula for calculating benefits prevails in occupational pension schemes nowadays, while the seventies and eighties of the last century were dominated by defined benefit schemes (Blake 2006, pp. 101, 12, 101-102).

The theory of finance assumes that investing in the stock market is risky in the short term, but safe and by far more profitable than investments in debt securities over the longer period. However, along with extending the investment horizon, the size of the potential losses that in case of the collapse of the stock market increases (Sławiński, 2006, p. 101). Such situation occurred during the global financial crisis in 2008, which proved to be particularly detrimental to defined contribution schemes.

As an example of high, even spectacular, falls in value of pension assets with a large share of stocks, can serve U.S. occupational pension schemes 401 (k), to which employees can voluntarily contribute additional retirement savings while benefiting from the tax relief (the name of these programs, called pension plans in the United States, comes from the number of a subsection in the Internal Revenue Code).

As shown by the analyzes carried out on the basis of statistical data regarding 21 million participants of such retirement programs (plans) stored in databases of U.S. research institutes: Employee Benefit Research Institute (EBRI) and Investment Company Institute (ICI), the value of individual accounts of these programs’ participants dropped in the crisis year 2008 between 15% and 25%. It was particularly perceptible for participants of plans with the longest history of saving, who understandably gathered in this longer period of saving for additional retirement in the workplace the largest savings invested in financial assets (see Figure 4.2). Some Americans additionally save for retirement on individual retirement accounts (IRAs), which value also fell sharply in 2008. The total decline in the value of assets in the accounts of corporate pension programs 401 (k) and individual retirement accounts (IRAs) reached in absolute numbers an astronomical amount of over $2 trillion. It is worth remembering that the assets of privately managed pension funds in the United States constitute as much as a half of the value of private pension funds in OECD countries.
Similar high declines in the value of pension savings in additional defined contribution pension schemes occurred in other OECD countries, especially in Great Britain, Ireland, Canada. In this type of programs, the investment risk is passed on to the program participants, and not the sponsor (e.g. an employer in case of a defined benefit occupational pension scheme). Although in 2009 the situation in the financial markets has improved, and some losses were recovered, but older members of DC schemes, approaching retirement age, had usually too little time to see the value of their retirement savings return back to the pre-crisis level (Pensions ... 2009, p. 26).

Also equity funded defined benefit schemes have been affected by the global financial crisis, although in various degrees. It is worth remembering that the defined benefit schemes still prevail in many countries, or still maintain a significant share in company pension schemes (e.g. in Germany, almost all occupational pension schemes are DB-type programs, and these programs gather approximately 60% of all employed). Savings accumulated in them will therefore have a significant impact on the level of material security of future retirees in those countries.

In most OECD countries, the value of assets held in defined benefit schemes has fallen below 90%, so it could not cover the obligations toward participants of these programs. For example, in the U.S., where in 2007 the assets coverage ratio in DB schemes was close to 100%, as a result of the crisis companies failed in 2008 to provide even 92% coverage level of pension obligations, required by U.S. prudential regulations (Pension Protection Act). In the Netherlands – a country...
with a high level of pension funds development – the ratio of assets to liabilities in defined benefit pension schemes (mainly occupational) fell even below 95%. Even worse, in this respect, looked the situation in the UK: the assets to obligations ratio in DB schemes declined from 94% at the end of 2007 to 85% in March 2012 (see Anatolin, Stewart 2009). This resulted in a financing gap, extremely dangerous for the participants of such programs approaching their retirement age.

Also in case of defined benefit schemes, the scale of the decline in value of assets depended on the composition of the investment portfolio. In countries, where the investment portfolios of DB systems were dominated by secure debts – such as in Germany – the fall in the value of pension assets was relatively small. Thanks to that, pension schemes had no major difficulties in meeting their obligations toward their retiring participants, whose pension benefits had been previously defined. However in countries, where exposure to stocks or other risky financial instruments was significantly higher (e.g. in Anglo-Saxon countries) a decrease in the value of assets caused or increased the deficits of particular programs. This often required the financial aid from outside the program, resulting in losses of companies offering defined benefit occupational pension schemes, which had to cover the pension scheme deficit from funds allocated for business activity or increase the amount of contributions paid to the program in order to maintain the required by law ratio of assets to commitments of the program to its participants (employees accumulating retirement savings) and beneficiaries (former employees receiving retirement benefits).

Needless to say, such additional commitment of companies-sponsors of pension schemes, burdened them additionally in the time of crisis, and in extreme cases even led to bankruptcy. Therefore, many countries have introduced regulations in 2008 to mitigate the requirements regarding the relationship between assets and liabilities in defined benefit programs, accepting the fact that they became under-funded. This means that obligations toward employees-pension scheme participants, regarding benefits of a certain amount, did not have a one hundred percent coverage in the value of program’s assets. Such loosening of capital requirements took place for example in the United States, the Netherlands, Canada, Ireland and the United Kingdom. Such solutions are usually temporary in nature, because in the longer run they may in fact jeopardize the financial stability and security of defined benefit systems, undermine their ability to pay benefits in predetermined amount, which has always been their unquestionable advantage.

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3 Only some of OECD countries, such as Canada, Germany, Japan, Sweden, Switzerland, the United Kingdom, the United States, have guarantee funds or other security systems protecting against the insolvency of an employer operating a defined benefit occupational pension scheme. In the time of global crisis, this type of security institutions have proven to be very helpful (Stewart 2007).
4.3. Influence of the crisis on public pension schemes

One of the main consequences of the global economic crisis, related to the financial crisis, was a drop in the value of retirement pension contributions paid to non-financial public pension systems, operating on the PAYG principle, also known as the generational contract. In these systems, in the phase of capital accumulation financial markets are not used (Chyballs 2012, p. 30). The current pension contributions (in Bismarck’s pension plans used in Germany, Austria or France) or taxes from working generation (tax-financed schemes used in Denmark, the Anglo-Saxon countries, Canada and New Zealand) are used to finance the benefits paid to current retirees; in exchange for that, the working generation acquires rights to future benefits to be funded by a new generation of economically active population. In the majority of OECD countries in 2009, there was a recession, increased unemployment, decreased economic activity (Pensions ..., 2009, p. 25). Many countries had to spent huge amounts on saving their banking systems, which resulted in a significant increase in public debt and the cost of its operation (e.g. Germany have spent nearly 100 billion euros on bailing out the banks by the end of 2010, see Sinn 2009, p. 11). As a result, the PAYG funded pension schemes received less funds from pension contributions or general taxes, they experienced serious problems with the provision of pension benefits payment, they had to be supplied from other public funds at the expense of realization of other important social needs. There was also an increase in demand for actions aimed at shielding poorer pensioners, offering help based on an individual assessment of the material situation of beneficiaries (means tested benefits), such as welfare benefits. The global financial and economic crisis has further aggravated and amplified the problems of PAYG funded public pension systems, related to – occurring in most economically developed countries – the demographic aging of the population (more people in retirement age in relation to the working-age population as a result of decline in the average fertility rate and gradual lengthening of the average life expectancy).

The global financial crisis had also a significant impact on public pension systems partially funded through the financial market and partially on the basis of generational contract (financing current pension benefits from current contributions of a working generation, or pay-as-you-go). In this type of mixed, PAYG-funded public pension schemes, the impact of the crisis depended to a large extent on the share of the capital segment in the entire public retirement security. For example: in Poland, the rate of return of open pension funds (OFE) was negative in 2008
(−14%), which of course resulted in a reduction of resources accumulated in pension funds (converted into participation units⁴ – see Figure 4.3).

Fig. 4.3. The averaged value of the OFE accounting unit (1999-2010)
Source: Otwarte fundusze emerytalne ... 2010, p. 124

OFE losses in 2008 were almost equal in value with what they had received in that year (through the Social Insurance Institution) from pension contributions. Although in 2009 the value of the OFE participation units increased to the pre-crisis level, but in 2011 another decline in the value of shares on the Warsaw Stock Exchange (the principal market for investments) caused that the rate of return of open pension funds for 2011 was again negative (an average of −4.8%) According to some experts, such large declines in the value of pension assets as a result of repetitive turbulence in the financial markets, undermine in general the sense of maintaining the capital segment in the public pension system. This standpoint is held for example by Leokadia Okrzei and Robert Gwiazdowski (Gwiazdowski 2012, p. 162). However – as mentioned before – the results of crises also affect non-financial systems (pay as you go). The idea of diversification of pension schemes’ financing methods, which prompted the introduction of pension reforms in many post-socialist countries (including Poland in 1999), was put to the hard test during crisis. Nevertheless, it seems that the sense of differentiation of public pension systems financing methods has not been challenged. Placed on the agenda, however, was the discussion regarding the acceptable share of equity financing in the total pension security or investment policies of pension funds. This ultimately led to the

⁴ The value of participation unit, attributable to each participant of open pension funds (OFE), is calculated by dividing the net assets of the Fund by the total number of accounting units recorded in the accounts on that day.
retreat from equity financing in the public pension schemes (e.g. elimination of pension funds in Hungary, a significant and permanent reduction of the size of contributions paid to open pension funds in Poland since May 2011 – from 7.3% to 2.3% compared to 19.55% of the total pension contributions).

Analyzing the structure of public and supplementary pension systems, most often taken into account is the phase of accumulation retirement rights capital (also called capital accumulation phase). Equally important, however, is the phase of the benefits payment. In majority of public pension schemes, the accumulated retirement capital is converted into a stream of lifetime financial retirement benefits (life annuities). In supplementary systems, various solutions are used – from the mandatory conversion of retirement savings into a stream of lifetime payments (for example, life annuity purchased in an insurance company) to one-time payments (lump-sum payments) or installment payments over a period of time. In a situation of sudden depreciation of the value of assets in financial markets resulting from a financial crisis, mandatory conversion of pension capital into life annuity can be a very unfavorable solution, if the time of conversion is limited to a few weeks or months.

It was experienced particularly strongly by participants of equity funded supplementary pension schemes (occupational or individual) in countries such as the USA, United Kingdom, Ireland, Australia and New Zealand, who retired in 2008-2009. Their pension assets lost value between 25% and 35% (see Figure 5.1), which translated into a stream of lifetime payments (calculated by the actuaries on the basis of further expected for that birth cohort life expectancy per unit of time, usually the number of months) meant that their retirement security level was much lower than that of pension systems’ participants retiring during non-crisis periods, free of financial and economic turbulences.

4.4. The impact of crisis on different groups of pension schemes’ participants

Not all participants of the pension systems were equally affected by the results of the global financial and economic crisis. The decisive factor, beside the structure of pension systems, was the age of the participants of these systems. The strongest effects of the crisis were experienced by adult participants, who were in the phase of benefits payment in defined contribution systems, receiving those benefits in form of a life annuity. These were therefore older people. Young participants of equity funded pension schemes (both defined benefit and defined contribution) with the prospect of a few decades of saving for retirement, could expect that in future the value of assets held in their retirement accounts will increase to a pre-crisis level and in longer perspective they will gather savings allowing for benefits payment at a sufficiently high level, ensuring the maintenance of an existing or
only slightly reduced standard of living after retirement. There is such chance, but there is still no guarantee that a new financial crisis will not happen in future, which once again will reduce the value of pension assets for future demographic cohorts approaching retirement age.

Table 4.1. The degree of impact of the global financial and economic crisis on the level of retirement security of pension systems' participants of different age groups in OECD countries

<table>
<thead>
<tr>
<th>Impact of the crisis</th>
<th>Younger employees</th>
<th>People approaching the statutory retirement age</th>
<th>Retirees (receiving benefits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>–</td>
<td>participants of defined contribution (DC) schemes particularly: (1) with large share of high risk financial assets, (2) participants of programs with mandatory conversion of retirement savings into life annuities</td>
<td>retirees, who have not yet converted their retirement savings in defined contributions systems into life annuities</td>
</tr>
<tr>
<td>Medium</td>
<td>–</td>
<td>participants of DB programs – occupational and individual participants of public PAYG systems (in the phase of accumulation of retirement savings)</td>
<td>pensioners in systems with automatic valorization of benefits according to certain parameters (e.g. inflation, average wages, both these parameters)</td>
</tr>
<tr>
<td>Lower, relatively small</td>
<td>applies to the majority of people in this age group</td>
<td>participants of recently created additional (occupational or individual) DC programs</td>
<td>retirees who converted their pension savings into annuities before the crisis, majority of people receiving benefits under supplementary DB pension schemes</td>
</tr>
</tbody>
</table>

DB – defined benefit pension schemes, DC – defined contribution pension schemes, PAYG – pay-as-you-go pension systems (generational contract).


Relatively more resilient to the financial crisis turned out to be payments for the elderly from pay-as-you-go systems, not directly dependent of the situation on the financial market.

To a large extent, the impact of the global financial and economic crisis was dependent on the age of the participants of public and supplementary pension schemes in connection with the structure of the pension scheme (see Table 4).
5. SUMMARY

From the analyzes and interpretations of empirical data regarding pension schemes and the economic situation in OECD countries in 2008-2009, a number of conclusions can be drawn, making it possible to provide answers to the research questions asked in the introduction of this paper.

The most important **direct, short-term consequences** of the global financial crisis include:
- a decrease in value of pension assets in equity financed supplementary pension schemes (corporate and individual) and in public system, in which there is capital segment (e.g. in Poland);
- deterioration of the situation of pension systems’ participants, particularly those approaching statutory retirement age.

**Medium-term effects** of the global financial crisis on pension systems include primarily a recession in most OECD countries in 2009, which resulted in lower contributory base of PAYG systems (it refers most of all to public pension schemes; PAYG financing in supplementary systems is rather rare). This has led to difficulties in maintaining financial stability of such systems, increasing budgetary subsidies, and often to the necessity of increasing public debt to finance current pension payments (that is what happened during crisis in Poland, and is, in fact, still happening).

**Long-term consequences** of the crisis in 2008-2009 for pension schemes (30-40 years perspective) are difficult to predict. Pension funds with a significant share of stocks in their investment portfolios can expect that in the longer perspective this type of investment will prove to be more profitable than investments in secure debts. Provided, however, that in the meantime there will be no next, difficult to predict today, global financial crisis. This applies to both pension funds operating in the capital segments of the public pension systems (for example, OFE in Poland), and to occupational pension schemes.

The study shows that a very significant influence on differences in the impact of the global financial crisis on the equity financed segments of public schemes and on occupational pension schemes had the structure of these systems, especially the used formula of benefits payment. As for the short-term consequences of the crisis, they were mostly experienced by participants of defined contribution pension schemes in the countries where a significant share of pension funds’ investment portfolios were the stocks (for example, in Ireland and the U.S.). In countries, where legal regulations prevent the occupational pension systems from using riskier investment strategies with a large share of stocks, losses associated with the
global financial crisis was much lower (e.g. Germany). Undoubtedly, this was the result of not only the various solutions regarding formal institutions (legal regulations, functioning of state institutions supervising the pension funds market etc.), but also non-formal norms - including cultural differences. Thus, the hypothesis H1 was positively verified, about the influence of institutional solutions (Institutions understood as organizations and institutions understood as formal and informal norms) occurring in individual countries, on the diverse impact of a global financial and economic crisis of 2008-2009 on pension schemes in various countries.

Positively verified was also the hypothesis H2 about the influence of the age of pension systems’ participants on their sensitivity to the effects of the crisis. Examples from various OECD countries clearly indicate that the most affected by the global financial and economic crisis were groups of participants of pension systems, which were fully or partially equity financed, and least affected – the pensioners receiving pensions from pay-as-you-go systems and younger participants of pension systems (expecting a few decades of retirement savings gathering).

The above research findings can also lead to conclusions of a practical nature. Proposals, emerging in response to the global crisis, to introduce secure sub-funds investing in low-risk financial instruments (e.g. bonds), where pension assets would be transferred a few years before a given demographic cohort reaches retirement age, do not ultimately resolve the problem created by difficult to predict financial crises, which in conditions of globalization are likely to also have a global character. The currently observed debt crisis in the euro zone shows that in a given situation, even economically developed countries experience problems with the redemption of its bonds (such as Greece), or increasing cost of obtaining buyers for its debt securities (such as Spain, Italy). Therefore, constructing a secure sub-fund for people approaching retirement age, in those new conditions developed in the financial markets in the first two decades of the twenty-first century, is becoming increasingly difficult.

While in supplementary systems, typically voluntary, the level of acceptable risk associated with the equity financing may be higher (if accepted by participants of these systems), in the public, mandatory, systems, where the participants have no control over the way of investing their retirement savings/contributions, too much exposure to investment risk is, in the author's opinion, unacceptable. That is why – despite the previously publicly expressed objections (Szczepański 2010) – a statutory change, introduced in 2011 in Poland, reducing the share of contributions paid to capital segment (OFE) (from 7.3% to 2.3%) as a reaction to the 2008-2009 crisis and possible future financial turmoil, seems to be legitimate after deeper analysis.

Regardless of the rapidly changing situation in the economy and in the financial markets, and different possible proportions between state and market share in the pension security, the role of the state is and will continue to be to provide a basic financial security for old age – protection against poverty. Supplementary systems
(mostly equity financed) increasingly take over the function of maintaining the standard of living at a level similar to the period of professional activity. The experience of the global financial and economic crisis indicates that ensuring the maintenance of standards of living through additional retirement savings, even in the form of occupational pension schemes, is becoming increasingly difficult and risky. Adopting a more conservative investment strategy, based mainly on investments in debt securities – as is clear from the conducted studies of investment efficiency of occupational pension funds (PFE) in Poland – resulted, in turn, in relatively low rate of return, similar to investments in government bonds.

The participants of occupational pension schemes in different countries represent very different level of knowledge regarding financial markets and investments, as well as different level of investment risk awareness. This applies not only to the post-socialist countries, but also to highly developed capitalist countries (e.g. USA). The empirical study conducted among employers offering occupational pension schemes in Poland shows, that awareness of the risks associated with investing pension assets in financial markets is gradually increasing among employers.

On the principle of dissemination of good practices, it would be worth applying in Poland solutions used in some countries (such as Belgium, Germany, USA) in form of guarantee funds to ensure payment of occupational pensions in case of employer’s bankruptcy. On the other hand, a suggested by some EU politicians extension of capital and prudential requirements typical for large insurance companies (Solvency II) on capital retirement security institutions (IORP), which in Poland applies only to employee pension funds (PFE) could only stop an already too slow and insufficient development of occupational pension schemes in the post-socialist countries, and also in other OECD countries (for medium-sized and smaller companies, creating and operating pension schemes fulfilling the requirements of Solvency II would be too expensive).

We can therefore formulate a general conclusion, that there is no perfect pension system, resistant to financial and economic crises and their short- and long-term consequences. The risk associated with the operation of occupational pension schemes can, however, be reduced, both by a proper construction of retirement portfolio, an institutional arrangements, such as:

- adequate prudential standards, enforced by market regulators, and supervision over the current operation of occupational schemes,
- guarantee funds, in the event of bankruptcy of the employer-sponsor of the occupational scheme;
- properly designed system of economic and fiscal incentives for the participants of occupational pension schemes, to counteract early withdrawal of pension savings,
- properly designed system of fiscal incentives for employers, who are usually also the sponsors of occupational schemes, and should have significant benefits
from the financing or co-financing of this form of long-term investment in human capital,
- and properly set fees and charges, forcing the financial institutions operating the occupational schemes to increase the efficiency of investments, while maintaining a level of risk acceptable by participants and sponsors of the programs.
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