Pensions Policies in the European Union
A Burden for New Members?

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Andrzej K. Koźmiński: Ladies and gentlemen, dear friends, welcome everybody. Our *Distinguished Lectures* series is featuring today another eminent speaker - Lord John Eatwell, President of the Qeen's College at Cambridge and professor of finance at Cambridge. May I ask professor Kołodko to introduce our speaker.

Grzegorz W. Kołodko: Professor John Eatwell will present within our *WSPiZ & TIGER Distinguished Lectures Series* a paper entitled "Pensions Policies in the European Union – a Burden for New Members?" As suggested in the title, pension policies within the EU-15 countries, including the UK, may be seen as a potential burden for new members, which soon will join the European Union. The problem is huge, not only from theoretical but, first of all, from policymaking viewpoint due to many factors of which, I believe, the most important is the process of society ageing. On the one hand, we are very happy that the life expectancy is growing, also in emerging economies of East Central Europe where it is increasing as in advanced market economies of Western Europe. On the other hand, it may cause a headache to each finance minister and the policymakers, because it calls for much more financial resources to provide the generation of retired people with proper pensions.

We have been reforming our pension system in Poland for seven or so years. It remains to be seen, however, how successful and fruitful this endeavor will be. I believe that with certain aspects we are more advanced in overhauling the pension system in Poland and in some other accession countries than in the old European Union. Anyway, pension policies within the European Union after the enlargement, since May 1st 2004, will be a very big

challenge, even a bigger challenge than so far. Hence, it is indeed an excellent opportunity that we can learn from such a distinguished scholar and expert on this and very many other issues as Professor Eatwell. We are keen to learn from him what one may expect as far as the evolution of the pensions system is concerned, what are the theoretical considerations focusing on, what are the policy options in the future.

Professor John Eatwell became the British Lord twelve years ago. He will address our audience as professor of finance policy at the University of Cambridge. Professor Eatwell was educated at Cambridge and Harvard, he has taught economics at Cambridge since 1970 and became President of Queens' College at Cambridge University in 1997. From 1980 to 1996 he was also a Professor in the Graduate Faculty of the New School for Social Research, New York. He has been a visiting professor at Columbia University, New York, the University of Massachusetts, Amherst and the University of Amsterdam and, since today, he can also include in his CV the fact that he has had a distinguished lecture at Leon Koźmiński Academy of Entrepreneurship and Management.

He has conducted research in the theory of value and distribution, macroeconomics, the economic policy problems of the UK and the European Union and, most recently, financial policy, particularly international finance. He has also worked on the economics of pensions policy. From 1985 to 1992, just before he became a Lord, John Eatwell served as an economic advisor to Neil Kinnock, the leader of the British Labour Party. In that post he was responsible for much of the work that led to substantial realignment of the Labour Party's economic policy. In 1992 he entered the House of Lords and from 1993 to 1997 was Principle Opposition Spokesman on Treasury and Economic Affairs in the House of Lords. It is indeed a coincidence, that while he was the opposition spokesman on Treasury, I was the Minister of Finance – that is the Secretary of Treasury – and Deputy Premier in my country. Consequently, we were acting in very different capacities while addressing very similar issues.

In 1988, together with Clive Hollock, he set up the Institute for Public Policy Research, which has now established itself as one of Britain's leading policy think tanks. I have had a privilege to visit a couple of times this institute to participate in certain research projects which, as the name of the institute suggests, are very much policy-oriented. I believe, that also today's presentation, despite its theoretical content, will also be policy-oriented. We welcome Professor John Eatwell, President of Queens' College here at the Leon Koźmiński Academy of Entrepreneurship and Management. Welcome John and the floor is yours.

John Eatwell: Thank you very much. The debate over the future of pensions is becoming a central problem for economic and social policy makers within the European Union. It is a policy problem that will therefore affect Poland, even though Poland has already gone through a very significant pensions reform by tackling the pressures inherent in the pensions system that Poland inherited in the early 1990s. Pensions policy is a vital component of economic policy within the European Union because it affects two of the crucial aspects of the Union.

First, pensions policy is relevant for macroeconomic policy because it can affect the fiscal balances of the member states. If member states are raising taxes to pay pensions the impact on fiscal balance is an important component of their stance within the overall monetary union.

Second, pensions policy is also relevant to the behaviour of financial markets within the European Union. The Financial Sector Action Plan (FSAP), a major component of the Union's economic policy, is designed to integrate and unify the financial markets of the European Union. As a consequence, factors affecting the operation of the financial markets of the 15 will affect the new members as well. In so far as pensions policy is an important component of financial market behaviour then it will be a component that will have a considerable effect on the economy of Poland.

There have recently been a number of major criticisms of the structure and performance of pensions policies in the EU 15.

In mid-1990s a group of distinguished economists writing for the OECD declared:

"It is clear that if present public pension payments are left untouched, the pension schemes in some countries would impose major burdens on their societies in the next century, either through requiring higher taxation or other spending cuts, or by rapidly increasing public debt burdens resulting from high primary deficits, compounded by explosive debt dynamics" (Liebfritz, Roseveare, Fore and Wurzel, 1995).

At around the same time, the Social Security Committee of the UK House of Commons, comparing the UK's pension system to that of other EU members, argued:

"As the UK's outstanding public pension liabilities are substantially below those of other EU members, there would be a risk that if the United Kingdom joined a single currency British taxpayers could be called upon to help finance pay-as-you-go pension obligations of the other EMU members, or suffer the consequences of being tied to interest rates on the single currency that were forced up by market pressures of financing certain countries' inherited pension commitments. (…) the extent of un-

funded pension liabilities in certain of our European partner countries casts serious doubts upon the long-term sustainability of their finances" (House of Commons, 1996).

In other words, it is claimed if Britain were to adopt the Euro, the pension systems of the core countries, of Germany, France, Italy and other Eurozone countries, would impose substantial economic burdens on Britain.

In similarly pessimistic terms the European Round Table of Industrialists has declared:

"In the next decade, the EU badly needs to raise its annual growth rates above the dismal averages of the 1990s. If they are left unreformed, current pension systems will be a ball and chain holding back improvements in competitiveness and growth, or even undermining both" (European Round Table of Industrialists, 2000).

And finally, just to show these are not the British who are always euro-sceptic or the industrialists who may be urging the removal of "burdens", Commissioner Frits Bolkestein, the then European Commissioner for the Internal Market, has argued:

"If pension payments were not reformed, but led to higher deficits, some countries would not respect their obligations under the growth and stability pact, which in turn could lead to inflationary pressures, which in turn would result in the ECB having to set higher interest rates with negative impact not only on investment, but also on growth and employment, which are the basis of sustainable pension systems (…) Clearly the reply to these questions – pay more, work longer, get less, is not an easy message to sell" (Bolkestein, 2001).

So a variety of commentators - from economists to a European Commissioner, to the British parliamentarians, to European industrialists - all argue that the pension systems of the major western European states are a significant burden on the European Union *as a whole*, a burden that will inhibit the growth of the European Union.

The fundamental component of this consensus is the ageing of the European population – the so-called demographic time-bomb. Three factors have coincided:

First, the baby boom that occurred after World War Two produced a peculiarly large population cohort that, as it ages, is moving through the population. But this is a temporary distortion. Eventually the cohort will disappear and the structure of the population could return to normal, if it were not for two further factors.

The *second*, is increased longevity – improving diet, public health measures and medical care have resulted in people are living longer.

Third, there is the dramatic fall in the birth rate throughout Europe. This has occurred in every European country, from what might be deemed traditional countries such as Portugal, to more avant-garde countries such as Sweden. Throughout the EU the birth rate has fallen below the net reproduction rate (i.e. the average number of babies that should be born to every woman of fertile age to maintain the population in a steady state) of approximately 2.4. Around Europe the average is now about 1.7.

Taking these three factors together the dependency ratio number, defined as the number of elderly people as a ratio to the working-age population, is rising as society ages. The chart illustrates this phenomenon in the G-7 countries. The dependency ration, here defined as the ratio of those aged 65 and over to those aged 15-64, is increasing throughout G-7, most dramatically of all in Italy and rather less in the USA.

Figure 1. Elderly dependency ratios in G7 countries

Population aged 65 and over as a percentage of the working age population (aged 15-64)
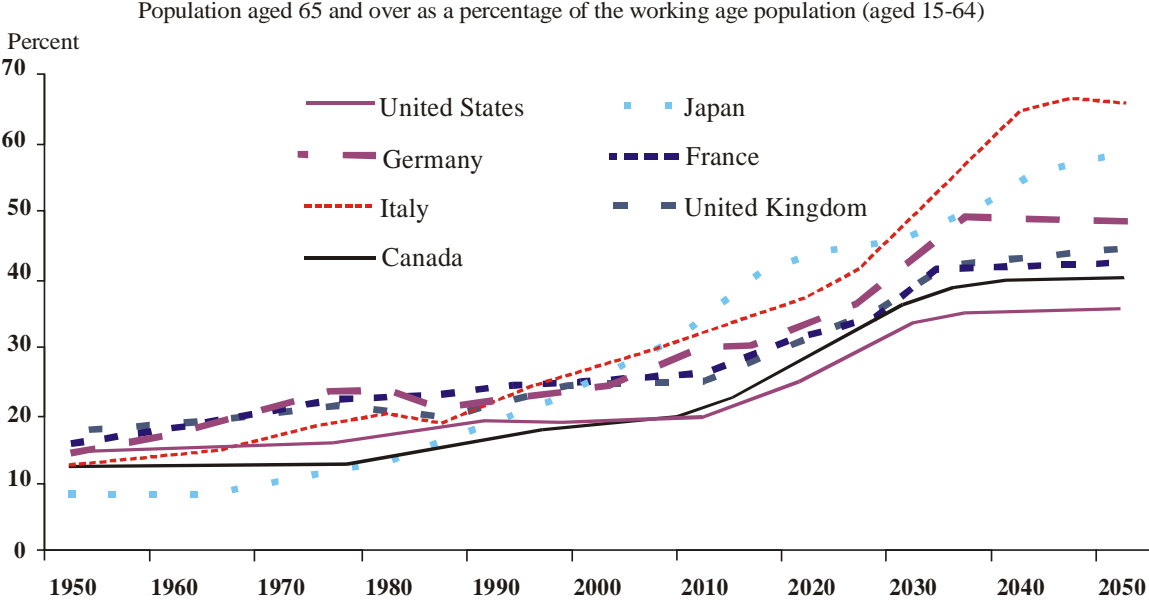
Source: United Nations Population Division, *World Population Prospects: The 1998 Revisions.*

The Table presents this information for the countries of the EU15. For the EU15 as a whole the dependency ratio is forecast to rise from 26.7 in 2000 to 53.4 by the year 2050. That would be a doubling of the ratio of old people (the majority of whom will have retired) to the working population.

Table 1: Old-age dependency ratio in the EU countries

	2000	2010	2020	2030	2040	2050
Belgium	28,1	29,4	35,6	45,8	51,3	49,7
Denmark	24,1	27,2	33,7	39,2	44,5	41,9
Germany	26,0	32,9	36,3	46,7	54,7	53,3
Greece	28,3	31,6	35,8	41,7	51,4	58,7
Spain	27,7	28,9	33,1	41,7	55,7	65,7
France	27,2	28,1	35,9	44,0	50,0	50,8
Ireland	19,4	19,1	24,5	30,3	36,0	44,2
Italy	28,8	33,8	39,7	49,2	63,9	66,8
Luxemburg	23,4	26,2	31,0	39,8	45,4	41,8
Netherlands	21,9	24,6	32,6	41,5	48,1	44,9
Austria	25,1	28,8	32,4	43,6	54,5	55,0
Portugal	25,1	26,7	30,3	35,0	43,1	48,7
Finland	24,5	27,5	38,9	46,9	47,1	48,1
Sweden	29,6	31,4	37,6	42,7	46,7	46,1
United Kingdom	26,4	26,9	32,0	40,2	47,0	46,1
EU-15	26,7	29,8	35,1	43,8	52,4	53,4

Source: EPC (2000).

The data from the Table are presented in the second chart where the black bars are the figures today and the pale gray bars represent the ratios in 2050.

Figure 2: Old-age dependecy ratio [1]
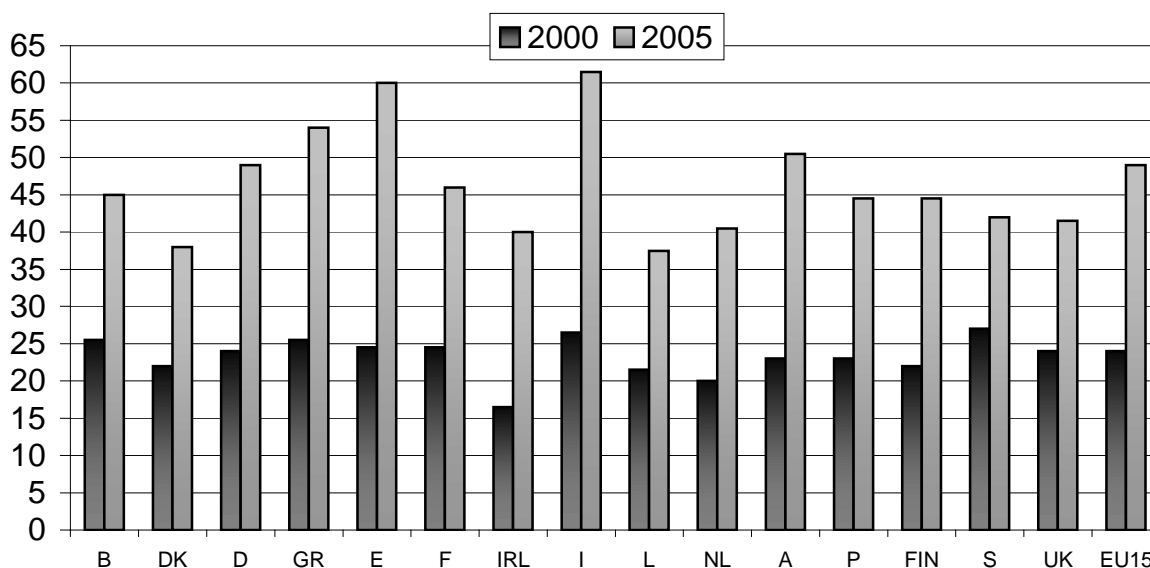
[1] Number of people aged 65 years and over as a percentage of people aged 15-64. *Source*: Eurostat, Population projections - Baseline scenario.

The next Table contains the data for the new members of the EU and for the candidate countries (Bulgaria and Romania). In the case of Poland the dependency ratio is actually very

low at the moment, compared to the rest of the European Union. The ratio of people over 65 to those between 15 and 64 was only 18 in 2000, but that figure is projected to go up to 50, that is, up to the levels of the EU15, by 2050.

Table 2: Old-age dependency ratio (persons aged 65+ as a percentage of persons aged 15-64)

| | 2000 | 2025 | 2050 | Change 2000/50 | |
				Absolute	%
Czech Rep	20	36	61	41	207
Cyprus	18	29	39	21	119
Estonia	21	30	47	26	122
Hungary	21	33	51	30	139
Latvia	22	31	50	28	128
Lithuania	20	29	51	31	156
Malta	18	37	47	28	154
Poland	18	31	50	32	180
Slovakia	17	27	50	33	200
Slovenia	20	38	66	46	233
Bulgaria	24	31	54	30	127
Romania	19	26	45	25	130
EU-15	24	36	49	24	100

Source: UN population projections 2002. AMECO for the EU-15.
Note: The old-age dependency ratio is defined as persons aged over 65 as a percentage of the working-age population (aged 15-64). Similar trends are expected for the economic dependency ratio, which expresses the population aged 15 and over not employed as a percentage of the number of persons employed.

The same phenomenon is evident in all the new members and the candidate countries. It is particularly evident in the Czech Republic where the dependency ratio is forecast to rise to 61 by 2050. The diagram presents the same information. The grey bars in the middle show the projected dependency ration in 2025.

Figure 3: Old-age dependency ratio, 2000-50
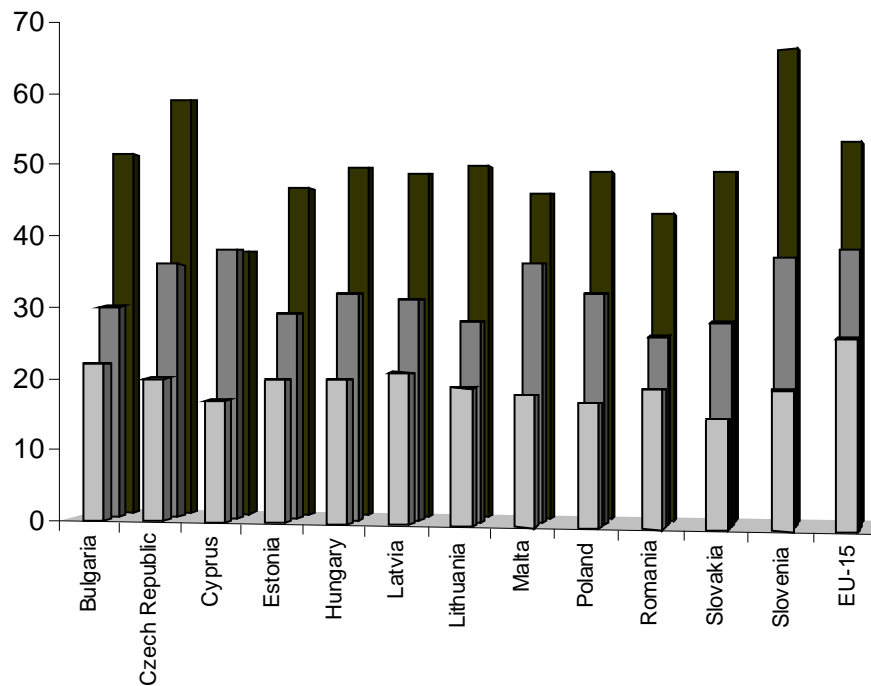
Source: UN population projections 2002 (EU-15: Eurostat population projections 1995 - baseline scenario).
Note: The old-age dependency ratio is defined as persons aged 65 or over as a percentage of the working-agepopulation (aged 15-64).

The consequence of these substantial increases in the number of older people relative to the working population, and the key to the arguments cited above, is that pensions systems will be required to support a larger and larger number of people.

It should be noted, however, that the warnings of the OECD economists, of the UK parliamentarians, and of Frits Bolkestein, all focused on the *public* pension system. The next Table shows estimates of the share of Gross Domestic Product that would be absorbed by public pensions given the population projections and given the structure of current pensions schemes. In Germany the share of GDP absorbed by public pensions is estimated to rise from just under 12% in 2000 to 17% by 2050 – a substantial increase in the share of GDP taken by pensions. The most dramatic of all is Greece where pensions grow from about 12.5% of GDP in 2000 to 25% in 2050.

Table 3: Projections for spending on public pensions as a share of GDP - current policy scenario

	2000	2005	2010	2020	2030	2040	2050	Change 2000-50
BE	10,0	9,5	9,9	11,4	13,3	13,7	13,3	3,3
DK	10,5	11,3	12,5	13,8	14,5	14	13,3	2,9
DE	11,8	11,4	11,2	12,6	15,5	16,6	16,9	5,0
EL	12,6	12,4	12,6	15,4	19,6	23,8	24,8	12,2
ES	9,4	8,8	8,9	9,9	12,6	16,0	17,3	7,9
FR	12,1	12,2	13,1	15,0	16,0	15,8		3,8
IE	4,6	4,5	5,0	6,7	7,6	8,3	9,0	4,4
IT	13,8	13,8	13,9	14,8	15,7	15,7	14,1	0,3
LU	7,4	7,4	7,5	8,2	9,2	9,5	9,3	1,9
NL	7,9	8,3	9,1	11,1	13,1	14,1	13,6	5,7
AT	14,5	14,5	14,9	16,0	18,1	18,3	17,0	2,5
PT	9,8	10,9	11,8	13,1	13,6	13,8	13,2	3,4
FI	11,3	10,9	11,6	12,9	14,9	16,0	15,9	4,7
SE	9,0	9,2	9,6	10,7	11,4	11,4	10,7	1,7
UK	5,5	5,3	5,1	4,9	5,2	5,0	4,4	-1,1

Source: EPC (2001)

Perhaps the most striking figure is that for the UK. In the UK, although the dependency ratio is growing in much the same way as elsewhere, the projected share of GDP absorbed by public pensions is actually projected to fall. This is because the UK has sharply reduced the growth factors in the structure of public pensions, essentially defaulting on earlier pensions promises. Until the early 1980s pensioners were promised that their pensions would rise at the same rate as wages - that they would share in the fruits of rising national productivity. A change in policy broke that promise, and linked pensions to the rate of inflation. This means that real value of the state pension stays the same, even whilst the economy grows. So even though the number of pensioners increases, this is offset by the fact that pensions are frozen in real terms, leading to the projection that the share of GDP going to pensions in the UK will actually fall. That is why the UK parliamentarians could argue that the UK has "solved" the pensions problem, and joining the Euro would create difficulties for the UK because France and Germany have not solved the problem.

Less detailed data is available for the impact of pensions on GDP in the new members and the candidate countries. But such data as there are show similar major effects. In the Czech Republic, for example, the share of public pensions expenditure is projected to rise from 8% of GDP in 2000 to about 15% of GDP by 2050.

Table 4: Public pension expenditures in 2000-50 (% of GDP)

	2000	2030	2050	Change 2000-50
Cyprus	8	11.9	14.8	+6.8
Czech Republic	7.8[5]	-	14.6[5]	+6.8
Estonia	6.9[2,4]	-	-	
Hungary	6.0[5]	-	7.2[5]	+1.2
Latvia	9.8[4]	-	-	
Lithuania	5.3	6	7	+1.7
Malta	5.4[2,4]	-	-	
Poland	10.8	9.6	9.7	-0.9
Slovakia	7.9[4]	-	-	
Slovenia	13.2	19.7	18.1	+4.9
Bulgaria	9.1[2,4]	-	-	
Romania	6.4	7.8	8.2	+1.8
EU-15	10.4	13.0	13.3	+2.9

Sources: If not explicitly indicated, data are based on the 2002 Pre-Accession Economic Programmes.
Notes: -: not available; [1] 2002 [2] 2001 [3] 2000 [4] According to Gesellschaft für Versicherungswissenschaft und -gestaltung e. V. (which in turn draws on national statistics). [5] OECD. Since definitions of public pension wxpenditures are not identical for each country, caution is warranted when making comparisons.

The Polish pensions reform has reduced the projected public expenditure on pensions by 2050. However, the Polish reform was essentially different from the British reform, in that in Poland those people who were already locked in, people who were already pensioners, were protected. The British reform actually penalized people who were already pensioners. The Polish three tier system does set the increase in first tier pensions at a rate which suggests that the share of GDP going to pensioners will fall. This should balanced by the second tier.

These projections of public pensions provision have been at the centre of the debate over the future of pensions. This debate has essentially focused on two ways of providing for pensions - either from pensions out of taxes, the so-called pay-as-you-go (PAYG) system, or from savings individuals have accumulated by investing in financial instruments - in stocks and shares and bonds - and using the fund that they accumulate to support themselves in old age. What is the key economic difference between these two?

Consider a pensioner's needs: food, heat, clothing, entertainment, to be able to take a holiday, and of course medical care, and so on. In other words the pensioner wishes to consume a flow of goods and services produced contemporaneously. Some services can be produced in advance and saved, such as the services of a house, but most cannot. The flow of goods and services is produced by the working population at around the same time as they are consumed. The pensions problem amounts to the need to persuade the working population to give up part of what they have produced in order to sustain the consumption of the pensioners.

There are two ways of achieving this: Either politically whereby the state taxes the working population, extracting part of their spending power and transferring it to the pensioners – the PAYG system. Or by funding pensions, i.e. by pensioners accumulating financial instruments which they can later use to buy goods and service from the working population. The two methods have the same result, goods and services are transferred from the working population and to the pensioners.

The debate over which of these two methods should be the main means of pensions provision has become a matter of controversy in the EU because different strategies are adopted in different member states. In Germany approximately 90 percent of all pensions are paid for out of taxation, a PAYG system. In the UK less than 20 percent of pensions are paid for out of taxation. The difference is made up by funded schemes. The data presented above has focused entirely on *public*, PAYG pension schemes. It is therefore not surprising that Germany's "burden" is projected to be substantial, and that of the UK is not. But, as I will argue later, this fails completely to take into account the impact of funded pension schemes on the overall balance of the economy.

The false perspective that may derive from concentrating solely on the impact of a rising dependency ratio on public pensions may be inferred from the fact that the pensions crisis has already arrived – and the current pensions crisis is not in German or French PAYG pensions systems, but in the British funded pensions system. Around 80 percent of British pensioners have funded pensions, typically occupational pensions linked to their jobs. In the last two years three quarters of these occupational pension schemes have refused to take any new members. One third of them have closed to existing members, that is the existing members cannot put any more money in it. One tenth of them have closed down altogether. One of the most famous pension funds companies in Britain, Equitable Life, has defaulted on its pensions promises. Another major company, a Scottish company of great repute, Standard Life, is also cutting pensions below what it had promised.

So the current pensions crisis has occurred *before* the impact of the "demographic time-bomb", and amongst private funded pension schemes, not in state schemes. There is a demographic element to the crisis of course, as actuaries revise their estimates of the size of funds required to support future pensioners. The decline in the rate of inflation has also had some impact, depending on the extent to which higher rates of inflation transferred wealth toward significant holders of equity (as was the case with a majority of pension funds). But the immediate cause has been the sharp decline in stock market values, exacerbated in some

cases by corporate failure allied with inadequate pension fund provision and, occasionally, fraud.

The current crisis demonstrates that the risks associated with pension provision are not confined to "excessively generous" public sector programmes, but have much wider aspects that should be acknowledged in the design of any stable and equitable pensions regime.

A macro-economic model of pensions provision, set out below, will provide a consistent framework for the identification of the distribution of pensions risks and for the examination of both macro- and micro-economic issues involved. Some proposals for the criteria that should inform pensions reform are sketched in the final section.

A Macro-economic Model of PAYG Pensions Provision

The notation used in the construction of the model is set out in the Box.

First suppose that all pensions are PAYG, paid for from current tax revenues or government borrowing. It is assumed that government expenditure is solely on pensions, hence ruling out paying for pensions by cutting other components of public spending.

Notation

    N = number of pensioners

    S = average savings rate

    T = average tax rate

    Y = output per head of the active working population (productivity)

    W = active working population

    E = net private saving

    I = investment

    G = government expenditure

    M = average propensity to import

    X = exports

    Z = average social 'savings rate', comprising saving, taxation, imports and dis-savings by pensioners

    D = share of pensions that are paid out of pension funds

    V = share of pensions that are paid out of foreign assets

    FA = stock of net financial assets

    Lower case roman letters indicate growth rates

In a closed economy total social savings is equal to the sum of private investment and government spending:

$$ZYW = I + G \qquad (1)$$

where $Z = [(S + T)YW]/YW = (S + T)$

Since all Government expenditure is on PAYG pensions, $G = PN$. Substituting in (1):

$$RYW = I + PN \qquad (2)$$

$$RYW - PN = I \qquad (2a)$$

where $R = S + T$. Differentiating (2a) with respect to time, and expressing the relationship as rates of growth yields:

$$\delta(r + y + w) + (1 - \delta)(p + n) = i \qquad (3)$$

where $\delta = RYW/(RYW - PN)$

$$r = s\gamma + t(1 - \gamma)$$

and $\gamma = S/(S + T).$

The lower case *roman* letters indicating rates of growth.

If it is assumed that investment remains a constant share of national income (the proportionate call of investment on national resources is constant), then

$$i = y + w.$$

Expression (3) can now be re-arranged as

$$- \lambda r - y - w + p + n = 0 \qquad (4)$$

where $- \lambda = \delta/(1 - \delta) = - (RYW/PN).$

So $\lambda > 0.$

Finally, (4) can be re-arranged to give

$$n - w = y - p + \lambda r \qquad\qquad (5)$$

Expression (5) is the key to understanding the pensions problem. On the lhs are n, the rate of growth of the number of pensioners and w, the rate of growth of the active working population. Given that the number of pensioners is growing faster than the active working population, $(n - w)$ is positive, the dependency ratio is rising. On the rhs y is the rate of growth of output per head or labour productivity; p is the rate of growth of pensions; r is the rate of growth of the weighted combination of average savings propensity and average tax rate, and λ is a positive constant.

If the lhs is positive, then rhs must be positive. Suppose that the working population wishes neither to increase its savings rate nor pay more tax. Then r is equal to zero. So $n - w = y - p$, that is if the number of pensioners is growing faster than the active working population this can be sustained either by high growth of y, (growth of productivity), or by p falling, by continuously cutting pensions. As noted above, it is the latter course that has been taken by the UK government. By indexing state pensions to inflation it has essentially frozen the real value of state pensions, p is equal to zero. The increase in the dependency ratio – in this case the difference between the growth of the pensioner population and the growth of the *active* working population – is more than covered by the growth of productivity.

If, on the other hand, pensions per head were indexed to wages and so grew at (roughly) the same rate as productivity in the economy as a whole p would be equal to y. In this case there must be a positive value of r, either the savings rate must rise, or taxes, or some combination of the two. Increased savings are needed to fund government borrowing should taxes be insufficient to cover the entire pensions bill.

A Mixed System: PAYG and Funded Pensions

The model can be extended to cover the case of funded pensions. Pensioners acquire resources either by consuming the income stream from a previously accumulated pension

fund, or by cashing in some of the capital in the fund. In both cases expenditure from funded pensions will result in a reduction in the social savings propensity, Z:

$$Z = [(S + T)YW – DPN]/YW \qquad (6)$$

so **ZYW = RYW – DPN.**

If all Government expenditure is on PAYG pensions, $G = (1 – D)PN$. Substituting in (5)

$$RYW – DPN = I + (1 – D)PN \qquad (7)$$

$$RYW – PN = I \qquad (8) = (2a)$$

It is obvious that, assuming again that $i = y + w$, then from (8) may be derived the same growth relationship as that above, namely

$$n - w = y - p + \lambda r \qquad \lambda > 0 \qquad (5)$$

The fundamental relationship between the dependency ratio, growth of productivity and pensions, and savings and tax rates is totally unchanged by the introduction of funded pensions. Even if all pensions are fully funded, growth in the dependency ratio in circumstances in which pensions are indexed to wages ($y = p$) will require increases in savings or taxes or both. The problem of sustaining pensions in the face of a demographic shift has nothing whatever to do with whether those pensions are PAYG or fully funded. D does not appear in (5).

The problem is essentially one of securing a suitable positive value for r, i.e. *contemporaneous* savings and tax rates. The argument that there is too little saving today to provide for future pensions is entirely fallacious, and may indeed be damaging. Building up a stock of financial assets today will not ensure purchasing power over a requisite flow of goods and services at retirement, unless savers at the time are prepared to increase their savings rate to purchase those financial assets when they are cashed in, or the state is prepared to increase taxation to increase its net assets. Another way of looking at the latter point is that the state now borrows less (or saves more). The flow of financial instruments made available to savers

by the state is less, and hence private sector savers must buy their desired financial instruments from pensioners.

Suppose $I = 0$, $G = 0$, $T = 0$, and, necessarily, $D = 1$. Given the absence of state provision pensions are derived solely from private pension funds. In these circumstances private net saving, $E = 0$, and equation (7) becomes

SYW – DPN = 0

This can be re-written

$$\mathbf{\Delta FA_W + \Delta FA_P = 0} \tag{9}$$

The sum of the changes in net holdings of financial assets is zero. Savers in the active working population buy assets sold by pensioners. The value of pensions is constrained by the value of savings. If, *in extremis*, the working population does not wish to save, then the financial assets accumulated in pension funds will be worthless.

If $I > 0$, then (9) becomes

$$\mathbf{\Delta FA_W + \Delta FA_P = E – I = 0} \tag{9a}$$

as net savings = investment. There is still no net accumulation of financial assets in the private sector, and it remains the case that pensions can only be financed by the purchase of financial assets by savers in the working population.

If the state is introduced into the argument, $G > 0$, $T > 0$, and $D \le 1$, expression (9) becomes

$$\mathbf{\Delta FA_W + \Delta FA_P + \Delta FA_G = 0} \tag{10}$$

where **$\Delta FA_G = TYW – G$**

i.e. the Government's net acquisition of financial assets is equal to the excess of tax revenues over Government spending. In turn, the overall net acquisition of financial assets is equal to

zero. Or, to put the matter another way, the excess of private saving over investment equals the excess of Government expenditure over taxation:

$$E - I = G - TYW \qquad (10a)$$

If pensions are funded by the sale of financial assets, then $\Delta FAP < 0$. In this case the resources for pensioners may be provided either by savers, or by the excess of taxation over Government expenditure. Even in the case of funded pensions, an increase in the dependency ratio will, in the absence of increased savings, require an increase in taxation if the value of pensions is to be sustained. The common proposition that only PAYG pension systems face fiscal perils is false.

The policy of pensions reform has typically been conceived as a conversion of state PAYG pension systems, supposedly exposed to fiscal threats, to fully funded systems. The model outlined above demonstrates that there is no fundamental macro-economic difference between the two systems, and that this characterization of "reform" is false. In both systems the maintenance of the same levels of pensions in the face of demographic shift demands changes in savings and/or tax rates. The balance of PAYG and funding is irrelevant. Similarly both systems pose an identical "threat" to the fiscal balance.

Extending the Analysis to an Open Economy

In the case of an open economy the rate of "social saving" must incorporate imports:

$$Z = (QYW - DPN - VPN)/YW$$

where $Q = S + T + M,$ and $M =$ the average propensity to import. The relationship between "social savings", investment, government expenditure and exports is then

$$ZYW = QYW - DPN - VPN = I + (1 - D - V)PN \qquad (11)$$

where V is proportion of pensions financed by the net sale of foreign assets.

By the same procedures as used above

$$QYW - PN = I \qquad\qquad\qquad (12) = (2a)$$

Once again assuming that $\mathbf{i = y + w}$

$$\mathbf{n - w = y - p + \lambda q} \qquad \mathbf{\lambda > 0} \qquad\qquad (13) = (5)$$

where $\mathbf{q = \alpha s + \beta t + \chi m}$

and $\quad \mathbf{\alpha = S/(S + T + M),\ \beta = T/(S + T + M)}$ and $\mathbf{\chi = M/(S + T + M)}$

so $\alpha + \beta + \chi = 1$.

In terms of changes in stocks of net financial assets

$$\mathbf{\Delta FA_W + \Delta FA_P + \Delta FA_G + \Delta FA_F = 0} \qquad\qquad (14)$$

where $\mathit{\Delta FA_F = MYW - X}$**,** the net acquisition of national assets by foreigners,

or $\quad \mathbf{(E - I) + (TYW - G) = (X - MYW)} \qquad\qquad (15)$

Expression (14) incorporates the idea that pensions may be paid from an accumulation of foreign assets. The sale of foreign assets (or accumulation of foreign liabilities) funds net imports of goods and services to sustain the real incomes of pensioners.

Net domestic savings in excess of investment and Government expenditure result in the accumulation of foreign assets. These are then available to be run down when the rise in the dependency ratio squeezes the availability of domestically produced goods and services. In effect this is "immigration without immigrants". Investment abroad is results in a quasi-increase in w, the rate of growth of the labour force. But instead of those workers joining the domestic labour force, they stay in their home countries.

Of course the same issues arise as with any financial asset. If it is to be realised then there must be a demand for net imports from the relevant country, or to put it another way,

there must be a desire by foreigners to increase their net asset position (reduce their net liabilities) with respect to the home country. The risk may be manifest as foreign exchange risk, but it is not essentially different.

Saving, Growth, and the Development of Financial Markets

The analysis so far has neglected the question of whether a change in the financing of pensions might have an impact on n, w, y, or s. Most analyses have focussed on the question of whether fully funded schemes might result (via higher savings) in higher rates of growth ($y + w$), as compared with PAYG schemes. From (5) it is clear that the overall impact is likely to be beneficial, certainly to the "average" pensioner.

There has been a good deal of controversy over the question of the impact of different pension arrangements on real investment rates and hence on the scale of future income flows. This controversy is unresolved. Feldstein (1974) argued that PAYG schemes could reduce aggregate savings and investment. However his work was shown to suffer from serious statistical flaws (Leimer and Lesnoy, 1982), and no clear-cut conclusion can be drawn. Savings rates in countries with predominantly funded pensions (UK, US) do not appear to be higher than savings rates in countries with predominantly PAYG pensions (France, Germany).

Nor is it clear that the development of the financial infrastructure associated with funded schemes results in an improved allocation of savings, or improved flows of funding to industry (Rosa, 1982; World Bank, 1994; Singh, 1995). Virtually all new funds required for corporate investment are derived from retained profits rather than from the investment of new savings. For example, in the late 1990s American companies financed *over* 100% of their investment by retained profits, and no new net funds were raised from the financial markets. The figure was over 100% because of the prevalence of share buy-back schemes. Similar results may be found for the UK economy.

The relationship between structures of corporate governance, the development of stock markets and economic performance is also controversial. It is not possible on the basis of the available evidence to argue definitively for the superiority of stock-market based governance structures over bank-based governance structures (Mayer, 1990), or for the efficiency of the take-over mechanisms that liquid stock markets promote (Hughes and Singh, 1987; Jensen, 1988; Warshawsky, 1987; Singh, 1992). Nor is it possible to argue that development of international financial markets, in which institutional investors, including pension funds, have

played a major role, have resulted in an unambiguous improvement in economic performance (Eatwell, 1997).

It might also be argued that there is a relationship between the switch to funded pensions and labour force participation (*w*). However, there are so many major social factors influencing labour force participation – in Japan, the role of women in the labour force, for example – that this is unlikely to be a major factor.

So whilst it may be possible to argue that the existence of funded pension schemes promotes the development of financial markets, there is no clear relationship between the growth of financial markets and aggregate savings, growth or economic efficiency.

Other Aspects of the PAYG versus Funded Pensions Debate

The advantages of PAYG systems are deemed to be that they are simple and they have very low administration costs. They tend to be progressive (the Gini coefficient of pensioner incomes is less than the coefficient for the incomes of the working population) and they cover everybody. They do not inhibit the mobility of labor since pensions are not tied to specific employment. They are also believed to be low risk. But the risk is not zero as the British pensioners discovered when the state defaulted on its promise uprate their pensions in line with average income (broadly $p = y$). But there is a reasonably low political risk.

A disadvantage is that there is no choice – you cannot choose how your pension is created, you just take what the state gives you. Moreover, there tends to be an over commitment to a specific level of pensions – it is politically difficult to change the pension regime, even if other economic circumstances might suggest this is desirable. There is also resistance to raising taxes to pay the pensioners.

With funded pensions the saver has independence and choice, which may lead to increased savings. Funding promotes financial markets. From a political perspective funding has the advantage of "automatically" adjusting the level of pensions to returns. If pension funds are inadequate then that is the fault of savers and "the markets". However, recent experience suggests the state does not escape liability in the face of the failure of private funds.

As far as the disadvantages of funded schemes are concerned: they tend to be very regressive - poor people cannot save and receive little or no pension. They tend to incur high administration costs and they have only limited coverage. The returns are uncertain and there are high risks. The mobility of labor may be restricted.

Recent events suggest that the major policy concern should be the social distribution of risk.

The Distribution of Risk

Expression (5) displays the central relationship of this paper. It also embodies the major risks to which pensioners are exposed.

First, demographic risk (*n* and *w*) – the risk that the ratio of pensioners to employed persons will rise. This is the risk to which pensioners are now exposed, created by unforeseen falls in the birth rate and increases in longevity.

Second, gdp risk (*y* and *w*) – the risk that the gdp will not grow as rapidly as expected, pressuring all incomes including pensions. This may be due to lower than expected productivity growth, or lower than expected labour force participation, or a prolonged recession with growing levels of unemployment (a version of demographic risk).

Third, distribution risk (*p*) – the risk that the distribution of income will change to the detriment of the pensioners. This can occur for a variety of reasons. In PAYG systems the Government may fail to honour its previously declared obligations, as has happened in the UK. However, it is funded schemes that are exposed to the greatest risk. Whereas in a PAYG system the risks are essentially political, the essence of the funded approach is that the pensioners' command of goods and services is defined by the accumulation of financial assets and by the market value of those assets at the time when the pension is needed. Moreover, assets are typically not accumulated by the individual, but by institutions – firms in the case of many occupational pension funds, or collective savings institutions – and those institutions may be less than secure.

The present pensions crisis is partly of this form. The reaction has been to demand that the state make up the losses. In this case the attempt to transfer of risk from the state to the individual or the firm has failed. The state remains liable for the well-being of the pensioners at least at some basic level.

These risks can interact in unexpected ways. For example an increase in savings to increase the stock of financial assets may (a) tend to reduce the growth rate of GDP, and (b) create an overhang of financial assets that holders expect to cash at some future date.

The design of an optimal pensions policy should be based on a transparent distribution of risk. One method of changing the relationship between *n* and *w* would be increase the active working population by both labour force participation and by reducing unemployment.

In some countries these measures may yield substantial results (for example, increasing the participation rate of women in the Japanese labour force). Another approach may be to invest in countries with different population profiles. The accumulation of net assets overseas in developing countries with high rates of population growth would provide a pool of resources that could be cashed in later for imports - at just the time (hopefully) when savings rates in those countries are rising with growing GDP. Not a perfect solution, of course, given the political and forex risks involved.

Risks associated with unexpectedly slow growth can be managed by linking the growth in pensions in some way to the gdp growth rate. Attempts to increase the rate of productivity growth would clearly be beneficial in this as in so many other areas.

Distribution risk is more difficult to handle, particularly in funded schemes where the risk associated with exposure to financial markets is particularly high (even holding cash is exposed to inflation risk). Given that the state cannot escape liability for some part of market risk, an optimal pensions policy is unlikely to be based on the promotion of a primarily funded framework. This conclusion is, of course, directly at odds with current fashions in pensions "reform".

Policies for Pensions

As should now be evident, the association of the pensions problem with public pensions, and with the contrast between PAYG and funded pensions schemes is a dangerous error in both economic analysis and policy debate. If levels of pensions are to be sustained, funded pensions scheme will have the same sort of problems as PAYG schemes. Taxes will have to rise if pensions are to be sustained. If taxes do not rise and the financial assets are not bought then they will simply fall in value and pensions will be lower

What is the relevance of this finding to the impact of the rise in the dependency on teh EU, particularly on new entrants? The analysis suggests that if there is to be a burden on new entrants such as Poland, it would come through financial markets as well as fiscal difficulties in the Eurozone. Indeed, the transmission of economic risks between countries is likely to be greater in the case of funded schemes, because risks are they transmitted via financial markets more quickly are fiscal problems. The biggest threat to Poland will be in sharing in financial markets problems created by the funded pensions schemes rather than sharing in the tax problems created by the PAYG schemes.

What should be the content of a more viable European pensions policy that place no excessive burden on anybody, particularly the new entrants.

The *first* component of any pensions policy must an employment policy. It is employment which is fundamental to solving the problem of pensions, getting more people into work for longer, increasing the rate of growth of the working population, *w*. Unemployment is a huge drain on the pensions system because it is reducing the number of people at work. Discrimination against women in the labour force, still common in Southern Europe, is a similar drain on the pensions system because it prevents women participating in the labour force. Similarly, early retirement is a drain on the pensions. Raising the pension age is an eminently reasonable policy when people are living longer. Consider this specific proposal: Throughout Europe the pension age should not fixed be at the particular age, say 65, but expressed as a decade, say between 62 and 72. People may retire at any age they wish within that decade. So people who have been in really hard manual work can retire early and those people who have been in really hard intellectual work can retire later. There would an actuarial adjustment to the pension depending on the age of retirement. It has been estimated that providing people with the choice in a "flexible decade of retirement" will in fact increase the median retirement age substantially.

The *second* element I would propose for European pensions policy is that there must be a recognition that if the dependency ratio rises and if the real values of pensions promises are to be sustained then, in the absence of increases in contemporaneous savings rates, taxes will have to rise. It is an insult to the public to suggest that funded pensions schemes remove the necessity for tax increases. Funded pensions may be a nice device for lowering pensions without the pensioners noticing, but they are not a device for sustaining pensions. So there must be a debate throughout the EU – how should the Growth and Stability Pact be modified in the light of the rising dependency ratios? What measures should be taken in recoginition fo the transmission of the impact of pensions policies between EU states? Should policies on immigration be changed in the EU?

The *third* element that must guide the European pensions policy is a commitment to fairness and to a fair distribution of risk. There is a burden. There is no doubt about that. Pensions policy must be based on the principle that the burden is fairly shared throughout society, and throughout the EU.

If a European policy is built on these three principles: the necessity of a new employment policy; the necessity of confronting the fact that taxes must rise whatever the

pension system may be; and the necessity of fairness, then we can design a pensions system in Europe that is not a burden on the new accession states.

Andrzej K. Koźmiński: Thank you, Professor for this very precise and clear presentation of a very, very serious problem. Now the floor is open for debate and for questions. Please, introduce yourself when asking questions and commenting on what Professor Eatwell said.

Jacek Tomkiewicz, TIGER and Leon Koźmiński Academy of Entrepreneurship and Management: What do you think about globalization, emerging market economies' rising productivity and investment opportunities in other parts of the world. What are the links between growing productivity in other parts of the world and investment opportunities for pension funds?

John Eatwell: I think that it is a very important point. If within Europe productivity goes on at about the same rate as has or a little bit more, perhaps with ICT, why cannot we share in productivity overseas? That is the so-called policy of "immigration without immigrants", in other words, increasing the growth rate of your working population, the population making things for you, but they are abroad, they are somewhere else, they are overseas. That is a reasonable strategy actually in the sense that by acquiring assets overseas the quasi-working population of the country increases.

But it is a risky strategy. Let's make it very concrete and suppose we are going to invest in China. Europe as a whole acquires large investments in China. Then, as the European population ages, we want to realize some of that investment and buy more goods and services from China. The first risk is a foreign exchange risk because you have to sell your assets in China to somebody else in order to acquire the cash to buy goods and services. Those investors have to be the young people in other countries of the world because there are no young people in Europe to do it. So there are a financial markets risk and the foreign exchange risk combined.

So foreign investment is a limited solution. But fundamentally there are only three choices: poorer pensioners, raise taxes or work longer.

Grzegorz W. Kołodko: Three problems. First, according to your knowledge, how reliable is all this forecast about growing dependency ratio? That must be coming from extension of longevity of life, growing life expectancy, that implies that food would be better, environment

will be safer, we will exercise still more and instead of living on average 72 or 79 years we will be living, what, 80, 90? How much this is the truth? How much this is just another exaggeration of the forecasters and the social policy makers because some of this data is striking. How is that possible that in country like Spain the dependency ratio will deteriorate by more than the factor of two? So that we will live instead of 72 years on average, we will live 85 years on average in 45 years? How can it come? So, maybe, we are little bit exaggerating with the true risk coming from ageing societies. Have you taken a look into this forecast or you just take it as granted because it has been done by somebody else, by demographic research.

Second, what is your answer for the trade-off between raising the retirement age and unemployment. Ceteris paribus, if one works longer, one is not making a vacancy on the labour market and at least in the short run there is the trade-off between extension of the retirement age and the rate of unemployment and all of the countries we are talking about are involved in unemployment. Yet the rate is different, in some countries it is hovering at around 20 percent and in some countries it is hovering at around five percent and therefore the policy challenge is a different one.

The third question or comment: please explain, because this is what I completely do not understand, why we are paying attention to these reforms, not the young people. It is not for us, it is not for my mum. I tried to convince my mum that it has nothing to do what I was doing as far as Polish pension reforms are concerned. She is doomed to stay in the pay-as-you-go system, we may index it by two percent or three percent, we can argue with the trade-unions what indexation suppose to be in the next year budget – 2.5 percent or 2.7 percent – they will complain that with five zlotys of indexation we can go to hell, the finance minister will complain that nine million people times 12 months makes a billion zlotys on the expenditure side of the state budget, so that it is really the burden imposed upon the taxpayer. But somehow the younger generation is really not concerned about their future. What is this psychological factor that makes it possible? We have to rely upon somebody to push forward these reforms. My experience from policy making is that certain rational (from economic viewpoint) approach is being paralyzed because at the end it shows that actually you are not talking about retired people, you are talking about electorate. If in a country like Poland you have 9.2 million people which are retired, by definition they are old people, who, however, vote if not this year, the next year. Democracy is not capable to enforce these reforms for the reason that they do not accept to get less for more. The question is that we have to have a

strong political support from the next generations and actually they do not seem to appreciate enough the problem which is not only financial but also a political one.

John Eatwell: Thank you for the three very important questions. The first one was about the reliability of the data. Is this scare story true? I think it is perfectly reasonable to raise a question mark over this. Obviously the work that was done on dependency ration is done by demographers. I have always been puzzled by the fact that demographers get things wrong so often. You know what the birth rate is, you know how many people there are, you just project it, you know how many people die in car accidents and all these things on average and you should be able to get the answer. But in fact they get it wrong quite often. The main reason they get it wrong is of course that the birth rate seems to move in ways which people cannot predict. It is a huge surprise, for example, that in Poland the birth rate is below the net reproduction rate. Nobody would expect that it would happen. But it is. Nobody would expect that in Portugal the birth rate would go below the net reproduction rate. But it is.

There is only one country in Europe which is sustaining its birth rate and this is France. And you may know that in France there are huge tax advantages to having babies. The French have designed their scheme very carefully because you get no tax advantage for one baby, you get no tax advantage for two babies, you get huge tax advantages for three. It is called the *famille nombreuse*. If you have a *famille nombreuse* then in France you get free nursery care, heavy tax advantages, special time of work, all those sort of things. The French have actually confronted this question by having huge tax advantages. But even so, they are affected by the increasing length of life.

I think that I am willing to agree that there are uncertainties and that demographers get things wrong. Nonetheless, it does seem to me that it is clear that we have three things happening at once and so, broadly, the dependency ratio is going to go up. We do have a falling birth rate, the effect of the postwar baby boom and the increasing longevity. And all those three things are coming at once. That is why the period between now and 2050 is so difficult. It will be easier afterwards because longevity cannot increase forever. People think that because they are living longer, that everybody is living longer, that the people who used to make it to 90 now go to a 100 and that small number of people used to make it to 100, go to a 110. That is not true actually. We are genetically programmed to die at around 100. What is happening is that the population is bunching up towards the top end but they will not go forever, unless somebody solves the genetic problem.

That takes me on to Professor Kołodko's third question, why do the young not care? Clearly, this is going to be a major political issue between young and old, and those who will be pensioners in the next 20 years are constructing an economic and political infrastructure that will ensure that those now young will, when middle aged support them. Pensions may seem to be boring, but they are a vital issue for young and old.

Returning to the second question which is the most difficult of all - is there a trade-off between raising the retirement age and unemployment? I think that is a very serious issue because, as I said earlier, an effective pension policy is really about two things: it is a tax policy and it is an employment policy. Unemployment in Europe is the biggest threat to maintaining pensions and the biggest threat to the taxes of the working population. We must increase employment in Europe. That means absorbing the unemployed, increasing labour force participation and persuading people to work longer. All those things at once. The problem is that we have not even solved the unemployment problem at the moment. The whole strategy of ensuring both macroeconomic policies that provide a growth environment, an employment environment, of increasing labour force mobility, so labour goes where it is wanted, of ensuring the quality and skills of the labour force, every bit of policy which bears on employment is going to save you from having to pay higher taxes to support pensions in the future. An employment policy is the key. You are absolutely right. It is no good just saying let people work longer if they add to the ranks of the unemployed. We must get more people into work, producing more to sustain the retired population. It can be done. The USA supports a very rapid rate of immigration. That high level of immigration is accompanied by the creation of more jobs. It can be done but it is the most important challenge for Europe today.

Andrzej K. Koźmiński: Thank you very much. In this grim picture, there is a light of hope. And this light of hope is a complete collapse of the healthcare system.

John Eatwell: There is an Italian satirical magazine that had a headline following a debate on pensions in the Italian Parliament that read: "Save Italy, kill a pensioner". The ray of hope is that, as a society, we are very adaptable in Europe. It is just that we must face the real problem, not be sidetracked into the funding versus pay-as-you-go debate, that is not the real issue. The real issues are taxes and employment. If we focus on those we will solve the problem.

Halina Wiśniewska, Leon Koźmiński Academy of Entrepreneurship and Management: For the moment the attention seems to be focusing on how to raise as much money as possible, which seems to be a difficult task. Should not the governments in the meantime start thinking about how to manage the funds which are already raised since it could bring bigger profit, meaning more money for the pensioners in the future, as vast sums of money seem to be simply mismanaged. Are there any legal regulations that a government could introduce to make sure that the money is spent in a proper way?

John Eatwell: That is a very interesting question because one of the main arguments for fully-funded pensions has been that the management of private equity funds is more efficient than the state and therefore a larger part of money, so to speak, is created for the pensioners. This was one of the main arguments, for example, for the development of the pension system in Chile. This was one of the great pensions experiments in which the Chileans basically scrapped their state pension scheme and went entirely over the private managed funds. For some time it worked very well. The problem is that the funds then collapsed and people lost their pensions.

Let us really identify the issue. Suppose we have very efficient fund management, so we develop a large pot of assets, of bonds and equity. You cannot spend bonds and equity, you can spend cash. So to get the cash to buy the food, to buy the medical services that you need you have to sell the bonds and equity. So somebody else has to buy those assets. Who is going to buy them when you have a large number of people who are old and who are selling and only a small number of people who are young and buying? That is the problem. In those circumstances either the prices of those assets would collapse, so that the money would just vanish, or the state would buy them, the state would support the asset market. But to do that it has to raise taxes, so you still have the tax problem. You cannot eat money. You can build up a huge pot of money or of assets but to survive you must transform them into goods and services. So even with very efficient management which may seem to improve the wealth of pensioners who invested in well managed pension funds, they still have the problem when we all get old together, we all want to cash in together. When everybody wants to sell and nobody wants to buy, the prices collapse.

Marcin Piątkowski, TIGER and Leon Koźmiński Academy of Entrepreneurship and Management:: What are your views on the long term debate in the US on privatizing their social security. Would you support the idea of privatizing social security? The second

question is in a context of the EU enlargement. One thing is to allow the outflow of money from the pensions funds so that they can be invested worldwide but the other thing is that you can allow immigration into your country. In the context of the EU and the pension reform and the pensions problem in the future would it not be a good argument for enhancing labour mobility within the enlarged EU?

John Eatwell: Let me deal with those questions in reverse. With respect to labour mobility, the British government is taking a clear position, we are very much in favour of labour mobility in Europe. If you go in a restaurant in London today it is quite likely that the person who serves you is going to be somebody who is about 18 years old and is Polish or Czech, as well as French or German, or Spanish, or Portuguese. It is very unlikely that he or she will be English. I would encourage labour mobility in Europe. It is one aspect which not only makes for a better Europe because people meet each other and work in each other countries but it also adds to the general productivity of Europe as a whole. But remember that we have a European problem here. Almost every European country is facing the same problem of the growth of the dependency ratio. Mobility will not solve the pensions problem for Europe as a whole.

The issue about the US social security is a classic case. You have the US social security system which in many ways is like the old Polish pension system, the old one before the reform. The pensions are fixed in a very specific rule, it is a pay-as-you-go system where contributions fund the outgoings and you have an aging population (though not as bad as everywhere else because of the high level of immigration in the United States) and the social security fund is moving into deficit.

The US social security system is a very fair system, it supports a lot of old, poor people and keeps them at a reasonable standard of living. Reforms proposed today, including privatisation, are euphemisms for lowering pensions. I would support the maintenance of social security because it has been a remarkably fair, progressive system. I would rather raise the tax rate by one cent in the dollar to keep the social security system going.

Andrzej K. Koźmiński: Professor, thank you very much for this exciting lecture and your kindness in answering all the questions. Please do not forget that you have a standing invitation to come and visit us again anytime you wish. Thank you very much.

John Eatwell: I would like to say thank you to you. You were wonderful audience on what is a difficult, technical subject. The subject that often is seen as rather boring. I am very grateful to you, for your questions and your interest. It has been a terrific visit. Thank you very much indeed.

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