



Institute of Actuaries of Australia



AN INQUIRY INTO THE BASICS OF PENSION FINANCE

Prepared by J.B. Kuné

Presented to the PBSS Program Part of the IACA, PBSS & IAAust Colloquium
31 October – 5 November 2004

This paper has been prepared for the IACA, PBSS & IAAust Colloquium 2004. The IACA, PBSS & IAAust wishes it to be understood that opinions put forward herein are not necessarily those of IACA, PBSS & IAAust and are not responsible for those opinions.

© 2004 Institute of Actuaries of Australia

The Institute of Actuaries of Australia
Level 7 Challis House 4 Martin Place
Sydney NSW Australia 2000
Telephone: +61 2 9233 3466 Facsimile: +61 2 9233 3446
Email: insact@actuaries.asn.au Website: www.actuaries.asn.au

AN INQUIRY INTO THE BASICS OF PENSION FINANCE

Abstract

The present paper deals with some basic characteristics of both pension finance systems pay-as-you-go and capital reserve. The merits and demerits of both finance systems are discussed at length. The major question mostly asked is whether funding does matter and if so, which conditions have to be fulfilled. Funding generally does not transfer the pension burden over time, opposed to frequent usual thinking. Apart from stimulating national savings and investments the major advantage of funding is that it provides the best way of securing pension liabilities and an adequate mechanism for solving the distributional problem of national product between the retired and non-retired by the ownership of (part of) the capital stock. After many years of debate of pay-as-you-go versus funding it can be concluded that the debate has lost much of its heat. The issues are better understood and there is convergence on some basic points.

Pensions are part of the support (income-maintenance) system that has evolved in western countries since the second world war. The system expanded significantly in that period of nearly uninterrupted economic prosperity.

In the 1950's, 1960's and 1970's attention was primarily directed to the rapid expansion of social security and to the proliferation of supplementary pension plans. Since the 1990's a period of maturity has set in. This period of maturity begins in a time of major demographic and family changes.

This paper 1 deals with the similarities and dissimilarities, merits and demerits of both pension finance systems pay-as-you-go and funding. After an introductory paragraph on basic and complementary pension schemes the basic characteristics of both financing methods are presented in paragraph 2. In paragraph 3 the question whether funding does matter is dealt with and if so, which conditions have to be fulfilled. Paragraph 4 looks at the relevance of the ownership of capital in respect of the long-term viability of pension schemes. Some further observations are made in paragraph 5 and paragraph 6 draws some concluding remarks.

1. Basic and supplementary pension schemes

A standard framework distinguishes four resources of economic security during old age. They are termed the four pillars of retirement. The first pillar includes public (basic) pension income maintenance programmes, often means-tested. The second pillar refers to industry-wide or company based occupational pension schemes, being part of labour conditions and jointly organized by employers and employees, whereas the third pillar refers to private personal pension saving schemes. Working (partially) after the current or statutory retirement age is the fourth pillar, being increasingly important as life expectancy is longer and worklife and retirement become more flexible.

By far the largest share of total pension benefits in the EU-countries is accounted for by public pension plans (the first pillar) generally pay-as-you-go financed. As a principle they can also be financed, at least in part, by funding.

Participation in supplementary pension schemes (the second pillar) can be voluntary or compulsory. Their financing is generally by funding, though elements of pay-as-you-go are often included. They can be based on defined benefit principles or on defined contribution principles¹.

In the developed countries complementary pension plans covering civil servants and military personnel are usually pay-as-you-go based. Some countries, notably The Netherlands and Sweden have a capital reserve system and thereby differ from the European standard. Some compulsory private sector supplementary schemes in several western countries, France, Denmark and Greece are also pay-as-you-go financed. In Germany, Austria and Luxemburg companies use a 'book-reserve' system, in which pension obligations appear as liabilities on the balance sheet of the company. The system evidently is very advantageous to companies since they can use the funds for investment purposes. The risks of insolvency and cessation of payments are generally insured with one of the large German insurance companies.

Most defined benefit schemes in the private sector in the industrial countries are substantially funded. Tax incentives often encourage funding; in most countries contributions to occupational pension

1) In a defined benefit plan (DB) participants will receive at retirement age a predetermined percentage of an a priori specified salary base, subject to the number of working years.

A defined contribution (or money-purchase) plan (DC) sets the contribution rate as a percentage of salary and the resulting old-age benefits depend on the amount of contributions made, investment earnings and the employee's entry and retirement age. These schemes are rather attractive to employers, as precise labour cost projections can be made, but presents the employee with the risk of an inadequate old-age income. Virtually it is impossible to finance pension rights based on DC by pay-as-you-go. The French *répartition* system - the AGIRC scheme for managerial staff and the various ARRCO schemes for all employees - as an exception operates according to the pay-as-you-go principle. DB-schemes can as a rule be financed by pay-as-you-go and by funding; in The Netherlands funding is obligatory.

Another mechanism of transferring resources to the elder population is by informal, intrafamily transfers (termed the extended family system), which is still usual in many parts of the world. It is pay-as-you-go based as there exists an implicit contract.

schemes are tax deductible and investment incomes are tax deferred.

In recent years various developed nations tried to enlighten the financial burden on public old-age pension plans by encouraging the introduction and further growth of occupational schemes, (1) making them mandatory (Australia and Switzerland) or (2) quasi-mandatory through collective bargaining (Denmark and The Netherlands) or (3) permitting employers to opt out of the (earnings-related part of the) public plan if they provide at least an equivalent private plan (Japan and the UK). Currently in the OECD-countries about 25 to 30 percent of the elderly population and about 40 to 50 percent of the working population are covered by an occupational pension plan.

In the developing countries and the transitional economies of the Eastern European countries and the former Soviet-republics the move towards occupational plans is only at an early stage.

Funding

It is argued frequently that pension funding may be useful in creating a resource base, thereby enabling a larger future volume of production and consumption². A shift from pay-as-you-go to funded schemes therefore is highly recommended by many authors and official institutions. This makes it easier to overcome the problem of distributing the available national product among different groups of population. This issue is of great theoretical and policy relevance and needs to be examined in more detail. Hence in paragraph 3 we turn to the topic whether funding does matter and if so, which conditions have to be fulfilled.

In professional literature and every day life practice one often speaks about the unrevealed or hidden controversy – sometimes incorporated in a time-bomb exploding at some point of time in the 21st century – between old-age pensioners and the working age population³. Such an approach however

2) It is often argued that the pension systems in e.g. France, Germany and Italy are not sustainable in the coming decades. If funding is (a part of) the solution, countries like Switzerland, The Netherlands and the UK are (happily) faced with a problem that can be easier dealt with than that of aforementioned continental European countries. Remember, if funding makes little difference, all aging countries may have a similar problem ahead. From a security point of view the UK's pension system undoubtedly is preferential to the systems we find in e.g. France, Germany and Italy. See also note 2 of Box 2. As pointed out in previous note 8 we may wonder whether there exists a significant aging problem.

3) The controversy between workers and pensioners, irrespective of how pensions are financed, is pointed out by e.g.,

* Johnson, P., C. Conrad and D. Thomson [1989], '... whether retired people receive income from the state via the tax transfer system (or from social insurance) or whether they live off the interest and dividend payments from their past savings, the goods and services they consume are part of the current outflow of the currently employed population.'

* S. Brittan [1996], '... all pensions have to be provided from the present national income. Even funded schemes can only give right to a share of this year's national income. They cannot transfer resources from this year to another year 40 years away. The economic reality is that today's workers pay taxes and contributions to pay for today's pensions.'

* M. Lunnon [1996], '... it is not true that, with funding, current workers do not pay the pensions of those who are retired: all consume what is produced by those working currently. Both funded and

shows some serious economic drawbacks, is only part of the argument and does not seem to be justified. This question is dealt with in paragraph 4.

2. Methods of pension financing

In the western countries all basic and a moderate part of the complementary pension schemes are financed on a pay-as-you-go basis. Retirement provisions (second pillar) through funded schemes appear to be most widely applied in The Netherlands, the UK, Switzerland, and to a lesser extent the US, Canada, Ireland and Finland, where pension fund assets (excluding pensions insured by life-insurance companies) as percentages of GDP amounted to 88 of GDP in The Netherlands, 79 in the UK, 79 in Switzerland, 59 in the US and 40 in Ireland at the end of 1993⁴. In the developing countries and the Eastern European transitional economies capital accumulation by complementary pension plans appears to be much less, both because their coverage is much lower and because they tend to be largely unfunded.

All developed countries will show a sharp rise in the dependency ratio, doubling or more, in the next forty years. When the replacement ratio can be assumed to remain constant the pension burden is growing directly with the rise in the dependency ratio. The old-age problem therefore can be considered as the classical distributional problem of national product between the retired and non-retired.

Financing a pension scheme

In the case of a funded scheme employees pay part of their (labour) income into a fund of financial assets from which eventually the pensions are paid out. Cohorts or groups of individual participants break even over their life cycle or, in other words, funded pension schemes are designed to be actuarially fair⁵. They are intended to be non-redistributive (DC-plans) or redistributive for a defined group only (DB-plans). The retirement pensions are paid out of current capital income, originating from investment revenues and by selling assets - more accurately, the physical or real capital goods as productive capacity hidden

unfunded pension arrangements formalise the transfer of income from those working to those retired.'

* D. Blake [1996], '... all pension schemes, whether formally funded or not, are in reality PAYG schemes. At first sight this may seem a strange notion, but it is related to the way in which the next generation (i.e the current *working population*) treats the previous generation (i.e the current retired population).'

* W.A. Jackson [1998], '... funded pensions transfer purchasing power from the past [...], but the inactive elderly remain dependent on the *working population* for the goods and services they consume.'

* N. Barr [1998], '... once this point is understood it becomes clear why PAYG and funded schemes, which are both simply ways of dividing output between *workers* and pensioners should not fare very differently in the face of economic change.'

4) Source EFRP [1996]

5) Much of the controversy whether a pension system is a 'good deal' (or far from it) for different groups of participants arises from our not-knowing what is the correct discount rate.

behind these assets - to the younger generations⁶. A funded system relies more on the development of the international capital market as opposed to the dependency of a pay-as-you-go based system on the domestic labour market.

Under a pay-as-you-go system pensions are paid out from contribution payments (predominantly out of domestic labour income) only. Instead of the life-cycle reallocation of a cohort's (or cohorts') aggregated income there is a cross-sectional income redistribution from workers to pensioners on the basis of an implicit social contract: each generation finances the pension income of the previous generation on the understanding that its own pension income will be financed by the next generation, with the inherent risk that future generations can break, at least in part, the contract. Pay-as-you-go schemes can bring about systematic income redistribution or, in other words, individual people generally will not break even over their life cycle. Pay-as-you-go based pension plans are normally implemented through the state's power to levy contributions.

The merits and demerits of funding and pay-as-you-go have been discussed extensively in the literature. Both systems have their advantages and disadvantages. They are exposed in BOX 1.

15) Note that an aging society (opposed to a younger society) generally holds a larger capital stock, hence a higher capital intensity (or capital-labour ratio), a declining capital productivity and a rising labour productivity and higher real wages. Therefore, an enhanced capacity is created to finance old-age pensions. The younger generation acquires the ownership of assets - behind which the physical capital stock hides - from the aged.

In view of an aging society we may distinguish three situations with an absolutely or relatively declining labour force, accompanied by,

a. a reduction in the stock of capital - with constant capital intensity - thereby (in the short term) disengaging resources which can be transferred to the aged. In this case net investments are negative or, in other words, dissavings of the elderly exceed savings of the youngsters. An aging society can indeed 'live on its capital' for some time. In the perspective of D.M. Cutler et al. [1990] society receives a near-term consumption dividend.

As far as the allowable rate of capital stock reduction does not exceed capital depreciation, redundant capital can be disengaged rather easily by diminishing or halting gross investments. On the other hand, when allowable disinvestment exceeds capital depreciation practical problems arise in respect of the (physical) feasibility of consuming part of the existing capital stock. Ultimately capital equipment can be sold abroad, thereby acquiring foreign currency by which consumer goods can be bought;

b. a reduction in net investments but they remain positive - the capital stock and the capital intensity are still increasing - thereby augmenting in the medium term the volume of consumption for the whole population. In this case savings of the younger population still exceeds dissavings of the elderly, but to a diminishing extent;

c. no reduction in net investment, leading to a further increase in the capital intensity of production. Consequently, today less consumption goods can be produced. On the other hand, the higher capital intensity gives rise to a larger labour productivity and a larger future resource base. High flexibility of the economy, viz. a high elasticity of substitution between capital and labour and a high elasticity of savings to the interest rate, makes that a larger part of the capital stock - made redundant as a result of the declining labour force - can be absorbed by an increase in the capital intensity.

BOX 1

Relative merits of pay-as-you-go and funding systems

There are at least two main reasons why pay-as-you-go programs have proven to be so popular in the decades following the second world war. First, in a funded system it will take many years to build up a reasonable pension. In contrast, under a pay-as-you-go system a full pension can be paid immediately, with a transitional gain to retirees and the older cohorts of workers. Starting a pay-as-you-go scheme – mostly covering the national territory - in the years following the second world war was rather easy, as the ratio of workers to pensioners and the expected population trends were favourable. There have been some definite winners and no losers or, in other words, when the pay-as-you-go schemes were installed, the first generation(s) of pensioners had a 'free lunch'; they received pensions without or only partially having contributed¹. Secondly, because pensions are paid out of workers' contributions, they can be increased - reflecting changes in prices and/or wage-level - rather easily without levying increasing contribution rates from workers' income.

Pay-as-you-go schemes probably will be preferred in a world with large economic change and uncertainty (at least when a continuing flow of contributions in a designated geographical area can be relied upon). Of particular relevance is that pay-as-you-go systems stand the risk of a low real rate of investment return and low asset prices due to persistent (and unexpected) inflation, a high capital intensity and other unforeseen events over which society has no control. Under a pay-as-you-go based system society - though it can definitely not guarantee a previously promised level of pensions – can better control the conditions of the social contract between generations. On the other hand the aging linked perpetual rise in pay-as-you-go contribution rates may contribute to higher labour costs and labour market distortions, hence a higher future unemployment level and a smaller coverage, thereby deteriorating the conditions of long-term viability.

Furthermore, pay-as-you-go schemes are said to minimize impediments to labour mobility at home, but generally not across national borders.

Undoubtedly one of the most important features of a funded occupational plan is that its premium payments are less likely to be regarded as taxes rather than as own savings for an old-age provision (less difference between gross and net wage level), thereby avoiding to a large extent negative labour market distortions and probably giving rise to an increased labour force participation². Clearly, this is beneficial for the economy as a whole, especially in countries where companies and workers are heavily engaged in the informal sector. Generally, a large informal sector diminishes the financial capacity of a basic old-age pension system based on pay-as-you-go; it also hurts the government's fiscal capacity, thereby crowding-out the supply of other important categories of public goods as well. In the worst case evasion can lead to the (near) collapse of the pension system, particularly when workers evade contributions but still qualify for benefits.

In a politically turbulent/destabilized world with insufficient self-control serious problems will arise in maintaining pay-as-you-go systems. Personal defined contribution plans may then be the only attractive or feasible alternative.

Funding can make another psychological difference as there is anticipatory behaviour involved and this may be one of the advantages of funding. The major advantage in our view is the ownership of capital, to which aspect we turn in paragraph 4. A major disadvantage of the funding principle remains that inflation has to be considered as an uninsurable risk, as it affects everyone.

For an individual contribution paying person a pay-as-you-go plan is preferential to funding when the sum of the rates of growth of population (n) and of real wages (g) exceeds the rate of interest (r). This is termed the Aaron-condition or Aaron-rule, which rule is well-known. The returns from both pension finance systems to the contribution payer are identical when $r = g + n$. It appears that what is true on a micro-level is not necessarily (always) true on a macro-level.

Today pay-as-you-go plans have lost much of their popularity in many countries, being accused of costing too much and having an adverse impact on the economy in an aging society. Funded schemes

have received much more emphasis in the last few decades as a result of changing concepts about (personal) responsibilities and choices and more fiscal incentives to provide for one's own pension income. Remember however the warning of N. Barr against '... reliance on funding *alone* to address demographic problems [...]. To imagine that funded schemes are substantially better in the face of aggregate uncertainty is to fall for crude mythology.'

- 1) On the other hand, when transforming a pay-as-you-go plan to a funded scheme, the 'last generation' of workers will pay twice: for the present pensioners and for their own funded scheme. There appear to be definite losers and no winners, so the argument goes. But it is not so dramatic as that as workers acquire in turn the ownership of capital assets and lower consumption today – or increased own saving – is balanced by greater resources for consumption in the future. The path from pay-as-you-go to fully funded schemes nevertheless will always be rather long.
- 2) It can be doubted, however, whether premium payments are considered as own savings rather than taxes when the funded (supplementary) pension system is organized on a collective basis, which happens to be the case in The Netherlands. Otherwise, an individual's pension can be closely linked to contributions paid during his working years under a pay-as-you-go system as well (system of notional funding).

Redistribution over time

On a personal or micro level the economic function of setting up a pension scheme is to transfer resources from one's working or younger age period to his old-age years, thereby creating a claim on future national product. Saving or consumption forgone during the working period is balanced by consumption in the retirement period. On a macro level or for a society as a whole this is not possible, '... ruling out the case where current output is stored in holes in people's gardens'⁷. No generation generally can store (for its own retirement purposes) the commodities that it has produced itself. Apart from (durable) infrastructural facilities some consumer goods can be stored and saved for consumption later, examples are durable goods like housing facilities, transport facilities, cloths, books and some good wines. But many others, particularly services, can not and, hence, must be produced simultaneously with their consumption. Thus, for a society as a whole there can be, *ceteris paribus*, no redistribution of pension assets and purchasing power over time to a substantial degree. The consumptional expenditures of the elderly, today and in the future, always has to be provided for out of current production in the same time period, irrespective of whether the pensions are funded or not. Or, in other words, the goods and services the retirees consume are always part of the current output of the currently present working population equipped with the present capital stock.

From an economic point of view it can be held that the costs in respect of any retirement income system, defined earlier as the resources or benefits foregone, are always equal irrespective the way they are

7) Cf N. Barr [1998], p. 214. The possibility and attractiveness of storing durable consumer goods in our view are underestimated by Barr. Storage of durables to some extent and up to certain time horizon can be of relevance and should not be ignored. ICT (information and communication technology) seems to be in an intermediate position.

financed. The particular mechanism of pension finance does not violate this basic finding. The pension burden on future generations thus is determined by the pensions to be paid out and not by the way in which they are financed.

Fallacy of composition

It is often argued that the origins of all future pension problems, if any, is the failure to start and maintain funded pension schemes rather than pension plans pay-as-you-go financed. If public and supplementary pension plans had accumulated sufficient assets - so the argument goes - paying future pension expenditures would be less or not a problem at all. This 'solution' however will not change the basic mechanism redistributing production among different groups of population, e.g. the retired and non-retired. Or, in other words, basically the competition over resources raised by the pensions (to be) paid to the elderly is not removed by the transition from pay-as-you-go to funding. Rather, it is switched from old-age pensioners soliciting a share of labour income to claims over the return on the capital stock. The ownership of (part of) the capital stock in our view is of utmost relevance in securing pension entitlements and solving the distributional problem. This topic is dealt with in paragraph 4.

On a personal or micro-level – and on a cohort or meso-level as well - funding clearly is the only feasible way to create an old-age pension. During one's working years actuarially fair contributions are paid in order to receive a pension income in the years of retirement, thus from capital revenues and the proceedings from selling pension assets. Such personal savings plans may considerably benefit from tax incentives.

On a macro-level, as a rule pay-as-you-go or any funding principle can be chosen. As observed the way of pension financing does not affect in its essentials the distribution across time of the resources to be transferred to the elderly. The question arises where this misunderstanding and confusion come from? It has been pointed out e.g. by L.H. Thompson [1988; p. 213] that '... the tendency to generalize from the individual to the economy is one of the major shortcomings of much of the debate over retirement costs because it often results in what economists call the *fallacy of composition*.' It is a fallacy of composition to assume that because something is true for an individual it is (necessarily) true on aggregate. This appears not to be the case. For instance, '... if I stand on my seat in the theatre I will get a better view, but if everybody does so, nobody will get a better view'⁸.

8) Cf N. Barr [1998], p. 214

3. Does funding matter?

More emphasis on funding is generally recommended to cope with the adverse consequences of population aging in the next century in the western world. This recommendation needs some more explanation.

From a welfare point of view the crucial question arises, 'does funding matter?' or, in other words, under which circumstances funding makes a real difference to the performance of the economy? Evidently a major difference between funding and pay-as-you-go is that funding is generally leading to an additional flow of saving during the period of growing up - and under circumstances also in an aging economy with economic growth - ,thereby creating a resource base, which enables higher levels of production and consumption for both future workers and retirees⁹.

From a theoretical point of view the condition of optimal savings has to be fulfilled. If savings accumulated to provide for an old-age pension income, together with all other sources of saving, would yield over-accumulation, the pay-as-you-go share in pension financing should be increased in order to attain what economists call the 'golden rule'-level. Similarly, if in the steady-state equilibrium stage, the economy would be undercapitalized, public and private pension arrangements should rely more heavily on funding. The test for this latter condition is that the total return to capital exceeds the sum of growth of population and output per worker. This is again the Aaron-condition from BOX 1.

Conditions to be fulfilled

The idea of stimulating economic growth by building up a larger capital stock by pension saving is based on four major assumptions.

First, additional pension saving increases, at least in part, total national saving, as long as there are no offsetting reactions by households, firms or government. For instance, savings within a public fund may be offset by increased spending in other government programs¹⁰, leading to dissaving to a certain extent and savings within private complementary schemes might be offset by reduced savings in other forms. If pension savings simply replace other savings, it makes little real difference. BOX 2 deals with the question how pensions effect personal and total savings. Saving rates in countries like the United Kingdom and the Netherlands with high pension assets are rather similar to that in Germany.

9) Higher levels of future national product evidently will nor alter the spending on old-age pensions in relative terms, but paying for pensions out of a larger economic 'pie', still leaving higher incomes (a grown 'slice' out of the future bigger economic pie) for the non-retired population in absolute terms, is much more comfortable.

10) Dutch pension capital is partly invested in government debt and the latter is mainly used to finance transfer income and other current expenses. On a consolidated national basis those pension investments are illusionary in the macro sense. They do not represent productive investment (cf. J.H.W Goslings [1994]). By putting claims on future tax receipts the bargaining position of pensioners in the future sharing of national product is improved.

Secondly, the savings will lead to investments that increase the capital formation and the productive capacity of a country. Or, in other words, investments do not fall short of the savings level. But this is not an automatic process; economies do not behave like well-oiled equilibrium machines. If savings fall behind, this can result in increased hoardings and decreased national income levels (the Keynesian model) or in a (larger) surplus on the current account of the balance of payments (the neo-classical model). If pension savings lead to new productive investments – which would not otherwise have occurred – then funding can make a real difference. The second condition unfortunately was not or at best only partially fulfilled in e.g. The Netherlands during the last few decades, where investments fell behind national savings, leading to a large surplus on the current account of the balance of payments. Note that for a small open economy assets abroad can be beneficial¹¹.

Third, the capital stock is smaller than according to the 'golden rule'-level or, in other words, national savings are below their optimal level and are expected to persist for a long time period ahead. It can be argued that savings nowadays in many countries, if not most, on a macro-level are below their optimal level. There appears to be a structural shortage of capital supply worldwide, particularly in the transitional economies and many developing countries and this shortage may increase further in the coming decades¹².

Fourth, increased pension saving must be the best way to stimulate productivity. If increasing the national saving rate were a main reason to fund pension plans, there could be found other and maybe even better ways to accomplish this goal¹³. The government, for example could run a surplus on its

11) A large amount of foreign assets enables a country to maintain the consumption of the population with goods produced abroad. It can be pointed out that major difficulties will arise on the meso and micro level, as foreign accounts are to a large extent owned by companies and banks and not by individuals or organizations of individuals. Thus, (Dutch) pension funds should invest on a wider scale abroad, e.g. in the newly industrialized economies.

12) An OECD-study [W. Michalski et al.,1995] observes that '... the OECD-area as a whole could find itself facing an *ex-ante* saving-investment imbalance in the order of US\$ 400-500 billion a year. Outside the OECD-area, there are grounds for anticipating the emergence of growing saving and investment imbalances which could trigger increasing net external capital demands.'

13) Pension savings might be unstable in some way or other. In a steady state economy with a stable age distribution of the population and with zero income growth, saving by the working population exactly balances dissaving by the retired. Aggregate net savings are zero, as with a pay-as-you-go based pension system. Thus, at first sight there is no real difference between both pension finance systems. In an equilibrium stage a funded system does not make a (major) contribution to the growth of the capital stock. In an aging population aggregate pension saving will be negative and in a growing population – a period during which pension funds are building up – pension savings are positive. Funding may be preferential and more favourable nevertheless. In the built-up phase to steady state the aggregate saving ratio and capital formation are increased. After several decades the increased dissaving among retirees will approximately offset the amount of savings of the younger population and the aggregate saving ratio will return to its previous lower level. The capital stock however is larger and thereby the production per worker. Or, in other words, the economy has settled to a new steady state with a higher level of income and production.

For the US S.J. Schieber and J.B. Shoven [1997] show findings from scenario-analyses, '... the pension system would continue to generate significant investable funds for the next 20 years or so. By 2024

budget, thereby creating government savings or use various kinds of incentives stimulating private savings. If there is an alternative policy to promote savings and productivity either more efficiently

BOX 2

How pensions affect personal and total savings

In most developed countries national basic pension plans (first pillar) are predominantly financed on a pay-as-you-go basis. Theoretical analysis suggests a negative relationship between the creation and availability of a pay-as-you-go based basic pension scheme and the level of personal savings. Empirical studies to establish the relationship between this kind of pension plans and the personal as well as the aggregate saving ratio have not produced unambiguous evidence. Introducing pay-as-you-go plans do not seem to have led to depressed personal savings levels nor to less total national savings in a significant way. Most likely public schemes have to a considerable degree replaced 'within family transfer systems'.

There has been much theoretical and empirical research as to whether supplementary funded pension schemes (second pillar) do effect savings and capital investment¹. Much of the theoretical work is based on the life-cycle theory, its main weakness being that bequests are ruled out.

Mandatory supplementary pension plans are assumed to have a positive impact on the level of personal savings but probably by less than the amount of pension saving itself. On the other hand, tax incentives of supplementary plans tend to reduce government's tax revenues and, ceteris paribus, a higher budget deficit. Empirical evidence shows that funded schemes increase saving fairly relative to the no-pension state - 20 to 60% was crowded out, so the net positive effect is 80 to 40% of the volume of personal pension savings. Empirical studies for several OECD-countries do not show an unambiguous relationship between the growth in pension assets and the *total* national saving ratio, due to decreased offsetting governments savings (needed to implement funded schemes) or reduced private savings (cf. L.H. Thompson [1998]). According to E.M. Engen and W.G. Gale [1997, p. 138],

'... pension reform measures offer the potential both to resolve the long-term financial problems facing the pension program and to exert a positive impact on the national saving rate. But predicting the magnitude of proposed reforms on saving is fraught with difficulty, and even the direction of the change in saving is in doubt under certain circumstances.'

Hence, the productive capacity of an economy using a funded pension system at least in the short term according to these studies is not necessarily higher compared to an economy using pay-as-you-go schemes only². But a favourable impact can also not be denied on the basis of the same studies. In the long term, however, government savings can be higher than they otherwise (with no-funding) would have been. Tax receipts are less in the short term due to fiscal pension incentives; these taxes are not forgiven, but they are postponed several decades later when pensions are paid out. At that time a higher (government) savings and investment level can result. Though convincing evidence of a strong case for funding on a macro-level is absent, the momentum for a shift from pay-as-you-go to funding remains in many developing countries and former Sowjet-republics in transition. On a micro-level there certainly is a strong case for funding as will be discussed in more detail in paragraph 4.

We may wonder furthermore whether a lower saving rate, if any, is the real issue, remembering that an aging society has an unprecedented large capital stock and corresponding high capital intensity. Shortage of skilled labour supply may be a more serious challenge.

1) Apart from the question whether or not funding has contributed to increased savings and investments – compared to what it otherwise would have been - , another relevant question is whether the actual savings level is

the pension system is projected to cease being a net source of saving for the economy and in fact to become from that point increasingly a net dissaver.'

sufficient and adequate. This question is not dealt with here. It is interesting to note however that the savings ratio and level of investments in e.g. the UK (with a high extent of pension funding) have been lower in the last decades than those in the other large European countries, mostly with a high extent of pay-as-you-go. In macro terms it must be expected therefore that the UK will face at least the same aging problems, probably worse, despite a high extent of funding in its pension finance system. On the other hand Luxemburg, by far the most wealthy country in Europe with an old-age income system predominantly based on pay-as-you-go is allegedly well equipped to face its population aging.

- 2) It is interesting to consider more carefully a society with a fully funded pension system but an aggregate capital stock equal to that in a pay-as-you-go based situation. Assuming equal labour input and hence equal output levels, on a macro level there is no difference in national economic performance under both pension finance systems. Thus, on the average there is no difference on a micro level, irrespective of the values of n , g and r in the Aaron rule from BOX 1. Is there a contradiction involved and if so, how it can be cleared up and reconciled with empirical data?

L.H. Thompson ([1988], p. 216), I think, gives the right answer/explanation. Assume an interest rate of 10% and a growth rate of population and wages of zero. Thus $r > g+n$ and funding is to be preferred according to the Aaron-rule. Clearly the individual can obtain a higher rate of return in the private market by escaping from the (pay-as-you-go based) social security program. Thompson: '... assume that we adopt the advance funding approach under which wage earners are forced to come up with \$ 90.90 now instead of \$ 100 next year. Where do the wage earners get the \$ 90.90? Suppose they borrow it from a bank by taking out a home equity line of credit at 10 percent, which costs them \$ 100 to pay off next year. Where does the bank get the money to lend? It issues a certificate of deposit to the pension fund, which just happens to have \$ 90.90 to invest. What difference does it make whether the system is current cost financed or advance funded? In this example, the difference is one of appearance, not substance: the income claim needed next year to allow the retiree to consume \$ 100 comes through a series of private sector transactions if the system is advance funded and from taxes if it is current cost financed.'

or with less risk, then it might be the preferred policy. Other fiscal policy measures may provide the government with more direct means of stimulating both public and private saving, thereby avoiding increasing public deficits – and possibly also a lower aggregate savings ratio - due to a smaller amount of tax receipts¹⁴.

When the four conditions referred to are fulfilled, the question whether funding matters and could be part of the solution to the problems caused by e.g. adverse demographic developments (and deteriorating ecological conditions) can be answered in the affirmative¹⁵. A higher degree of funding in financing the

14) Ideally the contribution level should reflect the liabilities that are being incurred and send the correct and timely signals. This is definitely not a characteristic of the pay-as-you-go system, but such a missing link can be established also without building up a fund. The government can levy higher taxes or contributions thereby reducing borrowing and diminishing the size of public debt. Decreasing interest payments on public debt can compensate future increases in contribution rates of pay-as-you-go pension plans. This principle (of *notional funding*) underlies the financing practice in respect of the basic pension scheme (AOW) in The Netherlands. From a fiscal point of view the policy of reducing the public debt/GNP ratio (in advance of coming demographic pressure) is 'equivalent' to accumulating a fund.

15) Note that on the micro-level decisions in respect of financing pensions are taken with a view to interests of employers and employees only. Pension schemes should be and actually are an instrument for providing old-age pensions, not for increasing the volume of national savings (nor for improving the functioning of financial markets or for being an instrument for labour market policy). Thus, the national concern (achieving the optimal savings level) and participants' interest (providing for adequate old-age pension provisions) do not automatically match; generally speaking they do not. These interests may be reconciled by well-chosen economic and fiscal policy measures, e.g. adequate tax treatment.

national pension system will enhance national welfare. Funding will be preferential to the extent that it causes national product to be higher. It will be clear that the costs of population aging can not be avoided. On the other hand by increasing investments now – the economic costs of it or the benefits forgone are the reduced current consumption expenditures of the present generations – one is anticipating the difficulties that could otherwise (with no-funding) arise in an economy with a lower national product. This favours future generations.

A further expansion of funded occupational supplementary pension plans can be considered as an adequate, but not a unique mechanism to promote savings.

Note however that pension finance systems are not created, at least not in the first place, because of the impact they might have on the performance of the national economy. Foremost, they are designed as mechanisms to adequately provide for pension incomes to the elderly. On the other hand, the two purposes do not necessarily exclude each other, they can be compatible.

Apart from the impact funding can have on the size of future productive capacity, pension saving might be particularly preferential to people as more security can be obtained compared with pay-as-you-go. Or, in other words, the major (economic) difference between funding and pay-as-you-go goes beyond the macro-economic issues of savings and investment. In the next paragraph we pay attention to the merits of funding as an adequate and efficient mechanism and device to strengthening the security of old-age income provisions and providing a solution for the distributional problems involved.

4. Securing pension claims

The argument that funding and pay-as-you-go are equivalent in real economic terms has its own drawbacks as it ignores the basic nature of the economic process and of social and financial institutions in solving the distributional problem in respect of old-age.

The notion of a large volume of material goods and services being transferred from their producers – the de facto working labour population – to the elderly is artificial and over-simplified.

As pointed out before, to consider workers and pensioners as groups with opposed interests is incorrect from an economic point of view¹⁶. Evidently national product is the result of the joint input of labour and of capital and as a consequence output is divided between capital and labour – under equilibrium

Countervailing policy measures of the government in respect of savings might be necessary.

16) From a social and sychological point of view there certainly can and will be opposed interests, as future generations of retirees receive high pension incomes and are (very) wealthy as well. Cf. S.A. MacManus [1996], '... today's intergenerational differences primarily involve intensity rather than direction. [...] Tomorrow, we are more likely to find different generations supporting policy priorities that are diametrically opposed to each other as the nation undergoes its greying metamorphosis and the economic realities associated with it sink in.'

conditions - according to their marginal product, i.e. wage rate and profit rate. This basic distributional aspect is ignored in much of the social security literature. Particularly, at least on a macro-level, the (role of the) ownership of the capital stock is frequently overlooked.

The crucial issue in respect of accrued pension rights is that it constitutes a claim on future output in exchange for foregoing a part of present output. Pensioners need a firm and solid claim on national product in order to be able to consume the goods and services currently being produced. Under funding the retired population has at its disposal such a claim arising from their identifiable ownership of productive capital as a resource base of their own¹⁷. A higher labour force participation of the elderly gives also rise to such a resource base.

The long-term viability of funded and pay-as-you-go schemes

Capital earnings are received by the owners of the capital assets, i.a. pension funds and many elder people on a personal basis. Apart from the expropriation of capital goods in revolutionary times as well as in times of war, the ownership of the capital stock will be a more secure basis for retirement income than the willingness and ability of the current labour force for paying pension contributions under a pay-as-you-go system. If pay-as-you-go contributions alone could satisfy promised pension payments ad infinitum one could be content alike without any funding system. But this promise can not be guaranteed; one can simply not count on it for ever. Economic and social institutions like the ownership of goods and assets, embodied in pension entitlements and other social security benefits, therefore are of much more relevance for the sustainability of old age income plans than levying taxes and contributions from labour income or capital income as there are many risks involved. Workers can evade contributions and taxes on capital income are very difficult or not at all to enforce effectively due to the high mobility of the financial capital¹⁸. Pensioners are thought to be better able to fight for their share of national product as owners of capital than as lobbyists for pay-as-you-go financed pensions. Furthermore, under funding the debate (and hence the concern) on how the number of contributors and their average contribution base are developing is weakened.

Both pay-as-you-go and funding are basically acting as a mechanism for transferring resources between pensioners and other age groups. The primary point of interest when comparing funded and pay-as-you-go based pensions is how pension entitlements are secured, and only in the second place how they are financed. Or, in other words, funding is not a unique mechanism for financing pensions, but funding can

17) P.A. Diamond [1997] proposes to give social security benefit promises the same status as private contracts or private property as a means of constitutional protection and insulation against benefit reductions.

18) In the global village, the capital income tax is subject to a 'race to the bottom' erosion from international tax competition.

be considered as a unique mechanism for solving and controlling the distributional problem in respect of old age pensions in an aging society, particularly at an unwished time of deteriorating economic performance. Nonetheless, risks remain¹⁹.

The nature and basic value of pension rights under both systems is fundamentally different. The real value of claims under both systems depends on the availability of future resources as well as on a variety of other future developments in the world. Under funding this value is dependent on e.g. inflationary processes, capital returns and the (market) price of assets²⁰. Under pay-as-you-go the claim value depends on the ability and the willingness of workers and tax-payers to finance pension outlays²¹. They can actually refrain from paying higher contributions, but they can not take away retirees' pension assets.

A funded scheme offers an economic claim on future national product, whereas a pay-as-you-go based scheme offers at best a moral claim (on future national product) or not even that: it basically offers an expectation on future benefits rather than a promise of future benefits and the claim is basically dependent on the political and bargaining strength of the elderly population and on the state power to levy contributions for the public pension system. Though the main argument for nonfunding rests on the quality of the pension promise made by the state, the state let alone the managers of a pay-as-you-go system are in a position to ultimately commit themselves to maintain the present pension level in the coming decades.

Securing old-age social security

19) From the points of view of security, equity and efficiency the IBRD [1994] recommends a multi-pillar system, a mixture of the publicly managed and tax/contribution financed first pillar and the privately managed fully funded second and third pillar. The second pillar can be mandatory and the third pillar will be voluntary. A well developed fourth pillar (continue working) is also very useful. Or, in other words, don't put all your eggs in the same basket. The three pillar system is also strongly recommended by the Group of Ten [1998].

The Netherlands pension system is of the three pillar type. The first and second pillar are substantial and the third pillar is of slight but rapidly increasing relevance. A fourth pillar practically does not exist.

20) The spectacular growth in pension fund assets in the last few decades - and the further growth in the near future - may have simply increased asset prices, rather than increased the real capital stock. If the process goes into the reverse direction at some point of time in the 21st century, asset prices may fall just when pensioners want to sell their assets to the younger generations. On the other hand funding and the concurrent widespread ownership of individual and collective pension capital accounts may even contribute to a larger political engagement for adequate and responsible monetary and fiscal policies.

21) An interesting discussion on the long-term viability in pay-as-you-go schemes is given by E. Reynaud [1995]. There are two major elements involved. In the first place the need for a constant renewal of the insured population. This may be ensured by making participation compulsory within a designated area which is sufficiently large and socio-economically coherent. The second element concerns the actors in the schemes' management. Managers should not be involved in defending special occupational or sectoral interests, but dedicated to supporting common interests.

It has been shown conclusively before that national product can be divided among different age groups using different methods. Remember that their joint demand will always be constrained by the current total supply of goods and services. Whatever method used, the actual value of the claim (on future output) of the elderly (or of any other age group) can never be completely guaranteed.

Risks remain. Guarantees given are in some way or other always virtual. In a pay-as-you-go scheme they are based on the strength of an implicit social contract between generations; under funding they are based on the ability of the economy always to yield an adequate return on financial assets.

When, in a funded scheme, total monetary purchasing power or the demand for goods and services (largely) exceeds the value and amount of current output at prevailing prices, a general price inflation will bring them back into line. First, prices of consumer goods will rise, thereby bringing about a cut in the real income of the retired. Secondly, the elderly will see the prices of the securities they wish to sell to the younger age groups, decreasing and thereby their claims on real goods and services²². This means a further cut in their real purchasing power. On the other hand, under a pay-as-you-go scheme contributions will be lowered when a readjustment seems to be inevitable and consequently the real income of the pensioners will decrease proportionately. Under both pension finance systems as a result a new equilibrium will develop at a lower level of income and consumption of the retired. Both pension finance systems then appear not to be immune against aging.

One may wonder which type of redressing is preferable, the price adjustment mechanism (led by an invisible hand) under funding or the (democratic?) decision making process in respect of tax and contribution levels when a pay-as-you-go system is at work.

Under circumstances only the (well-organized) state – up to a certain pension income level - can offer a reasonably complete guarantee against inflation, e.g. by issuing indexed bonds or from general tax revenues, although this solution is artificial and has its own disadvantages. When this gloomy world is reality, the preferential policy will be to let people work longer, often in part-time and to a lower wage rate. Pre-pension payments as an income supplement – if society can afford them - can be desirable or necessary till the (higher) statutory retirement age.

Apart from the ultimate risks – of which inflation is the most dangerous - it may be concluded that financial claims in the case of funded schemes generally can be considered as undeniably stronger than

22) In this way e.g. P. Wallace [1999] in a popularly written, but well documented book, who is rather sceptical about many future developments. Similarly, B. Bosworth and G. Burtless [1998 (2)] are rather pessimistic about the effects of expanding domestic capital formation in the face of population aging and a falling growth rate of the labour force, involving large declines in the return of capital. Labour income will rise.

On the other hand it is observed by R. Hemming [1999] that there will not be an 'asset meltdown' as aging populations switch out of stocks. 'Asset values will adjust gradually as national and global financial markets respond in a measured way to country-specific and worldwide population aging which is well understood and quite predictable.'

claims in the case of unfunded schemes, particularly if the Aaron-rule holds. Full funding of pensions therefore seems to be the more attractive and secure option in an aging society – a result that replicates the discussion of life cycle savings versus altruistic gifts (R. Disney [1996], p. 56). Thus, funding can be considered as the best way of strengthening security.

Not having children

For demographers in particular it is interesting to note that it can be argued that the present baby-boom generation has caused the old age pension problem by not having children, thus by not having invested in human capital. In order for a pay-as-you-go system to function properly and to survive, each generation had to perform two tasks. It has to pay the old-age pensions of the elderly and it has to pay for raising-up its children²³. Since they have chosen not to raise as many children as previous generations did – a moral hazard effect of the introduction of any pension system -, they should now be asked to use the expenditures saved by not raising children for financing investment in material capital goods rather than increasing their consumption. Thus, by capital deepening up to certain extent the production of a sufficiently large future national income can be secured. Moreover, those generations by paying extra contributions are not worse off than they otherwise with an unchanged population (under a pay-as-you-go system) would have been. Or, in other words, no pension for you or paying extra contributions if you default on financing the raising up and education of the young.

5. Some further observations

It is often said that the main risk of pay-as-you-go in pension financing is of a demographic character, whereas the major risks involved in funding are inflationary tendencies. This, however, is not the whole story. The pension burden can be far from heavy or even unbearably light in a prospering economy even when there are adverse demographic developments. On the other hand, there may be recessive economic developments with a young population. Similarly, the economy may prosper in an inflationary environment, which enables companies and contribution payers to pay for additional pension contributions, compensating the less than expected capital returns. Otherwise, as experience in the last decades demonstrated conclusively, rather high capital returns may be accompanied by a recessive economy.

23) H.-W. Sinn [1998]. Note however that under a funded pension system a sufficiently large well-equipped future labour force is of equal relevance. Generations which renounce their duties to raising-up children will be confronted with low pension asset prices when old.

The public versus private issue

Generally funded schemes are identified as being private and pay-as-you-go schemes as public. A preference for funding as an adequate instrument to cope with the aging problem can easily be transformed into a more general preference for private pensions and being part of a wider argument for privatization and less interference of politics and government with pension providers in a commercial market. L.H. Thompson [1995, p. 67]: '... people with less taste for redistribution will be more likely to favour private-sector approaches, and those who favour private-sector approaches may do so, precisely because they prefer less distribution.'

Expanding supplementary pension plans and personal pension schemes is strongly advocated by e.g. the World Bank [1994]. Note that public schemes are not necessarily restrained to pay-as-you-go. Hence, the public versus private issue should not be confused with the debate pay-as-you-go versus funding. The objective to increase national saving by a higher degree of funding in pension finance can be achieved with either publicly or privately managed pension funds.

Globalisation of the economy is another argument in favour of further privatization of pension schemes and more flexibility. For pensions to become more flexible and portable, they should first be converted from a pay-as-you-go based to a funded scheme and secondly from the defined benefit form to the defined contribution form.

Shift from pay-as-you-go to funding

Though it can not be shown unambiguously that funding favours national saving and economic growth, the momentum for a (partial) shift from pay-as-you-go to funding and more emphasis on capital reserve remains. Proposals for funding often primarily intend to reduce the size of intergenerational redistribution. The debate pay-as-you-go versus funding should (also) not be confused with the issue of solidarity or intra- and intergenerational redistribution.

A (partial) shift from pay-as-you-go to funding of the national basic pension plans is not without problems as there are major transitional losses involved. The generations living during the transitional period have to pay – in terms of reduced consumption - for the pensions of the preceding generations (under pay-as-you-go), while paying – in terms of savings or reduced consumption - for their own pensions under funding²⁴. A conversion from pay-as-you-go to funding therefore cannot be realized in

24) The present working population and the future leading edge working population presumably as well have chosen not to raise as many children as previous generations did. They can be asked therefore, it is argued, to use the expenditures saved by not raising children for financing the transitional costs of the shift from pay-as-you-go to funding rather than increasing their consumption. They are not worse off than they otherwise with an unchanged development of the population (under a pay-as-you-go system) would have been. After the transition future generations under funding pay pension contributions that, *ceteris paribus*, mainly depend on the real rate of return on capital and not on the number of children they have. Though less future labour supply will increase the wage rate and lower capital returns.

a Pareto-optimal way without extra costs involved for at least one generation. Thus, once a pay-as-you-go system has been introduced, it is often argued, practically speaking all generations are captured or 'locked-in', even when the funding system would generate the necessary savings for sustained economic growth.

But the transition burden should not be dramatized. In the case of Germany it is shown by A. Börsch-Supan [1997] that the transition burden is about 4 percent of average household income, relatively moderate and far from a 'double burden'. In the second place workers in turn obtain property rights of capital goods – yielding investment revenues - for reduced consumption. Furthermore, the working of the labour market can be improved as distortions in the labour supply are removed. As a result labour supply increases, which in turn reduces the wage level and heightens the return on the domestic capital stock. This makes possible a Pareto-efficient transition to a funded system²⁵. A large potential for Pareto-improvement can also be achieved when pension institutions invest in higher yielding assets than government debt, whereas the legislated pay-as-you-go based pension promises are transformed in public debt that earn the market rate of return²⁶.

Hence, we may find ourselves in a Pareto-efficient world, which can still be worse than many other possible worlds. We may wish therefore to go beyond that Pareto-efficient world, considering states of the world that originate from economic and pension policies of a different kind generating more gains for all future generations and a loss for one current generation.

In the (most fully) funded strategy all pension payments and the further accumulation of pension capital are financed from the returns on capital, opposed to a full pay-as-you-go based system in which all pension payments are financed by the current working population.

It can be necessary to resist political majorities that insist on maintaining pay-as-you-go based systems as funding is preferential in the long term. It is likely that there will be some need for curtailing of the pension provisions in the future and maybe even of those nearing retirement today.

Investing domestically or abroad

Finally we turn to the possibilities of using assets abroad – particularly publicly owned foreign currency and foreign currency owned by pension funds, insurance companies and individual citizens - to alleviate the burden of the retirement income system. In principle, a society can be a net lender on the

See for the transition from pay-as-you-go to funding e.g. various contributions in H. Siebert [1998] and R. Disney [2000].

25) See e.g. D.P. Broer and E.W.M.T. Westerhout [1996]. Note, however, that no Pareto-improving transition is possible if individual pension benefits are proportional to individual contributions, which happens to be the case in e.g. Germany, but not in the Netherlands (cf. R. Fenge [1995]).

26) Cf. S. Valdés-Prieto [1997].

international capital markets during the working period of the baby boom cohorts and liquidate its foreign investments during those cohorts' retirement years. Or, in present circumstances a society can run a current account surplus now and a current account deficit during its aging period²⁷. Total income available in future years will be increased. Consumption of imported goods can then be augmented if we had invested abroad, and consumption of domestically produced goods can be increased when the rate of domestic investments was raised.

A policy of higher savings and investment as observed can be helpful in offsetting some of the future burden of population aging. The extra savings can be invested in the public or private sector²⁸, domestically or abroad. The distributional consequences of the two latter alternatives differ. Investing in the domestic sector drives down rates of return on capital due to a higher capital intensity. On the other hand wage rates will rise as a result of higher labour productivity. Furthermore, labour supply may be too small to absorb the larger capital stock. If all or most of the extra savings flow abroad, the domestic rate of return on capital will not decline as much, but the domestic labour force will not receive then the productivity gains that they otherwise would have had. Instead, foreign workers will enjoy higher wages as a result of a capital deepening of their economies.

Furthermore, funding opens a global dimension of diversifying risks by the globalization of capital markets, which is unavailable in a pay-as-you-go system²⁹.

27) Increased investment abroad may alleviate the aging problem in the 'western' developed countries. Note however that virtually all the major (and smaller) developed countries will have the same problem in nearly the same time period ahead. The aging 'western' world as a whole has only a rather small foreign sector. Or, in other words, not all societies can play the same game at the same time. Japan, for instance, has during the last few decades invested its current account surpluses abroad, to a large extent however in countries which also face an aging problem. Realising overseas assets Japan - on a macro-level - may probably solve at least in part its aging problem but at the expense of making the problem of those other countries worse. Remember the world as 'one global village'.

28) Opposed to often-heard arguments it is of less relevance for the performance of the economy whether the (public) pension capital is invested in public or private (corporate) assets. If a public pension fund invests in government bonds, then from the point of view of the consolidated collective sector (government and social security institutions together) funding and pay-as-you-go are similar, so the argument goes, as future interest payments to the fund have to be financed from general tax revenues. Note however that, if the pension fund purchased government debt, a larger proportion of households' savings can be used to finance investments in the private sector. And otherwise, if the pension funds' savings were instead invested in private debt and equities, a larger part of households' savings can be used to meet public demand for capital. Or, in other words, in both cases higher savings associated with pension funding will lead to a higher demand for corporate debt and public debt, which in turn induces at least in part increased investment and a larger supply of real assets. Note also that the total of savings of all national sectors minus total investments in all sectors equals the surplus(+)/deficit(-) on the current account of the balance of payments.

29) Increased international portfolio diversification can have two opposite effects, first it allegedly increases the potential for risk reduction. Secondly, growing integration of worldwide financial markets induces higher correlations of capital returns across different geographical areas and thereby reduces the potential for risk reduction. R. Cragg [1998] tries to answer the question where people from the developed world could invest. Not surprisingly he recommends that investors should switch their funds from OECD to non-OECD countries, as the latter countries experience an increase or only a minimal decline in the size of the workforce in the first half of the 21st century. Opposed to what the cover of the book wants us to believe (detailed) survival guidelines are not given however.

6. Concluding remarks

Seven summarizing and concluding remarks are made.

* Countries with public pension plans owe an implicit debt to retirees and workers who have accumulated large old-age social security entitlements. The present value of this implicit or hidden debt depends on many factors as the size of the covered population (workers and retirees), their age distribution, the expected life span, the retirement age, the average level of benefits and the discount rate used to calculate present values. As a consequence present value estimates widely differ. As a rule they do not tell us anything about the future sustainability in any country of current pension plans. They give useful information about necessary adjustments ahead nonetheless.

* A fundamental question remains how developed countries will cope with their greying future. About 15 percent of their citizens are now aged 65 and over. By 2030 the proportion of people over 65 years of age will have increased to 23 to 25 percent, most of them women. Germany, Italy, Switzerland and with some delay The Netherlands are the most aging countries; only in Ireland the elderly will make up some 17 percent of the population in 2030. Similar information is obtained from projections of the dependency ratio, generally defined as the population aged 65 and older as a proportion of those aged 20 to 64.

* Whatever transfer mechanism is used, an increasing proportion of national product in the coming decades will be needed to provide for the basic public pensions and supplementary pensions to the elderly, but above all for increased health care³⁰. The higher the national product and economic growth are, the easier it will be to ensure that making one group better off does not imply another group worse off; a larger economic pie will provide everyone with a bigger slice. This is crucial to solve the distributional problems in respect of aging adequately. Note also that the economies of many countries now operating far below full employment, can alleviate significantly any transfer problem in respect of aging by increasing the labour force participation, thereby increasing national productive capacity.

* As observed, an uninterrupted process of economic growth is the best guarantee that the income distributional problem among the different (age) groups of population will be solved comfortably. The major challenge for the economic performance of the western countries will not be a shortage of savings and corresponding investments due to the aging of their populations. Most western countries have unprecedented large capital stocks. A slower rate of capital accumulation is not the real issue, rather a

30) Fiscal implications arise in all those countries where health care is predominantly publicly financed. Note that the financing of health care can to a large extent be viewed as similar to pension financing as the major part of health services are consumed during old age.

serious shortage of skilled labour may arise³¹.

If unfortunately at any future point of time in the 21st century a serious controversy arises between generations - the aging time bomb actually explodes - a persistent inflationary process will effectively contribute to its solution by reducing the (real) share of national resources being transferred to the retired population.

* The aging process nonetheless may impose an increasing strain on public finance at a time of reduced growth or actual decline in the labour force, leading to substantial budgetary deficits. Combined with the adverse effects of a declining (and aging working) population on productivity growth, public finance may be further under pressure. Note however that empirical evidence is not conclusive about these allegedly adverse effects.

It seems likely therefore that future problems, if any, will not arise from the size of national product, but from the vulnerability of the distributional mechanism that is heavily relying on the public budget in most western countries. Capital income arising from the (private property of the) capital stock provides a better safeguard against the political and economic vicissitudes than promises made under pay-as-you-go systems³². The same holds for (more) income from labour activities of the elderly. As a result the problems posed on public finance will considerably be alleviated.

* It can not be shown unambiguously that funding always makes a real economic difference; certainly it makes a psychological difference. By funding generations anticipate future demographic and economic developments and their anticipatory behaviour (probably) is not primarily dependent on present macroeconomic relationships, on whether the Aaron-rule holds and so forth. In almost all worlds funding therefore can be considered as the best instrument to secure pension entitlements and for solving and controlling the distributional problem in respect of pension incomes in an aging society. The claim of the elderly on future national product is best guaranteed under funding, arising from the ownership of part of the capital stock.

* The basic issue in pension programming, irrespective whether they are funded or pay-as-you-go financed, is the availability of real resources that finance the consumption of goods and services of

31) D. Blake [1996] is extremely pessimistic on this matter. He notices a 'significant minority problem' as he expects that the absorption and integration of minority cultures into that of the host population will not work. As a result standards in education and standards of civil behaviour will fall. '... Thus, if Europe's next generation is not able to achieve stable and productive long-term employment in a stable social and political environment, the future looks grim for both it and the current generation as it enters retirement. However, relative to the rest of the world, Europe's economic prospects are the worst that they have ever been in the continent's history. We could be seeing the beginning the end of European Economic Man, and, if that is the case, the author does not give much for the value of his pension in the future either!'

32) Note that pension capital (naturally) will generate pension income as though a 100 percent premium is

people in their old age. There is a pension problem when there is a short-fall in those real resources and conversely.

After years of controversy and debate over 'funding versus pay-as-you-go' at a theoretical and practical level, the question can be asked what remains of the debate. Without doubt the debate has lost much of its heat as the characteristics of both systems, the merits and demerits, the similarities and dissimilarities are made more clear now and are better understood. An inquiry into the basic issues of both pension finance systems has been carried out in the present paper and may have answered the final questions.

LITERATURE

- Aaron, H.J., **Economic effects of social security**, The Brookings Institution, Washington, D.C., 1982.
- Artus, P., The financing of retirement schemes, savings and growth, **International Social Security Review**, **47**, 1994(2), pp 3-16
- Barr, N., **The economics of the welfare state**, Weidenfeld & Nicolson, London, 1987; 3rd edition, Stanford University Press, Stanford, 1998.
- Barr, N., Economic theory and the welfare state: a survey and interpretation, **Journal of Economic Literature**, **30**, 1992, pp 741-803.
- Blake, D., On the long-term risks facing pension schemes and pension funds in Europe, **Journal of Pensions Management**, **1**, 1996, pp 225-244.
- Börsch-Supan, A., The impact of population aging on savings, investment and growth, in OECD [1996].
- Börsch-Supan, A., **Germany: a social security system on the verge of collapse**, Arbeitspapier 97/023, Universität Mannheim, Mannheim, 1997.
- Booth, P., The problems with PAYGO pensions, **Journal of Pensions Management**, **4**, 1999, pp 229-242.
- Bosworth, B. and G. Burtless, **Ageing societies, the global dimension**, Brookings Institution Press, Washington D.C., 1998¹.
- Bosworth, B. and G. Burtless, Social security and capital formation, in: **Redesigning social security**, Mohr Siebeck, Tübingen, 1998².
- Broer, D.P. and E.W.M.T. Westerhout, Pension policies and lifetime uncertainty in an applied general equilibrium model, in: **Pension policies and public debt in dynamic CGE models** (D.P. Broer and J. Lassila eds.), Physica Verlag, Helsinki, 1996.
- Brown, R.L., Paygo funding stability and intergenerational equity, **SCOR-Notes**, International Prize in actuarial science: 'Solidarity', Paris, 1995.
- Cragg, R., **The demographic investor; strategies for surviving the pension crisis**, Financial Times Pitman Publishing, London, 1998.
- Cutler, D.M., Poterba, J.M., Sheiner, L.M. and L.H. Summers, An aging society: opportunity or challenge?, **Brookings Papers on Economic Activity**, **1**, 1990, pp 1-73.
- Davis, E.P., **Pension funds, retirement-income security and capital markets: an international perspective**, Clarendon Press, Oxford, 1995.
- Davis, E.P., European pensions, 'fundamental' influences and the role of Economic and Monetary Union, **Journal of Pensions Management & Marketing**, **3**, 1998^a, pp 206-237.
- Davis, E.P., Population aging and retirement income provision in the European Union, in: **Ageing Societies**, (B. Bosworth and G. Burtless eds.), Brookings Institution Press, Washington, D.C., 1998^b.
- Diamond, P.A., Insulation of pensions from political risk, in: **The economics of pensions, principles, policies, and international experience**, (S. Valdés-Prieto ed.), Cambridge University Press, 1997
- Dilnot, A., Disney, R., Johnson, P. and E. Whitehouse, **Pensions policy in the UK, an economic analysis**, Institute for fiscal studies, London, 1994.

- Disney, R., **Can we afford to grow older; a perspective on the economics of aging**, MIT Press, Cambridge, MA, 1996.
- Disney, R., Crises in public pension programmes in OECD: what are the reform options?, **The Economic Journal**, **110**, pp. 1-23, 2000.
- Engen, E.M. and W.G. Gale, Effects of social security reform on private and national saving, in: **Social security reforms; links to saving, investment and growth**, conference proceedings, (Sass, S.A. and R.K. Triest eds.), Federal reserve bank of Boston, Boston, June 1997.
- EFRP, **European Pension Funds, their impact on European capital markets and competitiveness**, London/Brussels, 1996.
- European Commission, [1996], see Franco, D. and T. Munzi.
- Fabel, O., **The economics of pensions and variable retirement schemes**, Wiley, Chicester, 1994.
- Fenge, R., Pareto-efficiency of the pay-as-you-go pension system with intergenerational fairness, **Finanzarchiv**, **52**, pp. 357-363, 1995.
- Franco, D. and T. Munzi, Public pension expenditure prospects in the Euro-pean Union: a survey of national projections, in: **European Economy**, European Commission, Brussels, 1996.
- Goslings, J.H.W., The structure of pension benefits and investment behaviour, in: **The econmics of pensions: the case of the Netherlands**, (A.L. Bovenberg ed.), OC/EB, Rotterdam, 1994, pp. 25-40.
- Group of Ten, **The macroeconomic and financial implications of ageing populations**, Bank for International Settlements, Basle, 1998.
- Hemming, R., Should public pensions be funded?, **International Social Security Review**, **52**, 1999(1), pp 3-30.
- Jackson, W.A., **The political economy of population aging**, Edward Elgar, Cheltenham, 1998.
- Johnson, P., Conrad, C. and D. Thomson (eds.), **Workers versus pensioners: intergenerational justice in an ageing world**, Manchester University Press, 1989.
- Kuné, J.B., **Can we grow older comfortably?**, paper presented at the 55th congress of the International Institute of Public Finance, Moscow, 1999.
- Leibfritz, W., Roseveare, D., Fore, D. and E. Wurzel, Ageing populations, pension systems and government budgets - how do they affect saving, in: **Future global capital shortages; real threat or pure fiction?**, OECD, Paris, 1996.
- Lunnon, M., editorial note, **The Actuary**, August 1996.
- Masson, P.R. and R.W. Tryon, Macroeconomic effects of projected population ageing in industrial countries, **IMF Staff Papers**, **37**, 1990, pp 453-485.
- MacManus, S.A., **Young v. Old, generational combat in the 21st century**, Westview Press, 1996.
- Michalski, W., R. Miller and B. Stevens, **Future Global Capital Shortages; some key issues and policy recommendations**, report of a conference held on 3-4 April 1995 in Paris, OECD, Paris, 1995.
- Miles, D. and B. Patel, Saving and wealth accumulation in Europe, the outlook into the next century, Merrill Lynch Financial Research, 1996.

- Mortensen, J.,(ed.), **The future of pensions**, Brassey, London, 1992.
- OECD, **Maintaining prosperity in an ageing society**, Paris, 1998.
- Reynaud, E., Financing retirement pensions: pay-as-you-go and funded schemes in the European Union, **International Social Security Review**, **48**, 1995(3/4), pp. 41-58.
- Sartor, N., On the role of budgetary policy during demographic changes, **Supplement Public Finance**, **48**, 1993, pp 217-227.
- Schieber, S.J., and J.B. Shoven, The consequences of population aging on private pension fund saving and asset markets, in: **Public policies towards pensions**, (S. Schieber and J. Shoven eds.), MIT Press, Cambridge, MA, 1997.
- Siebert, H.(ed.), **Redesigning social security**, Mohr Siebeck, Tübingen, 1998.
- Sturm, P., **Population ageing and old-age income maintenance: basic facts and problems**, in: J. Mortensen [1992].
- Thompson, L.H., Altering the public/private mix of retirement incomes, in: S.M. Wachter (ed.), **Social Security and Private Pensions**, Lexington Books, Massachusetts, 1988.
- Thompson, L.H., The advantages and disadvantages of different social welfare strategies, **International Social Security Review**, **48**, 1995(3/4), pp 59-73.
- Thompson, L.H., Principles of financing social security pensions, **International Social Security Review**, **49**, 1996(3), pp 45-63.
- Thompson, L.H., **Older and wiser: the economics of public pensions**, The Urban Institute Press, Washington, D.C., 1998.
- Valdés-Prieto, S., Financing a pension reform towards private funded pension, in: **The economics of pensions, principles, policies and international experience** (S. Valdés-Prieto ed.), Cambridge University Press, Cambridge, 1997.
- Wallace, P., **Agequake, riding the demographic rollercoaster shaking business, finance and our world**, Nicholas Brealey Publishing, London, 1999.