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**DUTCH PENSION FUNDS IN UNDERFUNDING:
SOLVING GENERATIONAL DILEMMAS**

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Abstract

Pension funds in the Netherlands are facing their second solvency crisis within a period of six years. As most Dutch pension funds effectively are arrangements of intergenerational risk sharing, especially the larger sector pension funds, the necessary recovery process implies various generational dilemmas. We distinguish various policy options, among them contribution rate increases and benefit cuts, and compare them on the aspect of intergenerational redistribution.

Most pension funds in the Netherlands stem from the 1950s, and the current pension plan setting still reflects standards of that period. This practice is currently at stake. The introduction of a new regulatory framework built upon fair-value accounting and risk-based solvency supervision forces pension funds to reconsider their pension plan design and funding process. We discuss a number of reform proposals that currently are in debate.

Keywords: Pension funds, the Netherlands, intergenerational redistribution, pension plan reform, underfunding.

JEL classification: H55

1 Introduction

Pension funds in the Netherlands are facing their second solvency crisis within a period of six years. The current crisis is by far more severe than the first one. The nominal funding ratio of most pension funds fell below the threshold of 105% at the end of 2008, and in most cases, it is not defined who of the stakeholders has to make up for the deficit. The supervisor requires recovery of the funding ratio to at least 105% within five years.¹ In the Netherlands, it is not always the sponsor that has to fund the deficit. The risks are mainly borne by the members (line in mutual insurance). As most Dutch pension funds effectively are arrangements of intergenerational risk sharing, especially the larger sector pension funds, the necessary recovery process puts the pension funds in a difficult position of facing various generational dilemmas. This paper highlights these dilemmas. A way to cope with them may be found in introducing age differentiation in the pension plan and the funding process. Age differentiation will replace the current uniform rules, which are irrespective of age, for all plan participants.

2 Dutch pension plans as intergenerational risk-sharing contracts

Pension plans in the Netherlands effectively organize risk sharing between younger and older plan participants. Stemming from the 1950s and similar to those in the UK and the U.S., pension funds were set initially as traditional defined benefit (DB) plans. In the UK and the U.S. in past decades, there has been a trend to replace the traditional DB plans with individual defined contribution (DC) pension plans. Most plans in the Netherlands remained structured as DB plans, but the pension promise became less secure than the traditional DB plans.² These plans were replaced after 2000 by either DB plans with conditional indexation or by collective DC plans. This shift in plan design was forced by the deterioration of the funding position of most pension funds after 2000.

¹ The regulator and supervisor already stretched the normal recovery period of three years by two extra years.

² Some corporate plans still maintain traditional DBs with the sponsor bearing the consequences of underfunding.

The main characteristics of the various plans are as follows (cf. Blommestein, et al. 2009, Ponds and van Riel 2009):

(I) Traditional (final pay and career average) DB plans

In these plans, a formula links benefits to wages and the length of the service period. The replacement rate is fixed as a percentage of the worker's final or career average wage. To the extent that benefits are paid as inflation-indexed annuities, pensioners face no benefit risk. These types of plans therefore shift all risks related to benefit provision to the sponsoring employer, and to current and future workers (in the form of contribution risk).

(II) DB plans with conditional indexation

In these pension arrangements, benefits are calculated as in traditional DB plans except that indexation of pensions in payments and in some cases accrued benefits is conditional on the plan's funded status. This is often ruled via a ladder by which the indexation one-to-one is related to the funding status. Full indexation is given when the funding ratio is higher than some threshold, no indexation is given when the funding ratio has fallen below some threshold, and there is partial indexation when the funding ratio is in between the low and the high thresholds.

(III) Collective DC plans

In a collective DC plan, contribution rates are fixed. Benefits are calculated as in traditional DB plans but to the extent of indexation and nominal benefits are linked to the plan's funded status. Nominal accrued benefits and even nominal pensions in payment can be cut if the funding ratio falls below a certain level. Pensioners, therefore, face greater benefit risks than under the previous pension arrangements.

So the recent plan redesigns have safeguarded the DB nature of plans at Dutch pensions plans (to a large extent). The 600 pension plans (at the end of 2008) have a lot in common. Below we characterize the key aspects of the various plans. The first four aspects are present in *DB plans with conditional indexation* as well as in *collective DC plans*. The last one, uniform benefit cuts, is present only in *collective DC plans*.

- [1] **Uniform accrual rate:** employees build up for each year of service around 2% of their (pensionable) wage as new pension rights.³ A career of 40 years gives a pension income of 80% of the average wage over the career – that is, on average, around 70% of final pay for most workers.
- [2] **Uniform contribution rate:** all employees pay the same contribution rate over their pensionable wage. The contribution rate is set yearly such that the yearly contributions match the present value of new accrued liabilities by employees due to an additional year of service, plus buffer requirements and indexation ambition.⁴
- [3] **Uniform indexation rate:** the accrued liabilities of all plan participants are indexed yearly in a uniform way. Usually the aim is to index with the wage growth rate of the industry or the company of the corresponding pension fund. A number of pension funds differentiate in their indexation policy for employees (indexation linked to wages) and retirees (indexation linked to price inflation). The actual indexation rate is conditional on the financial position of the pension fund.
- [4] **Uniform asset mix:** the pension fund wealth is held in one asset mix.
- [5] **Uniform cutting of nominal benefits** (only for CDC plans): if and when benefits will be cut, all benefits will (most likely) be cut with the same percentage. This will most impact members with the highest pension accrual, the group closest to the retirement age (pre and post).

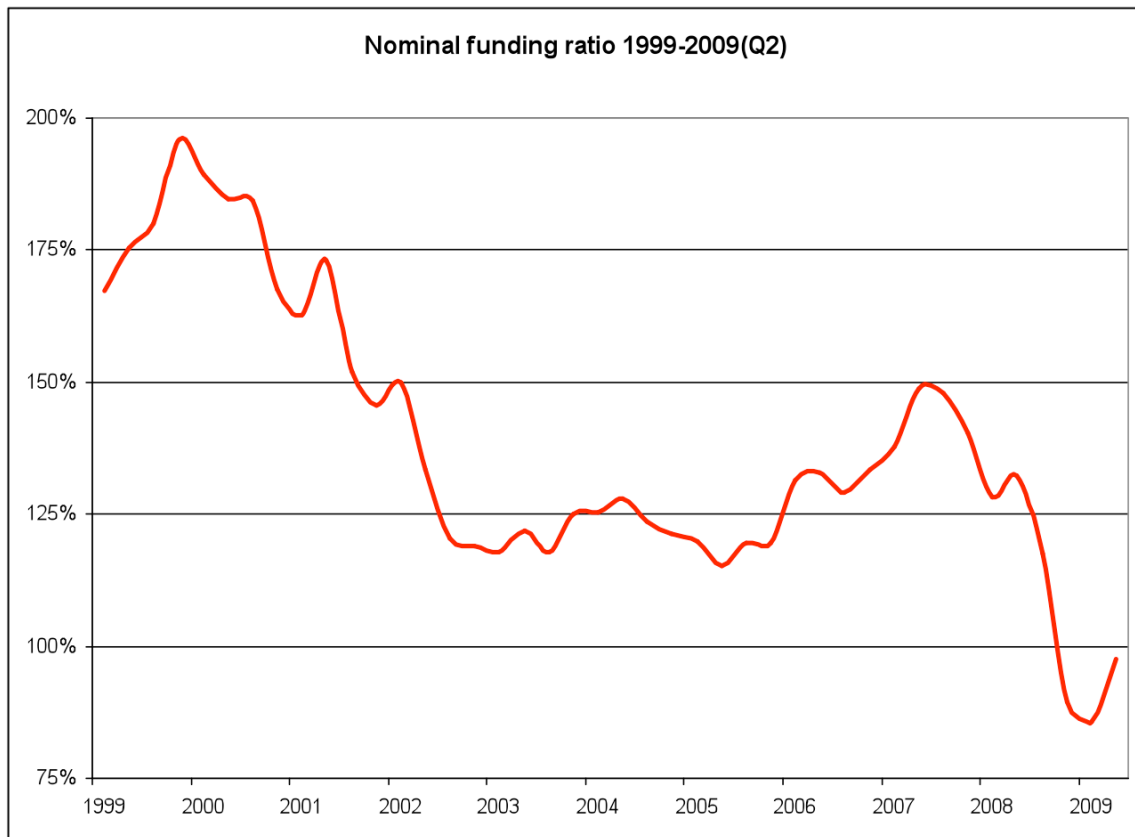
³ Maximal 1.75% for final pay plans.

⁴ There are some exceptions, especially for funds with lower indexation ambitions.

3 First pension crisis (2001-2003)

Figure 1 displays the course of the nominal funding ratio of a typical Dutch pension fund over the past 10 years. The funding ratio is defined as the ratio of assets over the nominal value of the accrued benefit obligations, marked to market using swap yields.

Figure 1: Nominal funding ratio of a typical Dutch pension plan (1999 Q1 – 2009 Q2)



In 2003, the funding ratio reached a low amidst the dotcom crisis, after the peak of the ratio at the end of the '90s. In reaction to the sharp drop in pension funding, the Dutch government imposed strict new funding requirements in 2002. Dutch pension funds started to reconsider their pension plan design in order to improve their risk absorption capacity and to meet the new regulatory requirement. Almost all pension funds switched from a final-pay plan with de facto unconditional indexation to an average-wage plan with solvency contingent indexation of all accrued liabilities. Conditional indexation is often ruled with a so-called policy ladder by which the indexation policy and contribution

policy explicitly one-to-one is related to the financial position of the pension fund (Ponds and van Riel 2009). The introduction of the policy ladder improved risk management capacity of pension funds considerably. Some pension funds took one step further by switching to the collective DC plan.

4 Second pension crisis (2008)

The nominal funding ratio slowly recovered from the low in 2003. From 2007 onward, the funding ratio fell in a dramatic way from a high on average of 150% mid-2007 to less than 90% in the first quarter of 2009. This fall was the combined effect of the worldwide fall in stock prices and the fall in nominal interest rates driving up the (market) value of nominal liabilities. In particular in the fall of 2008, the economic conditions deteriorated. Table 1 reports that in February 2009, just 15% of the funds met the solvency requirements of the supervisor. Of the funds, 85% had a nominal funding ratio below 105%. In September 2008, this was almost the opposite, as only 12% of the funds had a funding ratio below 105%.

Table 1: Development nominal funding ratio pension funds amidst the credit crisis

	Sept. '08	Dec. '08	Jan. '09	Feb. '09
Higher than 125%	37%	10%	7%	6%
Between 105% and 125%	51%	16%	13%	9%
Lower than 105%	12%	74%	80%	85%
	100%	100%	100%	100%

Source: DNB

5 Closing the recovery gap: policy variants and generational redistribution

DNB, the supervisor, requires a recovery of the funding ratio to be at least 105% within five years' time.⁵ Part of the recovery will come from the excess return above the nominal rate of interest (discount factor nominal liabilities) and from contributions being higher than the nominal accrual. When this is not sufficient, additional measures have to

⁵ Furthermore, pension funds have to restore the funding ratio to the solvency test funding ratio of 125% for an average Dutch pension fund within 15 years.

be taken in order to meet the supervisory requirement of recovery within five years to a 105% nominal funding ratio.

We consider a number of policy options that can be used to speed up the recovery process (Boeijsen et al., 2009). Each of these options will have impact on the participating generations. Solidarity always has two sides: there is a group of beneficiaries and a group of contributors. On balance, the sum of the gains and losses is by definition zero. What one group gains is a loss for the other.

We distinguish various policy options and compare them by looking at the net change in the position of generations of one policy option versus the alternative. Box A explains the method of value-based ALM that is used to calculate the generational effects and generational redistribution.

Box A: Value-based ALM

We make use of the method of value-based ALM (Kortleve and Ponds 2006, Hoevenaars and Ponds 2008). Value-based ALM is complementary to a classic ALM analysis, which is intended mostly to identify the risk distribution of significant pension fund variables. In classical ALM, the uncertainty surrounding future variables are analyzed, and choices are then made with regard to the fund policy to be adopted on the basis of an evaluation of the expected values and risk (and probabilities) for the current policy and alternative policies. An evaluation of pension fund policy on the basis of (future) risk distribution alone provides insight into the possible value transfers between generations. An understanding of these transfers is important in order to prevent unintended and/or undesirable transfers. Such transfers can be the result of an imbalanced distribution of burdens (risks, contributions) and benefits (undertakings, indexation) amongst the interested parties.

In value-based ALM, stochastic discount rates (deflators) or risk-neutral valuation techniques are used to value the future uncertain output from the classic ALM analysis (for a technical treatment of the derivation of stochastic discount rates in an ALM context, see Hoevenaars and Ponds 2008 and Kortleve et al., 2006). So the policy of a pension fund is evaluated not only on the basis of risk distributions, but also in terms of (present) economic value. The approach is as follows: by determining all contributions, benefits and investment returns for each future scenario and by calculating current value using the stochastic discount rate applicable to each scenario, we arrive at the current economic value of these cash flows. “Economic value” means here the cash value in euros today date of uncertain future cash flows.

So classic ALM and value-based ALM both are useful. Classic ALM allows us to see how a policy variant performs under significant variables such as expected values and risks concerning the level of contributions, indexation and the development of a financial position for the fund as a whole. Value-based ALM allows us to see the economic value in euros of participation in the

fund by various members, and how large the possible value transfers between members of a pension fund are.

In order to have explicit property rights so that we can calculate generational effects, we define a closure rule. The rule states that at the end of the evaluation period, the fund will be virtually closed and the wealth at that moment will be distributed among the participants in proportion to the value of their nominal liabilities. We then compare the value for the various generations in the situation with a funding ratio of 95% with a situation at the peak, when the funding still was 150%. The change in the present value per generation gives insight in the generational redistribution due to the underfunding.

Table 2: Policy options of pension plan analyzed

Reference point [1]	Start of 2008 (no additional measures)
Option 2	End of 2008, without additional measures
Option 3	End of 2008, workers pay 2.5% additional contributions
Option 4	End of 2008, workers pay 2.5% additional contributions and liabilities receive full indexation
Option 5	End of 2008, with possible benefit cuts after three years

The reference point is the start of 2008 when the funding ratio still was 150%. We compare this reference point [1] with the same fund at the end of 2008, when the funding ratio was 95%. In policy option [2] the pension fund takes no additional measures. Figure 2 shows the generational effects from the fact that a pension fund experienced a funding ratio decline from 150% to 95%. The figure clarifies that – given the fact that the fund has underfunding – the continuation of the fund is beneficial for the older members. A positive bar means that the generation benefits from the solidarity in the coming 15 years; a negative bar implies the opposite result, that the generation on balance loses in the solidarity. The numbers are expressed in euros per year per full-time equivalent.

The older cohorts, 55 and older, benefit from the continuance of the solidarity, the generations of 50 years old and younger lose. They will receive at least 100% of their nominal liabilities in the coming 15 years, assuming the pension fund is not going to cut

benefits. If the fund is to recover in the not too distant future, they will even get partial indexation, which will lead to benefits of over 100%. The working generations will lose. They pay more contributions than the value of new liabilities in the coming 15 years because the actual indexation falls behind full indexation. Part of the inlay of the active members will be used to pay out the full 100% to (future) retirees and possibly also to indexation for this group.

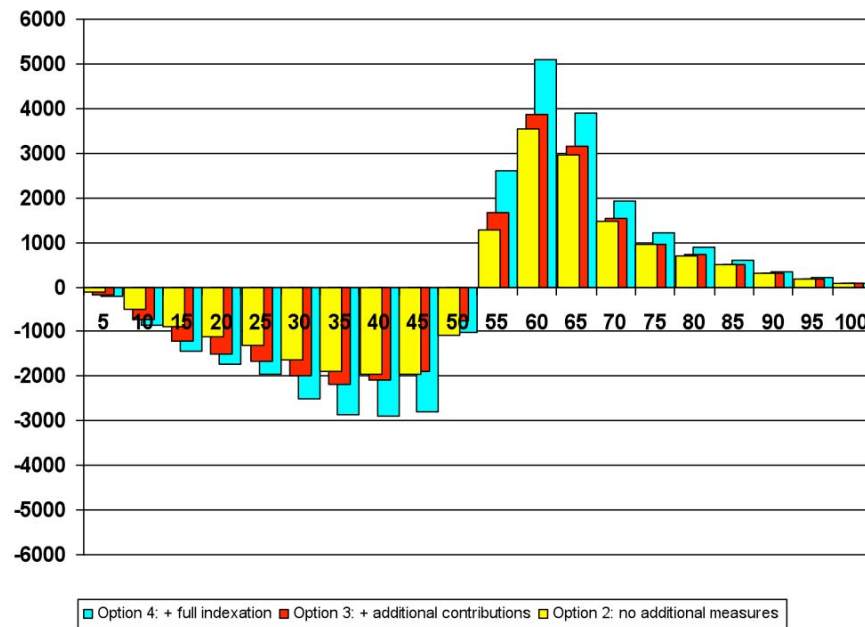
In option [3], workers pay additional contributions – 2.5% of the pensionable wage⁶ – as long as there is underfunding in order to fasten the recovery of the fund. As Figure 2 shows, the redistribution from young to old increases. As we evaluate the coming 15 years, Figure 2 and Figure 3 also report the effects for young cohorts that will participate in the labor force within 15 years' time. For the younger members, the difference between the value of contributions and the value of accrued liabilities further increases, since they have to pay extra contributions, which will not be fully beneficial for themselves only. For the older members, the recovery of the funding ratio is speeded up, so that on balance, more indexation is paid in the coming 15 years: they get higher benefits paid out.

In option [4] it is assumed that full indexation always is given. Option [4] is a combination of additional contributions and full indexation. Clearly the redistribution from younger members to older members further increases as retirees in no way participate in absorbing the funding deficit.

Option [5] allows for cuts in the accrued nominal liabilities. Option [5] is modeled like option [2] but after three years a cut in nominal benefits equals the size of the recovery gap at the end of the three-year period. The redistribution from young to old is reduced considerably as the cut in nominal liabilities warrants that more of the recovery burden is borne by the elderly.

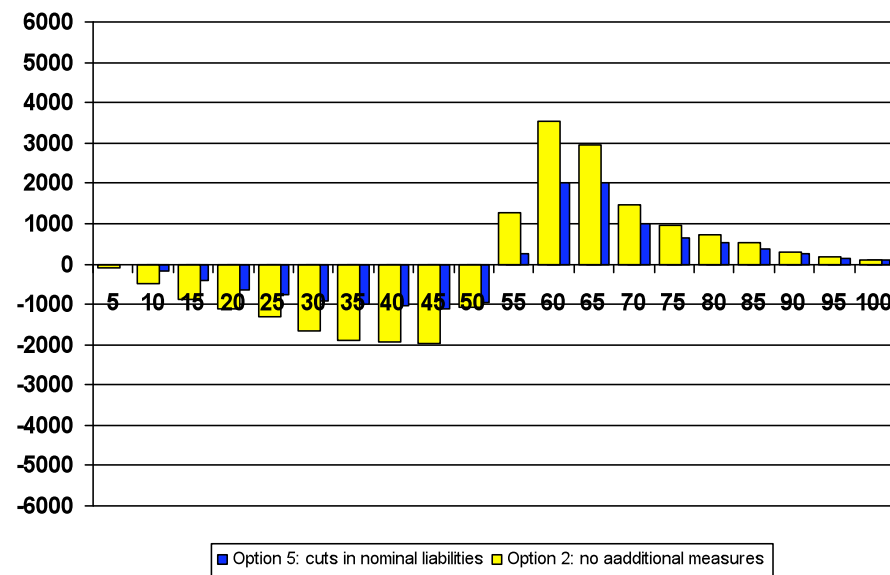
⁶ This is roughly equal to 2% of salary.

Figure 2: Intergenerational redistribution from young to old of policy options due to underfunding*



*) x-axis: cohorts with their age in 2008; y-axis: transfer from / to cohort

Figure 3: Cuts in nominal benefits redistribute from old to young due to underfunding*



*) x-axis: cohorts with their age in 2008; y-axis: transfer from / to cohort

6 Lessons for pension fund plan design

Most pension plans in the Netherlands stem from the 1950s. Accounting and supervision from the '50s up to the millennium were based more or less on rules of thumb and book value principles. Risk was not addressed for explicitly and seemed less of an issue since the new entering generation always used to be bigger in size and therefore relatively easy able to bear the risks of the previous generation. Conditions have been changed radically in the past 10 to 20 years. Market value principles, fair-value accounting, risk-based supervision and the like entered the pension sector. This change did not fit well with the core characteristics of Dutch pension plans, like the implicit and “unconstrained” risk sharing and focus only on the long run. Furthermore, since the early '90s pension funds in the Netherlands have increased considerably the share of risky assets in their portfolio. This increased risk appetite was needed to meet simultaneously the ambitions of pension fund governors of payable pensions (low contribution rate) as well as high pension quality (full wage indexation).⁷ However, in a fair-value framework, the higher risk taking made funding ratios more vulnerable for financial market risks (and market exaggerations).

We do not think that pension fund finance should be rebased on book-value principles and rules of thumb. It is a pity to have to note that regulatory principles will reshape pension plans, not the other way around. The pension plans of the '50s have to be updated to the standards of today. Therefore, pension funds in the Netherlands are faced with the need to reconsider their pension plan design and funding process. They may come up with either a redesign of the pension plan in operation so that more funding risk is borne by plan members or with a redesign of their funding strategy in the direction of a more conservative mix to control for solvency risk. With an ageing population, the latter option will lead to either high contributions or low benefits, both unattractive perspectives.

⁷ As well as the increased longevity.

We believe that there is – still – an almost nationwide support to continue with collective pension plans and the involved risk sharing. However, it is also recognized that redesign is needed (Verheij 2008, Gortzak 2008). This redesign has to improve the sustainability of plans in operations. The next section discusses a number of ideas put forward to improve the current setup.

7 Recommendations

We end with a list of policy recommendations for the pension industry in the Netherlands. These recommendations should solve the sketched intergenerational dilemmas. Social partners and pension fund trustees should discuss these and preferably follow all of them. Good counter-arguments are of course very welcome.

1. Sustain the elements of collectivity and solidarity in Dutch pension plans but reshape them to current standards in line with fair-value-based accounting and supervision practice.
2. Make more transparent who bears when, what kind and what level of risks.
3. Switch from a uniform policy (all ages have same risk profile) to age differentiation in risk exposure.
4. Switch from a uniform accrual rate to a degressive accrual rate to eliminate redistribution from young to old workers.
5. Use retirement age as a steering mechanism and link it one-to-one to life expectancy.
6. Use value-based ALM to highlight value redistribution in policy (re)setting.
7. Use utility-based ALM to rank policy options to the preferences of plan stakeholders using utility functions and preferences of stakeholders.

8 Pension plan redesign

This next section outlines three ideas according to recommendations 3, 4 and 5.

[1] Age differentiation

A promising route is seen in age differentiation of the pension plan itself and the funding process. Currently, plan members are offered the same risk exposure, as there is a uniform conditional indexation rule and a uniform asset mix. A uniform risk profile for all ages is not optimal from the perspective of life-cycle theory (Cocco et al., 2005, Ibbotson et al. 2008). As a pension fund is a compilation of young and old plan members, the pension fund must choose the risk profile from the perspective of the average plan member. The life-cycle approach clarifies that for the young, this risk profile is too conservative and for the older participants, the chosen risk profile is too aggressive. For young people, this makes the pension plan too expensive (higher contributions) or too poor (lower benefits/indexation); for the elderly, the plan is too risky, with too much uncertainty about their purchasing power. Moreover, most pension funds will have an increasing share of retirees among their participants, as the funds are getting more mature. A grey fund will be oriented at a conservative asset mix and that is not in the interest of the younger plan members. Various ideas have been put forward to introduce age differentiation within a collective pension plan setting (Molenaar et al. 2008).

One is age differentiation in the indexation rule. Currently, for all ages, pension benefits are indexed in a uniform way. Usually indexation is related to the wage growth of the industry. The proposal of an age-dependent indexation rule was put forward to relate the indexation for the younger to the real rate of return on some defined asset mix (this might be the pension fund asset portfolio) and for the elderly give (almost) certain full indexation at all times. The real rate of return is the gross rate of return on the asset mix minus the real discount factor of the liabilities. The return-related indexation is substituted for the wage-related indexation. With an age-dependent indexation rule, one may mimic the recommended age-related risk profile of the life-cycle theory.

Another idea is to replace the current structure by a two-fund model. One fund is initially meant for the younger participants, the other one for the elderly. The fund of the young has a high risk profile to get an attractive return on laid-in premiums, the fund of the elderly a low profile to warrant safe pensions in the form of indexed annuities. The collective components in this setup is first that the conversion of built-up pension wealth from the risky to the safe fund is executed with some fixed rate that may deviate from the actual fair value conversion rate, and secondly some guarantees as to the indexation of the annuities of the elderly. Furthermore, people move gradually from the one fund to the other, according to a preset life-cycle mix.

[2] Degressive accrual rate

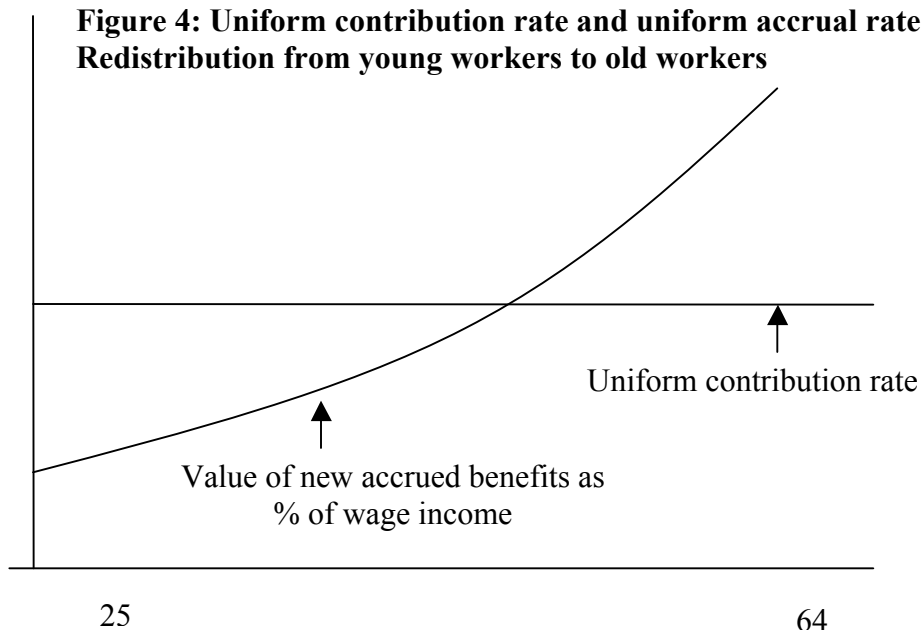
The current contribution policy still has pay-as-you-go elements (see Figure 4). Every member pays the same contribution rate and gets the same nominal accrual rate (around 2% of average pay), independent of age. The actuarial costs of one euro of pension for a young member of the age of 25 is roughly one-third of the costs of a nearly retired member (at 64), however, they both have the same contribution rate. An alternative is to give young people more accrual (see Boeijen *et al.* 2007). One may opt for a degressive accrual rate that is set actuarially fair; compare Figure 5.

Next to intergenerational transfers, the current system also leads to intragenerational transfers. For two persons with the same age, but one with an early start (working from 20 to 60) and the other with a late start (25 to 65), the system leads to a substantial transfer from the early starter to the late starter.⁸ People with flat careers pay too much, and people with steep careers profit from this contribution setting.⁹ Most of the time, the (intragenerational) transfers are from mostly lower paid people with lower life expectancies to the higher paid part of the pension fund population (Bonenkamp 2007), a form of solidarity that should be reconsidered.

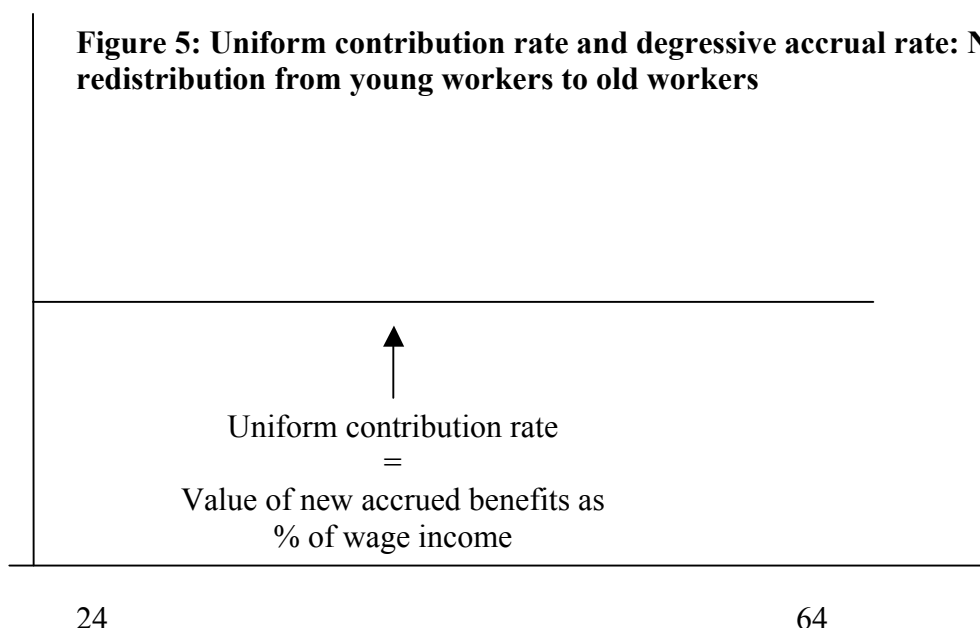
⁸ These subsidies can easily run into tens of thousands of euros (Boeijen *et al.*, 2007).

⁹ Even in an average salary plan.

**Figure 4: Uniform contribution rate and uniform accrual rate:
Redistribution from young workers to old workers**



**Figure 5: Uniform contribution rate and degressive accrual rate: No
redistribution from young workers to old workers**



[3] Retirement age

Uncertainty about indexation and possibly even over nominal benefits are mainly expressed in expected retirement income or replacement rate. Uncertainty leads to an interval of possible replacement rates (at age 65, 67 or whatever the standard retirement age will be). One could also target a required retirement income and look at the

dispersion in retirement age at which one can achieve that income. At age 65, one year of extra saving for pensions will increase the replacement rate with up to 10%.¹⁰

Especially when the assumptions around life expectancy (and financial markets) are under sustained pressure, it is sensible to increase the retirement age (collectively). If people continue to live longer, a coupling of the official retirement age to the life expectancy is sensible and avoids pensions becoming more and more expensive¹¹. In the Netherlands, people can always decide individually to shift their (individual) retirement age actuarial neutral if they want to continue to retire at 65, accepting a lower benefit.

¹⁰ There are four reasons: the pension fund can invest/save the accrued money one year extra, the pension fund has to pay one year less of benefits, the member can/will pay extra contribution, and there is a small probability that the member will die (between 65 and 66); see Tamerus (2007).

¹¹ With an increasing life expectancy and a fixed retirement age, pension funds have to pay extra years of benefits, causing the cost to rise.

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