"CAN WE GROW OLDER COMFORTABLY ?"

Actutum fortunae solent mutari: varia vita est

(Suddenly fortune turns: life is not
secure;
Plautus, *Truculentus*, 2.1.9)

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Abstract

Population aging was unknown before the middle of the 20th century. Nowadays developed countries are in unprecedented transition to a new era with aging populations. Aging will result in a smaller proportion of the population being employed in the decades after 2010/2020. Another primary issue which may harm industrialized economies is whether aging and particularly pay-as-you-go based pension systems will depress saving and investment.

Changing demography, fewer workers and more retirees, gives rise to much concern on the fiscal sustainability of public pension schemes, health care systems and other social services[1]. As a result pension reform is in discussion in all developed countries. The main features of the debate of the relationships between population aging, labour supply and saving behaviour are summarized.

Technological development, economic globalization and institutional changes are long-term processes occurring over the same time period as population aging. Under the plausible assumption that 2 percent yearly growth in per worker production can be realized in the coming two decades and 1 percent in the years after 2020, it can be demonstrated that per capita consumption of the working population increases from 1995 to 2020 by 80,6 percent and that of the 65^{+}-population by 125 percent. Only with a zero growth rate of labour productivity average welfare will decrease by about 8 percent, whereas a minor 0.4 percent productivity growth with unchanged labour participation rate suffices to maintain welfare at its present level.

1) The concern about aging is briefly summarized by Donald J. Johnston, secretary-general of the OECD, '... the aging of our societies over coming decades present OECD-countries with

Increased life expectancy and lower birth rates are in the coming decades significantly shifting the age distribution of population in developed countries towards older persons and in the second half of the 21st century in developing countries as well.
As a result scope and structure of pension systems are in discussion throughout the world. Apart from lowering benefit levels and increasing contribution rates the issue of funding versus pay-as-you-go is often raised to address the future problems of financing public pensions. After some introductory observations in paragraph 1, in paragraph 2 of the present paper the debate on the impact of an aging population on the economy is summarized. Paragraph 3 presents economic scenarios for the coming decades. It is argued in paragraph 4 that under realistic and plausible assumptions The Netherlands can indeed grow old rather comfortably. Though population aging is far from a problem on a macro-level, nonetheless severe budgetary difficulties can arise and thereby a new paradox (paragraph 5). Paragraph 6 draws some concluding remarks.

1. Some introductory observations

The *economic costs* of supporting the retired population can best be measured as that part of national product that is used for supplying the goods and services the retired consume. That part of national product can therefore no longer be used for other purposes, such as producing consumer goods for the active population and producing investment goods.
These economic costs are financed by some combination of transfers from labour earnings of the active population (pension contributions), general tax payments and investment revenues (earnings on assets owned by individual retirees or by pension funds). Different approaches to pension financing involve different allocations of pension costs between contributions out of labour income and capital returns. The total costs of a pension to the economy are always the same, though they may be distributed differently.

Policies to promote economic growth are the best strategy to cope with the rising costs of an aging population. Assuming the standard of living of the retired population does not stay behind with those of the working-age population, the economic costs of supporting the retired will increase proportionally. We believe however that the burden of an aging society can be

a complex and formidable set of interelated challenges', preface of OECD [1998].

easier borne when national product is larger and, otherwise, the burden can be felt as more problematic when national product is smaller[2].

More emphasis on funding is generally recommended to cope with the adverse consequences of population aging in the next century in the western world[3]. From a welfare point of view the crucial question arises 'does funding matter?' 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 retirees.

When certain conditions are fulfilled, the question whether funding matters and could be part of the solution to the problems caused by e.g. adverse demograhic developments (and deteriorating ecological conditions) can be answered affirmatively.
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 savings and investments now – the economic costs 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 also 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 (individual) people as more security can be obtained

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2) Higher levels of future national product evidently will not 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.

3) Apart from the national economic aspects of aging and pension schemes one of the most prominent features of the current debate is the controversy in respect of pension financing, viz. pay-as-you-go versus funding.

compared to 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.

2. The impact of an aging population on the economy

The aging of the population, the costs of supporting the elderly and the way pension plans are financed have an important impact on the performance of the economy as they influence saving behaviour, labour force behaviour, technological progress and productivity.

Aging and saving

The study of the relationship between aging, pension finance and saving behaviour has produced a considerable volume of (empirical) publications. The primary issue has been whether pay-as-you-go based pension systems reduce aggregate national savings and/or whether greater reliance on funded pension plans would increase national savings. The second question is whether population aging affects other components of saving (BOX 1).

BOX 1

How pensions affect personal and total savings[1]

In most developed countries national basic pension plans (first pillar) are predominantly financed on an 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 savings 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[2]. Most likely, public schemes have to a considerable degree replaced 'within family transfer systems'. See e.g. Th. Butare [1994].

There has been much theoretical and empirical research as to whether supplementary funded pension schemes (second pillar) do effect savings and capital investment[3]. 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[4]. See e.g. IBRD [1994]. Empirical studies for several OECD-countries do not show an unambiguous relationship between the growth in pension assets and the *total* national savings 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 only. 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 pension 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.
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) An elaborate survey of aging, pensions and saving is from R. Kohl and P. O'Brien [1997]. To people from The Netherlands G.E. Hebbink [1996] can be recommended.

2) R.J.M. Alessie, A. Kapteyn and F. Klijn [1997] using micro (panel) data of the years 1986 through 1990 for The Netherlands find evidence supporting the hypothesis of full displacement of household's savings by basic pensions (AOW) wealth.

3) 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 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 equiped to face its population aging.

4) R.J.M. Alessie, A. Kapteyn and F. Klijn [1997] for The Netherlands find evidence supporting the hypothesis of no displacement of free household's savings by supplementary pensions wealth.

Aging and labour supply

Aging of the population tends to reduce labour supply as labour force participation among the elderly is lower than among the youngsters. One cause of lower participation is the income effect of more generous public pension plans and a broader coverage of supplementary private plans. Other factors that are important are an increased willingness to retire on grounds of (bad) health, worsening labour market opportunities for the less skilled elderly and, above all, a higher valuation of leisure time.

The rapid shift to earlier retirement in many countries has slowed down in the 1990's; there is even a minor reversal, like in The Netherlands.
Programs to encourage early retirement through disability benefits, more lenient unemployment insurance schemes and several early retirement schemes are gradually cut back. Though the trend to earlier retirement has come to a halt nowadays, the continued population aging by itself will lead to a lower future participation rate of the total working population.

BOX 2

How pensions affect labour supply

From a theoretical point of view a pension system affects work effort differently to the extent that people perceive social insurance contributions to an unfunded scheme differently from their own savings to a funded scheme. In the first situation with a set of unrelated taxes and income transfers the effect on work effort depends on which of two influences, viz. the substitution effect and the income effect, is the stronger. There may also be an incentive to seek employment in the informal economy where contribution

payments can easily be evaded. When people view a pension program as a program of their own pension savings, where future pension payments are closely linked to past contributions, the impact on labour supply, if any, will be substantially less. Nor is there any incentive to seek employment where contribution payments can be evaded.
The impact of the payment of pension benefits - irrespective of how people view its contribution payments – less ambiguously will be a reduction of the work effort of those of retirement age.

Empirical studies examining the impact of income and employment taxes on the labour supply of the working-age population reveal that the impact on the work effort of these taxes for certain small groups of workers can be about 5 percent in response to a 10 percent reduction in net earnings.
Studies examining the factors determining the retirement decision reveal that i.a. the following determinants are of relevance in the individual labour force decision, 1) age, 2) availability and level of an old-age pension, 3) other sources of income, 4) health status, 5) worsening job opportunities and 5) partner's preferences[1] .
Older workers generally receive higher wages not because of enhanced productivity but because of seniority systems. Changing age structures undermine these systems and make them unsustainable, necessarily leading to a lower wage level for the older workers, termed demotion. Furthermore, per (older) worker reduced productivity will affect relative earnings again. This will offset the declining job opportunities many (less skilled) older workers are faced with.

A fundamental question is the impact of a changing age composition of the workforce on the overall productivity of the economy. The allegedly adverse effects of an aging workforce on productivity and output can not be supported unambiguously by empirical evidence.

1) See for The Netherlands e.g. C.J.I.M. Henkens [1998], M. Lindeboom [1998] and A.O.H. Heyma [1999]. In OECD Economics Department Working Papers series several microeconometric analyses of the retirement decision are published, viz. no. 202 all OECD-countries, no. 203 the US, no. 204 Germany, no. 205 Italy, no. 206 the UK and no. 207 The Netherlands. They can be downloaded free (as PDF-file).

General equilibrium models

One of the most admirable attempts at a general equilibrium approach is the model of Auerbach and Kotlikoff [1987]. In a study of Auerbach et al. [1989] an adapted model is used to examine the impact of population aging in four OECD-countries, the United States, Japan, Germany and Sweden. In this model rational consumers live for 75 years, which creates 75 overlapping generations of identical consumers. The model also has a competitive production sector and a government sector. Individuals supply labour under given assumptions about the age-productivity profile and the effects of technical change. They supply capital through an efficient capital market. The social security budget is balanced at all time. A general

equilibrium coordinates the three sectors of the economy, ensuring market clearing in all periods. The simulations showed (over the period 1990-2030) a fall in the national saving ratios by 4 percentage points in the US and about 18 percentage points in Japan. Social security taxes (pay-as-yo-based pension contributions) will in the same period increase by 8 percent of GDP in Germany and about 4½ percent in the US.

Analyses of saving data in the US demonstrate that the elderly hardly save less than younger age groups (Aaron et al. [1989]). Rather, it turns out that an older population holds a larger capital stock (even when the saving rate decreases), thereby causing capital deepening (more capital per worker) and increasing the marginal productivity and real wage level of the working population, which creates favourable conditions for solving the distributional problem of retirees and younger age cohorts.

General equilibrium approaches take account of market adjustments which tend to mitigate the effects of population aging. For unchanged pension levels an aging population for instance necessitates higher contribution rates in the general equilibrium model, but generally not as high as contribution rates predicted from simple partial projections.

BOX 3

Population aging and economic performance

The first detailed analyses of the economic effects of an aging population have been carried out about one decade ago by e.g. Auerbach et al. [1989], Masson and Tryon [1990], Masson [1991], Fair and Dominguez [1991][1]. They examined the macroeconomic effects of population aging in a number of developed countries using general equilibrium models, the middle two employing the IMF's multi-regional econometric model. Demographic variables are determined exogenously and the aim is to explore the effect of aging on i.a. saving and consumption propensities, goverment expenditures and tax revenues, social security expenditures and health care provision, labour supply and real wage rate, capital supply and real interest rate, exchange rates, the current account of the balance of payments and international capital flows.

The simulation results indicate that aging could have a significant negative effect on the national saving rate, leading to lower capital formation, productivity and employment. These results however are as plausible as are the underlying assumptions, and one of the key assumptions in these models is that savings rates decline with age. The theoretical justification for this assumption derives from the life-cycle model, where assets are accumulated over the working years and used during retirement. The empirical foundations however are weak or contradictory: the elderly save as high a proportion of their income as the younger age groups or even more.

The aging of the labour force population probably will not have much effect on its flexibility in respect of e.g. mobility, ability to adapt to new techniques and inovative capacities, and thereby on the overall performance of the economy [P. Johnson & K.F. Zimmermann, 1993; R. Disney, 1996].
Another assumption of utmost and predominant relevance is the effect of aging on the rate of technological progress. Technical progress could decrease due to a lesser dynamism of an aging population. On the other hand innovation can increase as labour becomes more scarce [D. Cutler et al., 1990]. The last author concludes that population aging will not bring about major problems for productivity.
Simulations using general equilibrium models are pioneering attempts to examine the economic impact of aging in developed economies, demonstrating the complexity of the relationships between population age stucture and economic performance. Assumptions about e.g. saving behaviour, technology, global developments are crucial. Small changes and differences in initial assumptions produce large differences in long term simulation results.

It is often argued that unfunded public pension schemes are increasing the depressing effects of aging on savings. In the life-cycle framework public pensions can be regarded as a form of implicit wealth accumulation, whereby the need for old-age savings is reduced. Feldstein [1974, 1995] has produced a lot of evidence. His findings have been disputed. Other studies indicate that the effects, even if negative, may be small[2].

1) During the nineties several other interesting studies appeared, e.g. Bikker [1996], Börsch-Supan [1996], Chand and Jaeger [1996], Roseveare et al. [1996], Leibfritz et al. [1996], OECD [1996, 1998], Chauveau and Loufir [1997] and Miles [1999].

2) It appears, as observed by Aaron [1982, p. 28], that '… a person determined to find a respected theoretical argument to support a preconception can find one, and that a person without preconceptions will find a bewildering diversity of answers in economic theory about whether social security is more likely to raise or to lower consumption or labour supply.
To get by this theoretical impasse, one turns with hope to the empirical research for measures of observed behavioral responses. As will become clear, most of these hopes remain unfulfilled.'

An illustration of the opposed results of a partial and a general equilibrium analysis can be found in the current social security and pension reform debate. The major concern here has been about the burden on the baby bust generation that a pay-as-you-go financed defined benefit-system imposes on it. H. Bohn [1999] convincingly demonstrates that for plausible contribution rates and elasticities of factor substitution, small cohorts are actually better off than large cohorts. This is because small cohorts enjoy favourable wage and interest rate movements even though they face relatively high contribution rates to pay for the pensions of the preceding larger cohorts under a pay-as-you-go based DB-system. Conversely, large

cohorts are worse off than small ones: their high labour supply drives down the wage rate when the cohort is young and pension asset prices go down when the cohort wants to sell these assets when old. This is clearly beneficial for the young small cohorts. Conventional partial equilibrium anaysis makes long run projections of future wage and interest rates by extrapolating past trends and ignores endogenous factor price effects, which can be seriously misleading.

It can not be shown unambiguously from theoretical analyses that population aging adversely affects economic performance, though it seems likely - mainly due to a shrinkage of the labour force – that in the first quarter (and more so in the second quarter) of the 21st century growth rates of GNP in most OECD-countries will slow down.
The effects of aging on the performance of the economy, a (possibly) gradual shift to a funded system and other reform measures will have important implications for domestic and international capital markets. First the scope and structure, the breadth and depth of worldwide financial markets. Secondly, the impact on prices and rates of return on variuos types of assets in different geographical areas as well as across time. This subject matter is nor pursued here.

It is demonstrated below in a simple scenario-analysis for The Netherlands that a rather moderate increase in labour productivity suffices to offset the negative impact of population aging on average per capita consumption or general standard of living[4]. Assuming a growth of labour productivity of 2 per year ensures significant welfare increases for both working-age groups and pensioners. This result contrasts with findings from e.g. a general equilibrium approach of Börsch-Supan [1996], investigating the impact of population aging on saving, investment and per capita consumption. Per capita consumption – the 1990-index being 100 – decreases in the coming decades to 92 à 87, depending on the rate of technical progress function (on labour force growth and its average age).

3. Scenarios for The Netherlands

The size of birth cohorts have a significant impact on labour and capital markets. What can be said about this impact in The Netherlands in the coming decades? Some tentative lines of

4) D.M. Cutler et al. [1990] also argue that a moderate rate of thechnological progress might

thinking about developments of population, labour market and capital market in the coming decades are exposed in Table 1.

Taking 1955 as the year of birth of the average baby boomer and 1985 as the year of birth of the average member of the baby bust generation, then in the *near* term – the years between 2000 and 2015 - the representative baby boomer will be between 45 and 60 years of age and the average baby buster will be aged from 15 to 30. The next generation is still unborn.
In the *medium* term, 2015-2030, the average baby boomer is of age 60-75 – his parents are no longer living in this period - and the average baby buster is of age 30-45. The next generation is then between 0 and 15 years of age. In the *long* term – the period 2030-2050 – the average baby boomer will be older than 75 and the average baby buster is between 45 and 65. The next generation ages from 15 to 30.

Aging and factor markets

The groups over 60 years of age are characterized by labour force exit and pension assets divestiture. They sell these assets to members of the next generations who are between 30 and 60 years of age, who are then in the labour force and who are accumulating pension capital for themselves. Pensioners start selling assets after 2010/2015 and increasingly in the following decades.

There is a close relationship between cohort size and *labour market* conditions. In the *near* term and medium term the labour market is becoming gradually more tight as young cohorts entering the labour market are less numerous. In the *medium* term the baby boom generations are leaving the labour market. As a result labour is becoming more scarce, capital intensity increases due to a maintained high level of investment; labour productivity and wage rates will rise.
Following CPB [1996] we assume that the participation rate of the working age population will rise from 0.64 in 1995 to 0.74 (scenario 'European Coordination') or 0.77 (scenario 'Global Competition') in 2020. Hence, the work force will in the *medium* term increase at a yearly rate of about 0.7 percent. In the *long* term with unchanged participation rate and negative population growth the work force will decline (about -0,3 percent yearly).

Higher wages can have two contradictory effects, first (in a world of global competition) inducing capital substitution and hence, further productivity and employment growth.

be sufficient to offset a decline in the living standard due to aging.

Secondly, higher wages can harm competitiveness, impede productivity growth, leading to diminishing investment and increasing unemployment, particularly of low-qualified labour.
The same argument applies to a relatively low wage rate: either inducing labour substitution and lower productivity growth or contributing to a strong competitive position.

Of equal importance is the behaviour of *capital markets* in reaction to demographic developments. In the *near* future there will be a continuing demand for assets from the baby boom generation. Asset prices will remain rather high. Savings and investments continue to grow; a less increasing labour supply will give rise to a higher capital intensity and a lower rate of return to capital, but also to inflationary forces, which work in the opposite direction.
In the *medium* term the capital market is relaxing, as the baby boom generation is seller of assets to the less numerous baby bust generation. As a result asset prices will be lower and also the real interest rate
persists at a rather low level. Savings and investments stabilize at a equal or slightly lower level, leading to a further capital deepening.
In the *long* run the baby boomers and the leading edge baby busters are selling assets to the baby bust generation. Asset prices will remain rather low. Decreased savings and investments match with the decline in the rate of investments required to achieve a constant capital–output ratio. Hence, the rates of return to labour and capital stabilize. In the next paragraph the assumption is made that a 2 percent yearly growth rate in per worker production can be realized in the coming two decades - in the years after 2020 1 per cent growth is assumed -, though a higher rate of capital accumulation combined with (mild) labour scarcity may induce a more rapid rate of technological innovation. These assumptions are crucial for the prospects of the Dutch economy in the coming decades (the medium and long term).

Table 1. Prospects for The Netherlands in respect of population, labour market and capital market; near term, medium term and long term.

N e a r t e r m (2 0 0 0 - 2 0 1 5)

POPULATION:

'last' generation:	70^{+}, sellers assets
baby-boom generation:	45-60y, buyers assets
baby-bust generation:	15-30y, leading edge entry labour market
'next' generation:	unborn

LABOUR MARKET: gradual tightening; increasing participation rate, higher level of wages, particularly in respect of young labour supply

CAPITAL MARKET: structural large demand for assets; rather high asset prices; increased saving and investment level.

M e d i u m t e r m (2 0 1 5 - 2 0 3 0)

POPULATION:

'last' generation:	dead
baby-boom generation:	60-75y, exit labour market, sellers assets
baby-bust generation:	30-45y, buyers assets
'next' generation:	0-15y

LABOUR MARKET: tight, bottlenecks; high participation rate, rather high level of wages

CAPITAL MARKET: relaxing, baby-boom generation seller of assets to the less numerous baby-bust generation; lower interest rate, lower asset prices; constant or slightly decreased saving and investment level

L o n g t e r m (2 0 3 0 - 2 0 5 0)

POPULATION:

baby-boom generation:	75^{+}, sellers assets
baby-bust generation:	45-65y, buyers assets
'next' generation:	15-35y, entry labour market
LABOUR MARKET:	normalized; high participation rate
CAPITAL MARKET:	relaxing, baby-boom generation seller of assets to the less numerous baby-bust generation; structural low interest rate and low asset prices; constant or slightly decreasing savings and investments.

Adverse developments can arise nonetheless. Participation rates hardly increase (CPB's scenario 'Divided Europe') and higher wages (due to labour scarcity) will harm the competitiveness of the Dutch economy. This will impede product and process innovation and investments, leading to falling productivity. Production is increasingly relocated abroad[5]. A downward spiral develops with lower consumption, saving, investment and employment. The old-age income system can no longer be sustained.

To the extent that the increase of wages, however, can be compensated by productivity growth (with undiminished investment and corresponding high capital deepening), such negative distortionary effects will be absent. This is assumed here to be the case. The Dutch competitive position then does not suffer from a higher (nominal) wage level. Domestic consumption, saving and investment are growing steadily. Moreover, an expanding world economy will prevent interest rates to decline. The living standard of the elderly in this favourable scenario stabilizes at a high level.

A larger labour supply due to higher participation will lead to lower wage increases and hence less incentives to substitute capital for labour and less productivity growth. On the other hand lower wage increases may stimulate product and production process innovation, leading to higher investment and productivity growth. The net effect is ambiguous. We assume that a larger labour supply does not affect per worker productivity.

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5) The economic performance of many modern economies are heavily conditioned by the (degree of) openness of the economy and the world globalization. This makes these economies interdependent and also vulnerable. As a result independent and autonomous decision-making in respect of monetary and fiscal policy (in the first place), but e.g. also in respect of labour market, social and pension policy are severely constrained.

4. Will we grow older comfortably?

It is useful to have an idea of the economic consequences of the aging population process. In Table 2 the population of The Netherlands in 1995 is taken as 100. The age distribution from row (1) is shown in row (2). Looking at the age distribution in the years 2000, 2020 and 2050 we discern the greying and the greening of the population in The Netherlands. It can be observed that the greying of the population in The Netherlands is more prominent than in any other OECD-country.

Of the total population in 1995 40.1 per cent was actually employed. The labour force participation, defined as the ratio of the currently employed population to the present population of age groups 20-64 years, at that time was 0.64, which is lower than in other European countries. There appears to be room for a further increase of the female participation in the labour force in The Netherlands. The Netherlands bureau for economic policy analysis (CPB) thus expects a considerable increase in the labour force ratio in 2020. A fraction of 0.77 of the working age population – or 0.456 of the total population - can then be employed[6].

Assume that, in 1995, the per capita consumption of persons aged 20-64 is 100, that of young ones (mostly children) 50 and that the consumption level of older people is still lagging behind somewhat at 80 (Table 2). Hence, total consumption in the baseline year is 8645. Ignoring investments and a surplus or shortage on the (current account of the) balance of payments, the volume of production also amounts to 8645. That is 215.9 per worker.

Productivity growth and welfare

Growth in labour productivity in European countries in the seventies and eighties – a period with rather low productivity growth - amounted to 2 percent per year approximately (Englander, A.S. and A. Gurney [1994]). It seems to be reasonable, therefore, to take the productivity growth in these decades as a lower bound for future productivity growth. Hence, it is assumed that a 2 percent yearly growth rate in per worker production can be realized in the coming two decades (the medium term). In the face of feasible negative consequences of population aging on labour supply, labour productivity and saving/investment decisions as well as the falling of the productivity growth due to an aging working population and a higher

6) CPB [1996], CPB/CBS [1997]. Note that – in calculating the results shown in Tables 2, 3 and 4 – the heroic assumption of an unchanged average number of hours worked per worker per year has been made. It can be expected that the number of part-time workers will increase further in relative terms in the coming two decades.

part of services in national product, the presupposed 2 percent growth rate is also considered as an upper bound ceiling. Therefore, for extra safety after 2020 a yearly growth rate of 1 percent is assumed[7]. On the other hand,

Table 2. Production and welfare in The Netherlands in the years 2000, 2020 and 2050 (indexes[1)]) for different population cohorts, 0-19y, 20-64y and 65^{+} years of age, assuming 2 percent yearly production growth till 2020 and 1 percent afterwards and a labour force participation rate of 0.77 in 2020 opposed to 0.64 in 1995.

age	population	working-population	C/population	Y/working-population	C(=Y)
(1)	(2)	(3)	(4)	(5)	(6)
1995					
0-19	24.5	-	50	-	1226
20-64	62.6	40.1	100	215.9	6258
65+	12.9	-	80	-	1161

7) Decomposing the growth of output per worker in factor productivity (technology) and capital-labour substitution (capital deepening) reveals us that in Europe in the last two and a half decades of output growth (viz. 2¼ à 2½ percent) a part 1¼ à 1½ percent was due to technological advance and a part of 1 percent was due to capital deepening (Bosworth [1996]). It seems reasonable, therefore, to assume a yearly growth rate of average production per worker of 2 percent (in the period 1995-2020), which can be decomposed in 1 percent in respect of technology and another 1 percent in respect of capital deepening. After 2020 – when a) capital deepening is assumed to come to an end, b) the work force is aging further and c) the shift from the industrial sector with higher productivity growth to the service sector with lower productivity growth continues – a modest 1 per cent growth rate (technology) is presupposed. This is a conservative estimate (OECD/D. Turner et al. [1998] presuppose an annual 1.4 percent).
Others foresee an unprecedented high and long-term economic growth, 2½ à 3½ percent annually in the coming decades with low inflation and only slight business cycle movements. The 'new economy' arises, mainly due to globalization and ICT-developments. Some object, pointing out (in the US) the low level of savings and investments and the large deficit on the current account of the balance of payments.
Taking into account the size of the labour force the annual growth rate of GNP in the medium term in the Netherlands is about 2½ percent and is in the long term diminishing to a slight ¾ percent.

total	100,0	40.1	ave. 86.5	total 8645	8645

2020 (*medium term*)

0-19	23.2	-	90.3	-	2097
20-64	64.5	49.7	180.6	354.1	11650
65+	21.3	-	180.6	-	3845
total	109.0	49.7	ave. 161.4	total 17592	17592

2050 (*long term*)

0-19	21.9	-	113.0	-	2479
20-64	58.7	45.2	226.0	477.3	13267
65+	25.8	-	226.0	-	5831
total	106.5	45.2	ave. 202.7	total 2157721577	

1) C is consumption and Y is a part of gross national product

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ongoing research in so-called endogenous growth models suggests that the aging of the working population may induce incentives to invest in human capital which, in turn, would increase economic growth in the long run. Though the combination of 2 percent and 1 percent productivity growth is far from excessive, appropriate policy measures should be taken in respect of labour supply, investment in human capital and technology to ensure that it will be realized. Of crucial importance is whether economic and fiscal policy measures to further increase the female labour force participation, that of people over 55 years of age and of allochthones, and particularly to reduce the persistently high disability rates are succesful.

Under these assumptions total production for consumption purposes – apart from investments and a surplus or shortage on the balance of payments – in 2020 amounts to 17592, which makes possible an average per capita consumption of 180.6 for all people over 20 years of age (Table 2). Note that in 2020 equal consumption opportunities exist for the active population and the elderly. The end of the struggle for emancipation.
Consumption of the active population increases in the period 1995 to 2020 by 80.6 percent and that of the 65^{+}-population by 125 percent (from index 80 to index 180.6).

In an unchanged population (no aging from 1995 onwards) per capita consumption would be 195 for all people over 20 years of age instead of 180.6. The difference between the indexes 195 and 180.6 can be considered as the consumption sacrifice or the volume of consumptional expenditures forgone by the younger population groups in favour of the elderly.
Between 2020 and 2050 per capita consumption according to conservative assumptions increase with a slight ¾ percent annually.

Alternative presentations

Table 3 below shows the consumption level of the adult population in 2020 (1995 being 100) with different labour force participation rates and different growth rates of production per worker. Only with an unchanged labour force participation rate (of 0.64) as in the baseline year and a

Table 3. Consumption level of the 20^{+}- population in 2020 under different growth rates of production per worker and different labour force participation rates (1995 = 100).

	growth rate of production per worker (%)		
participation rate	**0**	**1**	**2**
0,64	92	117	150
0,74	107	136	174
0,77	110	141	181

zero growth rate of production per worker, the consumption level of the adult population is decreasing from 100 in 1995 to 92 in 2020, which seems serious but not dramatic. In all other scenarios, however, the standard of living can be maintained and there is still room for a further increase, ranging from a modest 107 to an impressive 181.

As announced we can also reverse the question and examine which yearly growth rate of labour productivity is necessary to offset the negative impact of population aging on living standards or average per capita consumption in 2020. The question which level of productivity growth is necessary to arrive at a 25 percent, 50 percent or 75 percent growth of average per capita consumption over the time period 1995-2020 is also answered. Evidence is presented in Table 4.

It turns out that a modest to moderate rate of technological progress is (necessary and) sufficient to offset the adverse consequences of aging on welfare and the consumption level. With unchanged labour force participation rate of the working age population a growth rate of average production per worker of 0.4 percent suffices[8]. The required productivity growth rate is small compared with the productivity growth in the past two decades, which amounted to about 2½ percent. Furthermore, a growth rate of production per worker of zero necessitates the labour force ratio to rise to 0.70 to offset any detrimental effect of population aging on welfare.

Table 4. Growth rate of production per worker (percentage) necessary to achieve zero percent, 25 percent, 50 percent or 75 percent higher level of consumption of the 20^{+}- population in 2020 under different labour force participation rates .

	desired growth of consumption level from 1995 to 2020 (%)			
participation rate	**0**	**25**	**50**	**75**
0,64	0.4	1.3	2.0	2.6
0,74	-0.2	0.7	1.4	2.0
0,77	-0.4	0.5	1.2	1.9

8) It can make a difference for workers' perception of bearing the pension burden in an aging population whether GDP growth is reached by productivity growth with a constant or even smaller labour force or by expanding the working population. In the former case higher gross wages and higher contribution rates will result than in the latter case with higher employment and slower productivity growth.

On the other hand, a yearly growth rate of labour productivity ranging between 1.5 percent and 2 percent, depending on labour force participation, give rise to considerable welfare increases in the year 2020 vis à vis the year 1995, varying between 33 percent and 81 percent.
It can be concluded that without doubt we can afford to grow older. We in The Netherlands (and elsewhere in the developed world as well) are rich enough to sustain an old-age pension for a more numerous older population.
Aging is the result of a process of continuous and increasing civilization during the last one and half century in the developed world – first ameliorated sanitory conditions (e.g. adequate water supply, sewerage, general hygiene), furthermore a broad supply of medical services - and, hence should be applauded cheerfully and gratefully. The 'problems of aging' rather are the pessimistic way of looking at a great succes of civilization.

The income and purchasing power of today's elderly are high and will be still higher tomorrow.
There is more reason to be concerned about the welfare of many younger age groups and, above all, the sustainability of an adequate health care system for the whole population as there are major bottlenecks in respect of labour supply involved. Reallocation of labour from the more productive industrial sector to the less productive sector of services will occur. Those issues are outside the scope of this paper.

5. A new paradox

As pointed out before the best guarantee that future pensions can be paid is a large volume of future national product. A decline in the labour force causes problems for any pension scheme when it induces a fall in output. The problem is solved to the extent this can be prevented.

Policies in the face of aging

Increased output per worker can arise from increases in the quantity (and quality) of capital and increases in the quality of labour. Preventing a decline in labour supply can be realized from increased labour force participation by those of working age (reducing unemployment) and importing labour (either directly by selective immigration or indirectly by exporting

capital abroad) and, most powerful, raising the age of retirement[9]. Increasing labour force participation will also diminish the amount of (means-tested) social assistance expenditures.

Adequate policy measures therefore should aim at (1) stimulating invest- ments in the human capital of the working age population, (2) encouraging investments in physical capital domestically or abroad, infrastructure and R&D programs[10]. Investments in human capital include,

- policies to raise the labour force participation by reducing official unemployment and above all, other forms of not-employment,
- particularly for The Netherlands policies to increase the female labour force particiption rate by e.g. creating child-care facilities and reducing the tax-wedge on labour income,
- policies to increase the labour force participation of the older workers by,
  a) reducing moral hazard in social security schemes (early withdrawal, disability and unemployment schemes),
  b) making pension schemes (and other social security measures) more actuarially fair on an individual level, thereby e.g. reducing early retirement and above all, decreasing the size of the informal or black economy (see for more details about pension reforms in The Netherlands the *Appendix*) and,
  c) bringing into line wage rate and productivity, leading to lower earnings for older workers and improving job opportunities,
- policies to increase productivity by further (re)training and education and stimulating R&D programs.

A higher level of savings makes possible a higher level of investments and a larger physical capital stock, leading to a larger future resource base and a larger future national product. Pension savings are a large part of total private savings in The Netherlands. To increase pension savings, apart from fiscal privileges and stimuli, more emphasis should be laid on the (funded) supplementary pension system, hence a new balance between collective and individual responsibilities[11].

9) Note that increasing welfare may (on a micro-level) stimulate people to retire earlier, frustrating the (macro) policy goal to increase the average age of retirement.

10) See also OECD [1996, 1998], Group of Ten [1998].

11) To the extent that a linkage exists between contributions paid and acquired pension rights, paying contributions will be preferred to general taxes. This linkage can be established by an actuarially fair funded system, but also by a notional system where such a linkage exists without funding.

If necessary, the government should run a fiscal surplus thereby creating a source of saving of its own.

By investing in emerging countries the elderly in the aging countries can contribute to a better performance of those economies, better international economic co-operation and reduction of (political) risks[12]. Investing in emerging markets will undoubtedly be beneficial for the western economies and particularly their pension funds, but the size of the benefit might be only modest[13].

A new paradox

It is (implicitly) argued that not the size of future national product but the mechanism of *distributing* future national product among retired and non-retired, for a large part via government budget, is the real issue and this mechanism allegedly will create increasing difficulties**.**

It has been observed e.g. by Davis [1998] that '... pay-as-you-go based pension systems pose broad problems to public finance and the wider economy, both now and in the future.' The maturation of the social security pension systems is posing increasing difficulties. Estimates of D. Roseveare et al. [1996] suggest that pension expenditures will rise by about 6 to 7 percent of GDP in the period 1990-2040 in Spain, Italy, Finland, Germany and Portugal. The UK stabilizes at 5 percent and Ireland notably shows a decline in pension costs[14]. Unchanged contribution rates clearly will lead to sizable public sector deficits.

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12) Turner, D., Giorno, C., De Serres, A., Vourc'h, A. and M. Richardson [OECD, 1998].

13) H. Blommestein [OECD, 1998].

14) It is important to note that wide differences exist in projections of (trends of) pension costs between e.g. D. Franco & T. Munzi [1996], D. Roseveare et al. [1996] and S.K. Chand & A. Jaeger [1996]. To give a few examples, in the Netherlands public pension costs as a percentage of GDP rise in the period 1995-2030 from 6.0 to 11.2 conform the study of D. Roseveare et al.; from Franco/Munzi we derive that the contribution rate in respect of the Dutch public pension plan rises only slowly from 11.0 percent in 1995 to 13.0 percent in 2030 (of contribution base). For Ireland pension expenditures (as a percentage of GDP) decline from 3.6 to 2.8 and contribution rates increase from 13.6 to 23.5 (percentage of contribution base), both in the period 1995-2030 according to the two first mentioned studies. Chand/Jaeger reveal for Italy a contribution gap of a minor 2.5 percentage points (of GDP) between the sustainable contribution rate (for the period 1995-2050) and the

There is much concern about the fiscal sustainability of the population aging process[15]. According to OECD [1998, p. 27],

> '... public finance will deteriorate severely and for a prolonged period. The size of the potential shortfall in many member countries is such that continuing major reforms to public pension systems will be required, but these might not be sufficient in themselves to ensure desired living standards for retirees without unacceptable rises in contribution rates. Other reform measures are desirable.'

And rather alarmingly (K. Hviding and M. Mérette [OECD, 1998]),

> '... there is no easy way to reduce the burden of the projected increase in the number of older people relatively to those of working age[16]. [...] The short-term costs of reform are significant. Most of the simulated policy reforms result in a sustained period of depressed per capita consumption of goods and leisure. [...] Furthermore, it takes a long time for policy reforms to have significant macroeconomic impacts. Only after about 12 to 20 years, would the income increase be sufficiently large to offset the reduction in the propensity to consume.'

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actual contribution rate in 1995; in Franco/Munzi pension expenditures stabilize from 8.2 in 1995 (via 7.6 in 2010) to 8.3 (percentage of GDP) in 20230, whereas Roseveare et al. present the (expected) increase in pension expenditures from 13.3 in 1995 to 21.4 in 2040 (percentage of GDP).

15) Expressed i.a. by D. Franco and T. Munzi [European Commission, 1996], S.K. Chand and A. Jaeger [IMF, 1996], D. Rosevaere et al. [OECD, 1996], W. Leibfritz et al. [OECD, 1996], OECD [1996, 1998], B. Bosworth and G. Burtless [1988], E.P. Davis [1998a,b].
For dealing with the budgetary problems two broad policy adjustments can be distinguished. First, one group of policy-makers calls for 'reforms' of the public old-age pension system, basically maintaining its pay-as-you-go character, including i.a. lowering benefit levels, increasing contribution payments (broadening the contribution or tax base, increasing labour force participation, higher contribution rates, etc), tightening eligibility conditions (means testing, etc) and increasing the age of eligibility for retirement (e.g. in line with increased longevity). The other group proposes changes in the financing method towards introducing more capital funding and privately managed defined contribution plans. Thus public spending on the elderly (optically) can be reduced by a switch to the private sector, thereby evading the delicate challenge of distributing the fiscal burden both efficiently and equitably. Note that the short-term costs of these reform measures can be significant and it can take a long time for them to have a relevant impact.

16) K. Hviding and M. Mérette [OECD; 1998] conclude that in seven OECD-countries (Canada, France, Italy, Japan, Sweden, UK and USA) the effect of aging results in a large increase in the wage-income tax. Italy and Japan are the highest with an increase of about 40 and 25 percentage points respectively, whereas for the other countries the rise is between 10 and 25 percentage points. The national saving rates are also severely affected by the increasing old-age dependency ratios and a substantial decline of capital return is found in all countries.

On the other hand, in an OECD Working Paper D. Turner et al. [1998, p.15] observe that,

> '... living standards will continue to rise in the main OECD regions, despite ageing. Thus, for example, living standards, expressed in terms of per capita GNP could be about 80, 90 and 100 percent higher by 2050 in the US, Japan and the EU respectively than at the turn of the century. Nonetheless, the implied rates of growth in living standards (in the 21st century) are markedly slower than in previous decades. [...] A suitable package of reform policies should go a long way to re-establishing earlier growth trends.'

With appropriate reform measures resulting per capita GNP could be 202, 227 and 264 by 2050 in the US, Japan and the EU respectively (1995=100). The only caveat that can be made is that society in 2050 is less affluent than it otherwise without aging would have been.

There appears to arise a new *paradox* that on a macro-level the affluent society can afford to grow older comfortably and that on a meso- and micro-level severe and prolonged budgetary problems arise, that allegedly will impede economic development. Evidently the mechanism to levy taxes and pension plan contributions on labour income alone is thought to produce unmanageable difficulties. Pensioners therefore preferably should create a resource base of their own.

It has been pointed out that economic and social institutions like the ownership of goods and assets, embodied in pension entitlements and other social security benefits, 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 capital[17]. 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.
Thus, in order not to be only dependent on the willingness and ability of the working population who pays the contributions to finance old-age pensions, it is preferential that the elderly create a resource base of their own. As pointed out before the ownership of (part of) the capital stock is an adequate instrument for sustaining a pension scheme and minimizing its vulnerability, thereby securing the claim the elderly have on (future) national product as safely as possible.

17) Pension capital (naturally) will generate pension income as though a 100 percent premium is levied.

Long-run trends

Population aging is a long-run process occurring over the same time period as major institutional and technological developments and growth of international trade, which will reduce the adverse effects of population aging and favour future economic development. It can be assumed (as we did in the present paper) that there exists a key trend of a further rise in labour productivity, which may far outweigh the relevance of population aging. Population aging does not operate in isolation. The gloomy short-term perspectives contradict the long-term prospect of global developments and technological change which favour the international economy[18].

Several long-run trends reduce the expected adverse effects of population aging on the economy, the most important of which is the growth of labour productivity. Another major trend is the growing flexibility and decentralization of economic activities, indicated as institutional changes. There is a development from the (postwar) Keynesian economy – characterized by mass production techniques, large national corporations, standardized products, mixed economic order and an extensive welfare state with centralized pension systems – to the capitalist post-industrial society, with IT-induced smaller-scale production and flexible production techniques, diversified products and less commitments to the former welfare state (Laczko and Phillipson [1991]).
The formal retirement at a fixed age in the former centralized welfare state hence will evolve in the post-industrial state into a flexible (earlier and partial) exit route at various ages, based on more diversified and to a large extent privatized arrangements, which are predominantly actuarially fair on an individual basis. Institutional innovations in respect of retirement practices – more diversified, less restrictive - will in an atomized society to a major extent solve the problems associated with aging. The new exit routes comply with the new ways of production, the increased welfare of large groups of population and a new balance between individual and collective responsiblities. Growth in labour productivity will do the rest,

18) According to J.H. Schultz, A. Borowski and W.H. Crown [1991, p. 341], 'Not only is most of "the burden of the elderly" literature oversimplistic, it encourages us to look for solutions in the wrong places. Today, as in the past, the most important determinants of the future economic welfare of people (of all ages) are the longstanding factors discussed by economists and others as influencing growth: labour-force participation, saving, investment in human and business capital, technological change, entreprenurial initiatives, managerial skills, government provision of infrastructure, and so on. *Thus the debate over how best to run an economic system is not primarily an aging discussion. In fact, the aging of populations may have little to do with the outcome.'*

leaving room for a further increase in welfare. Evidently there appears to be much reliance on market forces with their own merits and demerits.
In this brave new world we can rely upon that societies can adapt their economies succesfully and can get older comfortably.

6. Concluding remarks

Three summarizing and concluding remarks are made.

* Technological change, product specialization on a global scale together with international trade, institutional changes and population aging are all elements of the same long-term process. Hence, future production levels suffice to sustain a twice as large retired population. Society can afford to grow old. Population aging is not likely to create an aggregate shortage of savings and investment, thereby lowering the future resource base. There is more reason to be concerned about a qualified labour supply, notably in the health care sector. Note also that unemployment reaches levels comparable to the size of the elderly population in many western countries. Thus, there are much more resources that can be used.

* Though population aging has not proven to be a real constraint on productivity so far, it may nevertheless require major adjustments as to the mechanism of distributing national product, hence to economic and social policies. The main example is the balancing of public budgets in respect of basic pension schemes, health care facilities and other government expenditures on behalf of the elderly. Higher taxes levied on labour income cause distortionary effects, impeding in turn economic development. To avoid budgetary imbalances and distributive problems drastic policy measures have to be taken on a broad front, viz. reducing benefits, increasing contribution rates, raising the retirement age as well as policies to improve the working of markets and the allocation of resources. There are large risks involved. Creating a resource base of their own therefore will be a more solid fundament for securing pensioners' income.

* Particularly imbalances may arise in two sitations, one of which is budgetary and the other one originates from an inflationary environment. First, pension schemes predominantly based on pay-as-you-go will lead to a doubling (or more) of contribution rates on labour income. All pension costs are borne by the working population – capital income can not be taxed effectively - , leading to i.a. social injustice and impeding the proper functioning of the labour market. Second, when asset prices fall as pensioners want to sell their assets to the less

numerous younger generations, the elderly are left with pension incomes lower than they had expected. The situation might worsen when tight labour markets and fiscal imbalances give rise to inflation.

On the other hand high capital returns create a world characterized by a large retired leisure class and a poor working population giving rise to severe social imbalances. Society may well have more important priorities than allocating ever-increasing parts of national product to sustain an increasing number of ever-wealthier elderly.

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APPENDIX: Short outline of the Dutch basic (public) and supplementary (private) social security system and of pension reform options[1]

1. Basic and supplementary systems

The Netherlands' basic **old age** security scheme (AOW) was introduced in 1957. Its purpose was to guarantee a sufficient income to virtually all residents of age 65 and over. The AOW was preceded by several earlier schemes which provided less broad coverage; the AOW ended a political debate which lasted more than 60 years. The AOW-benefit is flat-rate and does not depend on labour history, contributions paid, wealth or other income (the *first* pillar).
Since 1976 the AOW-pension level has been linked to the statutory minimum wage. The development of minimum wage stays behind aggregate wage increase with 1%-point per year approximately (i.e. the difference between aggregate wage increase and negotiated wage). Moreover, the linkage of minimum wage to general wage increase was weakened during some years. As a result the AOW-pension from 1980 up to 1998 lagged more than 25% behind with gross wage.
EC-legislation led to individualized AOW-benefits in 1985. The AOW-benefit for a couple is now 100% of net minimum wage (50% per person) if both persons are over 65 years of age. If one of the spouses is younger than 65, only 50% is paid out. Contingent upon the income of the partner, an additional pension is provided to a maximum of 50%. Before 1985 a 100% AOW-amount was payed out, irrespective of the age of the younger partner. A single person receives 70% of net minimum wage. The proportion of AOW-pension in total old-age income is gradually decreasing as the AOW-benefit level is indexed to contractual wage-earnings rather than to actual earnings.
Total volume of AOW-benefit payments at the end of the 1990's amounts to about 5% of GDP.

The Netherlands' basic old age security scheme (AOW) differs from analogous schemes in most other European countries. The basic scheme is a flat benefit system, in wich entitlements generally are not dependent on the individual's labour force participation. The schemes in most other countries are earnings-related benefits, contingent on contributions made in the period of the individual's working years. The replacement rate of the national basic old age social security program in The Netherlands, amounting to around 45% of average earnings, is lower than the replacement rates in, for instance, Germany, France and other southern European countries.
The public pension scheme AOW is financed on a pay-as-you-go basis by a (stabilized at a rate of 17.95 percent) payroll contribution on taxable income up to a certain ceiling (of people less than 65 years of age) and to an increasing extent the AOW will be financed out of general tax revenues (thus, levied on the income of the 65^{+}–population as well) in the coming decades.
The AOW-scheme is administered by the Sociale Verzekeringsbank (Social Insurance Institution).

Compulsory supplementary pension schemes (the *second* pillar) by contrast form a rather large part of total old age pensions in The Netherlands. These pensions are financed by funding. The contractual savings through pension funds and insurance companies hence

1) See e.g. chapter 7, *Pensions*, in CPB [1997], Blomsma, M. and R. Jansweijer [1997] and Bovenberg, L.A. and L. Meijdam [1999].

constitute the major part of private savings. The contractual savings fraction of GNP in The Netherlands is larger than in other OECD countries.

The basic public **survivors'** pension is termed the 'ANW' (in operation since mid 1996) with maximum benefits of 70% of minimum wage. Rules of eligibility are rather complex. The ANW-scheme clearly is less generous than the former basic survivors' plan (since 1959), thereby creating new markets for pension funds and insurance companies.
Supplementary survivors pensions are a comprehensive part of the supplementary pension system. Note that from the year 2000 onwards it is legally possible to transform a survivors' pension into a higher and/or earlier eligible old age pension.

A number of arrangements enable persons to stop working before the age of 65. The main ones are the disability benefit scheme, unemployment schemes and various early retirement schemes. Together these schemes induced and facilitated the decline in labour force participation in the age group 60 to 64 from 80% in 1960 to less than 20% in 1996.

The **disability** scheme 'WAO' covers all employees against the loss of earnings due to long-term sickness and disability. Disability benefits start at 70% (if fully disabled) of previous earnings (up to a maximum), but they fall to a lower level after a certain period (both the length of this period and the percentage depend on age). However most employees insured themselves for the risk of the disability benefit falling below 70% of their previous earnings. For persons receiving a disability benefit, pension rights generally continue to accrue as if they were still employed.

> In the 1980's the WAO-scheme became a very popular arrangement that employers could use to get rid of elderly, less productive employees. Disability benefits were up to 1985 (replacement rate 80 percent before 1985 and 70 percent thereafter) more generous than unemployment benefits. The ensuing rise in the costs of disability plans induced the government to limit eligibility for disability benefits by tigtening entry conditions. Up to the present time this policy unfortunately has not been very succesful.
> The *unemployment* route of exit from the labour force is of increasing importance - and a substitute for the disability exit route (I. Woittiez et al. [1994]) - , particularly for older employees. Together with supplementary severance payments of the employer the unemployment benefit scheme yields a replacement rate of 70 percent or more.

The statutory pension age in The Netherlands is 65 years; the effective retirement age was about 60 or even lower in the last few decades. Various policies encouraged older workers to leave the work place and employers could shift the costs of early retirement rather easily into public disability schemes (WAO). Recent and coming reforms of the WAO-scheme have made this more difficult. 'Normal' retirement age nowadays seems to have been (re-)established at 60, which may be too low to guarantee an adequate (economic) resource base for securing all pension payments in the coming decades.

Early retirement schemes - termed VUT-schemes and introduced in the early eighties primarily to reduce the high unemployment levels among the younger age groups - were also very popular in the last 20 years. Almost all of them were financed on a pay-as-you-go basis. Nowadays they are rapidly being transformed into funded systems to be financed by the employees themselves, the usual (early) retirement age being 62 years. They are also less

generous with a replacement rate of about 70 percent opposed to 80 percent or more under most VUT-schemes. At the turn of the 20th century labour supply is rather scarce.
The early retirement route to leave labour force participation is of the supplementary type only; there is no identifiable basic public arrangement.

In The Netherlands also a system of *social assistance* exists. The level of benefits is approximately equal to the minimum wage. The system is not dealt with here.

Collective pensions including the basic pension plan AOW plus the various supplementary plans aim to achieve a pension result of 70% of final gross earnings approximately after 40 working years (in new pension legislation after 35 years, hence an accrual rate of 2%). Those employees who have to (or want to) go beyond the collective pension results can use private individual supplementary pension insurance of the defined contribution type (DC), termed the *third* pillar or simply continue working (the *fourth* pillar). As observed, the World Bank [1994] argued strongly in favour of a four pillar system.

2. The relationship between complementary private schemes and basic public pension schemes

Pension schemes serve various objectives, including poverty-alleviation and insurance against longevity and income provision in the old age. Alleviating (old-age) poverty is generally best accomplished by a nationwide pay-as-you-go system that provides a minimum standard of living. As pointed out before in The Netherlands a basic public flat rate pension scheme exists for all residents. The basic plan (AOW) is mandatory, redistributive and financed out of contributions and general tax revenues.
Supplementary occupational pension benefits in The Netherlands are more important than in most other European countries - the major exceptions being Switzerland and the UK - primarily because the Dutch public pension scheme provides only a relatively modest minimum benefit level.

Old-age pension benefits in Dutch industry-wide and company-based pension plans are generally based on final pay and the number of working years (defined benefit-system). In calculating individual old age pension payments the average annual earnings in the last two to five years prior to the pension date minus a franchise are multiplied, first, by the accrual ratio (e.g. 1.75%) and secondly, by the number of working years. Thus, for instance 24 years of service gives rise to a pension annuity amounting to 42% of last pensionable income. With 40 years of service the replacement rate is about 70% of final income at the (standard) retirement age of 65. The replacement rate thus includes the basic pension under the public national old age scheme (AOW) and the private supplementary schemes.
In new pension legislation a pension result of about 70% of final income at retirement age of 60 can be acquired after 35 working years and an accrual rate of 2% (in respect of final pay schemes and 2.25 percent in respect of average pay schemes). This change will be favoured by tax incentives.

At an individual level the old-age benefit (OB) amounts to:

$$OB = nwy * 1.75 * (Salary \text{ -/- } Franchise) \qquad (1)$$

where nwy is number of working years, Salary is final income and Franchise is nowadays released from or at distance related to the AOW-benefit level. The concept of 'Franchise' is the actual linkage between the public and supplementary private pension system in respect of old-age pensions. Prior to 1985 the Franchise-level generally was equal to 10/7 * AOW-level for a couple. Nowadays the Franchise varies between complementary pension plans from 7/7 to 10/7 or more of the AOW-level for a couple. Furthermore, the AOW-benefit level as observed is lagging behind with aggregate income by about 1%-point annually, that part of income growth exceeding general (negotiated) wage increases (termed the incidental wage component).
Accruing pension claims of part-time workers is pro rata to that of full-time workers.

Pension funds governors and managers try to immunize their schemes against the divergent development of wages and AOW-benefit level by disconnecting the value of Franchise and the AOW-benefit. Hence, there is no longer an integrated system of public and private pension schemes, reflecting a change in pension policy, e.g. to start the accruing of pension rights above at least the minimum wage level. Or, in other words, the aggregate pension provision shifts from a layer or tier based system to a pillar based system. Simultaneously there is a shift of responsability of the state to employers and employees, in The Netherlands called the social partners.
In respect of the pension formula, notice also that 'Franchise' is subtracted from 'Salary' for both working partners, therefore twice, whereas the couple receives (only) one time full AOW-benefit.

Survivors' benefit schemes: widow's (and widower's) pension benefits amount to 5/7 times the old age pension benefits that the deceased male (female) received - or would have received if he (she) had lived until the age of 65 -, apart from income rises due to merit. Orphans generally receive 1/7 or 2/7 of this baseline old age pension, depending on whether one or both of the parents died. Again, the survivors' benefits (SB) calculated in this way are integrated with the benefits under the national basic insurance scheme for old-age pensioners (AOW). Hence,

$$SB = 5/7 * \{nnwy * 1.75\% * (Salary -/- Franchise)\} \qquad (2)$$

where nnwy is the notional number of working years. Private survivors' pensions in the second pillar are supplementary to the public survivors' benefit scheme, largely in the same way as the private old-age pension plans supplement the AOW-benefit.
The level of 'Franchise' is the actual linkage between the public (ANW) and supplementary private system in respect of survivors' pensions. The relationship between Franchise, as defined before, and the current ANW-benefit level is released as the relationship between the AOW-level and the average ANW-level is disconnected as opposed under the former basic survivors' pension scheme. In practice therefore, various additional insurances have been introduced to repair the gap between the Franchise and the current ANW-benefit level.
Note, as observed before, that from the year 2000 onwards it is legally possible to transform the SB-pension into a higher and/or earlier eligible OB-pension.

The major part of the **disability** benefits (DB) for employees up to the age of 65 is of the basic national type (WAO) and financed on a pay-as-you-go basis. Eligibility rules are very complex. A supplementary part is usual in The Netherlands and most often financed by terminal funding. Benefits are calculated by directly applying a replacement rate (up to 70%) that primarily depends on the degree of disability and not on length of working time. The national basic insurance disability benefits (WAO) are an integrated system with the

supplementary disability schemes. Old age pension benefits for those who formerly received disability benefits are determined as if tenure would have continued until the age of 65. Dutch disability benefit schemes typically do not distinguish between social and occupational risk.

Eligibility for **early retirement** under most schemes (of the supplementary type only) arises at an age between 60 and 64 years. Benefits under this early retirement scheme are rather generous, with a replacement rate of about 70% of gross annual earnings in the last year of employment.

3. The Dutch supplementary pension system; further aspects

The Dutch occupational pension system - generally of the defined benefit type (DB) - is industry-wide or company based and covers almost the whole working population[2]. Pension regulations are the result of negotiations between (organizations of) employers and employees. The industry-wide complementary pension schemes, particularly the pension formula and the contribution level, are as a principle compulsory for all firms in the sector, thereby making possible intergenerational risksharing. For employees participation in sector-wide or in company based pension funds is always obligatory. Clearly there are advantages and disadvantages associated with the compulsory system.
The board of governors of the funds consists of an equal number of employees and employer representatives.

There are about 75 sector or industry-wide pension funds and over a thousand company based pension funds. On average, company based pension plans are more generous than most industry-wide pension plans. In addition, over 20,000 companies provide insured pension plans for (part of) their employees.
Financing of all occupational pension plans in The Netherlands is statutory by funding. Pension assets must be held by independent pension funds outside the sponsoring firm (for at least 90 percent). In recent years Dutch pension funds have significantly increased their holdings of domestic (and foreign) equities, leading to investing pension savings in high(er)-yielding projects in the corporate sector. Furthermore, it enhances capital mobility and allows a higher expected return over a longer time period.

The vast majority of the pension schemes are of the defined benefit type. More than 70% of the pension benefits are defined on the basis of final pay, the remainder being based on average pay or a mixture of final pay, fixed amounts and average pay. Only a small part is of the defined contribution type. In future years DC-plans will expectedly become more important, particularly in respect of additional pensions provisions.
Most large firms have their own pension fund; smaller firms usually participate in sector-wide pension funds or have their own pension plan administered by an insurance company.
In industry-wide pension funds the contribution rates do not differ between firms, leading to inter-firm and intra/inter-generational solidarity.

First pillar pensions at the turn of the 20th century provide for about 45 percent of total retirement income and second pillar pensions for about 30 percent. Income from third pillar

2) Summary information on social security and employee benefits in the Netherlands is given by Hewitt & Koelman International [1999] and on the Dutch industry-wide pension system by J.W. Kloet [1998].

pension products, other assets and owner-occupied housing account for the remaining 25 percent.
Supplementary pension schemes and third pillar insurance products are of increasing importance in The Netherlands as the public AOW-pension is lagging behind with aggregate wage increases. There is a gradual lowering of minimum wage and social minimum benefit levels as compared to the average standard of living. Continuing this income policy will be necessary for sustaining the AOW-benefit scheme in an aging population in the coming decades. In the long term, its cumulative effect will result in an eroded public pension level and in a remarkable shift to the second and third pillar old-age income generating products. More generally, Dutch government is cutting back on its social security arrangements. Pension funds and insurers are competing to fill the gap.

Complementary pension schemes must comply with the PSW-act (Pension and Savings Fund Act). This requires them to be based on a pension agreement in an employer/employee relationship and to be insured with an approved insurance company or pension fund.
Contributions for supplementary pension plans and investment revenues are tax-exempt. Pension incomes are taxed. This is known as the 'reversal rule'. Pension plans leading to pension results up to 100 percent of last income can benefit from tax exemption rules.
The complementary pension schemes are administered by the funds themselves, insurance companies or specialized agencies.
The supervision of pension funds and insurance companies in The Netherlands is the responsability of the Supervisory Authority (Verzekeringskamer).

4. Pension reform options

Summarizing, the main *characteristics* of the Dutch old-age pension system are,

1) emphasis on scale and uniformity rather than diversity by relying heavily on a collective pay-as-you-go financed basic plan and funded DB-plans rather than on individual pension insurances of the DC-type;
2) emphasis on intergenerational risksharing by relying on the basic plan and the complementary system, which forces companies and enterprises to join the industry-wide system. In the coming years many more exemptions to start a own company based plan will be possible;
3) emphasis on the distibutive feature of the system rather than on the insurance principle;
4) portability of pensions is well organized and facilitated, which favours labour mobility.

Future developments and *policy options* are,

1) the basic pension system AOW is gradually getting less important and lagging behind with personal incomes in The Netherlands. The gap is offset by present supplementary schemes and increasingly by personal (complementary) pension insurances. More emphasis on general tax revenues rather than peculiar contributions over only part of labour income (viz. the first bracket of taxable income) broadens the financial base for the AOW-plan;
2) the DB-system will gradually shift from a final-pay to a average-pay system. Indexing pension payments and accrued pension rights to price or income developments will no longer be a automatism. It will primarily depend on the real rate of return on pension assets vis à vis the (usual) discount rate of 4% whether increases of the pension level can be realized. Evidently they are part of labour negotiations;

3) there will be more emphasis on pensions of the DC-type. They will increasingly be incorporated in the supplementary system, e.g. above a certain income level and besides particular types of pensions. The supplementary pension system thus will be more and more of a mixed character in the coming years and decades;
4) there is room for increasing investments in the corporate sector, allowing higher returns in the long run and being less sensitive to expected inflation. Furthermore, it may improve corporate governance. By investing a larger part in venture capital, pension funds can help increase the supply of risk-taking capital for starting entrepreneurs;
5) more possibilities for firms to opt out of industry-wide pension funds. Furthermore, this possibility may increase competitive pressures to improve their performance. The need to protect individuals against income risk in old age through collective pension plans will be reduced at least up to a certain level. This may help better controlling pension costs.

Another major development will be the supply of an employees' benefits based range of tailer-made pension products.

The new *Act on the Fiscal Treatment of Pensions* which came into force on 1 June 1999 aims at a replacement rate of 70 percent at a retirement age of 60 (after 35 working years). This severely contradicts government policy to increase labour force participation of the older working age population, thereby further reducing (scarce) labour supply.

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