

**Pension expenditure as the part of GDP:  
Social security vs. economic growth**

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## **1. Introduction**

The demographic change has caused a challenge for majority of countries in the world. The challenge focuses on social systems that are exposed to it the most. Within social systems the pension systems are usually the largest. The burden on the working generation caused by pension systems is really large especially in Europe. Pension reforms are on the top of policy agendas all over the world. They are particularly difficult since the meaning of pensions is not intuitive so the public not necessarily understand both the problem and ideas on how to solve it.

Dominating especially in Europe method of organisation and financing pensions has a long tradition. This method has become fully internalised and is now a part of common thinking on social security. However, from the very beginning the so-called Bismarckian pension system has been based on what later was called a Ponzi scheme. It worked until 1970-1980s. The second demographic transition led to economic and financial problems of a scale dangerous even for the strongest European economies. If a Ponzi scheme is run by a private institution – which is illegal – it just goes bankrupt one day. Mandatory public schemes have the so-called state guarantees. However, protecting people through the guarantees is limited in time. The ever-falling demographic dependency ratios cause huge pressure on economies. Governments have two choices: recognising pension rights or not. In the first case pension system debt is growing to levels that cause negative financial market effects (even if pension systems do not use them). In the real economy, huge pension debt contributes to large tax wedges that cause high and persistent unemployment and slow down GDP growth. In the second case, namely reduction of pension rights, strong social protests and political instability is generated. Recent protests in Austria, Germany and France show that there is actually no way in between the two approaches.

There is, however, yet another approach that can be applied to pension systems in the current situation. This is designing an entirely new type of system that tends to be neutral for economic growth. The key requirement for neutrality is keeping stable proportion of GDP allocated to the entire retired generation. New pension systems in Sweden and Poland have been designed in the way taking into account this requirement. It is worth realising that the two countries that adopted the same way of thinking belong to different regions, namely current EU in the case of Sweden and accession countries in the case of Poland. These countries have also different tradition, different income per capita level, and many other different features but in both cases very deep pension reforms of similar design were adopted.

## 2. Economic background: demography rules

The pension system depends on the demographic structure. If – as it is the case in traditional systems – pensions are administratively defined in terms of wages (replacement rate promised) then even strong productivity growth cannot help in balancing the system's revenue and expenditure. Replacement rates can be kept for some time above the sustainable level, through further increasing pension system debt that will never be paid back. This is a temptation for politicians all over the world (and one to which they often succumb). However, in the long run, given obvious limits for increasing the contribution rate, future reduction of the replacement ratio is inevitable with or without a reform. So there are only two options:

- ✓ either a reform, which means cutting down pension expectations (expressed as the replacement rate) *ex ante*;
- ✓ or no reform, which will lead to cutting down pensions *ex post*.

Choosing the latter would just be cheating the current generation of workers. It should be made clear that a small working population will never be able to provide a large retired population with relative per capita income at the level comparable to what was possible in the case of large working population sharing its product with a small retired population. The paper will address this issue since it is extremely important in discussions on pension reforms.

Pension reforms have either been introduced or are in course of introduction or preparation in many other European countries. The paper will provide a picture on what countries already achieved in this area. There exists growing literature on pension reforms. However, there are a lot of controversies in this respect. They stem from ideological and political context of the discussion on pension reforms, as well as from theoretical and also terminological problems related to pensions.

New methods used in the area of pensions are often perceived as a kind of giving up social principles. In the paper I will discuss another view: Giving up inefficient methods and exchange them for new ones is necessary to save the principles of social security. Of course the new methods have to be designed taking into account objectives of social welfare of current and future generations of workers becoming pensioners after retirement.

Attempts to rationalise existing systems are necessary but even if successfully implemented they will be insufficient. Designing a new type of pension system is one of the most difficult challenges for ageing societies.

The area of pensions has traditionally been covered by two groups of specialists, namely social policy experts and financial experts. Both groups stress different goals and their approaches can hardly be put together. The dispute focuses on differences between the so-called pay-as-you-go and funded systems as if they were different extremes of a bipolar universe. The problem can also be perceived in a different way:

- ✓ A pension system analysed from the macro viewpoint is always pay-as-you-go since it is just a way of dividing current GDP between the working generation who has produced it and the retired generation who has not participated in production. The division of current GDP can be automatic or discretionary.

If the share of GDP transferred to the entire retired generation is constant then pension system is economically neutral (remuneration of production factors is not affected by financing the system).

- ✓ The same pension system analysed from the micro viewpoint is always funded since it is a way of income allocation over individual life-cycle. This can be well organised and based on well defined liabilities or left fuzzy to be made concrete ex post.

If the present value of contributions paid into the system equals the present value of benefits paid out from the system then the system is actuarially neutral (individual decisions on income allocation are not affected).

Having the framework for thinking as defined above we can distinguish two possible goals for pension reforms.

- ✓ Channelling the flow of contributions from workers to retirees through financial markets that can possibly increase savings contributing to stronger growth.<sup>1</sup>
- ✓ Reintroducing intergenerational equilibrium by creating an institutional framework that tend to keep stable the proportions of GDP being allocated to each generation, which reduces distortions and consequently contribute to stronger growth.

Economic literature focuses on the latter justification for pension reforms. There are disputes on whether the effect really exists and if yes to what extent. However, even if we assume the effect is strong it is not the explanation why not only pension experts but also governments aim at pension reforms. This is even more striking if we realise how many politicians lost their positions because of advocating changes in pension systems. They would

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<sup>1</sup> There is extensive economic literature of the issue. See for instance Feldstein (1980), Holzmann (1997), Barr (2002).

probably not be eager to “die for financial markets”. Actually, politicians would also resist reforms aiming at the reintroducing intergenerational equilibrium but they have to at least reduce their resistance since given demographic dynamics the part of GDP left for remuneration production factors is shrinking because of the increase of the part of GDP being allocated to the retired generation, which in turn slows down growth of welfare.

So this is the “intergenerational equilibrium” rather than “financial markets” what drives pension reforms. At the same time there is much less discussion on this former issue. Does it affect the outcome of reforms? Yes and no. “Yes” is natural. “No” is much more interesting. The most natural approach to channelling contributions through financial markets is individualisation of participation. Pension liabilities are based on account values. This is good for the reasons related to financial markets but at the same time this leads to actuarial neutrality of pension systems which implies intergenerational equilibrium and economic neutrality of pension systems. So aiming at developing financial markets we achieve the key goal of the reform, namely equilibrium.

Equilibrium could be reached even without involving financial markets. However, it would be more difficult since for ordinary people operations in financial markets are more intuitive than macroeconomic approach. So if their contributions are managed in financial markets in a similar way than their other financial resources they feel more comfortable and accept the concept of individual accounts. Without financial markets it would be less understandable, hence less acceptable for the public. Financial markets play a “demonstration” role. Additionally, development of financial markets is beneficial itself. So aiming at the first pension reform goal we can realise the first one that matters the most.

Disputes on implementation of individual accounts tend to focus on three issues that are possible treats of transforming traditional pension systems into new ones based on individual accounts:

- ✓ Reduction of the replacement rate;
- ✓ Elimination of redistribution;
- ✓ Creation transition cost.

In many cases the treats contribute to postponement of pension reforms. Discussing the above issues goes beyond the scope of this paper. Here are only selected pieces of explanation.

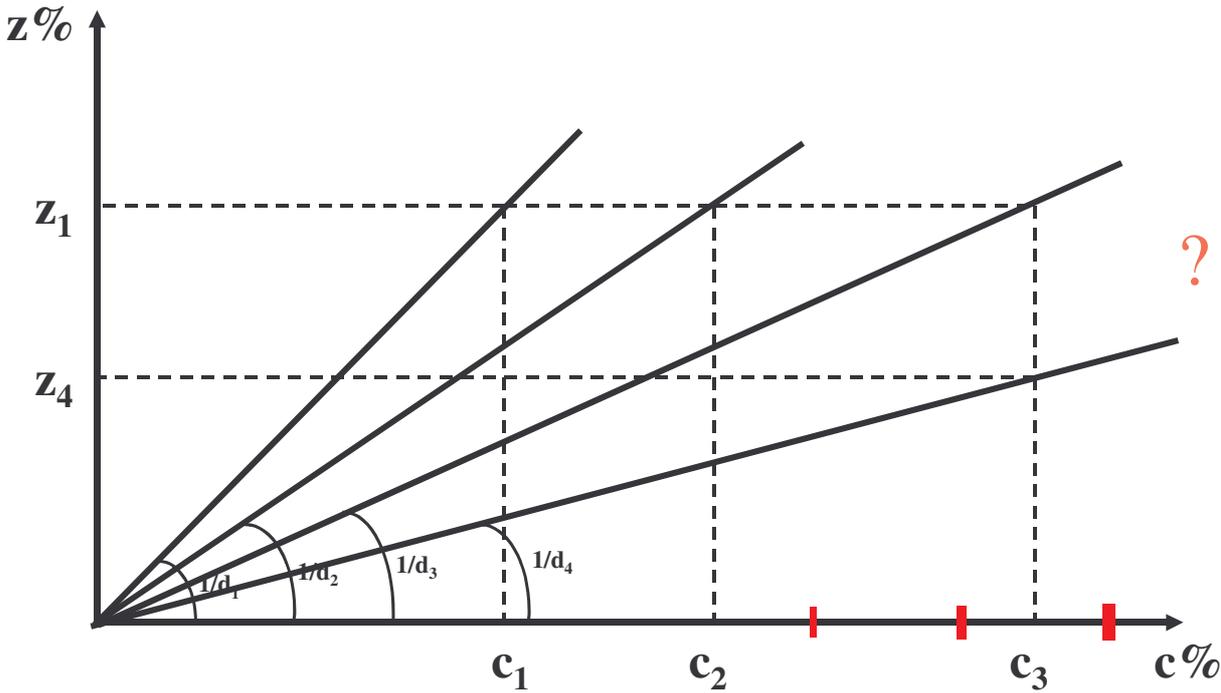
The replacement rate is a measure of relative level of pensions compared to wages. In the perspective corresponding to period of participation in pension system the rate is determined by two factors: the contribution rate and the dependency rate:

$$z = c \frac{1}{d}$$

where: c – contribution rate, z – replacement ratio, d – dependency ratio.

This relation can incidentally be violated but only in short periods and ex post replacement is the same irrespective to pension system type. At the same time absolute level of pensions depend on future GDP. Hence, pension system design that contributes to stronger GDP growth will generate higher pensions.<sup>2</sup> Figure 1 illustrates the problem.

Figure 1. Contribution and replacement rates

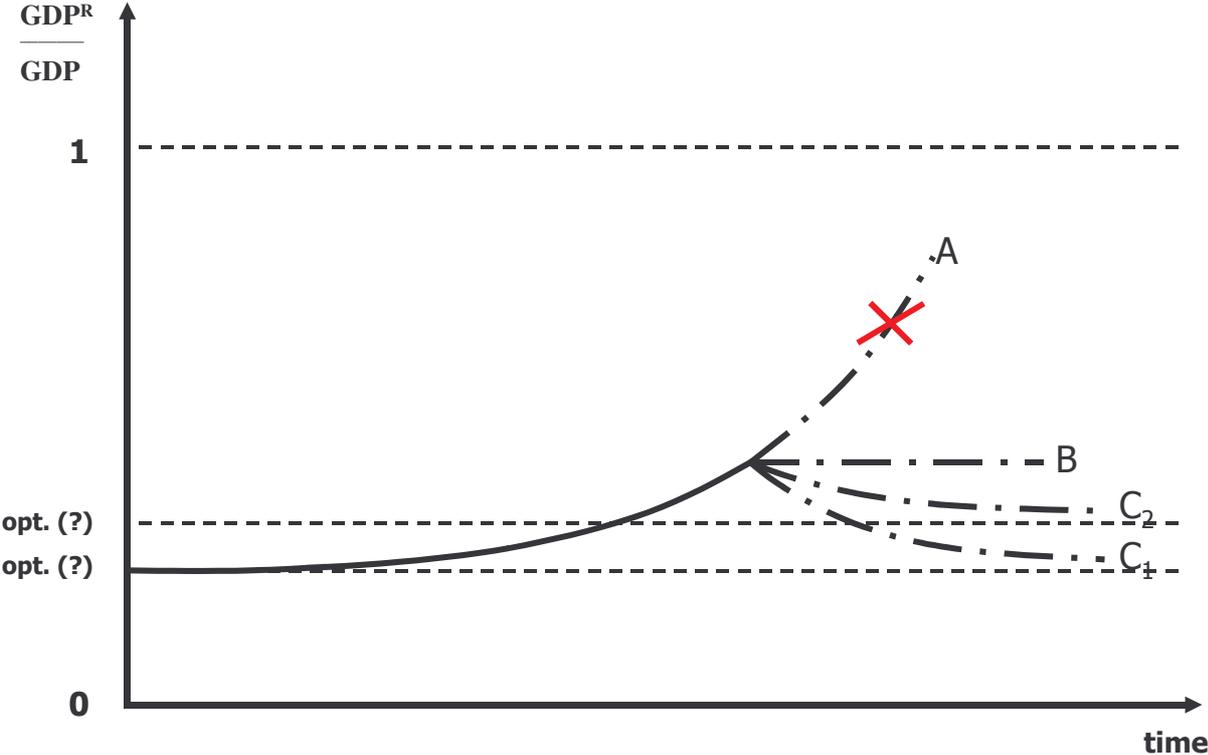


$c\%$  -- contribution rate;  $z\%$  -- replacement rate;  $d_i$  – dependency ratio in period  $i$ .

<sup>2</sup> I discuss the issue in Góra (2003).

Postponing pension reforms because of a fear of reduction of replacement rates will not only not save the current level of the rate since it will converge to the level determined by demography but also reduce absolute welfare of future pensioners – and also workers.

Figure 2. Increasing share of pension expenditure in GDP



Redistribution is needed, which is commonly accepted in European societies.<sup>3</sup> However, a question arises whether the pension system is an efficient channel of financing the redistribution. An alternative is budgetary based redistribution. It is more efficient since it has broader redistribution base (not only labour is taxed; there is some tax progression) and is more transparent and adjustable. At the same time redistribution built in pension systems turns contributions into taxes which leads to larger distortions in comparison to financing redistribution through taxation. The latter creates distortions anyway. Moving redistribution from the pension system to the budget reduces the overall scale of tax distortions.

<sup>3</sup> It is usually called "solidarity" which is not necessarily correct. I discuss this and related issues in Góra (2004).

The so-called transition cost is a statistical artefact. In real economy terms channelling contributions through individual accounts means clear expression of pension system liabilities but this does not mean any additional cost in economic terms. Traditional pension system liabilities are kept fuzzy and not accounted, which does not mean they do not exist. Implementation of individual retirement accounts makes visible what existed before but was not taken into accounts. The problem of transition cost calls for a modernisation of national accounts methodology having little to do with pension reforms.

### **3. Reformers are hostages of terminology**

In many cases discussion on pension reforms is a mixture of ideological on one hand and technical concepts on the other hand. The paper will critically review existing theoretical and practical approaches being used. In particular analysis will attempt to go beyond commonly used way of thinking on pensions.

Pension reforms are strongly dominated by the framework of thinking that can be describe by the following three pairs of opposite concepts.

- ✓ pay-as-you-go versus funding;
- ✓ public versus private;
- ✓ monopillar versus multipillar.

Although commonly used, these concepts narrow discussion to some extent. In the paper I will discuss an alternative framework for thinking on pensions based on the following pairs of concepts:<sup>4</sup>

- ✓ universal (mandatory covering the entire population) versus partial (voluntary participation of a group of people);
- ✓ individualised (individual accounts) versus anonymous (no accounts) participation;
- ✓ task specific/segmented (first of all old age pensions separated from other elements of social security) versus multitask (entire social security within one scheme) organisation of social security;
- ✓ financial (generating the rate of return through financial markets) versus non-financial (generating the rate of return through real economy growth).

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<sup>4</sup> For more discussion of this concepts see Góra (2003).

This alternative set of concepts can help in developing more efficient (economically and socially) pension systems. The efficient pension system is designed in a way that makes it endogenous, which means it adjusts automatically without intervening from outside. The system needs only one decision, namely the initial choice of the contribution rate.

At the macro level a pension system is a method of division of GDP between the working generation and the retired generation. The generations trade with each other buying (in activity period) and selling (after retiring) pension rights. The rights can be expressed in various ways. The pension system provides an institutional framework for such an intergenerational trade.

Covering entire working population with a pension system needs implementation of compulsory participation. Organising a universal pension system the state has to impose a set of rules. The key decision is to choose a contribution rate that determines the demand side of the pension market. If the rules and the demographic structure is stable then the system is in equilibrium. In the real world the rules are exposed to discretionary changes and the demographic structure is not stable. However, fine tuning of the contribution rate can keep the pension market in equilibrium with no effect on the supply side of the market (the so-called defined benefit regime). I call this exogenous pension system (EXO). The system can be kept in equilibrium only if there exist a decision maker that fully internalises the goal of the system which is equal treatment of each generation in the process of intergenerational trade. Adjusting the demand side (contribution rate) becomes useless if the rate reaches the upper acceptable limit and at the same time projections show a further increase of the dependency ratio. In such a situation the exogenous arrangement leads to creation of pension system debt increasing its level that can be serviced by contribution revenue.

EXO arrangement cannot keep the pension system in equilibrium in current and projected demographic situation since a number of interrelated reasons of which the following three are crucial.

- ✓ Time inconsistency. Decision makers (politicians) and pension system participants have different time horizons. The former have much shorter one than the latter. Consequently decisions serve current political situation more than the pension system, which leads to overgenerous pension promises.
- ✓ Myopia and free riding apply not only to individuals but also to society at a macro level, which leads to pension pressure (demanding higher pensions regardless pension system possibility to pay).

- ✓ Illusion of the state providing pensions. Intermediation of the state in the intergenerational trade creates an illusion that it is the state not other people who finance pensions, which makes the pension pressure even stronger.

An alternative pension system arrangement is endogenous (ENDO), which means automatically adjusting the supply side of the pension market given the demand side. This type of arrangement is theoretically equivalent to EXO in the case of constant rules and demographic structure, which is nonexistent in practice. The ENDO system leads to a situation in which the share of GDP allocated to the retired generation is stable over time. This feature of ENDO is particularly important nowadays. It helps in avoiding overindebtedness of pension systems leading to labour market problems and economic slowdown.

One can argue ENDO leads to a reduction of pensions as expressed by the so-called replacement rate. This is not true given our inability to increase contributions and/or taxes over the current – already very high – levels. Given that fact, pension generosity in terms of the replacement rate depends only on demography. The type of pension system has little to do with pension generosity. However, in absolute terms ENDO pension system should lead to higher pensions than EXO since the former is neutral while the latter creates negative externalities for growth.

Methods applied to reach social goals, especially the traditional old-age pension system, are strongly based on the assumption on relatively stable demographic structure. Stabilizing mechanisms other than discretionary decisions are weak if existing at all. Nowadays, the assumption is obviously wrong. The demographic structure ceased to be of a pyramid shape. Actually, using the pyramid scheme was dangerous from the very beginning since – as we know for sure – sooner or later financial pyramids disappear. The pyramid easily generated large flows of resources to finance social goals but after it disappeared the uncontrolled social debts started to rise quickly. Countries (workers) need to bare the cost of servicing these debts even if the debts themselves are hidden.

Economists used to ignore pension systems. That was until pension systems lost their neutrality. Now  $PV(B) > PV(C)$ , which means pension promises will not be fulfilled unless the burden put on workers is increased. The latter has been done a number of times, which now create strong negative externalities and cause further increases unlikely. If the burden is not increased pension promises will not be fulfilled. So either contributions (plus subsidies and so on) need to be increased – which is unlikely – or pension promises need to be reduced – which is also difficult. The cost of doing nothing is weaker growth of welfare since large parts of GDP have to be spent on keeping the pension debt under control.

Table 1. Change of demographic structure and its consequences in Europe

	Dependency ratio 2000	Dependency ratio 2050	Primary surplus needed to keep debts at 2000 level
Belgium	28.1	49.5	4.2
Denmark	24.2	40.3	3.7
Finland	25.5	50.6	2.5
France	27.2	50.5	5.9
Germany	26.6	53.2	4.3
Italy	28.8	66.8	4.9
Netherlands	21.9	44.9	6.1
<b>Poland</b>	<b>20.4</b>	<b>55.2</b>	<b>-1.0</b>
Portugal	26.7	50.9	3.4
Spain	27.1	65.7	4.8
Sweden	29.6	46.3	1.0
UK	26.6	45.3	0.8

*Source: Dang, et al. 2001 (OECD).*

Table 1 provides basic information on the cost of population ageing to be beard by current and next working generations in EU countries. Pension debts will explode if not serviced as show figures in the last column. The explosion of the debts can also be avoided through a pension reform reducing pension expenditure.

Poland is an exception among countries listed in Table 1. Irrespective to one of the largest increase of dependency ratio the cost of servicing pension debt is negative, which means the share of GDP allocated to the entire retired generation will decrease – not increase as in the vast majority of other European countries. That is an effect of implementation a radical pension reform that was focused on reintroducing intergenerational equilibrium.

#### **4. The Polish/Swedish approach**

The new Polish pension system is an example of practical implementation the ideas briefly described in previous sections of this paper. The Polish approach is similar to ones applied in Sweden and Latvia.<sup>5</sup> It is based on termination of the previous system and exchanging it for a new one entirely based on individual retirement accounts. The three countries applied,

<sup>5</sup> The new pension systems in Poland and Sweden are “twin brothers”. They were even “born” on the same day, namely 1 January 1999. For more info on the Swedish system see Palmer (2002).

however, different scale of diversification of financing their systems and also partially different methods of using financial markets for financing a part of their systems.

Within the Polish universal system the old-age part of social security (OA) was separated from the non-old-age parts of social security (NOA). This also meant segmenting the flows of revenue. Afterwards the OA part of the system was terminated for new entrants. A new OA pension system replaced the previous one. The new OA system was entirely based on individual accounts. Accrual accounting was introduced to the OA system.

From the individual perspective, the new system is a method of life cycle income allocation.<sup>6</sup>

- ✓ Contributions based on a fixed percent of individual earnings create account values.
- ✓ Account balances from the close of the preceding period earn a rate of return based on the growth of the sum of paid contributions.
- ✓ Accumulated account values are annuitised at the time of retirement.
- ✓ Annuities are calculated on the basis of accumulated capital and life expectancy at the age of retirement.

Contributions paid to the OA system for individual participants are split between two types of accounts: (1) NDC – individual accounts based on government quasi-bonds (idea similar to Buchanan bonds) not traded in financial markets, bringing a rate of return that equals the wage sum growth (GDP growth in long run); (2) FDC – individual accounts based on instruments traded in financial markets. Participants have two individual accounts, one of each type. Account values in both accounts are annuitised on the day of retirement.<sup>7</sup>

The shortest description of the new Polish universal old-age pension system from the individual perspective:

- ✓ Each pension system participant receives from the system (in the form of annuity) the present value of contributions paid for him/her.

It should be noted that the approach applied in Poland is different from the one commonly called the three pillar approach. Entire universal system plays in Poland the same sole role, namely income allocation over individual life-cycle. So, although, the term “pillar” is used in public communication in Poland, it does not really fit the design of the system – irrespective to a definition of pillars (World Bank or EU).

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<sup>6</sup> See Góra and Palmer (2004).

<sup>7</sup> See Góra (2003).

## 5. Demographic and financial projections (Poland)

Poland's population is still young in comparison to most other OECD countries. However, the demographic change projected for Poland is very sharp, so the pace of worsening of the dependency ratio will be strong (see Table 1). It has really been needed to introduce the reform. Otherwise the growing cost of pensions would lead to severe economic, social and political problems. The new system automatically adjusts to demographic changes. In the decades to come policy makers will not need to think on how to slow down the increase of pension expenditure. This will be done by the system itself leaving much more freedom to future decisions. Demographic pressure projected for Poland is illustrated in Figure 3 and Figure 4.

Figure 3. Preproductive, productive and post productive age groups' shares (2000, 2025 and 2050, respectively)

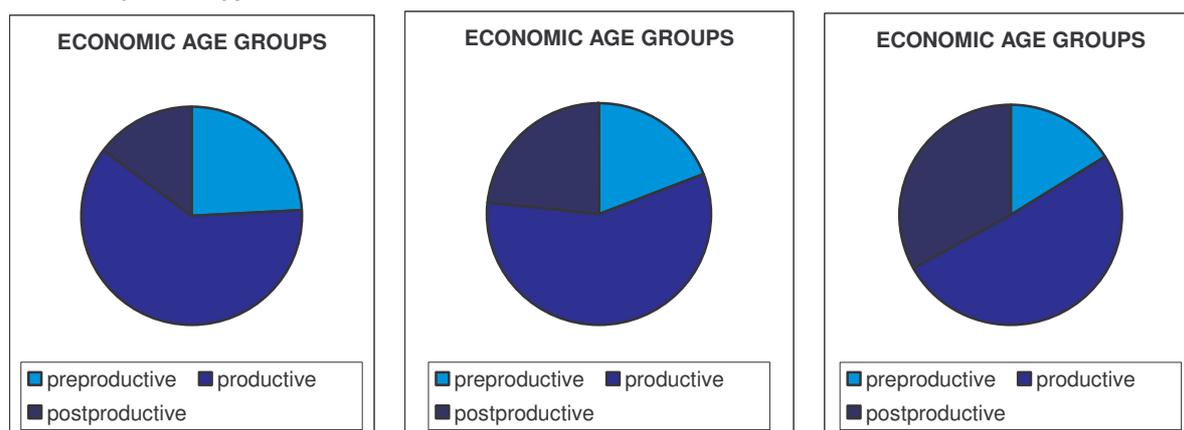


Figure 4a. Demographic structure by age cohorts (2000)

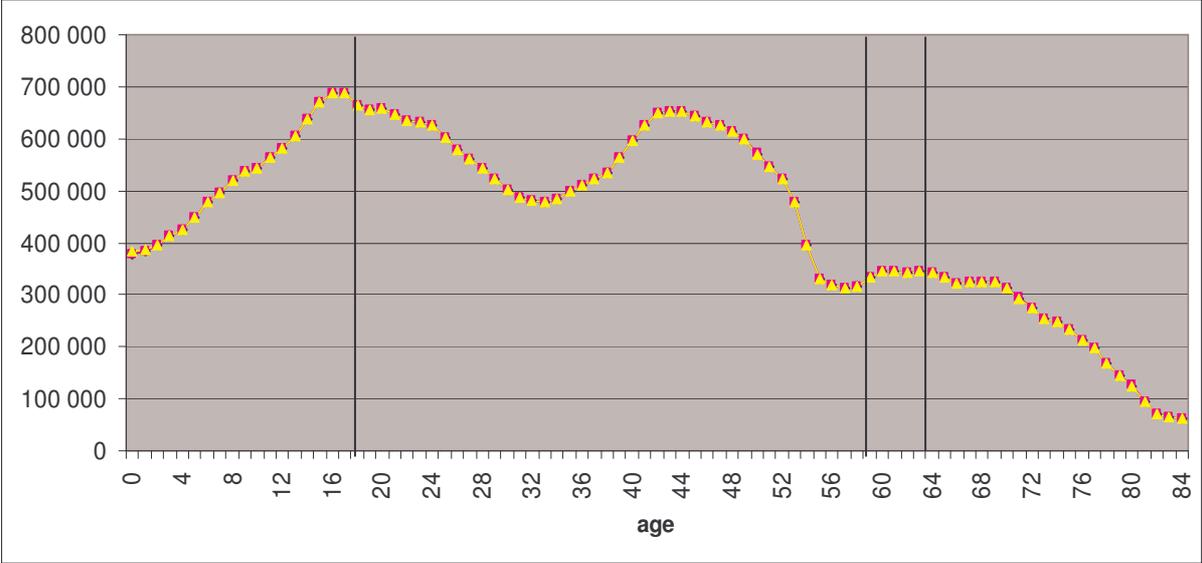
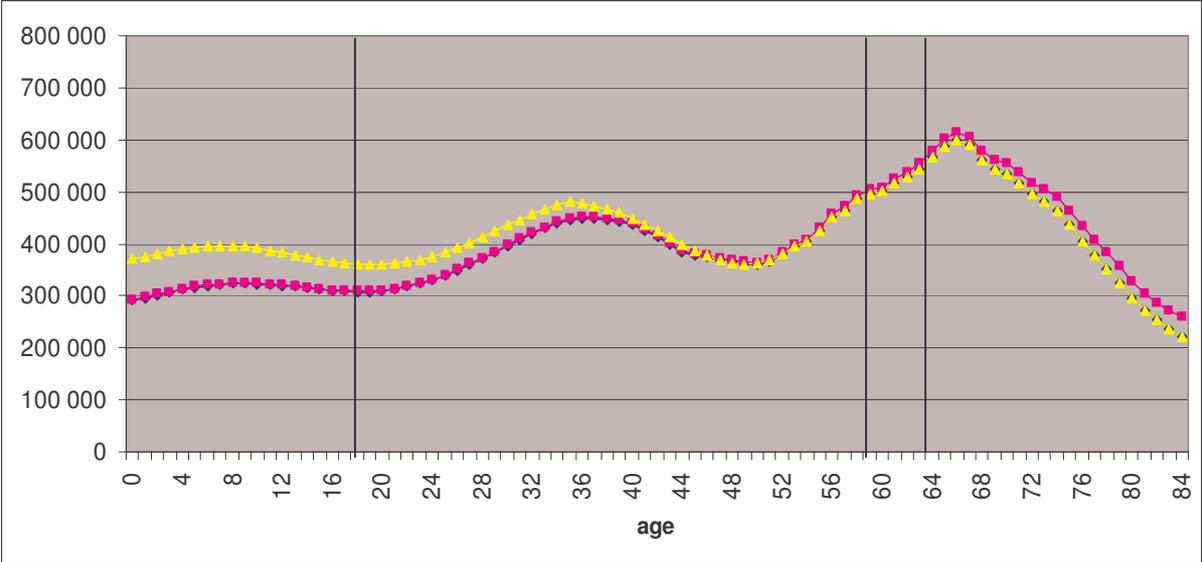


Figure 4b. Demographic structure by age cohorts (2025)



Figure 4c. Demographic structure by age cohorts (2050)



Key precondition for the pension reform was separation of the old age (OA) part social security from the non-old age (NOA) part of it. The new OA pension system is entirely based on individual accounts of two types. The first one, called notional (non-financial) yields the rate of return equal by definition the GDP growth rate<sup>8</sup> This part of the OA system is called NDC (notional defined contribution). The other part of the system is called FDC (financial defined contribution). Individual accounts yield rate of return depending on financial markets.<sup>9</sup> Both accounts are closely linked to each other, which among others means they are annuitised on the same moment and using very similar way of annuitisation.

The key feature of the new system is that pensioners receive (in the form of annuity) the present value of contributions they paid as workers. At the macro level this leads to stabilisation of the share of GDP allocated to the entire retired generation.

The new pension system covered in 1999 the vast majority of the working population. It has been done along the lines as presented in Table 2. Covering workers with the new system was automatic. There was no so-called switching process. The decision that workers were free to take was to split or not the contribution between the two accounts within the new system.

Table 2. New and old pension system

New system (people born after 31 Dec. 1948)		Old system (people born before 1 Jan. 1949)
People born after 31 Dec. 1968	People born before 1 Jan. 1969	
Automatically covered by the new system; OA contribution <u>automatically</u> split between two accounts [NDC+FDC]	Automatically covered by the new system; OA contribution either split between two accounts <u>or</u> paid into one account [(NDC+FDC) or NDC]	Stay in the old system ( <u>no possibility</u> to participate in the new one); <u>no accounts</u>

Table 3 provides information on how many people were covered by the new system and how many of them split their contributions between two accounts. Figure 5 illustrates a projection for new system coverage.

<sup>8</sup> For technical reasons NDC accounts can be linked to some other economic variables that are correlated with GDP growth rate.

<sup>9</sup> In the universal pension system covering the entire population rates of return from both parts of the system will converge.

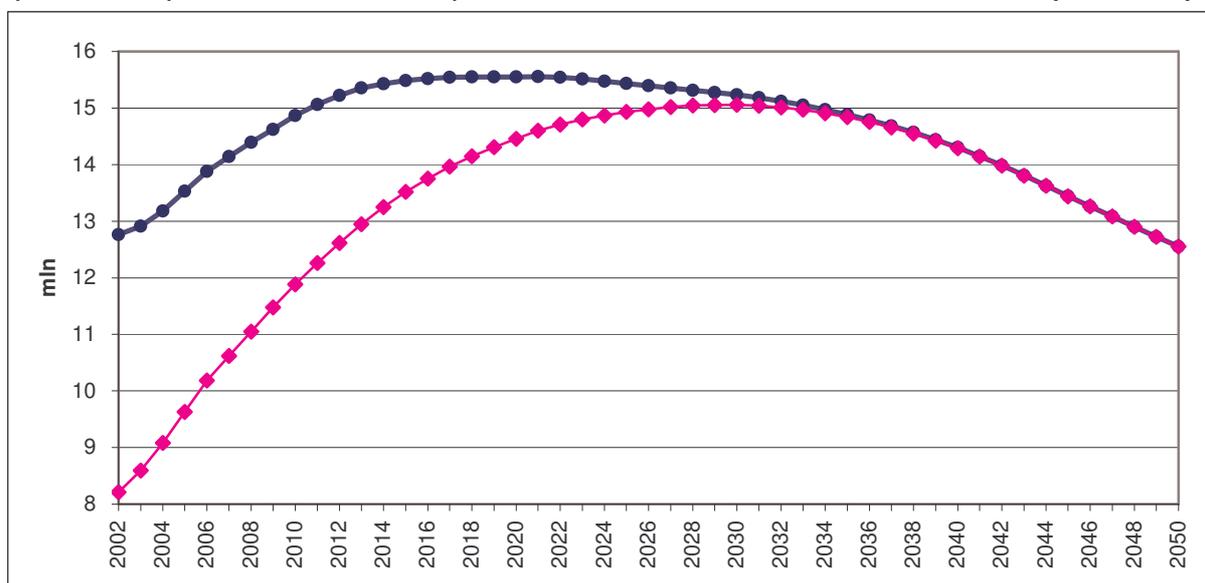
Table 3. Number of people covered by the old and the new system

Year	Total	Old system	New system – NDC	New system - FDC+NDC	Registered members in the FDC scheme <sup>a</sup>
1998	12 737	12 737			
1999	13 271	1 993	3 684	7 594	8 693.9
2002	12 761	1 608	3 300	7 853	10 989.8

<sup>a</sup> the number of persons registered in the FDC scheme is based on the supervision registry.  
 Source: Chlon-Dominczak and Góra (2005). Estimates based on Social Budget Model (The Gdansk Institute for Market Economics)

The difference between estimated number of covered workers and persons registered in the FDC scheme (the last two columns in Table 3) results from the accumulation of fluctuations in the workforce and covered persons. The number of registered members represents all those persons who at any point of time paid contribution and even some who actually never contributed. The number of persons with NDC and FDC accounts is based on the estimates on the number of workers who contributed to the pension system in a given year.

Figure 5 Number of workers covered by the new OA system (upper line) and those covered by the new system who have not split their contributions between two accounts (lower line)

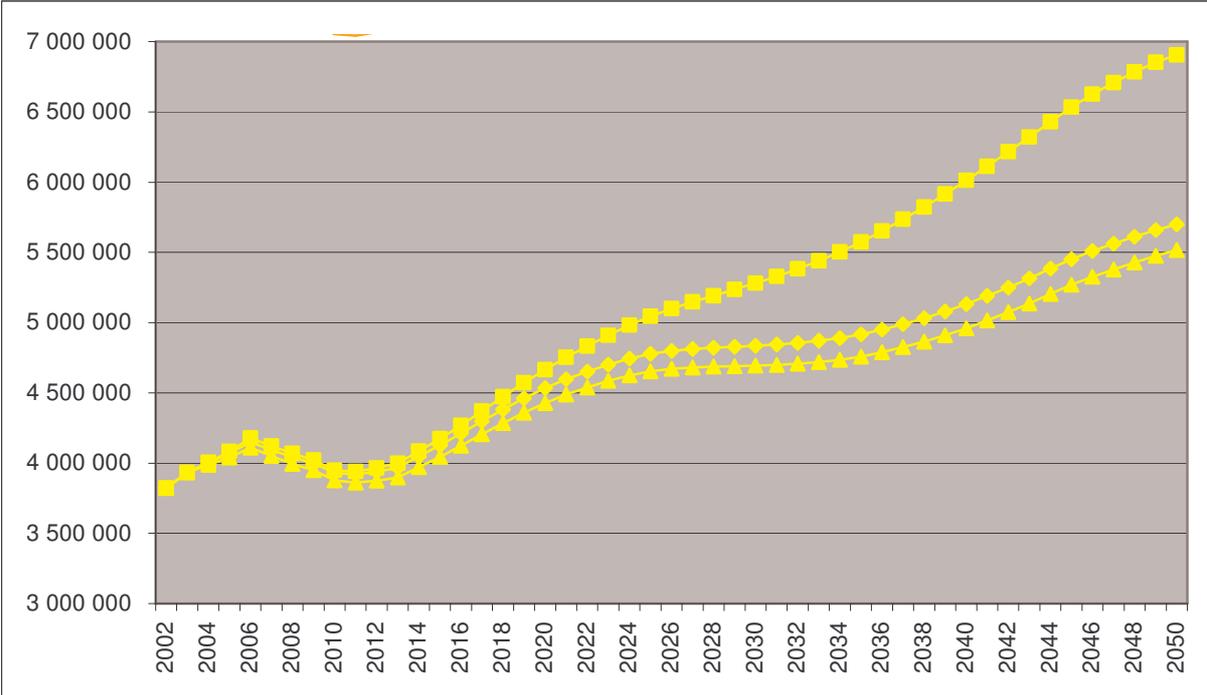


Implementation of the new system will not change demographic trends. The new system will have to cope with the same worsening situation as the old system would have to do if it had not been terminated. However, adjusting expenditure automatically to revenues the new system will just cope with the same situation better. Figure 6 illustrates the projection of the

dependency ratios: demographic and systemic. Implementation of the new system has automatically increased the retirement age by around 5 years, which will generate significant, though short term effect.

Figures 6 and 7 show the effect of postponed retirement will temporarily be much stronger than the effect of the demographic change. The long run trend will remain, however, unchanged. The number of OA pensioners is projected to grow from the current level of around 4 millions to 5.5-7 millions in 2050.<sup>10</sup>

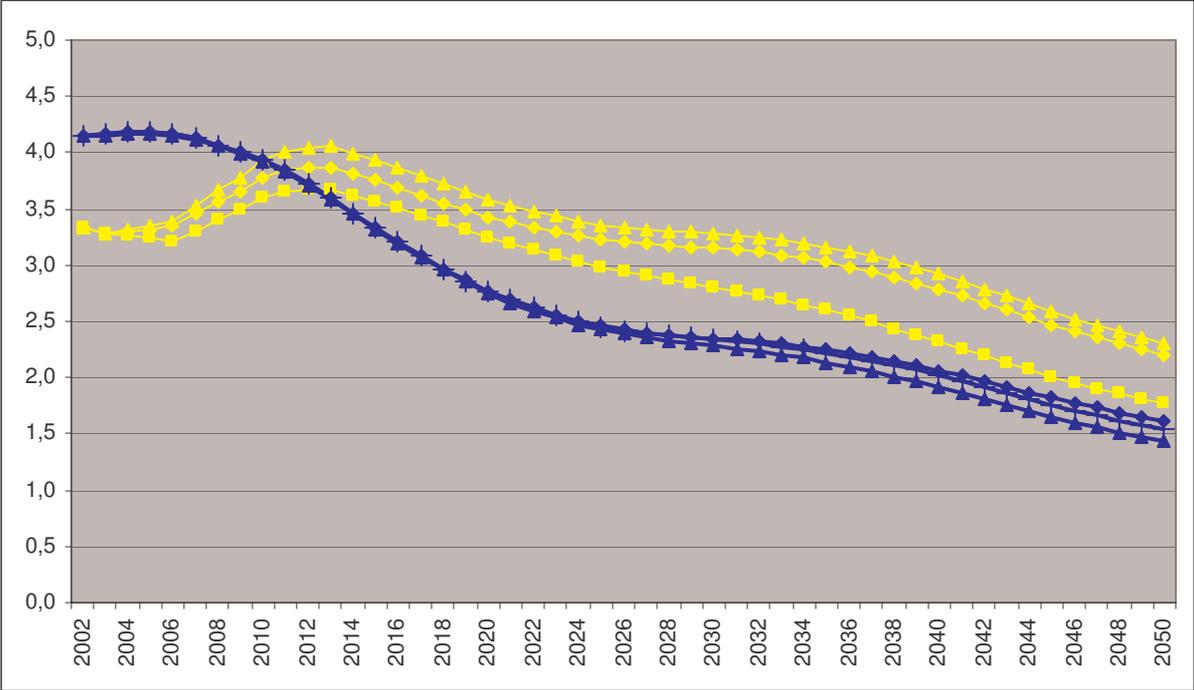
Figure 6. Number of OA pensioners



Dependency ratios illustrate the scale of the change in demographic structure. Projections show the constant decline of the demographic dependency ratio (productive to post-productive population) from the current around 4 to around 1.5 in 2050. The systemic dependency ratio (workers to OA pensioners) will follow a similar path. The exception will be the period until 2010-2015 when the effect of increased retirement age will dominate. See Figure 7.

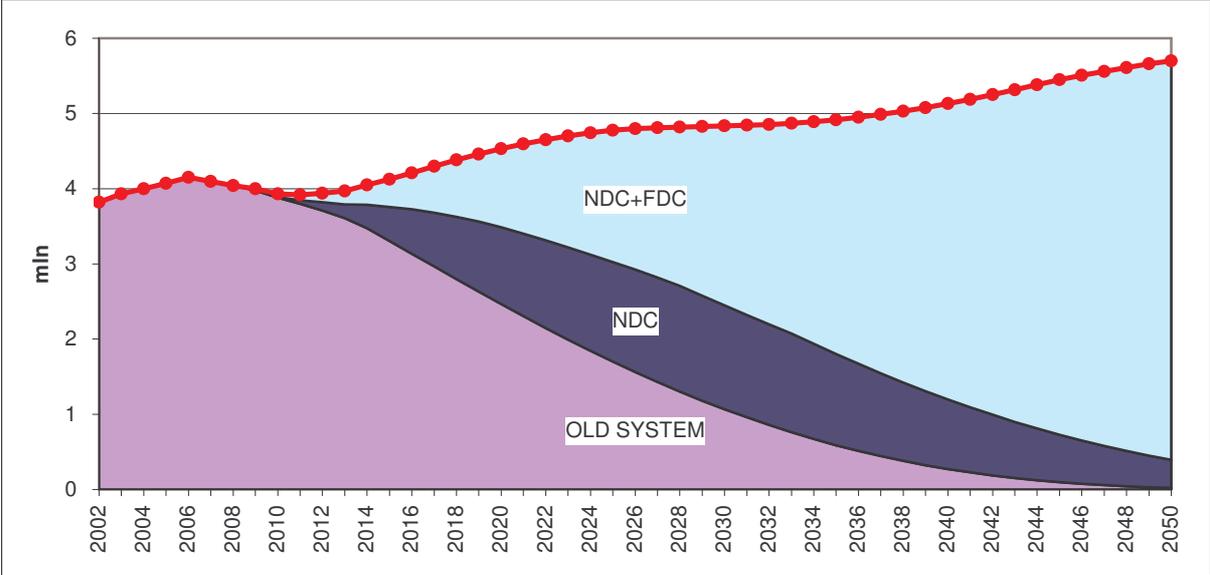
<sup>10</sup> Projections depend on assumptions on fertility and mortality.

Figure 7. Demographic dependency ratio (productive to post-productive; blue lines) and OA system dependency ratio (workers to OA pensioners; yellow lines)



The new system will start paying benefits in 2009. First cohorts of female workers born after 1948 will get the possibility to retire starting from this year. First male workers will start retiring 5 years later. However, the history of the old system will not finish at the same moment. People born before 1949 will keep receiving benefits from the old system for next couple of decades. The number of old system retirees will diminish due to natural reasons. The proportion of people covered by the new system will quickly grow. However, the number of those future pensioners who split their contributions between two accounts will remain unchanged for a couple of decades. This group will start to shrink starting from 2035-2040. Eventually, all pensioners will be those who split their contributions between the two accounts. See Figure 8.

Figura 8. Numer of OA pensioners receiving benefis from the old and the new system



The new OA system automatically adjusts expenditure to contribution revenues. This means the share of GDP allocated to the entire retired generation tends to be stable over time. However, this means the average individual share of GDP per retiree will follow demography (dependency ratio). Since a substantial decrease of the dependency ratio is projected, the average individual share will have to go down. Table 4 provides projections for people of various age in 1999 covered by the new system.

Table 4. Projected replacement rates by age in 1999

	retirement at 60	retirement at 65
25	46%	65%
30	51%	69%
35	53%	71%
40	54%	72%
45	56%	74%
49	57%	75%

Note: Simulations for average wage earner starting work at the age 25 and assuming average real wage growth of 3% p.a., average funded tier rate of return of 4% p.a. and up-front fee on funded system at 5% and assuming constant employment level (i.e. average wage growth = wage bill growth) and constant life expectancies. Replacement rate calculated net of social security contributions.

Source: Chlon-Dominiczak and Góra (2005)

As already discussed in this paper, the reduction of replacement rates is inevitable. The new system will just do the job smoothly and political and policy intervention will not be needed to achieve the goal, namely reintroducing intergenerational equilibrium.

## 6. Pension system debt: accounting rules

Introducing the pension system based on individual accounts instead of traditional pension system regime is a challenge for public finance. Contributions flowing through individual accounts of the FDC type in national account system are accounted as expenditure. Hence, the reform means expenditure. Table 5 provides projections of expenditure and corresponding deficit/surplus in two cases. In the first one there is only one type of accounts, namely NDC, introduced instead of the former system. In this case substantial surplus is generated. If, however, contributions are split between NDC and FDC then the FDC part causes a deficit that will disappear around 2030.

Table 5. Projections of OA pension expenditure by the type of individual accounts (in percent of GDP)

	2000	2010	2020	2030	2040	2050
If the new system uses only NDC accounts						
Expenditure	6,04	5,34	4,62	3,44	2,66	3,11
Deficit/surplus	0,02	0,38	1,09	2,28	3,07	2,62
If the new system splits contributions between NDC and FDC						
Expenditure	6,01	5,27	4,46	3,11	2,08	2,06
Deficit/surplus	-1,38	-0,70	-0,93	0,36	1,39	1,41

*Source: Chlon-Dominczak (2002).*

Financial projections as provided in Table 5 are based on traditional accounting of pension expenditure. If, in turn, we realise that both types of accounts create similar effects for the real economy then we shall see that even in the case of split contributions expenditure is substantially reduced from the moment of implementation of the new system.

The pension system is an institutional framework for intergenerational exchange leading to establishment of proportions of GDP transferred to the retired generation and the rest of GDP spent on remuneration of production factors. In order to get the part of GDP transferred to retirees production factors need to work again.

The two generations, namely the working generation and the retired generation exchange pension rights (various ways of expressing the rights). People are first in the working generation (purchasing the rights) and then the same person is in the retired generation (selling the rights).

The pension system creates debt. The workers pay contributions and get a right to participation in GDP produced after they retire. The pension debt, irrespective to the way it is expressed in, is a hard debt. It used to be classified as a soft debt. This is not possible any more. The governments that tested the "hardness" were all in troubles (France, Germany, others).

Traditional "bismarckian" pension systems are based on a combination of the financial pyramid and the Ponzi scheme. Given present and projected demographic structure the pyramid can be "kept alive" only by increasing contributions and/or increasing subsidisation. There is a lot of evidence from numerous European countries. However, the increased contributions and/or taxes can help only for the time being. The implicit debt is growing all over Europe. Formal government guarantees for the system are welcome by the people but instead of providing them with more security they expose them to higher risk in the future. The "agony" of the pyramid can be prolonged but it cannot be avoided. The longer the agony, the more suffering social and economic consequences will be.

Although the pension debt is hidden (implicit), it is hard and its effect on economies is the same as the effect of the open (explicit) debt. The two types of debt should be treated in the same way.

$$D = D_{\text{exp}} + \alpha D_{\text{imp}}$$

Coefficient  $0 \leq \alpha \leq 1$  represents hardness of implicit debt. Recently  $\alpha$  is only a little bit smaller than one.

The Maastricht criteria are to prevent governments' temptation to play the Ponzi game in public finance. However, pension debts are excluded from this restriction. This creates a clear incentive to hide as much of the debt as possible. In consequence, pension reforms are not welcome since they inevitably lead to unhiding at least a part of formerly hidden debt. No pension reform means smaller explicit debt but at the same time growing hidden debt. Hence, the overall debt in economies is also growing. Unhiding already existing implicit debt does not contribute to any increase in economies indebtedness. Keeping the implicit debt hidden contributes to stronger economic indebtedness. Paradoxically, attempts to keep explicit debts below the Maastricht level by hiding the implicit debt leads to an increase of the overall debt and its devastating effects on the economy.

In light of the above an answer to the question "are mandatory open pension funds a part of public finance or not?" is much less obvious than some may think. The recent decision of Eurostat to exclude transfers to mandatory open pension funds from public finance is an

example of a decision based on good grounds but leading to the incorrect statement if analysed from the point of view of merits of the problem.

If the pension system is well defined, this means:

$$PV(c) = E\{PV(b)\}$$

Then the pension debt can be serviced out of contribution revenues.

The present value of contributions equals the expected value of the present value of benefits. Expected value refers only the longevity risk.

In a universal (covering entire population on the same rules) pension system individual participant's risk is close to the average risk even if there is a limited room for individual decisions within the system.

Contributions transferred to the entire universal pension system are neither public nor private. But if somebody wants to classify them in the bipolar public-private world, then it does not matter which of the two options is chosen. There are, however, two crucial conditions:

- ✓ both unhidden debt (mandatory open pension funds) and still hidden (various types of arrangements called "pay-as-you-go" (it is not necessarily correct name) are classified the same – either both are public or both are private;
- ✓ the classification applies to all countries in the same way.

Poland, Sweden and Latvia turned their universal mandatory pension systems into entirely defined contribution arrangements. This means the debt newly created within the pension system meets the condition as presented in point 7 above. Some other countries did the same with respect to a part of their systems.

In the countries listed above it is easy and natural to sum up account values in the entire pension system (irrespective to whether some prefer to call some of these accounts "pay-as-you-go" or "funded" the sum of the two is aggregated liabilities) and create a category "explicit pension debt" which is neither public nor private. The most rational approach to the problem is to keep the unhidden pension debt as a separate category – irrespective to whether somebody prefers to call it private or public.

The inherited implicit debt in these countries and entire pension debt in all other countries should be also estimated and unhidden even if they are not well defined. Unhidding entire pension debt is the necessary condition to stop the ever increasing pension debts. If not

stopped, these debts will lead to bankruptcy of public finance and/or permanent substantial economic slowdown in many European countries. In light of the above, the recent Eurostat's decision was not equal to the task (challenge). It will have to be changed soon. Otherwise Ponzi game will lead European economies to very deep problems.

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