

Developments in pension reform: the case of Dutch stand-alone collective pension schemes

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Published online: 11 April 2009

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Abstract Corporate defined-benefit plans suffer from a number of serious weaknesses, including credit risk of the sponsor, ambiguous ownership of the surplus and back-loading of benefits. Also defined-contribution plans feature drawbacks. Individuals are not well equipped to make the complex financial decisions involved, transaction costs are substantial and various risks are not managed properly over the life cycle. Stand-alone collective pension schemes offer an attractive third way between corporate defined-benefit schemes and individual defined-contribution schemes. The members of the fund are the risk bearers and the funds manage risk aimed at providing an adequate income level during retirement at low costs. Dutch pension funds are evolving into such stand-alone pension schemes. Some directions for future reforms are sketched.

Keywords Stand-alone pension schemes · Netherlands · Risk

JEL Classification J32 · J10 · J40 · J24

1 Introduction

All over the world retirement systems are under severe pressure. In continental European countries, large pay-as-you-go (PAYG) schemes are vulnerable to aging, in

This paper was prepared for the 64th congress of the International Institute of Public Finance, Maastricht, the Netherlands, August 22–25, 2008. The authors thank various participants and an anonymous referee for helpful comments on an earlier draft.

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general, and low fertility rates, in particular. Occupational defined-benefit (DB) plans in which companies guarantee pension benefits are being phased out in the Anglo-Saxon world. The retreat of governments and corporations as sponsors of pension systems calls for institutional innovation in pension insurance.

This paper argues that stand-alone collective pension schemes in which participants share risk among themselves are an attractive third way between corporate defined-benefit schemes and individual defined-contribution (DC) pension plans that are increasingly replacing these corporate defined-benefit plans in Anglo-Saxon countries. Whereas the traditional occupational defined-benefit schemes are not sustainable because neither sponsors nor young and future participants are willing to provide expensive guarantees to the retirees, individual pension plans suffer from financial illiteracy of members and associated marketing and other transaction costs. We illustrate the potential benefits of stand-alone cooperative pension funds by focusing on the case of occupational pension plans in the Netherlands. Indeed, the Dutch pension system contains strong elements that may be appealing to other countries.

The rest of this paper is structured as follows. Section 2 describes the challenges currently faced by the elaborate public PAYG systems in continental Europe, by the occupational DB plans and by individual DC plans. Section 2.1 argues that continental European countries should focus their public PAYG retirement systems on poverty alleviation by gradually reducing public benefits for those earning higher incomes. These schemes should then be gradually supplemented by funded schemes to allow these higher income earners to smooth consumption over the life cycle. Section 2.2 turns to occupational DB plans offering guaranteed pensions and shows that these plans are increasingly expensive, while their pension promises often end up being empty because of the dependence on the sponsor. We therefore argue that these plans should be phased out, as is indeed happening in many countries. Discussing the individual DC plans that are gradually replacing important parts of the pay-as-you-go and corporate DB plans, Sect. 2.3 argues that these schemes generally are poorly designed. The analysis of Sect. 2 thus leads to the conclusion that institutional innovation in retirement management is called for.

Section 3 describes Dutch sectoral occupational pension schemes, which have been evolving in the direction of stand-alone pension funds. These pension schemes assist individuals in accessing financial markets and exploiting the potential of complex financial instruments in managing risks. The strengths of these schemes are discussed in Sect. 4. Section 5 analyzes to what extent these schemes remedy the shortcomings of traditional DB and DC schemes and describes several further reforms that would make these pension schemes more robust in view of various trends, such as aging and increased mobility of workers on transitional labour markets. Section 6 concludes.

2 Retirement systems under stress

Retirement systems around the world can be classified in three broad groups: public PAYG schemes, occupational DB schemes and individual DC schemes. This section discusses the shortcomings of these schemes, thereby setting the stage for a discussion of collective stand-alone schemes.

Table 1 Pension systems in various countries

	% of total retirement benefits							
	The Netherlands	Germany	France	Italy	Spain	Switzerland	UK	US
PAYG public pensions	50	85	79	74	92	42	65	45
Occupational pensions	40	5	6	1	4	32	25	13
Personal pensions	10	10	15	25	4	26	10	42

Source: Börsch-Supan (2004)

2.1 Pay-as-you-go schemes

PAYG schemes pay the retirement benefits of the older generations by levying contributions on the younger, working generations. The retirement promise is thus not backed by financial assets but rather by the power of the government to force the younger generations to transfer resources to the elderly. In the larger continental European countries (including France, Germany, Italy, and Spain), the pension system relies almost exclusively on PAYG financing. This makes these countries especially vulnerable to lower fertility because PAYG schemes rely on human capital of the young to finance the pensions of older generations. As generations invest less in the human capital of the next generations by reducing fertility, they should invest more in financial capital. Lower fertility thus calls for gradually shifting from pay-as-you-go financing to funded pension schemes (see Sinn 2000).¹

The large continental European countries that rely almost exclusively on PAYG financing for the provision of retirement income have integrated the two main functions of pensions—poverty alleviation and old-age insurance—into a single comprehensive public pension system. These countries should consider focusing the public scheme on poverty alleviation by gradually reducing earnings-related PAYG benefits for those earning higher incomes.² This would yield a better-balanced portfolio between funded and PAYG schemes, as workers with middle- and higher incomes substitute private, funded pensions for public PAYG benefits (see Table 1). Individuals would thus better diversify political, demographic and market risks. Among other things, the pension system would become less vulnerable to low fertility rates.

The public scheme dealing with poverty alleviation is explicitly redistributive and should be financed from general tax revenues. Reliance on broad-based taxes paid by the entire population, rather than on payroll taxes, shifts the tax burden away from workers to those outside the labour force, including the retired. Including retirement benefits in the base of the progressive income tax would allow the tax system to continue to play an effective role in intra- and intergenerational risk sharing. In this

¹ Another policy option for countries with low fertility rates and PAYG pension systems is to stimulate fertility (see, e.g. van Groezen et al. 2003).

² A flat public pension may be preferred over means-tested public pensions because means-tested benefits may be stigmatising. These latter benefits may also discourage saving. Finally, they may undercut the political support of the middle class for public pensions: targeted programs for the poor may result in poor benefits.

way, the tax system can pool risks and shift these risks to those who can bear them best.

Reducing PAYG benefits for, and increasing the tax payments by, the more affluent elderly is consistent with the trend towards a more heterogeneous older population. When PAYG schemes were established, the Second World War had impoverished the older generation. Since poverty was thus concentrated among the elderly, poverty alleviation called for transfers from the younger to the elder generation. At present, in contrast, age is generally no longer a good indicator of poverty, because many elderly individuals have accumulated substantial financial wealth, and more risks have shifted to the beginning of the life cycle. Hence, information on age should increasingly be supplemented by other information (in particular on incomes and family status) to identify those most in need of income support.

The transition from a large PAYG system to a retirement system with a larger funded component is difficult. The generation that is retired when the transition is started will not have been able to anticipate lower public PAYG benefits. Moreover, this generation will not be able to adjust easily because it has already depreciated its human capital. Accordingly, a strong case can be made for changing the rules of the game (i.e., reducing PAYG benefits and increasing taxes on the elderly) only gradually.³ Extensive grandfathering provisions protecting those who are currently old are expensive. Indeed, grandfathering implies that younger generations have to pay not only for their own funded benefits but also for the public benefits of the currently old. To enhance confidence and trust in a stable social contract while at the same time facilitating timely adjustments, governments should announce as early as possible any prospective changes in the social contract. This would allow the large baby-boom generations to anticipate reduced public transfers in retirement by starting to build up more funded pension provisions.

The need for more funding of pension schemes is widely recognized nowadays in many countries that at present rely almost exclusively on PAYG financing. Also Eastern European countries and several emerging economies are developing a funded pillar to supplement public PAYG systems. All of these countries have to develop efficient funded pension institutions that the population can trust. This constitutes a major challenge. Indeed, the next subsection documents the way in which funded corporate pension plans in the Anglo-Saxon world are crumbling, while Sect. 2.3 argues that individual DC schemes are often poorly designed.

2.2 Occupational defined-benefit systems

In traditional occupational DB plans, companies guarantee fixed pension benefits by absorbing all financial market and demographic risks. Years of service and a reference wage typically determine the benefit entitlement. To illustrate, for every year of service, the scheme could offer a pension income of 2% of final salary after retirement until death.

These DB plans suffer from a number of shortcomings, which have contributed to their demise in especially the Anglo-Saxon world:

³Relative PAYG benefits can be reduced gradually by indexing benefits to prices rather than wages.

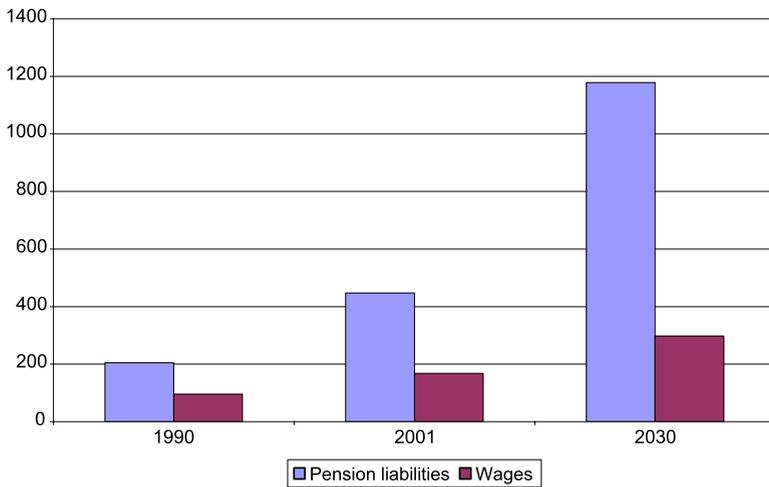


Fig. 1 Liabilities and premium base of Dutch pension funds, 1990–2030. Source: CPB Document 67, the Hague, www.cpb.nl/nl/pub/cpbreksen/document/67/doc67.pdf

- Inability of risk sponsor to absorb risk
- Incomplete contracts and ambiguous ownership of surplus
- Governance problems
- Back-loading of pension benefits
- No tailor-made benefits.

Each of these shortcomings will be discussed in turn.

Inability of risk sponsor to absorb risk Aging of the members⁴ of the pension funds has expanded the obligations of the funds compared to the premium base (see Fig. 1). This implies that unanticipated shocks in financial markets and longevity require larger changes in pension contributions in order to shield pension rights from these shocks. Guaranteed pension obligations have thus become more expensive in that they result in more volatility in pension contributions. Indeed, for many companies, financial and actuarial risks of pension guarantees start to dominate those of the core business for many companies. They therefore no longer underwrite the risks of their pension funds. Rather than becoming an insurer outfit, these companies choose to focus on their core business.

Another reason why companies are less willing to provide guarantees to DB plans is the increasingly competitive and dynamic world economy. More intense competition implies that companies exhibit shorter life spans and enjoy smaller rents with which they can guarantee DB pensions. In a dynamic economy, constant innovation results in substantial creative destruction. Firms can thus offer less security to their employees. Indeed, defined-benefit promises increasingly end up being empty. Workers end up as residual risk bearers because companies often are in trouble at the same

⁴A *member* of a fund has pension claims on the fund. A *participant* of a scheme pays contributions, thereby accumulating pension rights.

time that the pension fund is experiencing financial distress. The probability that a firm will experience periods of financial stress during the long duration of pension saving is substantial, especially in sectors facing intense international competition. The increased bankruptcy risk of sponsoring companies in a dynamic, more competitive economy implies that workers with DB claims are saddled with the substantial credit risk of the company for which they work. Hence, the workers are exposed to the risk of losing not only their job but also part of their pension if the company they work for loses out in competition. They tie their fate to the firm as regards not only their human capital but also their pension rights.

New accounting rules (FRS 17/IAS 19/FAS 87) are also stimulating companies to get out of the pension insurance business. These new accounting regulations disclose pension risks assumed by companies, thereby enhancing transparency. Moreover, solvency regulations force pension funds to mark their obligations to market. This enhances market discipline and facilitates better risk management. Most importantly, it enhances transparency by revealing the substantial costs of defined-benefit obligations. Indeed, ad-hoc actuarial rules for discounting pension obligations have in the past led to mispricing of pension guarantees.

Incomplete contracts and ambiguous ownership of surplus DB plans in effect often amount to incomplete contracts between the participants, the sponsor and the fund because it is not clear in advance what happens in case of substantial under- or overfunding. The identity of the ultimate risk bearer and the associated owner of the surplus in the fund is thus ambiguous. This complicates the valuation of pension rights when workers move between funds. Most importantly, it makes adequate balancing of the interests of the various stakeholders difficult. Indeed, the ambiguity of ownership and the associated risk-sharing arrangements are likely to give rise to additional risks and conflicts after substantial shocks occur, which may lead to litigation. Making explicit agreements about how risks are shared before these shocks actually materialize (i.e. implementing state-contingent rules *ex ante*) allows for contracts that are advantageous for all parties (i.e. giving up resources in one contingency is traded for receiving resources in another contingency).⁵ After the shock (i.e. *ex post*, when the contingency that actually materializes is known), in contrast, one of the parties has to give up resources for the benefit of the others. Insurance (and mutual advantageous trade) then becomes redistribution (in which the benefit for one party amounts to a cost for the other).

Governance problems The ambiguous ownership of the surplus of corporate DB plans gives rise to governance problems (see Boeri et al. 2006). If it is not quite clear to whom the surplus in the fund belongs, it is also not clear whose interest the fund should serve: the interests of the workers or those of the shareholders of the company.

⁵In designing state-contingent rules, pension funds face a trade-off between commitment and flexibility. On the one hand, pension funds may want to create clarity *ex ante* with regard to the way in which risks are shared, for the reasons described in the main text. On the other hand, funds may prefer to leave some discretionary powers so that they can respond to unforeseen contingencies. This latter flexibility implicit in incomplete contracts requires, however, that participants trust the governing board to act in the fiduciary interests of the participants. This requires professional governance (see Sect. 4 below).

Indeed, a potential conflict of interest between these stakeholders may arise in setting the investment portfolio. This conflict may hurt the workers if their interests are not well represented on the governing board of the fund. To illustrate, just as the other holders of corporate debt, the members of the fund have in fact written a put option to the shareholders of the firm. By encouraging the fund to invest more in risky assets, firms that face substantial bankruptcy risk can increase the value of this put option for the shareholders of the firm at the expense of the other stakeholders of the pension fund (see, e.g., Kocken 2006). In this way, the shareholders of the firm, who enjoy limited liability, can reap the upside of the returns on the assets in the pension fund but can shift the risks of the downside to the members of the pension fund.

Back-loading of pension benefits Many DB pension plans are back-loaded. This means that most workers accumulate most of their pension rights at the end of their working career, while the pension contribution paid by themselves or by their employer on their behalf is not age-dependent. The back-loading of benefits results in all kinds of distortions. In particular, it is unattractive for older workers to leave the scheme, for example by becoming self-employed. More generally, it inhibits the portability of pension rights if people engage in various transitions in the labour market. Lack of portability has often been emphasized as a major drawback of DB schemes (see, e.g., Munnell and Sunden 2006).

Back-loading increases the credit risks faced by workers who in effect hold an implicit claim on the firm they work for. If a firm has to lay off middle-aged workers, this firm in effect defaults on its implicit promise to buy additional pension rights for these workers when they are older. Indeed, back-loading implies that workers tie their fate more closely to that of the firm. To better diversify risks (credit risks, in particular), workers should invest their pension saving in the capital market rather than in the firm for which they work. Back-loading thus seems increasingly inappropriate in a flexible transitional labour market in which people and firms experience substantial idiosyncratic shocks in part due to a dynamic, competitive world economy.

No tailor-made benefits DB plans typically assume that the characteristics and preferences of all participants in the scheme are similar. These schemes implement one-size-fits-all solutions without considering the heterogeneity in the pool of participants. Traditional DB plans thus leave little scope for tailoring the pension product to personal characteristics or preferences. If the provided pension income exceeds what the worker prefers, this worker cannot undo this by taking out individual, supplementary products. The worker also often lacks the expertise and the access to capital markets to undo investment policies that are not tailored to his individual-specific risk appetite.

2.3 Individual DC plans

Governments are reducing their role in pension insurance in many countries. Indeed, Sect. 2.1 argued that public PAYG schemes should focus more on alleviating poverty rather than on providing earnings-related old-age insurance to the population at large. At the same time, corporations are withdrawing from their role as sponsor of DB

plans. As a result, in many countries, individuals have to resort to individual DC plans. In these plans, individuals themselves are responsible for planning how much to save for retirement, how to invest their savings in the capital market and benefit optimally from risk premia without running excessive risks, and how to insure individual longevity risk by converting pension capital into annuity income.

Individual DC plans, however, typically suffer from the following important weaknesses, which we will discuss below:

- Inadequate individual decision making
- Agency problems and lack of buying power
- Inadequate product design
- Inadequate risk management resulting in conversion risk
- High expenses
- Lack of financial instruments
- Imperfect annuity products and markets.

Inadequate individual decision making Households typically lack the basic financial knowledge and computational ability to implement financial life-cycle planning involving saving levels, risk management, portfolio decisions, and life and annuity insurance (see Lusardi and Mitchell 2006; and van Rooij et al. 2006). Inadequate decision making by individuals gives rise to inadequate saving rates, under-diversified stock portfolios or investments in own company stock, as well as to leakage and lapse behavior. Munnell and Sunden (2006) document that many individuals exercise the option to withdraw their 401(k) savings as a lump sum when they change jobs. This significantly reduces their retirement savings. Blake (2008) presents evidence on inefficient lapse behavior in British DC schemes. This suggests that the products that were initially contracted were inadequate.

Agency problems and lack of buying power Financial illiteracy combined with the nature of the pension products as an experience good gives rise to serious agency issues, as households have to delegate these complex decisions to professionals and financial institutions, which do not necessarily act in the interests of their clients. Individuals lack the expertise and the buying power to discipline these institutions. The risks of misselling are thus substantial.

Inadequate product design Individuals who participate in DC plans typically face a bewildering array of choice. In Sweden, for example, investors choose mutual funds from an official list of more than 600 funds. It is by now well documented that people cannot handle such an enormous choice set and that people need to be assisted in order to be able to make good choices—through, for example, good defaults or structured choice (see, e.g., Bernatzi and Thaler 2007).

Inadequate risk management resulting in conversion risk DC products are typically designed as pure saving products aimed at wealth accumulation instead of as pension products focused on providing income during retirement. Accordingly, during the accumulation phase, interest-rate, longevity and inflation risks are not managed in anticipation of the retirement phase when wealth is being decumulated in order

to generate sufficient real income during the remaining lifetime. The risky level of the interest rate at retirement is thus an important determinant of the income that is available during retirement. Hence, individuals face substantial so-called conversion risk when they convert their pension capital into an annuity.

High expenses Administrative and investment costs charged by the provider of the DC plan can seriously erode the value of pension entitlements in view of the long average duration of pension investments. Indeed, the average duration of a typical pension investment is 25 years. For such an investment, a difference in annual costs of one percentage point reduces pension income by about a quarter. The literature (see Bikker and de Dreu 2007, Buetler and Ruesch 2007, Table 6 and Andersen and Skjoldt 2007, Tables 9–11) suggests that the costs of individual DC products exceed the costs of schemes provided by occupation pension funds plans by a substantial margin, namely by 50 to 100 basis points.⁶ In this connection, Blake (2008) emphasizes that lapse behavior gives rise to the high costs of DC plans.

Lack of financial instruments Other asset categories than stocks and bonds can be quite attractive for pension provision because these asset classes can help to hedge inflation risk, which is one of the most important risks faced by long-term investors. These asset classes include real estate, hedge funds, private equity and infrastructure. Unfortunately, such investments are usually not available in individual DC plans because they require specific expertise and investment size.

A related point is that specific risk factors are simply not (yet) traded in financial markets. Macro longevity risk due to increases in overall life expectancy is an important example. Moreover, various important macro-economic risks, such a standard-of-living risk, are not yet traded on financial markets (see Shiller 2003). Such risks may be traded between the various generations in an occupational DB plan. An individual DC plan, in contrast, cannot hedge these risks on the capital market.

Imperfect annuity products and markets The academic literature provides strong arguments that a substantial fraction of retirement wealth should be held in the form of annuities, provided that a rich set of annuities is offered. The optimal asset menu contains not only nominal annuities, but also real annuities, which hedge inflation risks, and variable annuities, which allow individuals to exploit the equity premium. In the presence of habit formation, also escalating annuities are part of the optimal portfolio. These various types of annuities are typically not available (or if they are available they may involve substantial costs). One reason is a lack of demand related to financial illiteracy. The literature shows that few people annuitize if they are given the option to take a lump sum, unless they face strong recommendations and incentives to annuitize (see e.g. Butler and Teppa 2007). Annuity markets in many countries are poorly developed as a result of not only financial illiteracy of households but also adverse selection due to heterogeneous longevity risk (see Finkelstein and Poterba 2004).

⁶It is not always clear, however, whether these data always include all costs incurred by employers. Munnell and Sunden (2006) argue that employers prefer DC over DB schemes because of administrative costs related to running a DB scheme.

3 Occupational pension funds in the Netherlands

Collective stand-alone pension plans based on capital funding offer an appealing third way between the individual DC plans and the corporate DB plans. As the second pillar of the Dutch pension system, sectoral occupational pension schemes have been evolving in the direction of stand-alone pension funds. This section describes the Dutch pension system in general and the occupational pension schemes in particular.

Dutch pension system The Dutch pension system consists of three pillars. The first pillar is a pay-as-you-go public pension scheme. It provides a basic flat pension to all older residents at a level that is related to the minimum wage. Compared to other EU countries, the state pension in the Netherlands provides only a relatively small part of pension income for those workers earning middle and higher incomes. If these workers want to maintain their standard of living in retirement, they need additional pension income. This is where the second pillar comes in. The third pillar consists of voluntary personal savings, which are tax favored up to a ceiling. This pillar can be used to tailor the pension portfolio to individual preferences and characteristics, and is especially important for self-employed individuals who lack occupational pension provisions.

Occupational pension schemes The second pillar involves occupational funded pension schemes. These schemes are earnings-related and supplement the flat public benefit for workers who earn more than the minimum wage. These schemes cover more than 90% of the labour force. The pension scheme is part of the labour contract, which is typically negotiated between unions and employers in collective labour agreements. Employees are thus obliged to participate in the negotiated pension scheme. The value of assets in the second pillar amounts to about 125% of GDP. Industry-wide pension funds are organized for workers in a specific sector of the economy. These sectoral funds own more than two-thirds of the assets in the second pillar and account for more than 80% of the active participants.

The institutional set-up of labour relationships and the pension system gives unions a strong position, even though unions organize only about a quarter of workers. In particular, collective labour agreements negotiated between employer organizations and unions are extended to all employers and workers in a sector. This mandatory extension also extends to industry pension schemes and the industry pension fund that administers these funds and that works exclusively for the sector concerned. A company can opt out of an industry fund only if it offers a better pension plan than the plan offered by the sectoral fund.⁷ The mandatory extension of occupational pension schemes explains the high coverage of supplementary pensions in the Netherlands.

⁷In terms of active participants, the most important other type of pension fund is a company pension fund. A company, however, does not have to set up its own company pension fund but can also contract out the pension scheme to an insurance company.

Guarantees and ambitions The occupational plans are run like DB plans, which aim at a certain annuity level during retirement. Years of service and a reference wage typically determine the benefit entitlement. The reference wage used to be the final wage but in recent years most funds have moved to career-average schemes. In these schemes, entitlements to deferred annuities accrue based on a percentage of the average wage level during the career. These schemes typically aim at an annuity level of about 80% of average pay (including the flat public benefit) after 40 years of service. This corresponds to an accrual rate of about 2% per year.

The aspired annuity levels are ambitions rather than guarantees. In particular, the pension funds aim to index the pension rights to prices or wages, but this indexation is not guaranteed because indexation is conditional on the financial performance of the fund. One can in fact view the system as a hybrid system of guarantees and ambitions; nominal annuities are guaranteed, but the degree to which pensions rise in line with prices and wages depends on the performance of the investments of the pension funds.

Through the shift from final-pay to career-average schemes with conditional indexation of nominal pension rights, pension funds have made indexation conditional on the financial performance of the pension fund. Conditional indexation in these career-average schemes applies not only to the pension rights of the already retired members but also to the indexation of the pension rights of the active members. These reforms have thus strengthened the steering capacity of the indexation instrument because the indexation of all accrued liabilities (including the entitlements of active members to deferred annuities) now depends on the solvency position of the fund. As a result of these reforms, those in the active working population absorb more risks in terms of their pension rights. Moreover, members rather than participants and employers have become the main risk bearers of the fund.

More complete contracts Several large sectoral pension funds now employ policy ladders—rules that state explicitly how both the extent of indexation of pension rights and a possible recovery premium (levied on top of the cost-based premia for the newly accumulated pension benefits) vary with the solvency ratio, which is defined as the ratio of the market value of the assets to the market value of the nominal liabilities of the pension fund. These policy ladders can be viewed as more complete contracts compared to the previous rather incomplete ones, which allowed for a great deal of discretion by the governing board. Indeed, in the past, funds would make only rather ambiguous statements that pension rights would be indexed as long as the financial position of the fund would allow it.

A policy ladder for a typical Dutch pension fund is shown in Fig. 2, which is adapted from Ponds and van Riel (2007). The horizontal axis measures the market value of the assets of the pension fund. The extent to which pension rights are indexed to inflation as well as the contribution level depends on where the market value of the assets is relative to a lower and upper threshold. The lower threshold L_N typically corresponds approximately to the market value of the nominal liabilities of the pension fund, while the upper threshold L_R measures the value of indexed annuities.⁸

⁸The market value of the nominal liabilities is computed on the basis of the nominal swap curve, assuming standard actuarial survival tables adjusted for projected longevity changes. The upper limit of the policy

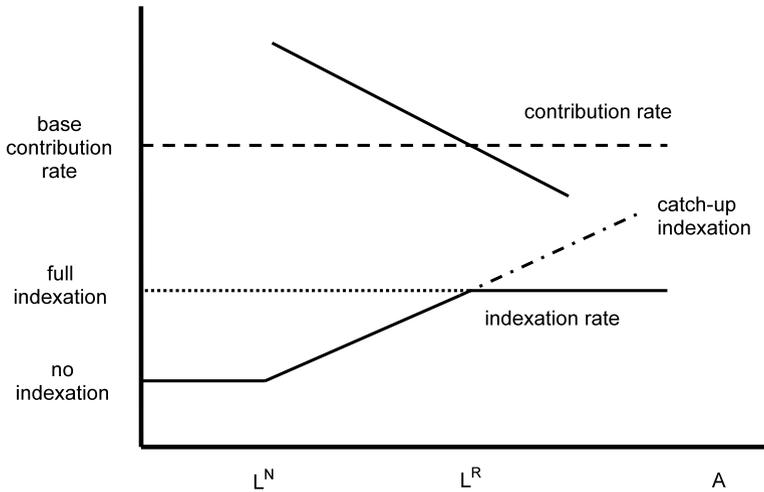


Fig. 2 Typical policy ladder of Dutch pension fund. Source: Ponds and van Riel (2007)

The left vertical axis measures the actual extent of inflation indexation of the pension rights. This actual inflation indexation depends on comparing the actual inflation indexation reserve $A - L_N$ to the inflation indexation reserve that is required to fully meet the ambition to index the pension rights to inflation, $L_R - L_N$. If the actual indexation reserve is positive but less than the reserve needed to fully meet the aspirations (i.e. $L_N < A < L_R$), then actual inflation protection is provided in proportion to the actual inflation indexation reserve $A - L_N$ as a share of the required inflation indexation reserve $L_R - L_N$. If the actual inflation indexation reserve exceeds the required reserve, then the pension fund may provide so-called catch-up inflation indexation to make up for missed inflation indexation in the past. The dotted line in Fig. 2 depicts this possibility.

The left vertical axis of Fig. 2 also measures the contribution rate. The base contribution rate is calculated as the market value of the hybrid pension claims that are acquired by the active participants (i.e. a nominal DB guarantee and a risky DC claim involving inflation indexation). An additional so-called recovery premium may be charged if the actual indexation reserve lies below the required indexation reserve. If a recovery premium complements conditional inflation indexation, the plan can be viewed as a hybrid DB-DC plan.

Whether the fund levies recovery premia or grants catch-up indexation is up to the discretion of the governing board of the pension fund. In fact, the policy ladder is merely a guideline. The governing board can thus deviate from this guideline.

Stand-alone pension funds Dutch pension funds are independent trusts with their own governance and administrative structures. The governing board of a pension

ladder L_R is typically based on an approximation to the real yield curve, using estimates of expected Dutch price inflation and assuming that inflation risk would not be priced. Index-linked bonds related to Dutch inflation are not traded. Hence, direct market-based estimates of the real yield curve are not available.

fund consists of equal representatives of employers and unions. On the one hand, employers thus do not dominate decision-making. On the other hand, they are not exclusively responsible for correcting any underfunding.

In fact, in the newly emerging risk-sharing contracts, participants of the pension fund bear most risks in terms of their pension rights. Pension funds are relying more and more on the indexation instrument and less and less on the instrument of fluctuating recovery pension contributions to absorb risk. The main reason is that aging and the maturation of pension funds makes recovery contributions a less effective instrument to maintain the solvency of pension funds. With a rising ratio of pensioners to workers, pension liabilities are increasing compared to wages (i.e. the contribution rate) so that large changes in contributions are required to contain fluctuations in liabilities pension benefits (see Fig. 1 and Sect. 2.2).

Moreover, the costs of volatile contributions are increasingly being recognized in terms of adverse demand- and supply-side effects. In particular, fluctuating recovery premia are likely to affect the demand side of the economy in a pro-cyclical fashion. As regards the supply side, the fluctuating pension contributions distort the labour market. Indeed, higher pension contributions aimed at correcting funding deficits act as an implicit tax on labour.⁹

In view of these considerations, pension funds rely more on the indexation instrument rather than the premium level as a steering device. Indeed, as indicated above, the shift from final-pay to career-average systems with conditional indexation of nominal pension rights implies that workers bear risk more in terms of the value of their pension rights. Rather than those who pay the premium (i.e. employers and/or employees as participants), the members of a pension fund (i.e. those who have pension rights) are the main residual risk bearers. This change helps to alleviate labour-market distortions but also implies that young generations who have not yet accumulated many pension rights share less in the risks taken on by the pension fund.

4 Strengths of the Dutch occupational schemes

Section 2 discussed the main disadvantages of both traditional occupational DB schemes and individual DC schemes. This section argues that Dutch occupational schemes circumvent many of these drawbacks. The main strengths of the Dutch occupational schemes, which are discussed in the rest of this section in turn, are the following:

- Stand-alone funds owned by members without credit risk sponsor
- Adequate defaults

⁹If more workers are mobile across sectors, workers are able to shift the burden of the implicit tax to others, such as consumers in non-tradable sectors or shareholders in tradable sectors facing intense international competition. In that case, firms thus bear (part of) the risks of the fund in the form of risky wage costs, even though they do not pay the statutory contributions. Workers are more likely to be able to easily leave companies than sectors. Accordingly, companies with a company pension fund are likely to bear more investment risk through risky contributions and wage costs than companies who participate in sectoral funds.

- Governance on behalf of members
- Advanced risk management
- Low expenses, substantial buying power and reduced selection
- Completion of financial markets and intergenerational risk sharing
- Advanced pension communication.

Stand-alone funds owned by members without credit risk sponsor Dutch sectoral funds are stand alone in the sense that they lack a risk-absorbing sponsor. Pension funds face a hard budget constraint so that the members of these cooperative schemes become the explicit risk bearers: they have to either share risks among themselves or shift risks to others by trading financial instruments on capital markets or by contracting with insurance companies. An important advantage of stand-alone cooperative schemes compared to traditional corporate DB plans is that members do not bear the credit risk of a sponsoring company. Moreover, the ownership of the assets lies unambiguously with the members. The pension funds are cooperatives that explicitly aim to further the interests of the participants. Indeed, one can view the pension funds as mutual insurance companies that are owned by the policyholders instead of outside shareholders. Companies do not have a claim on a possible surplus in the cooperative fund. They are thus not tempted to increase the risk profile of their pension fund in order to maximize the return on the company's equity at the expense of the members' fiduciary interest.

Adequate defaults Empirical research shows the importance of defaults (i.e. what happens if people do not choose themselves) in pension insurance. Defaults are important for the premium level, for portfolio selection and for the way in which the pension is paid out. Defaults are so powerful because financially illiterate individuals see the default as an implicit recommendation for a complex product that they do not fully understand. In cooperative pension plans in the Netherlands, the broad portfolio composition and the type of annuity are determined by the board of trustees, while the premium level is set in close consultation with the social partners who negotiate collective labour agreements. The individual members thus cannot opt out of the collective arrangements. In recent years, individuals have been given more individual discretion to select their retirement date and to choose between an individual or a joint-life annuity. Dutch pensions are paid out as annuities because health-care costs are insured through compulsory private and public insurances. Hence, Dutch households face only limited idiosyncratic risks, so that illiquid annuities are an attractive option to insure longevity risk.

Cooperative pension plans allow individuals with scarce cognitive abilities to delegate complex saving, investment and insurance decisions to professionals. Collective pension funds assist individuals in properly exploiting their long-run investment horizon and in gaining access to complex investment strategies provided by modern financial markets. More sophisticated life-cycle investment by pension funds on behalf of long-term investors stabilizes financial markets and facilitates macroeconomic stability.

Governance on behalf of members Restricting individual choice protects financially illiterate individuals with scarce cognitive abilities from making mistakes in complex intertemporal financial decisions under uncertainty, but gives rise to agency issues and problems associated with collective decision-making. Governance arrangements should thus address principal-agent issues that arise if unsophisticated consumers delegate complex financial decisions to professionals. Members should have confidence that the trustees take delegated decisions in the interests of the members so that a certain lack of individual choice remains legitimate. In this connection, the non-profit character of pension funds organized as trusts can bolster the confidence of the participants and members that pension funds act in their interests. Indeed, the members themselves are the shareholders of the pension funds, thereby preventing a conflict of interest between policyholders and shareholders.¹⁰

Advanced risk management The Dutch occupational pension plans aim at achieving the ambition of a DB promise of an appropriate income level during retirement. In particular, the pension fund manages interest-rate and inflation risks so as to guarantee the nominal annuities and to realize its ambition to index these annuities to inflation. Hence, the main risks (e.g. investment risk, inflation risk, interest-rate risk and longevity risk) are managed so as to hedge risks on behalf of households while at the same time exploiting the risk premia on various risk factors by optimizing the trade-off between return and risk.

An important technique for managing the various risks optimally is so-called asset-liability management (ALM). Based on stochastic simulations of the various risk factors, ALM studies simulate the probability distributions of pension income and contribution rates under alternative policy scenarios in terms of asset mix, contribution policy and indexation rules. The contribution and investment strategies are then optimized on the basis of these ALM techniques.

Low expenses, substantial buying power and reduced selection Cooperative pension funds with compulsory participation of members reduce marketing and other transaction costs. The board of trustees can contract out various financial services to insurance companies, hedge funds or mutual funds. Accordingly, competition occurs on a wholesale level rather than a retail level. This tends to reduce transaction costs for individual members, who typically lack sufficient expertise to buy the various services that make up the pension product. Moreover, joining forces in a cooperative pension fund that is run professionally strengthens the buying power of individuals, exploits scale economies in buying complex financial products that are not available to individual investors, and helps to discipline commercial financial service providers to act in the interests of the members of the pension fund. Another advantage of

¹⁰At the same time, non-for profit organizations have to deal with several difficult governance issues (see also Glaeser and Shleifer 2001). Section 5 discusses how the governance of pension funds can be improved.

forced risk pooling in a sectoral pension fund is that it reduces selection in longevity insurance. Also this helps to reduce the costs of pension insurance.

Completion of financial markets and intergenerational risk sharing Collective risk pooling not only combats selection in longevity insurance but also allows members to exchange risks that are not (yet) traded in financial markets. In particular, young members can share in longevity risks faced by older cohorts. To illustrate, if these cohorts live longer than expected, the resulting lower funding rate affects the indexation quality of the deferred annuities of the younger cohorts. In this way, the pension schemes help to fill the gaps of incomplete financial markets. Moreover, by linking pension benefits to the wages of workers, pension funds allow retirees to share in the wage risks of workers. Furthermore, young workers can share in financial market risks faced by the older members through so-called recovery contributions. Indeed, in a scheme that indexes benefits to prices and carries mismatch risk because of investments in risk-bearing assets, the active participants (i.e. the workers who pay contributions into the fund) in effect borrow from the older, retired members by issuing price-indexed bonds to these older members and use the funds to invest in the risk-bearing assets.¹¹ In fact, the risky pension contributions produced by the mismatch risk allow the young to transform their human capital into an asset with exposure to financial risks (see Beetsma and Bovenberg 2008).

In principle, one can share financial-market shocks not only between currently living generations but also with generations that are not yet participating in the pension scheme when the shocks actually materialize. In fact, the pension fund buys risk-bearing assets on behalf of future generations by in effect borrowing from older generations. From an ex-ante point of view, this internal trade is actually welfare improving because financial shocks are shared even more broadly, namely not only with the currently participating generations but also with future generations (see Teulings and de Vries 2006).

Advanced pension communication Communicating the occupational pension rights to the individuals concerned has become more important for a number of reasons. First of all, members bear more risks in terms of their pension rights as contributions have become a less effective instrument to buffer risks. As residual risk bearers in pension plans, members should be informed about what macro-economic risks they face so that they can take this into account in their own financial planning. Second, idiosyncratic risks have increased on account of more frequent so-called life events, which may be due to changes in the household composition (e.g. divorce) or transitions on a more dynamic labour market (e.g. changing jobs, moving from a full-time to a part-time job, becoming self-employed). These life events tend to have major consequences for actual and desired pension insurance. A final reason for the increased importance of pension communication is that individuals are confronted with more choices, such as the choice about the type of annuity people want to receive (e.g. individual versus joint-life annuities, timing of retirement, the possibility to buy

¹¹In the absence of pension funds, borrowing constraints and other capital-market imperfections are likely to prevent young workers from taking advantage of the risk premia offered on capital markets.

additional pension rights by paying additional individual premiums, whether or not to transfer pension rights to another pension fund in case of a job move into another sector).

Fortunately, improved information and communication technology helps to better communicate the features of pension contracts and individual pension rights that have been accumulated. To illustrate, a so-called indexation label is being developed that measures the indexation quality of a pension scheme in terms of the expectation and the standard deviation of the extent to which the pension's rights will be indexed. As another example, by 2011, a so-called web-based pension register should provide individuals with up-to-date comprehensive information on all their pension rights in the first- and second pillars. This pension register will be extended later to include also third-pillar products.

5 Remaining challenges facing Dutch pension funds

As the second pillar of the Dutch pension system, Dutch sectoral pension schemes have been evolving in the direction of stand-alone pension funds. This section discusses the following major remaining challenges facing the Dutch pension funds:

- Make contracts on risk sharing complete
- Improve risk sharing between cohorts
- Reduce backloading of benefits
- Link retirement age to longevity
- Increase flexibility labour market
- Develop tailor-made policies
- Extend life-cycle financial planning
- Improve governance.

Complete contracts on risk sharing As argued in Sect. 2.2, making explicit agreements about how risks are shared before the shocks actually materialize prevents costly political conflicts when the shocks hit. Although pension funds have strived to make risk-sharing contracts more complete through policy ladders (see Sect. 3 and, in particular, Diagram 1), further improvements are possible. To illustrate, the current policy ladders tend to be silent on what happens in case the funding rate (i.e. assets as a percentage of the nominal liabilities) falls below 105% or rises above the level that is necessary to finance fully indexed pensions. The policy ladders are also incomplete in the sense that they do not specify investment decisions. By changing investment decisions, governing boards can redistribute resources among the various stakeholders of the fund, depending on the various options that are written by the stakeholders of the fund (see Hoevenaars and Ponds 2006). Finally, policy ladders are at present not more than guidelines for the governing board. They have therefore no legal status and thus do not offer the same protection as legal property rights do.

Improve risk sharing between cohorts The current risk-sharing arrangements in the Dutch pension funds could be improved further. Efficient risk sharing implies that an

adverse shock causes consumption of all agents to decline by the same percentage.¹² Risks are thus shared as broadly as possible. With permanent income determining consumption, everybody's wealth should thus decline by the same percentage after a negative shock. The most important components of aggregate wealth of individuals are pension wealth, housing wealth, and human wealth (i.e. the discounted value of future labour income). For younger workers, human wealth is the most important wealth component. For older members, in contrast, pension rights account for most of individual wealth. In fact, retirees have (almost) completely depreciated their human capital. Hence, in order to achieve the same relative change in overall wealth for all cohorts (as required by optimal risk sharing), the pension wealth of young cohorts should fluctuate more than that of older generations if a shock hits the pension funds. By adapting pension rights in this way, one can shift financial and demographic risks to younger generations without having to rely on the recovery premium instrument.¹³ Whereas pension rights for younger generations are relatively uncertain (i.e. the system resembles a DC system), pension rights are less risky for the elderly. As individuals grow older, they thus transform their DC claims into DB claims. The gradual transformation of defined-contribution claims into defined-benefit claims as individuals grow older is consistent with optimal investment behavior over the life cycle (see Bodie et al. 1992). Young agents invest more in risk-bearing assets because most of their wealth consists of less risky human capital. As agents grow older, they move more into secure assets, which are preferably also protected against inflation (see Teulings and de Vries 2006).

The current Dutch occupational pension plans impose uniform investments and indexation rules on all participants. Accordingly, cohorts do not share risks optimally, especially if pension funds can rely less on fluctuating contribution rates to implement intergenerational risk sharing. Large Dutch pension plans are currently investigating whether indexation rules can be differentiated across age groups. Younger generations can then take more risks on their pension savings and benefit from the associated risk premiums, whereas the contract for the elderly is geared primarily towards protection of the purchasing power of the pension entitlements (see, e.g., Munsters et al. 2008).

These reforms can be complemented by more flexibility in tailor-made premium rates. In fact, this allows agents to bear more risks and thus to benefit more from the rewards to risk taking. Indeed, after an expected shock, it is optimal to adjust consumption levels during the rest of one's lifetime. In effect, this involves spreading the risks over the longest possible recovery period. Hence, pension schemes may

¹²This assumes that all agents feature the same constant relative risk aversion and that utility is time-separable and separable in consumption of commodities and leisure. More generally, optimal risk sharing implies that everybody's marginal utility changes with the same percentage after a shock hits. See Bohn (2005).

¹³This assumes that pension wealth does not become negative to produce the required relative change in overall wealth. For young households, this may happen if shocks are adverse in the beginning of their working life. To prevent this happening, these households should buy call options to get the optimal exposure to stock-market risk. If these instruments are not available, recovery premia may be used to expose these households to equity risk, even though these premia distort the labour market.

levy individual-specific pension contributions, depending on the shocks that a specific individual has experienced throughout his or her lifetime. The pension scheme may thus ask for a voluntary, individual increase in the premium after an agent has suffered several adverse shocks. Alternatively, it may set such an increase in the premium as a default. In that case, an individual can then always opt out of this premium increase.

The hybrid system of both DC and DB elements can be viewed as a pension fund that has on the liability side of its balance sheet both *soft* equity claims (or *junior* claims) and *hard* debt claims (or *senior* claims). The active members who are not yet retired, and especially the young members who still have substantial human capital, hold most of the *soft* claims and are thus in fact the residual risk bearers of the fund. The retired generations own more secure claims in the form of debt.¹⁴ The young agents are in fact the owners of an insurance company that protects older members against old-age risks if the pension fund has not matched the guaranteed pension rights of the older generations on the capital market. The claims on this insurance outfit are not traded on capital markets, but are assigned to agents depending on the nature of their work effort on the labour market.

Dutch pension funds already make a distinction between *hard* and *soft* claims. However, the hard rights (i.e. the guarantees) are usually defined in *nominal* rather than *real* terms. The Dutch pension system (and the pension rights of young agents with a longer investment horizon in particular) is thus vulnerable to inflation now that pension funds are tempted to match these nominal obligations with nominal assets.¹⁵ Moreover, these hard rights are granted to all members, irrespective of their characteristics (such as age).¹⁶ The solvency rules in the Dutch risk-based supervisory framework in fact focus on the hard rather than the soft pension rights, which typically involve the ambition of the pension funds to index pension rights to prices or even wages. Hence, capital funding does not necessarily extend also to soft pension rights.

Reduce back-loading of benefits The benefits in the Dutch occupational pension plans are currently heavily back-loaded: the pension fund charges the same price for a deferred annuity for all age groups even though the money that is contributed on behalf of the young will be paid out later and thus can yield a higher overall return. This lack of market pricing implicit in the uniform pricing of deferred annuities implies that the young are taxed on their working effort while the old are subsidized. The transition from final-pay to career-average has increased back-loading. Under the final-pay system, the rights accumulated in the beginning of the career could become

¹⁴The retired generations may still find it optimal to have some exposure to stock-market and longevity risk. Kojien et al. (2006) find that with plausible parameter values, retired agents should hold 20% of their pension wealth in equity. In fact, in the simplest model with homogeneous and constant relative risk aversion and no mean reversion of stock returns, all generations hold the same share of overall wealth in equity (see Bovenberg et al. 2007).

¹⁵For maturities of over 35 years, inflation risk is persistent and thus substantial over a long horizon. Campbell and Viceira (2005) report that the annualised standard deviation of real returns on nominal bonds is as large as 8% and exceeds that of stocks.

¹⁶The ratio of soft to hard pension rights, however, is especially large for young participants because of the long duration of their soft indexation claim in the fund.

valuable if one experienced substantial wage increases during one's career. This is no longer the case under the career-average system.

Burdening intergenerational risk sharing with predictable redistribution due to back-loading makes the pension system less robust: the pension scheme faces a larger discontinuity risk. In particular, younger agents may leave the system if they are confronted with substantial recovery premia. Indeed, the pay-as-you-go (PAYG) financing implicit in the back-loading of the financing of benefits makes the pension scheme less well funded (and thus more vulnerable to political risks) than appears from the official funding rate.¹⁷

Recently, proposals have been put forward to continue to levy the same uniform pension contribution for all participants but to assign pension rights that are actuarially fair (see, e.g., Boeijen et al. 2007). Addressing the back-loading of benefit accumulation and marking pension premia to market (in the sense that the premium paid corresponds to the value of the additional pension rights accumulated) is complicated by the fact that it creates the familiar transitional burden of moving from PAYG to full funding. Possible solutions include using collective buffers or asking sponsors who want to get rid of the risk to pay a one-time fee for transferring these risks to their younger workers. In any case, a long transition period will allow pension schemes to gradually implement two-sided solidarity between the young and the old.¹⁸

Link retirement age to longevity A longer life expectancy raises the length of the inactive period that needs to be financed. Hence, increased longevity puts financial stress on not only pay-as-you-go-schemes but also funded pension schemes. To prevent this stress on funded pension systems, longer life expectancy for cohorts younger than 65 years of age must go together with a higher retirement age (or lower annual benefits) for the cohorts concerned if lower mortality is associated with lower morbidity and thus more human capital. If these shocks materialize only at older ages at which the cohort has already depreciated its human capital, then younger cohorts (who exhibit a longer horizon and more flexibility to adapt) should optimally share a larger part of these risks. A collective pension scheme can implement this particular way of sharing risks between generations. In particular, the pension fund can promise an annuity to retirees while at the same time making the pension rights of the active members conditional on the capital that remains available after meeting these obligations to the retirees. The pension fund then in fact issues longevity bonds on behalf of the active members to the retired members. In this way, pension funds in effect create new non-tradable assets that are not yet available on financial markets.

¹⁷The funding rate underestimates the implicit obligations to middle-aged workers who have in effect paid premia in advance without having received the equivalent market value in pension claims. These workers expect to receive a subsidy from younger workers in the second half of their working life. In other words, they have an implicit claim on the pension fund that is not taken into account when computing the funding rate. Boeijen et al. (2007) estimate that the implicit obligation of PGGM due to back-loading of benefit accumulation is in the order of 15% of the PGGM's current nominal obligations.

¹⁸Another alternative is to extend the tax on youngsters and the subsidy on old workers from employees also to the self employed. This would alleviate the drawbacks of back-loading for domestic labour mobility. These explicit age-specific transfers could gradually be phased out as older workers get a stronger labour-market position.

In addition to stimulating financial innovation, liquid markets for longevity-indexed bonds would help to establish objective market prices for longevity risk. This would assist regulators and help pension funds in setting the terms of trade for internal risk trading between generations. Moreover, longevity bonds would allow members of a pension fund to trade not only with other members in the same fund but also with capital-market participants more generally. Indeed, there is a strong theoretical case for developing *macro-markets* for such contingent securities (see Shiller 2003).

In theory, governments can be providers of longevity bonds, as they are in a good position to shift this risk onto future and younger generations. These generations may best be able to absorb these risks through a longer working life associated with more human-capital investment. Governments, however, already bear substantial longevity risk on their balance sheets through public pay-as-you-go systems. Indeed, governments are able to issue longevity bonds on behalf of younger and future generations only if they reduce their exposure to longevity risk by linking the age at which these generations first receive their public pension to life expectancy.

Also tax benefits for pension saving can be linked to life expectancy.¹⁹ The rule of automatically linking public pensions and tax privileges to life expectancy avoids the political costs of discretionary decisions to limit eligibility to public pensions and tax benefits if longevity increases further. Agreeing on a risk-sharing rule *ex ante* also reduces the political risks associated with collective discretionary decision-making. Moreover, it allows individuals and firms to gradually adapt to a longer working life by better maintaining human capital and adjusting the organization of work. An increase in spending on disability pensions and unemployment benefits is thereby avoided.

Increase flexibility labour market One of the challenges for the Dutch pension system is create a more flexible labour market for elderly workers. Together with better-maintained human capital, a more flexible labour market for older workers allows the speed and extent of phased retirement to act as a buffer for absorbing aggregate financial-market and longevity risks. In an actuarially neutral pension system, working one year longer (and thus receiving annuities one year later) tends to raise the annual pension by about 7%. The speed and timing of retirement is thus a powerful instrument for absorbing risks. Allowing the speed and timing of retirement to act as an instrument to buffer risk requires adjusting the implicit labour contract according to which workers are underpaid when young and overpaid later on. Indeed, increasing the retirement age at which the employer lays off the employee must not put undue strain on the employer. Employees should thus accept more wage flexibility over the life course (payment according to labour productivity; i.e., mark to market reward for labour) and internal flexibility in working practices (so as to protect their labour productivity at higher ages).

With a more flexible labour market for elderly workers, older workers bear less risk because they are less dependent on their firm surviving. The differences narrow

¹⁹In fact, one can argue that all ages that are used to measure old age should be linked to longevity. In other words, one should measure old age from the end rather than the beginning of life (see also Shoven 2007).

between the *insiders* who are lucky enough to work for a surviving firm and the *outsiders* whose firms have not survived. Moreover, golden chains no longer tie older workers to their employer. This facilitates entrepreneurship and a more efficient allocation of labour. More generally, more flexible labour markets with new, flexible career patterns should allow young households to bear more risks by allowing these households to vary their labour effort depending on the shocks they have experienced throughout their lifetime. This requires European labour markets to become more inclusive so that workers do not have to be continuously employed full-time in order to enjoy a successful career. In such a transitional labour market, the role of employers thus shifts from a risk-bearing sponsor to, first, a facilitator of investments in human capital; second, an insurer of that human capital by protecting it; third, the creator of flexible work arrangements that allow elderly workers to adjust the speed and time of retirement to the pension rights; and fourth, the creator of flexible career paths and workplaces that allow young parents to invest in the human capital of their children without having to depreciate their own human capital. Employers should attune work to the needs of employees who want to remain employable in the face of substantial family obligations and rapid innovation (and thus creative destruction).

Employers may also assist in creating collective pools for old-age and other human capital insurances (such as disability and unemployment insurances) for their workers. By thus keeping the costs of these kinds of insurance under control, they improve their position on the labour market and reduce their wage costs. An important factor in determining the types of insurance and the optimal investments of the pension scheme is the type of human capital of the workers and the associated risks and possibilities to absorb risks by adjusting labour supply. This suggests that the pools should be homogeneous in terms of human capital. Moreover, the retirement plans should be closely integrated with human-resource management (HRM) of the employers.

Develop tailor-made policies We already argued that default contribution and investment strategies should be age dependent. Moreover, in setting the default portfolio, one can take into account other characteristics of members besides age—such as the nature of human capital, the income level, the flexibility of retirement choices implied by the flexibility of the labour market for elderly and owner-occupied housing and its financing. To illustrate, agents with particularly risky human capital that is strongly correlated with financial-market risks should invest less in risk-bearing assets (see Viceira 2001). The same holds true for workers that are liquidity constrained, face substantial idiosyncratic human-capital risk, exhibit habit formation, and do not exhibit much flexibility in their retirement choices and thus cannot use the speed and timing of retirement to absorb risks (see Bodie et al. 1992; and Gollier 2005). These individual financial planning solutions tend to become more important now that individual life cycles have become more heterogeneous and information technology allows for more tailor-made products. At the same time, the costs of more tailor-made features in collective schemes should be traded off against the associated additional transaction costs and the potential for adverse selection. Another reason for paying more attention to individual solutions is the increasing number of self-employed individuals who are not served by sectoral and company pension funds and have to make active decisions themselves on retirement insurance.

Extend life-cycle financial planning Pension funds can become financial intermediaries that help individuals with their financial planning over the life cycle. In particular, they can advise workers in accumulating and insuring human and financial capital over the life cycle. During the active phase of the life cycle they may help workers in insuring their human capital through disability and unemployment insurances. These risks typically rise as people become older. Indeed, the optimal retirement age depends on idiosyncratic health and labour-market risks. In contrast to pension insurance, however, disability and unemployment insurances involve moral hazard; better insurance reduces the incentives to maintain human capital. Accordingly, these insurances inevitably include substantial own-risks. Deductibles help to internalize the costs of insurance payments, thereby discouraging individuals from making excessive claims. Precautionary saving can improve the trade-off between insurance and incentives by facilitating self-insurance. Pension funds may help to find the optimal mix of saving and insurance. Moreover, integration of part of pension saving with precautionary saving may be optimal (see Stiglitz and Yun 2002).

During the retirement phase, the elderly need integrated advice on their housing, health care, the type of annuity (possibly of the escalating type) and, possibly, part-time labour income. Linking reverse life insurance through annuities to health-care insurance can combat selection. Bad risks for an annuity company tend to be good risks for health insurers, and the other way around. Moreover, by providing health insurance, an insurance company reduces the need for liquidity, thereby making annuitization more attractive. Also in health insurance, moral hazard may be important, especially for relatively small risks such as required personal services around the home. For these risks, precautionary saving may thus be appropriate. This implies that annuities should be complemented with liquid private saving.

Improve pension governance Another challenge is to adjust the governance structure to the newly emerging risk-sharing contracts in which members bear risks in stand-alone pension funds mainly in terms of their pension rights rather than in terms of recovery premia. Rather than those who pay the premium (i.e. employers and/or employees as participants), the members of a pension fund (i.e. those who have pension rights) should have their interests represented in the governing board.²⁰ If members are residual risk bearers but social partners have a large say in the governing board, then social partners may be tempted to put pressure on the fund to set the price for new pension rights (i.e. the pension contributions) below the market value for these additional rights. The current members in fact pay the associated implicit subsidy on the additional pension rights for participants.

Also the management of the funds should be conducted in a professional manner. Pension fund trustees and supervisory bodies are not always well equipped to understand complex investment principles and regulations, and to monitor their fund managers adequately. Outside professionals can help in this respect. This calls for a two-tier governance structure for pension funds with, first, a supervisory board or

²⁰Employers, however, are still stakeholders in the pension fund to which their workers belong. In particular, a well-functioning pension fund implies low insurance costs for the workers. This enhances the position of the employer on the labour market, thereby reducing wage costs.

board of trustees representing the interests of members and, second, a professional executive board to deal with the funds' daily operations. The board of trustees should be appointed by a meeting of members.

6 Conclusions

Old institutions for retirement provision, such as extensive PAYG schemes and corporate DB schemes, are crumbling rapidly because governments and companies are withdrawing from their roles as risk sponsors. In the absence of new pension institutions that are better adapted to the modern knowledge economy in which we live, individual DC schemes are likely to become the dominant pension contract for supplementing the remaining public pension benefits. In most of these schemes, individuals have a tough time planning for their retirement. Indeed, more and more evidence emerges around the world suggesting that households by themselves cannot implement complex financial planning and must delegate these decisions to institutions.

Dutch pension funds have been evolving in the direction of stand-alone cooperative pension funds as an attractive third way between the corporate DB schemes and the individual pension plans.

In the years to come, further gradual reforms will be required to modify Dutch collective pension schemes in view of aging, a more transitional labour market, and more heterogeneous tastes and needs. Responding sooner rather than later will allow pension reforms to be implemented gradually rather than suddenly. Confidence in stable, credible long-term commitments will thus be maintained, thereby allowing the Dutch pension sector to keep its leading position in the world of pensions.

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