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PENSION SAVINGS AND GOVERNMENT FINANCE IN THE NETHERLANDS

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INTRODUCTION

The Dutch pension system has been much acclaimed as a sound basis for accommodating an ageing population. As a supplement to the public pension, substantial funds have been accumulated in the second pillar funds, *i.e.* the industry and company pension funds. These funds, whose assets comfortably exceed the country's national debt, play an important role in the economy. The pension system not only offers good income prospects to its participants, it also helps to provide a solid tax base for the growing needs of finance for government in the wake of population ageing. In the Netherlands, revenues from taxes on pension income are expected to rise from 1.9 per cent of GDP in 2001 to 4.3 per cent in 2040 (Van Ewijk *et al.*, 2000). The tax base is further broadened by the increasing consumption of pensioners, which adds another 2 percentage point increase in tax revenues. Together these two factors more than compensate for the growing burden of public pensions, which is expected to rise by 3.8 percentage points. In total, expenditures rise by more, however, mainly due to the increasing cost of health care. But even then, the extra tax revenues from second pillar pensions compensate for more than half of the total budgetary cost of ageing.

In the Netherlands, pensions are subject to personal tax, while contributions are deductible from personal income taxation. The large wealth accumulated in the pension funds – about 130 per cent of GDP in 2003 – thus comprises a large implicit tax claim by the government. With an average tax rate of 40 per cent this tax claim almost balances total public debt that was 55 per cent of GDP in 2003. However, the positive contribution of past savings to public finance does not necessarily imply that also future pension savings are beneficial to the government budget. In general they are not, as there is a significant tax subsidy on pension savings. Occupational pensions are organised on a decentralised – often sectoral – level by the social partners (labour unions and employers organisations). To encourage the development of these pension schemes the government provides tax facilities up to a certain level of pensions (70 per cent of final wage at the age of 61). In particular, pension wealth is exempt from capital taxation. Furthermore, as pension contributions are deducted at a higher effective tax rate than the one applying to pensions on average, this leads to an additional implicit subsidy on pension savings. Together the tax subsidy amounts to some 30 per cent of total pension contributions. The aggregate cost of this tax expenditure depends on the degree to which pension savings substitute for normal – non tax favoured – savings of households.

This paper analyses the impact of pension savings in the Netherlands on government finance. We focus on the question of how much pension savings contribute to the sustainability of government finance. Indeed, in the Netherlands pension savings play a key role in the relative mild sustainability problem that is found in earlier studies for the Dutch government (Van Ewijk *et al.*, 2000) and in the ongoing project of the European Union EPC Working Group on Ageing (EPC, 2003). Important issues, which still have to be settled, are how to account for the growing tax revenues from pension income (see also Boskin, 2003 and Auerbach *et al.*, 2003 for a discussion on this same subject for the United States). First, we discuss how the fiscal impact of pension savings on the sustainability of public finances is accounted for in the Netherlands. We largely follow the generational accounting framework (Auerbach *et al.*, 1991), with some important modifications in the way we take account of the tax revenues related to future pensions. In particular, we include the growing revenues from indirect taxes on the consumption out of pension income. As a result, our assessment of sustainability is more favourable than other accounts of the Dutch situation in *e.g.* Auerbach *et al.* (1999) and EPC (2003).

Next we will consider the impact of future pension savings on government finances. Is an expansion or reduction in tax favoured pension savings beneficial or detrimental to the government budget? For this question the accounting framework is of limited value, and we need a more comprehensive account of the economy, including household behaviour with regard to savings, consumption and labour supply. Therefore we apply the general equilibrium OLG model for the Netherlands, GAMMA (Draper *et al.*, 2002) which has been developed to provide an economic basis to the generational accounting framework for the Netherlands. Using this model, we analyse a pension reform reducing the ambition level of Dutch pensions from 70 per cent of final earnings to 60 per cent. We focus on the impact on government finance, and also pay attention to the economic effects of this reform. Particular attention is given to the distributional effects, as measured by each cohort's net benefit from the pension system and the net benefit from the government. The latter is important as government taxation is known to modify the distributive effects of pension reform.

GROWING PENSION WEALTH

The pension system in the Netherlands consists of the well-known three pillars. The public pension comprises the first pillar. This is a PAYG-financed flat-rate benefit that is linked to the minimum wage. The second pillar includes the occupational pensions. These are organised by employers and employees on the firm or sectoral level. These pensions are mandatory, and largely defined benefit. The role of the government in the second pillar is confined to providing a fiscal and legal framework. The third pillar features strictly individual retirement provisions. Part of these receives a favourable tax treatment, in particular as far as these

savings are meant to compensate an inadequacy in the individual's occupational pension. Both the second and third pillars are funded.

Mandatory pensions in the Netherlands are high by international standards. First and second pillar pensions together aim at a level of 70 per cent of final earnings for all income classes (Table 1) at the pension age of 62. At the – statutory – age of 65 pensions can grow up to 100 per cent of the final pay.

Table 1. **The ambition level of mandatory pensions (1st and 2nd pillar)**
By income groups, expected replacement rate according to present arrangements

	Pension (percentage of the final wage) by income group					Fraction of workers covered
	0.5 × average wage	Average wage	1.5 × average wage	2.0 × average wage	2.5 × average wage	Per cent
Netherlands	70	70	70	70	70	91
Germany	50	38	38	32	26	46
France	80	72	65	54	48	–
Italy	58	58	58	58	58	5
Spain	88	88	88	76	61	–
Sweden	93	69	66	65	65	90
Switzerland	63	58	46	34	28	–
United Kingdom	51	35	30	22	18	46
United States	57	45	39	33	29	45

Source: Whitehouse (2002).

The ambitious level of the mandatory pensions in the first and second pillar is reflected in little savings in the third pillar (Table 2). In the Netherlands, the first pillar accounts for 50 per cent of retirement income, the second pillar accounts for 40 per cent, whereas the third pillar only accounts for the remaining 10 per cent, of which about 60 per cent is tax favoured. With the growth and maturation of occupational pensions the share of second pillar pensions is expected to increase in the future up to about 60 per cent of total retirement income in 2040.

Table 2. **Size of the pension pillars (share in pension income, total = 100)**
Share in per cent

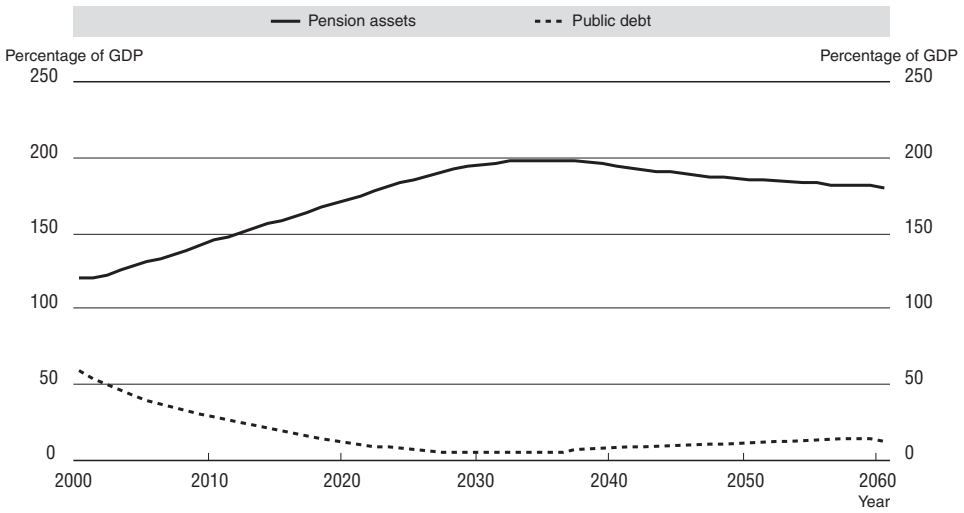
	Netherlands	Germany	France	Italy	Spain	Switzerland	United Kingdom	United States
1st pillar	50	85	79	74	92	42	65	45
2nd pillar	40	5	6	1	4	32	25	13
Other	10	10	15	25	4	26	10	42

Source: Börsch-Supan (2004).

The share of the – funded – second pillar in the Netherlands is much larger than in other countries, and its size will grow in the future. The assets of the pension funds constitute an ever-larger part of the total assets in the Netherlands. Assets of pension funds have grown from approximately 70 per cent of GDP in 1991 to 120 per cent of GDP in 1999, at the top of the stock market boom. Since then they have declined to somewhat below 100 per cent of GDP. Several factors account for the sharp increase in pension fund assets in the 1990s. First, more employees gained access to a collective pension scheme. Also, the maturation of pension funds led to a growth in assets. Lastly, in recent years the pay-as-you-go early retirement schemes have been gradually replaced by funded pre-pension schemes. Also developments in the stock market had significant effects on the value of pension fund assets, notably the boom in the second half of the 1990s followed by the decline in stock market prices at the start of the new millennium. Note that after relaxation of regulation at the beginning of the 1990s, Dutch pension funds increased their share in equities from about 15 per cent to 50 per cent of their portfolios.

Pension wealth will further increase in the decades ahead. Figure 1 gives an estimate of the growth in the assets of pension funds. Up to 2040, the assets of pension funds are expected to increase to nearly twice GDP. At the same time, government debt is expected to decline, also illustrated in Figure 1. Along the

Figure 1. **Assets of pension funds and public debt in the Netherlands (per cent GDP), 2001-2060**[1]



1. Projection for sustainable path on the basis of Van Ewijk *et al.* (2000).

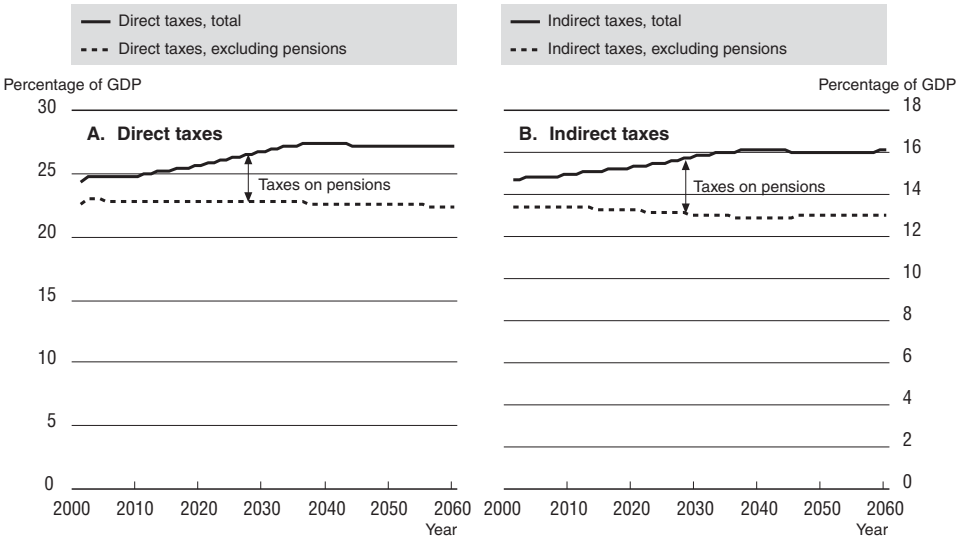
sustainable path public debt is expected to decline from 54 per cent in 2001 to some 10 per cent of GDP in 2040 (Van Ewijk *et al.*, 2002). If one takes account for an implicit tax claim of about 40 per cent on pension wealth the improvement in the government's financial position is even more spectacular.

Fiscal impact of occupational pensions

The second pillar pensions influence government finances in several ways. Pension contributions are deductible from personal income taxation, and the returns that accrue to pension funds are exempt from taxation. Pension incomes, however, are subject to income tax. As far as pensions affect consumption this will have an impact on indirect taxes as well. Underlying the baseline scenario for government finances is a consistent set of accounts for each cohort describing their expected saving and consumption behaviour over time. Projections for the pension contributions and expenditures are based on comprehensive financial accounts for the pension funds.

Figure 2 shows the impact of pensions on direct taxes and indirect taxes. The part of consumption attributed to pension income is obtained using the average ratio between consumption and income of the elderly according to the observed

Figure 2. **Tax revenues on pensions (1st and 2nd pillar), 2001-2060**



Source: Based on Van Ewijk *et al.* (2000).

life-cycle pattern of consumption. Direct taxes on pension income rise by 3.1 percentage points as a share of GDP, and the indirect taxes add another 2 percentage points. Together this is more than sufficient to compensate for the expected rise in first pillar PAYG pensions, which are projected to increase by 3.8 percentage points (see below).

SUSTAINABILITY OF GOVERNMENT FINANCE

How to measure – in the accounting framework – the impact of pension savings on government finance depends on the definition of sustainability. In general, sustainability implies an affirmative answer to the question: is it possible to keep up social security and government expenditure without having to raise taxes in the (distant) future? Or more briefly, sustainability is defined as solvency of government finances upon continuation of current fiscal arrangements. Solvency requires that the present value of future taxes (at constant tax rates) should balance the present value of expenditures plus initial debt. The gap in sustainability can be measured by the required adjustment in (indirect) taxes that would be necessary to restore solvency. This required adjustment can also be interpreted as the annuity of the solvency gap using the growth adjusted interest rate (see also Blanchard, 1990).

The "constant policy" assumption is pragmatic by nature. It can – under some specific conditions – be founded on more welfare theoretic grounds. We distinguish two relevant dimensions: intertemporal efficiency and intergenerational equity. Efficiency refers to the distortionary impact of taxation, equity to the distribution of income over generations.

E*fficiency*

The condition of constant tax rates is appealing from an efficiency point of view as it is consistent with the Ramsey principle of "tax smoothing" (Barro, 1979). In the presence of convex welfare costs of the tax distortion a constant tax rate for each tax base may ensure efficiency from an intertemporal point of view. Important to our analysis is that tax smoothing is defined at the level of each separate tax base (wage income, capital income, consumption etc.), and not as a constant share in GDP. Due to changes in the composition of taxes, the average tax burden as a percentage of GDP (or National Income) can change over time. In particular, due to the increasing share of pension income relative to wage income the share of consumption taxes will grow relative to taxes on wage income. Development towards a pensioner's society or "*rentier* state" thus means that total taxes will increase relative to GDP (but not necessarily relative to National Income). This approach that allows for changing weights of taxes is in contrast to other

approaches which require the sum of taxes to be a constant percentage of GDP (*e.g.* Auerbach *et al.*, 2003).

Intergenerational equity

Sustainability can also be approached from the perspective of intergenerational equity. In a "constant policy" environment, sustainability is closely related to Musgrave's criterion of equal proportional net benefit from the government for each generation. In the present context this criterion refers to the net benefit of all generations (deflated by productivity growth) starting from the present young. It does not look back to the past. More specifically, it requires that the net benefit of all future generations is equal to that of the just born generation (Bovenberg and Ter Rele, 2000). In a steady-growth environment where all relevant variables – at the micro level – grow in fixed proportions, this measure coincides with the tax smoothing principle. More specifically, this is so if:

- The age profiles of net benefits from the government are constant over time; that is, all (age-specific) expenditure and income categories increase at the same rate, equal to productivity growth in the private sector.
- Life expectancy is constant over generations.

In these circumstances steady government policies imply a steady distribution between generations. Note that this allows for demographic changes over time. Steady state only refers to the economic variables per generation. We neglect the impact of savings on domestic investment, which is acceptable for a small open economy as in the Netherlands. Factor prices and commodity prices are given by the internationally prevailing factor prices.

The two requirements are not entirely satisfied in reality. Life expectancy increases, which causes an extra growth in expenditures on health care and public pensions. Furthermore, also the age profiles may change, for example if some types of expenditures (*e.g.* health care) grow faster than productivity. Consequently, the net benefit of generations may change over time despite tax smoothing and sustainable public finance. In that case, tax smoothing would no longer exactly coincide with intergenerational neutrality.

Tax smoothing: some qualifications

A number of qualifications are in order with regard to the application of tax smoothing:

- First, the distortionary impact of taxation may not be constant over time. E.*g.* growing mobility of labour or capital may increase the cost of levying taxes on these factors. Ramsey taxation should then imply falling tax rates over time.

- Second, the distortionary impact also depends on other distortions in the economy. For the Netherlands, the distortionary impact of the pension system is particularly relevant. As occupational pensions are defined benefit (DB) and mandatory, the contribution rates will generally feature an implicit tax as well. This tax is necessary to absorb shocks to the assets and liabilities of pension funds, but it also may comprise a systematic component due to non-fair pricing of pension entitlements. This may be due to deliberate solidarity or risk sharing, but also result from a bias in the traditional actuarial methods for determining the value of assets and liabilities. In that case the tax smoothing rule for taxes on labour income should be replaced by a *modified tax smoothing rule* that applies to the sum of government tax and the implicit tax of pension funds. More specifically, the government's tax rate should compensate for fluctuations in the implicit tax rate of pensions. In the specific case of the Netherlands this would allow for lower taxes and a greater deficit when pension contributions are temporarily high, and for higher taxes and smaller deficit in the opposite case. In practice this would imply a more indulgent look at the budget position in the Netherlands in the coming years.

- The idea of tax smoothing is developed for a world of certainty. The presence of uncertainty will give rise to a number of complications. In an uncertain world tax smoothing will generally lead to intergenerational risk sharing, which can have a positive effect on total wealth due to missing insurance markets. The intergenerational impact of the government budget is then no longer a zero sum game. But even in the complete markets case it is no longer obvious that efficiency requires a constant tax rate along the time path of expected GDP. For example, convex marginal costs of the tax distortion may require a falling path of tax rates by way of precautionary savings.

- The issue of risk also inevitably emerges when analysing the impact of deferred taxes (on pension savings) on the government budget. For example, pension savings feature a higher expected return than savings through the government budget, as pension funds invest part of their portfolio in risky assets. This is no free lunch, however. The equity premium incorporated in the higher return on pension saving is a compensation for the riskiness of these assets. The valuation of future revenues from pension wealth therefore requires proper discounting using the relevant risk premium. The riskiness also pertains to the impact of pensions on the government tax revenues. When the standard method of tax smoothing is applied, an increase in deferred taxes on pension savings would lead to a lower tax rate. This should not be interpreted as an improvement of the government budget, however. Nor does it reflect a welfare gain. The lower tax rate is fully due to the risk premium incorporated in the private pension income. One should

therefore be careful when interpreting the impact on sustainability whenever there is a shift between government savings and private savings.

Together these qualifications imply that any assessment of sustainability should be treated with care. The criterion is not perfect, and there are some intricate theoretical issues to be resolved. Yet, the accounting framework can be seen as a major step forward as it puts long term sustainability at the forefront, and it provides a useful benchmark for assessing the government financial position.

ACCOUNTING FOR THE IMPACT OF PENSION SAVINGS IN THE BUDGETARY PROJECTIONS 2000-2080

We define a baseline "steady growth" scenario of future policy where all relevant – age specific – categories of government expenditure grow in proportion to productivity in the private sector. This applies to transfers and social security benefits as well. The demographic impact is modelled using the tools of Generational Accounting (Auerbach, Gokhale, and Kotlikoff, 1991). This method has been extended to the Netherlands (Ter Rele, 1998), and provides a comprehensive basis for establishing the age-profile of government expenditures and revenues.

Government revenues consist of direct taxes, social security contributions, indirect taxes, corporate taxes and revenues from government assets (including gas). The growth of direct taxes and social security premiums, as well as indirect taxes, is based on the age profile of taxpayers and the (age-specific) rise of labour productivity. We distinguish direct and indirect taxes from various sources, *e.g.* taxes paid from labour income and from pension income. These components are extrapolated separately. This enables us to take account of the specific impact of a number of economic trends. One of these trends is the growing share of pension incomes.

Table 3 reveals how public finances develop along the sustainable path. In this path the surpluses are of such a magnitude that the reduction of government debt and of interest payments counterbalances the increasing net costs of ageing for the government and the dwindling revenues from gas. Indeed, between 2001 and 2040, government debt is nearly redeemed.

The results show that the increase in tax revenues on pension income is a major factor in future government finance. In quantitative terms it is far more important than the reduction in debt service due to the decline in government debt. Pension incomes from the first and second pillars rise from the present level of 8.8 per cent of GDP (of which 4.7 per cent from public pensions and 4.1 per cent from private pensions) to a total of 21.9 per cent of GDP in 2040 (9.0 per cent from public pensions and 12.9 per cent from private pensions). In this period, tax revenues from this source will increase by 5.1 percentage points (from 3.3 per cent of GDP to 8.4 per cent). These taxes comprise direct taxes on pension income as well

Table 3. **Future budgets with a sustainable policy, 2001-2080**
Percentage of GDP

	2001	2010	2020	2040	2060	2080
Expenditures						
Social Security	10.9	12.4	13.9	15.9	15.3	15.4
of which: public pensions	4.7	5.4	6.8	9.0	8.3	8.5
Healthcare	7.0	7.7	8.6	10.6	10.3	10.2
Other primary expenditures	22.6	21.2	20.3	19.9	20.3	20.1
Interest payments	3.5	1.7	0.8	0.4	0.8	0.6
Total	44.9	46.0	47.2	51.0	50.4	50.3
Revenues						
Income tax + social security contributions	20.7	21.7	22.5	24.2	24.1	23.8
of which: from pension income	1.8	2.1	2.9	4.9	4.9	4.9
Indirect taxes	19.8	20.1	20.7	21.9	21.9	21.9
of which: from pension income	1.5	1.7	2.3	3.5	3.5	3.5
Corporate tax, revenues from assets (including gas)	6.0	5.4	5.2	4.8	4.6	4.6
Total	46.5	47.2	48.4	50.9	50.5	50.4

as indirect taxes due to the higher consumption out of pensions. So the strong funded second pension pillar not only helps to ensure income in the next decades, it also helps to improve the government balance.

AGE MODELLING OF THE IMPACT OF PENSION SAVINGS ON GOVERNMENT FINANCE

The analysis so far was based on extrapolation of age specific household profiles using the framework of generation accounting. For a small open economy with given factor prices this gives a reasonable first approximation of future public finances. It does not take account of any behavioural reactions, however. It therefore tells little about the partial impact of the pension system on sustainability of government finances. In the following sections we analyse the impact of pension savings using the dynamic general equilibrium model GAMMA for the Dutch economy (Draper *et al.*, 2002). A brief description of GAMMA is given in the appendix. This model integrates the generation accounting framework into an AGE-OLG model based on optimising behaviour of households. This model incorporates endogenous life-cycle behaviour with regard to savings and consumption. It also allows for endogenous labour supply depending on government taxes and on the implicit tax comprised in mandatory pension contributions.

The model incorporates a detailed representation of the government budget as well as a comprehensive model for the second pillar of occupational pension funds, including the pension funds' behaviour with regard to funding. On the government side the model assumes tax smoothing based on perfect foresight about

future expenditure and revenues. At any time, the rate for indirect taxes (consumption tax) is adjusted to ensure sustainability of government finances. This happens only from the perspective of the government; it does not adjust the government tax rate to the variations in the implicit tax of pension funds.

In other respects the model is necessarily kept simple, so that the results have yet to be treated with care. First, it is based on perfect foresight and perfect capital markets. As a result there is perfect substitution between – mandatory – pension savings and private savings. Second, the production side of the model is of the utmost simplicity, assuming perfect international mobility of physical capital. Also there is only one representative type of households in each cohort. These simplifications help to focus on the pension system and its consequences for government finance.

Below we discuss two cases of pension reform aiming to reduce the replacement rate of pensions from 70 per cent to 60 per cent. The first case concerns the defined benefit (DB) system and the second a defined contribution (DC) system. In the first case the reduction in pensions concerns both old and new participants. For the current participants, who already have built up pension entitlements, this means a direct loss as their expected pensions are reduced. In the DC system the change only concerns the new pension savings. Old pension savings are not affected. In both cases it is assumed that the implicit tax subsidy is downsized accordingly.

Downsizing pensions in a defined benefit system

A reduction in pension savings is modelled by assuming that pension funds reduce the replacement rate of pensions from 70 per cent to 60 per cent of final earnings. This reform is carried out by cutting existing entitlements of workers; pensions of those who are already retired are unaffected. Also the accrual rate for new entitlements is reduced. Table 4 gives an overview the results for pension funds as well as for the government. All effects are measured in deviations from a baseline scenario. The reform is implemented in 2010.

First of all, contribution rates drop by 3.0 percentage points around 2015. This effect precedes that of the downscaling of pension payments, which reaches a similar reduction some 35 years later. Interestingly, employment improves in the first years after the reform up to 2025, but deteriorates in the more distant future. The initial positive effect can be explained as follows. Since the pension reform in the first year especially hits the "old" entitlements that have been built up in the past, this cut is non-distortionary with regard to the labour market decision. The loss in pension wealth is "sunk" to all current workers. Then the fall in contribution rates which follows from the improved funding ratio of pension funds has a stimulating

Table 4. **Effects of a reduction in DB pensions from 70 per cent to 60 per cent of final earnings in 2010**[1]

		2015	2025	2050	2100
Pension contributions (% of wage sum)	D	–3.0	–2.6	–1.6	–1.7
Pension payments (% of wage sum)	D	–0.5	–1.6	–3.1	–3.2
Tax revenue (% of GDP)	D	0.1	0.3	0.1	0
Public debt (% of GDP)	D	–4.0	–8.5	–12.8	–14.6
GDP (market prices)	%	0.5	–0.1	–0.3	–0.4
Private employment (labour years)	%	1.1	–0	–0.3	–0.3
Consumption	%	–0.3	–0.4	–0.4	–0.5
Tariff consumption tax	D	–0.1	–0.1	–0.1	–0.1

1. Averages over the preceding five years; D indicates an absolute differential *vis-à-vis* the baseline scenario, % indicates a relative change. Pension replacement rate concerns pensions as a percentage of final pay.

effect on labour supply. That is, the implicit tax in the contribution rates decreases. Employment is further stimulated by the fall in the tax rate.

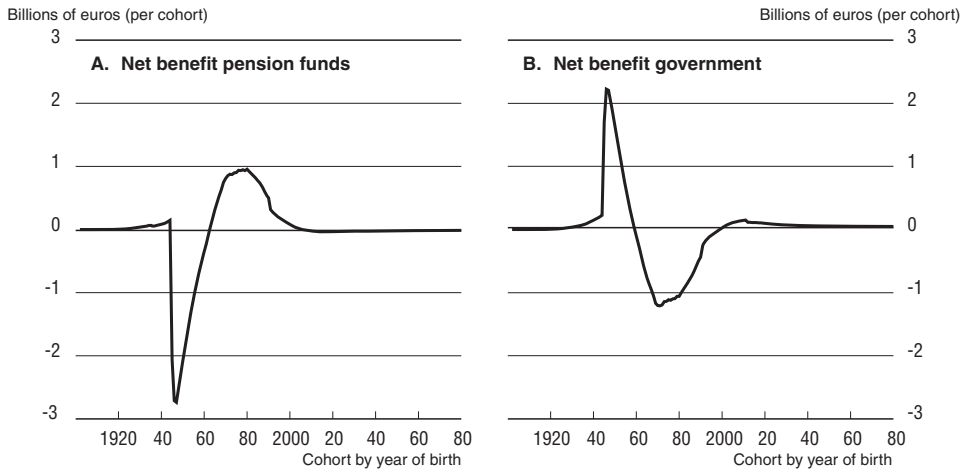
In the more distant future, the initial positive influence of the reform diminishes, and the negative effect of the smaller tax subsidy on pension savings becomes dominant. On average, employment declines by some 0.3 per cent in the long run, beyond 2025. This negative effect is due to the fact that favourable tax treatment of pension savings in a mandatory system acts as a subsidy to labour.

The impact of the pension reform on GDP largely mirrors the impact on employment, starting with a small gain turning into a small loss in the distant future. On average over time households appear to be worse off, however, which leads to a fall in consumption *vis-à-vis* the baseline path.

Government finance is influenced in two opposite ways. On the one hand, the downsizing of pension savings implies an equivalent reduction in tax expenditures. This has a positive effect on government finances. On the other hand, the fall in consumption and the mixed effect on employment and GDP lead to a smaller tax base, which has a negative effect on the government budget. The first effect dominates, so that the government can reduce its rate of indirect taxes, in this case by 0.1 point over an infinite time horizon. This adjustment in tax rates follows from the condition of sustainability of government finances. The time path of public debt changes, however, to show a gradual decline over time. This follows from the principle of tax smoothing according to which the initial positive impact on the government budget is spread over time so that also future generations benefit from it.

The cut in pension wealth of the older generations leads to a redistribution in favour of future generations. The – funded – pension system is a zero sum game. This is shown by the first panel in Figure 3 which shows the net benefit from the

Figure 3. **Intergenerational effects of a reduction in DB pensions from 70 per cent to 60 per cent in 2010**[1]



1. The horizontal axis features the year of birth, the vertical axis the present value of total net benefits for the cohort in billions of euros in 2001.

pension system for each cohort, indicated by date of birth. The net benefit is given by the present value of pensions and contributions, discounted by a real discount rate equal to the rate of return on pension funds' portfolios. (In this analysis we neglect possible gains from intergenerational risk sharing.) These figures show that the generations born between 1940 and 1960 are most severely hit by the pension reform. As the reform takes place in 2010 this means that all cohorts aged between 40 and 65 suffer from this reform. The younger and future generations gain. Those who are already retired at the time of the reform have a slight benefit as they share a bit in the improvement of the financial position of the pension fund due to the fall in liabilities. Furthermore, they benefit from the lower consumption taxes.

Interestingly, part of the loss of the older working generations is compensated through the government budget, as is the gain for the young generations. This can be seen from the net benefit from the government, the second panel in Figure 3. The net benefit from the government is defined as the discounted sum of expenditures minus taxes paid. Discounting by the risk free rate, the sum of – changes in – net benefits over all generations is zero, as in the case of pensions.

The government budget thus acts as insurance for shocks in the private sector, including shocks in the pension system. That is, at an average tax rate of 40 per cent almost half of the loss in pension income is borne by the government, and

ultimately spread over all taxpayers. Through this tax insurance, part of the loss of the older workers is redistributed towards younger generations.

Pension reform in a defined contribution system

Next consider a reduction in pension savings in a defined contribution (DC) system. Unlike in the case of the DB system considered above, existing entitlements that have been built up in the past are not affected by the policy reform. Only the new savings are influenced. As we will see this leads to quite different results. The reform is modelled by assuming that the contributions of all participants are reduced such that the expected pension will fall from 70 per cent to 60 per cent of the average pay. So the reduction is of the same size as in the DB case. The timing may be different however, as it only applies to the new savings in the DC case, leading to a gradual fall in pensions in the future. Also the distributional impact is very different. In the DC case the net benefit from the pension system remains the same – that is, zero – for all generations, while in the DB case old workers lost and young generations benefited.

The crucial difference in results (Table 5) is that now employment is reduced by the pension reform right from the start. The explanation for this effect is simple: together with the reduction in pensions the implicit tax subsidy on pension savings is also reduced. This reduction in the subsidy makes labour supply less attractive. The negative employment effect drives the other results in this case. GDP declines in proportion to employment and consumption falls equivalently. The government budget is affected in two ways: on the one hand, the downsizing of pensions implies a reduction in tax expenditures, thereby relieving the budget; on the other hand, the decline in economic activity has an adverse effect on government finance. On balance the reduction in tax expenditures dominates, so that the government can marginally reduce the tax rate on consumption.

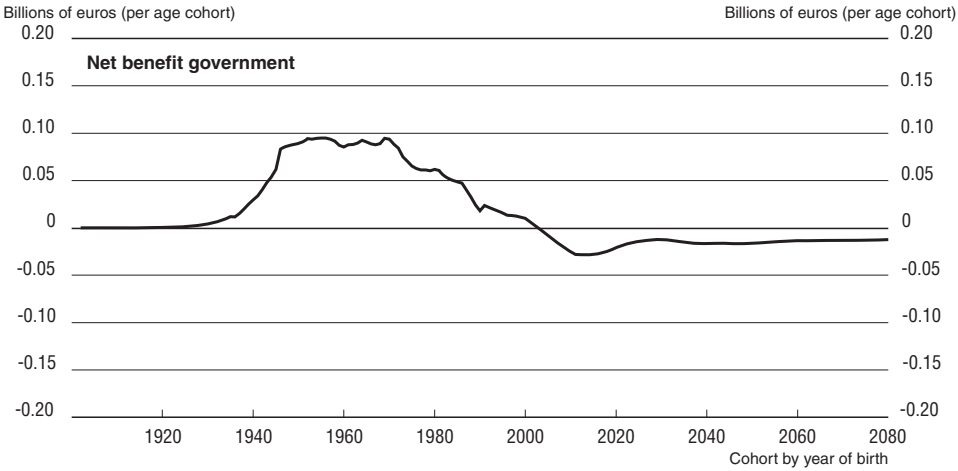
Table 5. **Reduction in DC pensions from 70 per cent to 60 per cent of average earnings in 2010**[1]

		2015	2025	2050	2100
Pension contributions (% of wage sum)	D	–1.6	–1.3	–1.6	–1.7
Pension payments (% of wage sum)	D	0	–0.3	–1.6	–3.1
Tax revenue (% of GDP)	D	0.3	0.2	0.2	0
Public debt (% of GDP)	D	–1.2	–3.3	–6.8	–10.3
GDP (market prices)	%	–0.2	–0.3	–0.3	–0.3
Private employment (labour years)	%	–0.3	–0.2	–0.3	–0.3
Consumption	%	–0.2	–0.4	–0.6	–0.6
Tariff consumption tax	D	–0.03	–0.03	–0.03	–0.03

1. Averages over the preceding five years; D indicates an absolute differential *vis-à-vis* the baseline scenario, % indicates a relative change.

Who benefits from this reform can be seen from Figure 4. Since the net benefit from the pension system is zero by definition the figure only gives the impact on the benefit from the government. As existing pension entitlements are not affected, there are only small intergenerational effects. On balance, the younger and future generations suffer from this reform and the older generations benefit. The reduction in pension savings thus causes a re-distribution in favour of older generations. They benefit from the reduction in consumption taxes, which – for them – dominates the effect of the cut in tax subsidy on pension savings. The gain is expressed in present value (€ in 2001) for the cohort as a whole. For an individual the gain can amount up to some € 500 (for the cohort born around 1960).

Figure 4. **Intergenerational effects of a reduction in DC pensions from 70 per cent to 60 percent in 2010; net benefit from the government**[1]



1. The horizontal axis features the year of birth, the vertical axis the present value of total net benefits for the cohort in billions of euros in 2001. The effect is measured as the change *vis-à-vis* the baseline scenario.

It should be noted that these results depend on two crucial assumptions. First, the tax subsidy decreases in proportion to the size of pension savings. This follows from the present tax system where pension savings are exempt from capital taxation, and where marginal effective tax rates are lower for pensioners than for workers (about 30 per cent and 40 per cent, respectively). The second assumption is that the proceeds of the reduction in tax expenditures are used for a cut in consumption taxes. As pensioners benefit from the lower consumption tax while they do not suffer from the reduction in – new – pension savings, this leads to a redistribution in favour of the older generations. If, in contrast, the government

would use the proceeds to reduce the tax on labour, the intergenerational redistribution could be avoided.

CONCLUSION

The large pension savings accumulated in the – funded – second pillar contribute significantly to the sustainability of government finance in the Netherlands. The increase in tax revenues on pension income is sufficient to compensate for the rising needs of the government for the financing of public (first pillar) pensions. The rising tax revenues from pension income are not sufficient, however, to cover all costs of demographic change; in particular the rising health care expenditure puts a further burden on the government budget. Therefore, a steady reduction in public debt is required to restore sustainability. This occurs as a result of changing sizes of different tax bases, while tax rates for each base are held constant in line with the definition of sustainability used in the paper. More specifically, as capital income and consumption increase in an ageing society, sustainability will be consistent with a rising share of tax revenues in GDP (but not necessarily in national income).

The accounting framework provides a useful benchmark for analysing the sustainability of public finances. It is less suited for analysing the impact of a change in tax favoured pension savings on government finance. For such analysis we need a more comprehensive account of underlying economic behaviour. Applying a general equilibrium OLG model (GAMMA) for the Netherlands, we find that downsizing the second pillar could have considerable positive effects on the economy as well as on the government budget in the case of a defined benefit system. We consider a pension reform aiming to reduce pensions from 70 per cent to 60 per cent of the final wage. In essence, the positive effect in the DB system arises from a cut in existing pension entitlements, which does not harm the labour supply decision. This cut in "old" pension entitlements also means that younger generations benefit from the intergenerational redistribution through the pension funds. This result changes, however, in the case of a defined contribution system. Here pension savings accumulated in the past are unaffected, and the policy reform only concerns new pension savings built up by current and future workers. Although the result is the same in terms of pension levels, the economic effects are completely different. In this case, the younger and future generations are worse off because they benefit less from the favourable tax treatment of pension savings, whereas the present older generations benefit from the improvement in the government budget, and the ensuing reduction in consumption taxes. In both the DB case and the DC case the government budget improves as tax favoured pension savings are reduced. However, how much the government benefits depends on the economic consequences of the policy reform, which can be very different for each specific case.

Appendix

The GAMMA model

GAMMA is an intertemporal applied general equilibrium model of the Dutch economy. GAMMA extends the generational accounting (GA) framework in order to account for relevant economic behavioural effects. In particular, the GAMMA model includes optimising forward looking saving behaviour and endogenous labour supply of households, tax smoothing by the government, and behavioural responses by pension funds.

Demography

The demographic model of GAMMA describes the development of the population, as has been drawn up by Statistics Netherlands (CBS). The demographic model is made such that it can reproduce the projection of the CBS, with one concession: it assumes a maximum age of 99. The demographic model distinguishes between men and women, with different mortality probabilities. Men and women are then differentiated into age cohorts. Immigration, emigration, birth and mortality determine the change of the population-cohort-size.

The public sector

Revenues for the public sector consist of revenues from income taxation, corporate taxation and indirect taxation, as well as social security contributions. Income taxes consist of labour income taxes, transfer income taxes, taxes on public pensions, taxes on private pensions, taxes on imputed income from wealth and other income taxes. Corporate taxes are levied on firms' profits; indirect taxes are levied on consumption and investment. The government has also non-labour income from the sale of natural gas and from public assets. All government expenditure grows with wages. The demographic impact on government expenditure is accounted for by extrapolating given age profiles for each type of expenditure.

Households

The life cycle model provides the basic theoretical framework for modelling household behaviour. According to the life cycle theory, households rationally choose levels of current and future consumption. Labour supply is age-dependent and endogenous. Labour supply features a zero income effect, so that there is no intertemporal substitution of labour. Households fully take account of the implicit tax in pension contributions. Every household is represented by a finitely-lived adult. Lifetime uncertainty is assumed to be diversified by letting each household receive an annuity from a life insurance company in return for bequeathing it its remaining assets upon its decease (Yaari, 1965).

Firms

Production takes place with labour and capital according to a CES production technology. The Dutch economy is considered to be small relative to the outside world. Factor prices are determined on world markets. Goods produced at home are perfectly substitutable with those produced abroad. The firm can sell its product at the given market price. Capital deteriorates at a constant rate. The productivity of labour is assumed to depend on both age and calendar time. In particular, different age cohorts have different productivity levels. Apart from their productivity, labour supplied by households of different ages is homogeneous. Firms maximize the discounted value of their future dividend flows. The dividend payments equal revenue minus the wage bill, corporate taxes and investments. The tax base for corporate taxes consists of revenues minus the wage bill and fiscal depreciation allowance. Fiscal depreciation is based on the historical cost price of investment, and is geometric.

Pension funds

Private pension funds adjust their contribution rates in order to achieve equilibrium on their actuarial balance. Equilibrium at the actuarial balance holds if the discounted value of future liabilities equals the sum of the discounted value of future premiums and current wealth. Liabilities consist of current and future benefits for present-day pensioners and of future claims of present-day workers. Old-age benefits are indexed to prices and partly to productivity, reflecting the financial situation for the average Dutch pension fund.

BIBLIOGRAPHY

AUERBACH, A.J, W.G. GALE and P.R.ORSZAG (2004), "The US Fiscal Gap and Retirement Saving", in this issue.

AUERBACH, A.J., J. GOKHALE and L.J. KOTLIKOFF (1991), "Generational Accounts – A Meaningful Alternative to Deficit Accounting", NBER *Working Paper* 3589.

AUERBACH, A.J., L.J. KOTLIKOFF and W. LEIBFRITZ (1999), "Generational Accounting Around the World", NBER *Project Report series*, Chicago and London: University of Chicago Press.

BLANCHARD,O.J. (1990), "Suggestions for a New Set of Fiscal Indicators", OECD *Working Papers*, No. 79, Paris.

BÖRSCH-SUPAN, A.(2004), "Mind the Gap: The Effectiveness of Incentives to Boost Retirement Saving in Europe", *Discussion Paper* No. 52-04, Mannheim Research Institute for the Economics of Aging, also in this issue.

BOSKIN, M. (2003), "Deferred Taxes in the Public Finances", Hoover Institution, July.

BOVENBERG, A.L. and H. TER RELE (2000), "Generational Accounts for the Netherlands: An Update", *International Tax and Finance* 7, pp. 411-430.

DRAPER,D.A.G. and E.W.T.M. WESTERHOUT (2002), "Ageing, Sustainability and the Interest Rate: The GAMMA Model", CPB *Report* 2002/4, pp. 38-41.

ECONOMIC POLICY COMMITTEE (2003), "The Impact of Ageing on Public Finances: Overview of Analysis Carried Out at EU Level and Proposals for Future Work Programme", *mimeo*, EU, Brussels.

TER RELE, H. (1998), "Generational Accounts for the Dutch Public Sector", *De Economist*, 146, pp. 555-584.

VAN EWIJK, C., B. KUIPERS, H. TER RELE, M. VAN DE VEN and E. WESTERHOUT (2000), "Ageing in the Netherlands", CPB Netherlands Bureau for Economic Policy Analysis, The Hague.

VAN EWIJK, C. and M. VAN DE VEN (2003), "Pension Funds at Risk", CPB *Report*, 2003/1, pp. 22-27.

VAN EWIJK, C. and H. TER RELE (1999), "Ageing and Fiscal Policy in the Netherlands", *De Economist* 147, pp. 523-534.

WHITEHOUSE, E. (2002),"Pension Systems in 15 Countries Compared: The Value of Entitlements", Centre for Pensions and Superannuation Discussion Paper 02/04.

YAARI, M.E. (1965), "Uncertain Lifetime, Life Insurance, and the Theory of the Consumer", *Review of Economic Studies*, 32.