Part II. Costs and Benefits of the Pension System Reform in Poland – the Impact on Savings

1. The Model and Real Costs of PAYG and Fully Funded Systems

The necessity of pension system reform in Poland stems from demographic factors (i.e. ageing of population especially after 2010–2020) as well as from ineffectiveness of the current PAYG system. A shift from the current PAYG to a fully funded system entitles transition costs. These costs arise because of the necessity to cover the pensions of those who remain within the PAYG system. At the same time, payments into the system are reduced by a group of people who transfer their contributions to a new fully funded system. The transition period is relatively long and covers the interval in which the 30-year-olds (in 1999) will still benefit from the PAYG system for maximum of 38–46 years.

The high costs of the reform are also associated with a relatively high degree of generosity of the former pension system in Poland. The latter stems from the cumulating of privileges of given social groups, abuse of granting disability benefits and a lowering of the retirement age in order to solve unemployment problems (so called *early pensions*). Therefore, a relatively short working lifetime and, in turn, short average period of contributing, and common cases of cheating (e.g. problem of people 20 and 30 years of age entitled to social benefits) are the main causes of a severe strain on the pension system in Poland.

At the same time, the pension system was used as an income policy instrument without considering the possibility of balancing revenues and expenditures of the Social Insurance Fund (ZUS) and the Farmers Social Insurance Fund (KRUS). Thus, the indexation of social benefits in line with wages (full indexation until 1993, then lowered to 0.9 of wage growth) caused rapid growth of the average social benefits in comparison to wages.

The share of the average social benefit in the average wage exceeded 64% and the average pension reached 74% of the average wage. Since then, both figures slightly dropped to 60% and 70% in 1997 respectively [CSO, 1998a, 157]. The level of relative generosity is comparable to those prevailing in Sweden and Italy and is among the highest in the world [Golinowska, 1997, 16; Averting, 1994, 104]. The comparison does not, however, concern absolute values of benefits as they, like wages, very across countries.

The life span, and in particular the retirement lifetime (i.e. period of economic passivity), is the last macroeconomic variable that determines the final level of costs of

the pension system reform. The *passivity ratio* (the ratio of retirement lifetime to working lifetime) is a base for calculation of income necessary to finance consumption during retirement and, thus, a base for calculation of savings (contributions) during the working lifetime. For many individuals the passivity period depends on the retirement age and the life-span but it could be shorter for individuals remaining employed after reaching the retirement age or it could be longer for those who, for various reasons, start receiving social benefits before reaching the retirement age. Overall these deviations cancel each other out and the actual number of pensioners should correspond to the number of people of the retirement age who participate in the pension system. The number of pensioners can be referred to the actual number of people of the retirement age as the ZUS PAYG system was generally addressed to all non-farmer people.

The ratio of population of the retirement age to economically active people is referred to as the *demographic dependency ratio*. In a macroeconomic scale, it should correspond to the *passivity ratio* – the ratio of the average retirement lifetime to average working lifetime. In Poland the two ratios differ significantly from each other, and this will be shown below.

People receiving social benefits other than pensions (e.g. disability and family benefits) increases the number of beneficiaries. This causes the number of people receiving social benefits and the number of people of the retirement age to differ from each other. The ratio of pension system beneficiaries to contribution payers is referred to as the *system dependency ratio*. Such a measure differs significantly from the demographic dependency ratio and the passivity ratio.

A model that compares costs of a PAYG system and of a fully funded system in Poland over the period 1998–2040 is presented below. The analysis is based on the model employed in the World Bank report on the ageing of world population [Averting, 1994, 297]. The base model is augmented in order to adjust to Polish characteristics. The demographic dependency and system dependency ratios are assumed equal in the World Bank model. They do differ in Poland and this implies a need for an analysis of two cost scenarios of the former PAYG system reform.

The assumptions of the cost model under the PAYG and fully funded systems are as follows:

1. In the PAYG model a pension equals a fixed part of wages and thus is indexed in line with wages growth.

2. The level of contribution (in relation to wage) depends on the target ratio of pension to wage and on the demographic dependency ratio

$$C_r = B \cdot D \qquad (1)$$

$$D = D_d = D_s$$

where:

C_r – contribution as a percentage of wage

B – target pension to wage ratio (benefit rate)

D_d – demographic dependency ratio (ratio of people of the retirement age to economically active people)

D_s – system dependency ratio (ratio of system beneficiaries to contribution payers).

Under a fully funded system individuals have to save throughout working lifetime assets sufficient to finance the assumed stream of pension benefits throughout the expected passivity period. The payment Ck into the system is a part of wage W in the initial year. During the n-year period of work wages and social benefits grow at an annual rate of $1+g$ (approximately equal to the rate of GDP growth). The accumulated contributions increase annually at a $1+r$ rate, where r is the interest rate (rate of return on capital).

At the time of retiring, the individual's accumulated assets during the n-year working lifetime equals:

$$C_k W[(1+r)^n+(1+g)(1+r)^{n-1}+\ldots+(1+g)^{n-1}(1+r)] \quad (2)$$

At the moment of retiring, the discounted present value of future pension payments indexed to wages at a benefit rate of B of wage, and calculated over the m-year retirement lifetime equals:

$$BW(1+g)^n[1+(1+g)/(1+r)+\ldots.+(1+g)^{m-1}/(1+r)^{m.-1}] \quad (3)$$

where:

n – number of working years

m – number of years in retirement

m/n – passivity ratio.

It is assumed that g, r, n, m are constant over time.

In a fully funded system the expressions (2) and (3) are equal – the accumulated capital has to equal the present value of future pension benefits.

If we assume that in the long run the rate of wage growth (and rate of GDP growth) equals the interest rate (rate of return on capital), i.e. $r = g$, then (2) and (3) reduce to the following formula:

$$C_k W (1+r)^n \cdot n = BW(1+g)^n \cdot m \quad (4)$$

so

$$C_k = B\ (m/n) \qquad (5)$$

Thus, the required contribution to the fully funded system depends on the passivity ratio and the target pension to wage ratio.

It also follows from (2) and (3) that if $r<g$, then $C_k>B(m/n)$. If the interest rate is lower than the rate of wage growth, a contribution to a fully funded system has to be higher in order to generate the assumed stream of benefits provided the passivity ratio remains unchanged. If $r>g$, then $C_k<B\ (m/n)$. If the interest rate is higher than the rate of wage growth, then cumulative contributions rise quicker than liabilities due to the assumed stream of pension benefits and, thus, the contribution can be lower as compared to the case where wage growth rate is equal to the interest rate. The contributions must be also rising if the passivity ratio (m/n) or pension-wage ratio (B) go up.

A comparison of the two PAYG and fully funded systems proceeds as follows:

I If $D = D_d = D_s$,
$R = g$ and $D = m/n$,
then the two systems do not differ with respect to costs, and thus with respect to contributions.

II If $D = D_d = D_s$,
$r = g$ and $D<m/n$,
then the PAYG system outpaces the fully funded one. This means that the population covered with insurance is relatively young (i.e. many young people contribute to one pension) hence, the contribution is lower than it would be under a fully funded system.

III If $D>(m/n)$ and $r = g$,
then the fully funded system performs better than the PAYG one. The population is relatively old (high D) and thus contributions under the PAYG system would have to be higher than those under a fully funded system are.

IV Assuming *ceteris paribus* conditions:
if $r>g$ a fully funded system is cheaper
if $r<g$ a PAYG system is cheaper

V If $D>(m/n)$ and $r>g$, then a fully funded system performs better than a PAYG system in absolute terms.

VI If D_d does no equal D_s then the system has to adjust to the actual system dependence ratio (D_s). A situation where $D_s>D_d$ is more common. This is the Polish case. The relative costs of pension systems will depend on whether

$D_s > m/n$
$r > g$ is the case or vice versa.

The above model is applied to the Polish economy. The demographic dependency ratio is relatively low in Poland; i.e. Polish society is yet relatively young. In the mid-90s a ratio of people over 65 to people 20–64 years of age stood at 0.20 (i.e. 1:5). Taking account for the retirement age stipulated in the legal acts (60 for women and 65 for men) and relating the population over these limits to groups of age 19–59 (women) and 18–64 (men), the demographic dependency ratio amounted to 0.24 – approximately 1: 4 (i.e. 4 employees paying contributions for one pension). It is a very low ratio. If it were equal to the system dependency ratio, then the contribution to the ZUS could be some 15% according to the following formula:

$C_r = B \cdot D$
$C_r = 0.60 \cdot 0.24 = 0.144 = 15\%$
given a high ratio of average social benefits to average wage, which stood at 60% in 1997 ($B=0.6$).

However, the system dependency ratio is considerably higher. As the matter of fact, a number of people receiving social benefits is significantly higher than indicated by demography. The figure stood at 9.3 mln in 1997 versus 13.1 mln insured in the ZUS and 1.4 insured in the KRUS so

$D_s = 9.3\text{mln}/14.5\text{mln} = 0.64$.

Hence, the system dependency ratio in Poland is over 2.5 times higher than the demographic dependency ratio. A 40-point gap between the ratios is a phenomenon on a world scale.

The discrepancy between ratios D_d and D_s stems from a disproportionally large number of people entitled to social benefits other than pensions as compared to pensioners. In 1997 there were 9.3 mln beneficiaries of which:

– 3.4 mln of pensioners receiving pensions due to employment,
– 2.7 mln people receiving disability benefits,
– 1.2 mln people eligible for family benefits,
– 2.0 mln individual farmers receiving social benefits [Statistical Yearbook 1998,157].

The average social benefits of the above groups constitute the following proportion of average wages:

– average pension – 70%,

– average disability benefit – 50%,
– average family benefit – 60%,
– average benefit for farmers – 42% [Statistical Yearbook 1998,150].

Thus, the pension system is very generous. Pensions and other social benefits do not drop below 50% of average wages, which is a target level adopted in the draft of the reform. The only exception is farmers' pensions (mainly due to bequeathing of land). In this case benefits constitute roughly 40% of wages. This level is employed in numerous reforms of pension systems around the world as a maximum level guaranteed by a state. The additional factor that imposes a burden on the farmers pension system is a very low level of farmers' contributions accounting merely for 5% of farmers pensions (R. St. 1998, 474, 158). This results from historical regulations applied to the group. Currently farmers' pensions do justice to this social group that was not treated equally under the former political system. However, the long-run strategy of farmers' pensions requires an increase in farmers' contributions.

According to present levels of the system dependency ratio (0.64) and the ratio of wage-pension substitution, the level of ZUS contribution should be 38%

$$C_r = 0.6 \cdot 0.64 = 0.384.$$

A difference between this level and the current level of contributions to the ZUS (45%) points to an inefficiency of the PAYG system as well as to the fact that contributions cover other social benefits in addition to pensions and disability benefits. Thus, there is the conclusion that the cost of the former PAYG system, as measured in terms of contributions level, is three times higher than the level of contributions according to demographic indicators (45% contribution is three times higher than the hypothetical 15% one). Although, due to some system-factors the cost would be only 2.5 times larger (38:15=2.5).

A comparison of the PAYG system and the fully funded one requires a computation of the passivity ratio. In the mid-90s in Poland the ratio m/n amounted to approximately 0.4. It is obtained through division of the average retirement period (15 years) and the average working lifetime (37 years), so $m/n = 15/37 = 0.4$. The length of work and retirement periods is determined, on the one hand, by average lifetime (68 years for men and 76 years for women, on average 72 years) and, on the other, by the effective age of retiring (55 years for women and 59 for men, on average 57 years) [Golinowska, 1997, 18]. Hence, the average working lifetime is 37 years (57–20=37). The age of 20 years is taken as a base age at which people commence work, and not the age of 18 years as stipulated in the labour law, because the coefficient of youth employment in the group of 15–24 years of age is negligible (0.3 of economically active in this group) and it only rises

in the group over 25 years of age (0.75 of economically active) [CSO 1998a, 121]. Employing the age of 20 years in setting the working lifetime seems to be justified. Such age will be also consistent with the popularisation of higher education until the age of 19, and in this respect the age is more suitable for forecasting purposes. Moreover, this age is a bottom age limit of workforce employed in the models of employment growth in OECD countries.

The comparison of the PAYG system ($C_r = B \cdot D_s$) and the fully funded one ($C_k = B \cdot m/n$) suggests that even now the latter would be cheaper as

$$C_k = B \cdot m/n < C_r = B \cdot D_s$$
$$C_k = 0.6 \cdot 0.4 = 0.24 < C_r = 0.6 \cdot 0.64 = 0.384.$$

Apparently, the contribution under the fully funded system of 24% would be lower than the present ZUS contribution of 45%. This calculation also shows that the current demographic and system relations suggest that the contribution of 36%, which will be maintained after the reform in the first pillar (ZUS), should cover most social benefits expenses provided the more disciplined ZUS system (the theory says about contributions of 38.4%).

For the sake of profoundness of the analysis, it should be said that if the Polish pension system prevailing so far relayed more heavily on the demographic dependency ratio (D_d=0.24) than on the system dependency ratio (D_s), then the PAYG system with the contribution of 14.4% would be cheaper as

$$C_r = B \cdot D_d < C_k = B \cdot m/n$$
$$C_r = 0.6 \cdot 0.24 = 0,144 < C_k = 0.6 \cdot 0.4 = 0.24.$$

The weight of demographic factors in this calculation is very significant. It turns out that if the pension system took greater account for demography, then it would be much cheaper. This is quite important for the present demographic relations will not be changed until the year 2010. The demographic dependency ratio (D_d) is to reach 24% in 2010 (alike in 1995), and only in 2015 to increase to 29% and to 34% in 2020 [Security, 1997, 24]. Therefore, the necessity for reforms of pension system in Poland does not stem primarily from demographic reasons, although they are important in the long run. The reform of pension system is driven mainly by the very high system dependency ratio. In this case, the reform should in the first place lower the ratio through limiting pension privileges, eliminating loopholes and abuses of granting disability benefits as well as through increasing farmers' contributions or introducing contributions for some groups previously not covered (in particular for professional soldiers, policemen, firemen, etc. –

so called uniform pensions). Under the reform a gradual lowering of the ratio of wage-pension substitution (*B*) so as to reach ultimately 50% is envisaged. This will be hard to achieve due to social reasons and for it will bring a negligible saving in the system.

It is striking that there is no attempt to lengthen working lifetime what, in turn, relatively decreases a number of future pensioners. Maintaining the lower retirement age for women is incomprehensible given their longer life span and relatively better education attainment in comparison to men. In 1997 45% of women over 19 had secondary and higher education, whereas the figure for men was only 35% [CSO 1998b, 66, 102]. Thus, the shorter employment period for women is a waste of human capital. The present demographic relations secure 12 years of a relatively easy transformation to the fully funded system. The generation of the post-war population boom will be still working in this period. Thus, it is possible to improve the pension system parameters that are related to demography but can be altered by economic policy over the period. It particular the active working lifetime should be lengthened. This is possible if the pension system is not used to solve unemployment problems. The right to earlier pensions (by 5 years) as well as abuses of granting disability benefits will contribute directly to shortening of employment periods and in turn to an increase in the passivity ratio (*m*/*n*).

In my opinion, unemployment policies and the pension system should be separated. Unemployment is primarily influenced by economic growth. Sustaining fast growth until 2010 would facilitate employment of young people (children of the generation of the post-war population boom) as well as of the people of the boom themselves [Liberda, Tokarski, 1999]. This will be even more crucial after 2010 because labour supply will diminish relatively as a result of people of the 1990s population depression joining the labour force.

Any increase in working lifetime of one year lowers the passivity ratio and, in turn, costs of pension system (given the assumption that the life span is rising as well). For instance, a lengthening of effective working lifetime by 2–3 years, provided for extending of life span, decreases the passivity ratio by 4–5 points. To be more specific, the lengthening of working lifetime by 2 years and the life span by 1 year yields the m/n equation (in relation to the present figures) as follows

$$m/n = (73–59)/(59–20)=14/39=0.36,$$

and by 3 and 2 years respectively

$$m/n = (74–60)/(60–20)=14/40=0.35.$$

If such processes took place prior to 2020 (demographic forecast sets a 3-year increase in the life span over the period [CSO 1998b, 98]), then the passivity ratio (m/n) and the dependency ratio (D_d=0.34) would converge. It would mean that a ratio of retirement period to work period equals a ratio of pensioners to economically active people. Then a choice of pension system would be possible. However, in Poland such a situation will not occur until 2020 as the actual system dependence of the pension system (D_s) is higher than the demographic dependence (D_d). The system dependency ratio will be likely decreasing after the introduction of mixed system (PAYG and fully funded). Although it is doubtful that the ratio would nearly halve by 2020. However, even now the proportion of pensioners and family members of ex-employees receiving family benefits (4.6 mln in total) account only for 32% of the people contributing to the system. The problems arise in the case of disability benefits as well as farmers social benefits. Hence, it is more likely that the system dependency ratio will lower considerably only after 2020 and definitely after 2030, when the generation of the post-war population boom will quit the pension system. A more detailed forecast would require an in depth analysis of the flow of current pensioners age. Such a forecast would be still biased due to the assumption on life expectancy. Under the life-span forecast of 78–80 years in 2030–2040 [CSO 1997, 12] and the assumption of extending the working lifetime up to an age of 65 would cause the three ratios (demographic dependency ratio, system dependency ratio and passivity ratio) to equalise in this period. They would stabilise approximately at a level of 33%:

$$D_d = D_s = (m/n) = (80–65)/(65–20) = 15/45 = 1/3 = 33\%.$$

Then the contribution (= payment into the pension system) could be something between 16% and 33% of wages, under the assumption that pension is 50% or 100% of wages.

Given $m/n = D_s = D_d = 0.33$
$C_r = C_k = C$

for:	$B_1 = 0.5$	$C = 0.5 \cdot 0.33 = 16.5\%$
for:	$B_2 = 1.0$	$C = 1.0 \cdot 0.33 = 33\%$.

The exact time of equalisation of the ratios (2030 or 2040) will hinge on how long the generation of the post-war population boom will be willing to work and for how long it will stay alive.

2. Pension Savings According to the Life Cycle Theory

Relating of pensions to wages is a kind of technical measure. As a matter of fact, the pension (i.e. income and consumption during retirement) should be related to the lifetime income, which is a smoothed income of entire life. According to the life cycle theory, one can assume that consumption during retirement should be as high as the lifetime average consumption. However, this means it cannot be equal to the income over the working lifetime because the income must be partly saved for pension. The savings rate for this purpose results from the expected retirement lifetime, but related to entire active lifetime and not only to working lifetime. In the case of the last example it would amount to:

$$s=(80–65)/(80–20)=15/60=1/4=25\% \qquad (6)$$

Therefore, in order to obtain pension at a level of consumption over the working lifetime one would have to contribute to the pension system 1/4 of wage income. This would mean that consumption would constitute 75% of wages and would be the same over the retirement period.

Thus, if $s=C=0.25$ $B=0.75$,

then $m/n = 1/3$ (i.e. the retirement lifetime would still be 1/3 of the working lifetime),

$s = C = B \cdot m/n$

so $s = C = 0.25 = 0.75 \cdot 0.33$.

This means that consumption in retirement equal to consumption in the working lifetime would constitute 75% of wage income given 45 working years and 15 retirement years.

On the verge of pension system reform in Poland, the working lifetime is lower than in the case under consideration, in which ultimate proportions for the ratios after the reform are set. Let us insert actual data on the Polish economy to equation (6). According to the life cycle theory, in order to secure consumption over retirement equal to consumption over the working lifetime we should save 29% of income given 37 years of work and 15 years of retirement on average

$$s=15/(37+15)=15/52=0.29=29\% \qquad (6a)$$

How much do we actually save for this purpose? In 1997 contributions to the ZUS and the KRUS stood at PLN 56.4 milliard. The sum of disposable household income

amounted to PLN 339.3 milliard, while voluntary savings were PLN 45.4 milliard [CSO 1998a, 474, 527]. The sum of disposable income and the contributions to the ZUS may be treated as household lifetime income according to the life cycle theory. It amounted to PLN 395.7 milliard. Households paid 14.2% of this amount to the ZUS for the future pensions and saved 11.5%. So they saved 26% of lifetime income and consumed 74% of it. According to equation (6a), households should save 29% of their lifetime income to have smooth consumption over the entire lifetime.

If total voluntary savings were devoted for pension insurance in the third pillar, then consumption during retirement, which can be achieved by spending 26% of lifetime income, would be 65% of current income – according to equation (7).

$C=s=B\cdot m/n$

$B=s:(m/n)$ $\qquad B=0.26:0.4=0.65.$

The level of consumption, which results from saving only the current ZUS contributions, amounts merely to 35% of current total average income (i.e. not only wage income).

$$B_{ZUS}=0.14:0.4=0.35.$$

Thus, in order to secure consumption during retirement at least at a level of 65% of present income one must devote total voluntary savings to the additional pension insurance. If we want to afford consumption during retirement at the level as during working lifetime (i.e. 71% of lifetime income), then 29% of income should be saved throughout the entire working lifetime. This means that if the obligatory contribution of the pension system in the first and second pillars is not changed, then voluntary savings must increase by 3 percentage points up to about 15% of life income. A 15% level of lifetime income savings implies a savings rate of disposable income of 17% (i.e. lifetime income deducted by the ZUS contributions). As now households save over 13% of disposable income [CSO 1998a, 527] their savings should rise by 4 points of disposable income. Such an increase and the devoting of all voluntary savings to future pension (i.e. total of 17% of disposable income) would be hard to manage for an average citizen and thus this seems impossible. An alternative solution is to limit consumption or/and lower own passivity ratio through lengthening the working life relatively to the entire lifetime and retirement life. The latter parameter depends to a large extent on individual's decision.

In the equation $s=C=B\cdot m/n$ all parameters can be influenced by an individual, although the parameter m/n has the biggest impact. Its lowering via lengthening of working lifetime facilitates income growth and, in turn, also higher voluntary savings for

pension purposes. Hence, it is not necessary to lower the standard of living during retirement and even the standard may increase if saved pension contributions bring high returns.

It is also important to study the parameters of own pension savings equation and bear in mind that the state pension system (the first pillar) does not take responsibility for the individual's overall consumption level during retirement. In fact, now it guarantees pensions at a level of 35% of household income. Changes in the awareness of society will be probably the weakest element of the success of the pension system reform. Thus, from the viewpoint of economic policy it is more important to make people aware of the necessity to save for retirement and encourage longer working lifetime and not to indicate threats stemming from the sustaining of the former system.

The awareness that the obligatory pension system guarantees future benefits at a level of roughly 1/3 of current total household income are very limited. The relating of pensions to wages, being a technical solution for a politician-economist, is not conducive to development of such awareness. The idea what we want to have when retired (i.e. amount and sources of pension benefits) is central to the reformed system. Basing on these needs one should decide on the length of working lifetime, amount of pension contributions as well as whether to save on ones own. The decisions will differ depending on the individual's age. Demography is important indeed. Freedom of choice of parameters in the saving equation is limited for people over 30 and in particular those over 40. The period over which an individual can save for pension is shorter and voluntary savings are reduced by obligatory contributions to the pension system. In fact, choice concerns mainly working lifetime that is a rational behaviour in the longer term. This will be hard to achieve as even in more developed economies a significant part of households do not make rational decisions with regard to pensions. For instance, in the USA a large part of households do not have individual savings for retirement at all and the median value of financial savings of households with heads 65 to 69 was USD 14,000 in 1991. The savings would cover at most one year of average consumption during retirement [Poterba, 1994, 181]. There are no reliable data on financial resources by household groups in Poland.

3. The Impact of the Pension System Reform on the Savings Rate

The transition from the PAYG system to the fully funded pension system can bring about positive effects such as increased rates of private savings and of total savings in the

economy and improved welfare. Several factors will be crucial in determining whether these positive tendencies will actually occur. Macroeconomic factors (e.g. interest rates, income and wages growth, government indebtedness) are important as well as the development of the capital market and the way in which the transition from one system to another will be financed (by borrowing or higher taxes). Not less substantial will be the behavioural factors, in particular the awareness of the circumstances and risks associated with the intertemporal choice and the willingness to risk. Hence, the microeconomic choices made by individuals are based on macroeconomic fundamentals, but the perception of risk associated with own choices is subjective in the end.

Among the macroeconomic variables the interest rate is of particular importance for the potentially advantageous outcomes of the pension system reform. The interest rate or more generally the rate of return on invested capital in relation to growth of wages determines whether the reform is actually beneficial and can influence the decision on its implementation. The higher rate of return from saved income in relation to wages growth, the relatively cheaper a fully funded pension system is. This is a straightforward consequence of the fact that in the situation described above invested contributions bring higher returns than benefits growth in a PAYG system. Thus, under a fully funded system current contributions could be lower or future benefits higher. Historically, during the last one hundred years interest rate on the invested capital outpaced wages growth [Maddison, 1995]. In dynamically effective economies real interest rates are higher than the growth rate. Currently the Polish economy is in the dynamically effective state and thus it has not yet reached the steady state point that can be derived from the so-called golden rule of accumulation. In the steady state marginal revenue from capital equals the rate of growth yielding a maximum share of consumption in income. In the dynamically effective state both the capital per employee and the share of savings in income can be changed without affecting consumption of present and future generations. If the PAYG system is employed in such an economy, the difference between interest rate and the GDP growth rate equals the real cost of contributions to the system. This is actually a dead-weight loss that results from no accumulating of contributions to a fully funded system.

A PAYG pension system lowers the effectiveness of economy as it distorts the labour market as well as may lead to a decrease in savings. The need to pay high insurance contributions diminishes wages and employment in the official sector with the business activity being transferred to the informal sector in order to avoid taxes. The rationale for such a behaviour comes from the fact that insurance contributions are proportional to wages and the return on contributions (benefit payments) is lower that the market interest rate on capital and also that there is a variation in pension benefits received by

individual pensioners (i.e. they receive benefits different from the average for a given cohort) [Arrau, Schmidt-Hebbel, 1993, 6]. Unless there is an intergenerational distribution of income favourable to seniors, an individual expects real benefits in the amount at least equal in the value of own contributions indexed by the wages growth rate. The difference between the interest rate on capital that would be earned if the insurance contribution were invested and the wages growth rate constitutes a pure tax. In the USA during the last 35 years this gap amounted to 6.7% per annum. In 1960–1995 the non-financial capital generated on average 9.3% of real income before tax while real wages grew at a average rate of 2.6% [Feldstein, 1996, 3]. This means that the cost of acquiring a pension in the state run system was in the USA many times higher than in the fully funded system. To put it differently, the PAYG system was characterised by the large dead-weight loss. Wiśniewski estimated the dead-weight loss of the Polish PAYG system at 3/4 of the contributions to the ZUS for men with average income and nearly 1/2 of the contributions to the ZUS for women. Pensions generated in a funded system would be cheaper by that amount [Wiśniewski, 1997, 29].

A PAYG system constitutes a negative incentive for the households' savings rate if the present value of future retirement benefits (social security assets) is a rising share of individual's total lifetime wealth. A private savings rate (s) is a function of income growth rate [equal to wealth growth ($p=\Delta A/A$)] and a ratio of wealth to income ($a=A/y$) [Modigliani, Sterling, 1983]. The relation can be written as:

$$S=\Delta A$$
$$s = S/Y = p \cdot A/Y = p \cdot a$$

Where:
Y – disposable income of the private sector
A – private wealth
S – private savings

If the individual's social security wealth (present value of future pension) covers the growing portion of total consumption during retirement, the rate of savings covering the remaining part of consumption during retirement decreases over time. Consequently, social security wealth crowds out private savings. Individuals decide to save less from their total lifetime earnings or to shorten the working lifetime thus reducing the total lifetime earnings and private wealth (wealth replacement effect). Feldstein notes that an increase in mandatory social security contributions also causes the effect of crowding out of private savings by social security wealth. The rise in mandatory contributions to a PAYG system lowers disposable income and thus also private savings [Feldstein, 1994].

The negative effect on savings of a PAYG pension system can be to some extent offset by expanding the retirement period that increases savings. Individuals rationally expecting longer period of economic passivity decide to save more in order to cover the part of increased consumption in that period that is not financed by the pension system. Modigliani and Sterling (1983) studied both effects of pension systems on private savings (saving reducing replacement effect and saving augmenting retirement effect). Their study covered 21 OECD countries in 1960–1970 and they estimated a relatively low coefficient of crowding out of private savings by the social security wealth and rather high coefficient for (indirect) effect of retirement age on the savings rate. Ultimately both effects nearly cancel each other out in a majority of countries. This means that the savings rate was kept at a certain level by shortening the working lifetime and extending a retirement period. The analysis also leads to a conclusion that a further increase in social security wealth can lower the private savings rate.

One of the highest ratios of crowding out of private saving by the social security wealth (mandatory social security system) for the USA was estimated at 0.5–0.6 by Feldstein (1996, 8). A number of other empirical studies for the USA and other OECD countries (review in OECD, 1998a) using both times series and cross-section data usually found lower crowding out ratios. The results suggest that the present value of future pension payments reduces private savings by 10% to 30%. The marginal effect of increase in the social security wealth on reducing savings is lower and amounts to around 5% [OECD, 1998a, 35]. The wealth accumulated in private pension funds has stronger negative influence on savings – around 50% (i.e. 100 units of present value of future pension payments from the private pension system reduce private savings by 50%) [OECD, 1998a, 11].

Cross-section data reveal differences in crowding out effects in various social groups. Generally, the wealthier and better-educated groups tend to react stronger in their intertemporal choices to changes in social security wealth than economically weaker groups. This phenomenon can possibly be explained by the fact that poorer individuals have very low savings or no savings at all and thus do not exhibit significant reactions in their intertemporal choices to increase in the present value of future pension payments. Some empirical studies found that private savings contract further when a state pension system is more mature and there is deeper awareness concerning future pension benefits. Barro and McDonald (1979) made the point that a crowding out ratio is found to be different in cross-section and time series analyses: countries with higher social security wealth exhibit higher savings, while the increase in this variable over time led to lower private savings.

Empirical studies also show that tax incentives, aiming at increasing household savings in pension funds effect in savings growing by 20–25% of the whole contribution [OECD, 1998a, 40]. Still, net effect on the national savings is much smaller and can even be

negative due to high costs of tax relieves. In countries where savings in additional pension funds increased significantly (e.g. 401(k) programme in the U.S.) other factors turned out to be more important than tax relieves, namely easy access to a pension system, knowledge about the characteristics of a system, increasing awareness of a need to save for the retirement period.

The studies mentioned above allow for drawing a conclusion that the scale of crowding out of savings by a stock wealth of future pension payments can increase with ageing of populations (as elderly people save less), decrease in a number of children in families and with development and liberalisation of credit markets (improved possibilities for incurring credits, including mortgage credits and credits pledged by insurance policies).

The effects of the reform of the former PAYG system on private savings will depend on the scope to which the PAYG system is replaced or complimented by fully funded systems. All empirical studies find significant positive correlation between levels of income and wealth and crowding out of the private savings by wealth due to future pension payments. Consequently, forcing poorer households to save in mandatory fully funded systems increases private savings. The increase in total savings depends then on the reaction of government savings. If the latter falls total savings can change. Thus, the effects of a pension system reform are also determined by the way, in which the transition from one system to another is financed.

The scale of potential increase in non-compulsory savings is determined by households' ability to predict correctly the value of future pension payments (from both the obligatory and the funded systems), the way in which these predictions affect the decision on the moment of retiring and whether individuals intend to leave bequest. The last factor is most difficult to assess. Assuming that individuals making decisions on savings take into account future generations utility (according to the Ricardo-Barro equivalence rule) the transition from the PAYG to the fully funded system will result in increasing willingness to save by individuals. In such a situation, it becomes irrelevant whether higher taxes or an increase in public debt finances the transition. This is because, according to the Ricardo-Barro equivalence rule, an increase in contributions to a PAYG system or an increase in taxes is a transfer from currently working generation to older generations. To keep private savings constant there should be counteracting voluntary transfer in the opposite direction.

Financing the transition costs by expanding public debt is nothing else but the swap of implicite future indebtedness to explicite current indebtedness. Consequently, the current generation should save more (benefiting from higher government expenditure) in order to allow future generations pay back the debt. In other words currently working generations finance both pension systems. Savings of this generation, that include

contributions to both state and a funded system, grow but their welfare falls unless they receive heritage. It is difficult to estimate empirically the scale of intergenerational transfers (the Ricardo-Barro equivalence). Transfers are neither universal nor always voluntary. Therefore private savings do react to changes in government liabilities and the Ricardian equivalence does not hold fully. Consequently, a way of financing the transition to funded pensions can influence the growth of private savings and its magnitude [Engen and Gale, 1997, 112]. International experience suggests that if the pension reform is financed by government borrowing and the Ricardo-Barro equivalence holds the effects on savings growth is ambiguous – can be either negligible, negative or slightly positive [OECD, 1998b, 29].

In Poland the scope for increase in personal tax rates in order to finance the pension reform is limited. The effective tax rate paid by households (12–13%) is already relatively high. Moreover, households' expenditures are indirectly taxed at a rate equal to around half the income tax rate (6–7% of households' income) [Bolkowiak, 1998, 42–43]. Additional taxes would negatively affect private savings. The research in OECD countries indicates that income taxes do less harm to savings than consumption taxes [Tanzi, 1998, 10].

The analysis presented above shows that neither significant increase in taxes nor excessive borrowing can be used to finance the pension reform in Poland. More reasonable solution seems to be to look for other sources such as privatisation or inflow of foreign capital [Liberda, 1998, 32]. The success of the reform depends on the extent to which the transition generation will be willing to increase its personal savings.

An increase in private savings would bring more capital and improve productivity that would partly counteract the effects of population ageing in the second half of the next century. On the other hand, the drop in labour force in future will reduce demand for investment and capital. If savings were invested only in capital markets, the rate of return would also be lower. Higher international capital mobility shall increase expected returns on capital invested in the markets in rapidly growing economies [Bosworth and Burtless, 1997, 258].

4. Conclusions for Economic Policy

The pension system reform has become a necessity because the role played by the generation of the post-war population boom in financing the PAYG system is coming to

the end. The reform, however, does not prevent a rise in costs of pension systems if the effective retirement age and retirement lifetime are not changed.

Economic policy should stimulate an increase in savings for pension purposes, however not via tax incentives (although they are of some importance) but via encouraging extending working lifetime and discouraging early retirement. The Polish reality missed these objectives. As it could have been justified at the beginning of the transformation period, now it cannot be. The shape of the enacted pension system reform in Poland, which upholds the pension thresholds prevailing so far and a number of pension privileges for many social groups, does not create sufficient incentives for rapid growth of savings in Poland.

References

Arrau P., K. Schmidt-Hebbel, (1993). "Macroeconomics and Intergenerational Welfare Effects of a Transition from Pay-As-You-Go to Fully-Funded Pension Systems". World Bank.

"Averting the Old Age Crisis. Policies to Protect the Old and Promote Growth", (1994). World Bank.

Barro, R., G. MacDonald, (1979). "Social Security and Consumer Spending in an International Cross Section". Journal of Public Economics, No.11: 5, 275–289.

Bosworth, B., G. Burtless, (1997). "Social Security Reform in a Global Context" [in:] "Social Security Reform". Conference Series No.41, Federal Reserve Bank of Boston, 243–274.

Bolkowiak I., H. Kuzińska, M. Majewicz, (1998)." Obciążenie podatkowe przychodów gospodarstw domowych w latach 1995–1996". Instytut Finansów.

Central Statistical Office (CSO), (1997). Yearbook of International Statistics.

CSO (1998a). Statistical Yearbook.

CSO (1998b). Statistical Yearbook of Demography.

Engen, E., W. Gale, (1997). "Effects of Social Security Reform on Private and National Saving". [in:] Social.., 103–142.

Feldstein M., (1994). "Fiscal Policies, Capital Formation, and Capitalism". NBER Working Paper Series No. 4885, National Bureau of Economic Research.

Feldstein M., (1996). "The Missing Piece in Policy Analysis: Social Security Reform". American Economic Review, vol.86, No.2, 1–14.

Golinowska St. (eds.), (1997). "Reforma systemu emerytalno-rentowego". Raport CASE nr 6, Centrum Analiz Społeczno-Ekonomicznych.

James E., (1998). "New Models for Old Age Security: Experiments, Evidence and Unanswered Questions". The World Bank Research Observer, vol.13, No.2, August, 271–301.

Liberda B., (1997). "Oszczędzanie w gospodarce polskiej według teorii cyklu życia". Ekonomista, No. 5–6, 649–661.

Liberda B., (1998). "Inwestycje zagraniczne, oszczędności wewnętrzne i polityka gospodarcza". [in:] Z. Sadowski (eds.), "Kapitał zagraniczny w Polsce". PTE-Bellona, 11–33.

Liberda B., T. Tokarski, (1999). "Determinants of Saving and Economic Growth in Poland in Comparison to the OECD Countries". Center for Social and Economic Research – Central European University (CASE-CEU) Working Papers, No. 24.

Maddison A., (1995). "Monitoring the World Economy 1820–1992". OECD, Paris.

Modigliani F., A. Sterling, (1983). "Determinants of Private Saving with Special Reference to the Role of Social Security – Cross-country Tests" [in:] Modigliani F., R. Hemming (eds.), The Determinants of National Saving and Wealth, Macmillan, 24–55.

OECD, (1995). "Ageing Population, Pension Systems and Government Budgets: How do They Affect Saving?". W. Leibfritz, D. Roseveare, D. Fore, E. Wurzel, OECD Economics Department Working Paper No.156.

OECD, (1998a). "The Macroeconomics of Ageing". Pensions and Savings: A Survey, R. Kohl, P. O'Brien, OECD Economics Department Working Paper No.200.

OECD, (1998b). "Macroeconomics Effects of Pension Reforms in the Context of Ageing Populations: Overlapping Generations Model Simulation for Seven OECD Countries". K. Hviding, M. Mérette, OECD Economics Department Working Paper No. 201.

Poterba J., S. Venti, D. Wise, (1994). "Targeted Retirement Saving and the Net Worth of Elderly Americans". American Economic Review, vol.84, 180–185.

"Security Through Diversity. Reform of the Pension System in Poland", (1997). Warsaw.

Tanzi V., H. Zee, (1998). "Taxation and the Household Saving Rate: Evidence from OECD Countries". IMF Working Paper No.36.

Wiśniewski M., (1997). "Mikroekonomiczna analiza wyboru świadczenia" [in:] Golinowska St. (ed.), "Reforma Systemu Emerytalno-Rentowego", CASE, 28–36.

168	Marek Styczeń, Socio-demographic Forecast of Poland, 1997–2050, for Modelling Incomes and Social Security Retirement Pensions
169	Joanna Siwińska, The External Public Debt of Baltic and Selected CIS Coutries in Year 1992–1997, Estonia, Latvia, Lithuania, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation and Ukraine
170	Gerhard Fink, Peter R. Haiss, Lucjan T. Orlowski, Dominick Salvatore Privileged, Interfirm/Bank Relationships in Central Europe: Trigger or Trap for Corporate Governance?
171	Małgorzata Markiewicz, Marta Dekhtiarchuk, Urban Górski, Monetary Policy in Ukraine in 1996–1999
173	Magdalena Tomczyńska, European Union Financial Transfers to Applicant Countries
175	Mateusz Walewski, A Short Play on the Idea of the Laffer Curve in Transition Economies
177	Georges de Menil, Stephane Hamayon, Mihai Seitan, Romania's Pension System: The Weight of the Past
178	Katarzyna Zawalińska, Agriculture of the Czech Republic, Hungary and Poland in Perspective of Joining Common Agricultural Policy – with Some Fiscal Remarks
181	Krzysztof Połomski, Tax System in Selected Transition Economies. An overview
182	Stanisław Gomułka, Comparative Notes on Pension Developments and Reforms in the Czech Republic, Hungary, Poland and Romania
183	Eugeniusz Kwiatkowski, Paweł Kubiak, Leszek Kucharski, Tomasz Tokarski, Procesy dostosowawcze na rynku pracy jako czynnik konsolidacji reform rynkowych w Polsce
184	Mateusz Walewski, Restrukturyzacja tradycyjnych branż przemysłowych w krajach Europy Zachodniej – wybrane przykłady
186	Małgorzata Jakubiak, Paweł Kaczorowski, Joanna Siwińska, Tomasz Tokarski, Private, Public and Foreign Savings
187	Barbara Liberda, Household Saving in Poland