



Design and Delivery of Defined Contribution (DC) Pension Schemes

Policy challenges and recommendations

**Cass Business School, London, UK
5 March 2013**

This report contains highlights from a forthcoming OECD publication titled “Improving the design of retirement saving pension plans”. It was presented at a Conference on Defined Contribution Pensions, Guarantees and Risk Sharing in at the Cass Business School in London on 5 March 2013 which was opened by Steve Webb, UK Minister for Pensions.

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is available online at www.oecd.org/daf/fin/private-pensions

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Today in many countries defined contribution (DC) pension schemes are expected to provide a major source of retirement income. Here, the OECD summarises the challenges policymakers face and recommends key improvements that can help to ensure DC delivers the incomes individuals need.

What are the DC challenges for policymakers?

In recent years we have witnessed a dramatic global shift in pensions policy away from public (state) and private employer-sponsored schemes, in which benefits are pre-defined (defined benefit or DB), towards private retirement saving plans, in which benefits depend on the value of accumulated assets (e.g. defined contribution or DC). This has transferred significant risks from the state and employers to individuals, including inflation, interest rate, investment and longevity risk. This transition from DB to DC has been accompanied by a trend towards lower overall contribution rates.

Together these developments raise very significant concerns about the adequacy and security of future retirement income at a time when longevity is increasing and when the global experience of low returns and high volatility, following the 2008 financial crisis, have reduced public confidence in retirement savings.

What is the appropriate policy response?

The policy response to these concerns is to stress to individuals and policy makers that saving for retirement requires a long-term commitment and also that it is important to diversify the sources of retirement income. For DC policymakers, the implementation of full compulsion or auto-enrolment is a major step in the right direction. However, the design of DC systems still needs further improvement.

What are the flaws in DC systems?

DC is an integral feature of the private sector pension systems in the United States and United Kingdom, for example, and increasingly represents the main component of the pension system, as is the case in Australia, Chile and New Zealand, among others. However, at present DC systems might not produce adequate outcomes due to some or all of the following factors:

- Contributions are too low;
- Levels of public confidence and understanding of DC are too low;
- Individuals are unable or unwilling to choose appropriate funds;
- Investment strategies offer little or no protection;
- Funds are too volatile in the pre-retirement phase;
- Decumulation options lack clarity and in many cases are not fit for purpose.

Therefore, the OECD urges governments to improve the design of private DC systems in order to deliver adequate pensions.

What action should policymakers take to improve DC outcomes?

OECD research reveals that where the investment period lasts 30-40 years, it is possible for DC systems to produce attractive returns within a low-volatility environment that can help to deliver adequate retirement incomes. The research, therefore, indicates that DC represents a sustainable pension policy, *provided* the design and delivery features are optimal in relation to the overall pension system. These features include:

1. Ensure the design of DC pension plans is internally coherent between the accumulation and payout phases and with the overall pension system, including a robust investment governance framework that addresses key risks and the uncertainty inherent in saving for retirement;
2. Encourage high participation rates and adequate contributions (relative to the required outcome) paid over the long-term;
3. Promote well-designed incentives to save for retirement, particularly where participation and contributions to DC pension plans are voluntary;
4. Promote low-cost retirement savings instruments;
5. Establish appropriate default investment strategies, but also provide individuals with a choice of funds with different risk profiles and investment horizons;
6. Use life-cycle strategies as default option to protect people close to retirement against negative outcomes;
7. Encourage annuitization as a protection against longevity risk;
8. Promote the supply of annuities and cost-efficient competition in the annuity market;
9. Develop appropriate information and risk-hedging instruments to facilitate dealing with longevity risk;
10. Ensure effective communication and to address financial illiteracy and lack of awareness.

In seeking to assist policymakers, the OECD and its Working Party on Private Pensions (WPPP), explain these features in more detail below.

- 1. Ensure the design of DC pension plans is internally coherent between the accumulation and decumulation and with the overall pension system, including a robust investment governance framework that addresses key risks and the uncertainty inherent in saving for retirement**

Saving for retirement comprises the accumulation phase in which people build up assets that will be used in the pay-out (decumulation) phase to finance retirement. Therefore, DC design must be internally coherent between the accumulation and the pay-out phases. The design needs to be well-integrated with the overall pension system, which includes public (state) pensions, employer-sponsored pension schemes and individual pension plans.

Where retirement saving plans are mandatory or are the mainstay of the pension system, investment regulations, and in particular default options, need to be established in relation to robust criteria to avoid excessive exposure to risk. These criteria also need to take full account of the decumulation strategy. For example, if partial annuitization is mandated, the investment strategy during the accumulation phase needs to be designed to mitigate annuity-rate risk. The criteria here will vary depending on the overall pension system. In this regard, if a significant level of retirement income is

delivered through public pay-as-you-go (PAYG) financed and funded DB pensions, the pay-out phase for DC might permit greater choice and flexibility. However, if DC is the main source of retirement income, retirees may need to annuitize a larger share of their accumulated assets in order to reduce the risk of outliving their wealth.

The first step in the design of retirement saving plans such as DC is to establish a target retirement income. This target retirement income should be determined taking into account benefits provided by other components of the pension system. Consequently, if the overall target retirement income is, for example, set at 70% of final salary, and the PAYG-financed public pension provides 32%, as in the UK (OECD Pensions Outlook, 2012), contributions to retirement saving plans should be set so that a target retirement income of just below 40% is achieved, given other actuarial parameters. For example, the target contribution of 8% by 2018 in auto-enrolment is broadly in line with the OECD assessment. However, this point only applies to lower earners, where state pensions provide a greater proportion of the total pension income. For median and higher earners, 8% may not be sufficient to meet this target retirement income.

To define and achieve this target retirement income, all possible risks should be monitored. Policymakers have control over some of the factors that determine retirement income:

- The level of contributions (contribution rates);
- The contribution period;
- Fees/charges deducted from contributions and accumulated assets;
- Parameters for the design of the default fund;
- The allocation of assets in the pay-out phase (life annuities and/or programmed withdrawals, plus option to take part of the fund as cash);
- The interaction of the age at which decumulation begins and life expectancy, which together determine the length of the pay-out phase.

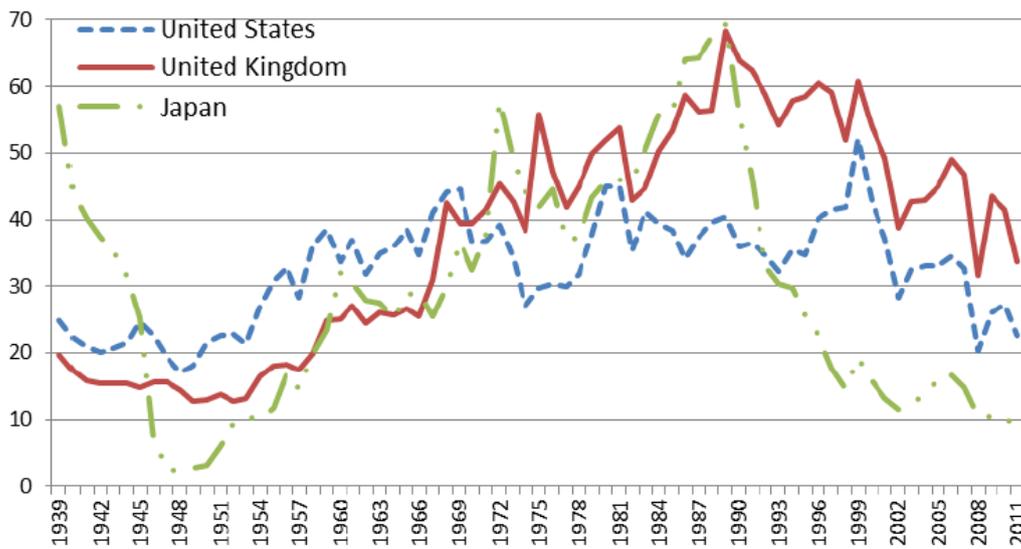
However, other parameters that affect retirement income are inherently risky and are far less easy to address:

- Labour market outcomes in relation to an individual's overall career wages and continuous employment (labour market/economic risks);
- Life expectancy (demographic risk);
- Future investment returns, inflation and/or discount rates (financial market risks).

Figure 1 below illustrates the extent of the uncertainty inherent in DC systems in relation to these risks.¹

¹ This uncertainty also exists for DB schemes, but here the replacement rate is underwritten by the employer and/or plan sponsor, which bears the risk. In DC individuals bear the risk.

Figure 1: Hypothetical replacement rates in DC pension plans for Japan, the UK and the USA



Notes: Hypothetical replacement rates for a hypothetical defined contribution pension plan since 1939 until 2012 using historical data on returns on equities, long-term government bonds, and inflation for people contributing 5% of wages every year during 40 years and investing in a balance portfolio of 60% equities and 40% bonds.

The risk of a shortfall in retirement income can be very significant as a result of the factors that represent uncertainty. Using stochastic modelling that incorporates the uncertainty in of future wages, potential unemployment, life expectancy, returns on different asset classes, discount rates, and inflation, the OECD argues that there is close to a 60% probability that replacement rates may fall short of expectations if uncertainty is not taken into account. The labour market and financial market risk, especially returns and inflation, are the main sources of uncertainty. The OECD stresses that replacement rates in worst-case scenarios (e.g. at the 5% percentile) can be extremely low (about one-third of the median retirement income) and therefore, there is a need to implement policies that mitigate the risk of worst-case scenarios affecting retirement income.

Consequently, the OECD argues that the main policy goal should be to increase the chances that an individual will achieve the target retirement income. The recent discussion of defined ambition in the UK should consider this as a starting point.

2. Encourage high participation rates and adequate contributions (relative to the required outcome) paid over the long-term

There is no doubt that the best way to improve the chances of achieving a target retirement income is to enrol and contribute for long-periods. Indeed, Table 1 below shows that the chances of achieving a target retirement income (the examples shown are for 30% and 70% of final salary), increase when contributions are raised (from 5% to 10% of wages) and/or when the contribution period is increased (from 20 or 40 years).²

Returns on investment are also crucial, but the OECD argues that while policy makers and individuals should strive to achieve long-term attractive returns, their primary focus should be the variables they *can control* – i.e. the contribution rates and contribution period.

² Some readers may argue that this point is obvious. Unfortunately, one of the main reactions to the financial and economic crisis in many OECD countries was to reduce contribution rates. Moreover, contribution rates in many countries are below the level rate that would represent a high probability of achieving the implicit target retirement income.

The OECD research also suggests that lengthening the contribution period by postponing retirement is an efficient approach to increasing retirement income. Postponing retirement simultaneously increases the contribution period and reduces the retirement period to be financed.

Clearly, a discussion about contribution levels and periods is meaningless if individuals do not enrol in the DC scheme or plan in the first place. Higher participation rates can be achieved in various ways, including mandatory systems and also through auto-enrolment, which relies on behavioural traits such as inertia and procrastination for its success. The structure of incentives to save in the first place for retirement – or to save more – might also be improved.

Table 1: Probability of achieving a certain retirement income

	Prob (RR≥30%)	Prob (RR≥70%)
5% contribution – 40 years	61.6	13.9
10% contribution – 40 years	91.7	52.8
5% contribution – 20 years	2.8	0.1
10% contribution – 20 years	33.0	1.3

Notes: OECD calculations, which result from assuming uncertain investment returns, inflation, discount rates, life expectancy and labour market conditions. People contribute either 5% or 10% over a 20 or a 40-year period, and assets are invested in a portfolio comprising 60% in equities and 40% in long-term government bonds.

The international evidence from OECD research indicates that the simplest and most effective way to increase coverage is through compulsion. Indeed, in OECD countries, the difference in coverage rates between countries with mandatory (e.g. Australia) or quasi-mandatory solutions (e.g. the Netherlands) and voluntary private pension systems, is as much as 30%.

An alternative approach to full compulsion is soft-compulsion (e.g. auto-enrolment), which incorporates an opt-out clause. Countries that have adopted this model include Chile (for the self-employed), New Zealand, Italy, the United States (on a voluntary basis) and more recently, the United Kingdom. New Zealand succeeded in increasing coverage rates substantially, but the default minimum contribution rate of 4% is perceived to be too low to achieve an adequate target retirement income. The Italian experience highlights the importance of aligning the design of incentives with auto-enrolment: coverage has been much less than expected because there were incentives already in place for people to opt-out.

Contributions and enrolment can also be increased with the help of “nudge” measures. These include matching contributions (by employers and/or the State), and auto-escalation schemes. Additionally, an appropriate structure of tax incentives (including financial subsidies for those who pay low or no income taxes) and/or matching contributions can both be efficient mechanisms to encourage participation and increase contributions.

3. Well-designed incentives to save for retirement, particularly where participation and contributions to DC pension plans are voluntary

Contributions to voluntary retirement saving pension plans benefit from tax advantages in most OECD countries. However, typically these tax advantages take the form of a deduction on the income tax base. Tax deductions provide incentives that increase with income levels, as the incentive is delivered through marginal tax rates, so they may be of little or no value for workers with low-to-median incomes. In addition, given that generally enrolment and retirement savings increase with income, an incentive structure skewed toward higher income is not the best way to increase participation and/or contributions.

An alternative is tax credits, which provide tax incentives that change inversely with income. Replacing tax deductions with tax credits, therefore, may help increase coverage among low-to-median earners.

However, the very low paid, who pay little or no income taxes, hardly benefit from tax credits any more than they do from tax advantages, so they need a different form of incentive in the form of a government subsidy or matching contribution into the individual's retirement savings account. The tax incentive of matching contributions is income-neutral (i.e. the incentives are the same for all income levels), but it could fall with income after reaching a cap (e.g. a cap equal to the match for the median income). Australia, Chile, Germany, New Zealand, and the United States, among others, have already introduced matching contributions with different degrees of success. The UK auto-enrolment system incorporates a government top-up of 1% to the member's contribution from 2018.

Matching contributions with a cap provides incentives that are inversely related to income, with the highest tax benefits going to low-income individuals. As most countries currently provide incentives via tax deductions, adding matching contributions with a cap makes the overall tax incentive to save in retirement saving pension plans more income neutral.

4. Promote low-cost retirement savings instruments

Policyholders need to ensure that there are incentives in place in the pensions market to improve efficiency and reduce costs, as fees and charges can have a substantial impact on retirement income. Indeed, reducing charges from 1% to 0.5% of assets under management lowers the potential reduction in pension benefits from around 20% to around 10% (assuming contributions of 10% for 40 years and average returns of 5%).

The OECD has considered several approaches to improving efficiency and reducing costs. Disclosure-based initiatives should be promoted, but these may not be sufficient on their own. More effective solutions include pricing regulations (a cap on fees/charges, for example), but these are not necessarily conducive to cost-reductions and efficient improvements in the industry. Alternatively structural solutions can be used, such as appropriate tender mechanisms or a default allocation to low-cost providers, especially in compulsory or auto-enrolment systems (as is the case in Chile). In certain pension structures, cost issues can be addressed by establishing large and centralised pension schemes, run on a non-profit base, such as NEST in the UK.

Policymakers and regulators also need to focus on reducing the impact on retirement income of severe market shocks, such as the recent financial crisis. Several approaches are under consideration to reduce this type of risk and also to reduce volatility. These include minimum return guarantees, establishing default funds and the use of life-cycle investment strategies. The recent discussion of defined ambition in the UK also focuses on this issue. However, at present, the OECD work leans towards establishing defaults and using life cycle strategies.

5. Establish appropriate default investment strategies, but also provide individuals with a choice of funds with different risk profiles and investment horizons

As many members of DC schemes may be unwilling or unable to choose investments, the design of default options is crucial, although we stress that individuals should be able to make their own choice of funds if they wish to do so. We set out the preferred default investment strategy below in point 7.

Clearly, the effects of market risk on retirement income can also be mitigated by introducing minimum return guarantees (MRGs). MRGs ensure that the amount of the accumulated savings at retirement does not fall below a certain value, but the actual pension benefit received after retirement will vary above that ceiling, depending on the type of pay-out product chosen and market conditions at that time of retirement. MRGs thus protect retirement income in DC plans against major investment losses. They could also improve public perception of and confidence in retirement saving pension plans and in turn

boost the coverage of, and contributions to these plans. However, as guarantees have to be paid for, they reduce the expected value of retirement income.

The cost of minimum return guarantees can be relatively high depending on risk aversion and the trade-off protection and reduced expected value of retirement income. By contrast, the OECD research shows that capital guarantees that protect the nominal value of contributions can be relatively cheap to provide, offer an attractive cost-benefit trade-off for pension plan members, and are valued highly by plan members, as they address one of the main concerns, which is that investors might not even get back their accumulated contributions. Consideration needs to be given to the implementation of capital guarantees and the terms that must apply, however. They are relatively cheap to the extent that contribution periods are long and investment strategies remain unchanged over the accumulation period.

When assessing the need for guarantees in retirement saving pension plans, policymakers and regulators need to look at the overall pension system. These guarantees may be less necessary in countries where the PAYG-financed public pension already provides a high level of retirement income and where there are public safety nets that compensate workers – especially low income workers – from a low investment return on their funded pension contributions. On the other hand, guarantees are most useful where DC plans provide a large part of the overall retirement income and when membership is mandatory.

6. Use life-cycle strategies as the default option to protect people close to retirement against negative outcomes

Life-cycle investment strategies reduce the impact of market risk on the account balance as the member ages. Such a design is consistent with economic rationale and risk attitudes and is therefore well-suited for default strategies.

It is important that default investment strategies concentrate on reducing the risk of extreme negative outcomes on retirement income. Obviously, risk and reward go hand-in-hand, so ensuring protection from negative market outcomes means lower potential gains during market upswings. Although having a default investment strategy for people with different risk profiles may not be ideal (the ‘one-size-fits-all’ issue), when the main concern is the impact on retirement income from extreme negative outcomes, such default options may be appropriate, in particular when choice is given. In this regard, default investment strategies may need to come with an opt-out clause for those who are willing and capable of making investment choices.

Choosing the appropriate default option requires balancing the trade-off between higher potential retirement income and the associated risks. The analysis of different investment strategies using stochastic modelling shows that investment strategies based on the life-cycle approach may be appropriate default investment strategies. These strategies provide protection for those close to retirement in the case of a negative shock to the stock market just before retirement, in particular for individuals who experience unemployment and who have medium to low growth in income. Among the life-cycle strategies, the one with a sharp decrease in equities in the last decade just before retirement performs best, at least when the shock occurs within one or two years before retirement. The positive impact of life-cycle strategies dwindles as shocks to equity markets occur further from retirement age. Life-cycle strategies also provide protection when contribution periods are short. Indeed, the OECD work shows a higher chance of having higher retirement income with life-cycle strategies than with fixed portfolios (given the same age-weighted equity exposure) when a negative shock to equity markets occurs before retirement. Additionally, this likelihood is higher for shorter contribution periods (e.g. 20 years instead of 40 years).

Table 2: Estimated probability that pension benefits based on life-cycle strategies will be higher than those based on a fixed portfolio strategy for two different contribution periods

	Entire random sample (10,000 obs)		Negative stock market shock ¹	
	Contribution period		Contribution period	
<i>Life-cycle investment strategies</i>	20 years	40 years	20 years	40 years
Sharp decrease after age 55 ²	30.2	42.1	71.0	61.5

Source: OECD Secretariat calculations.

It is essential to stress that life-cycle investment strategies are not a panacea. First, it is unclear whether in “normal” times a fixed-portfolio or life-cycle strategies perform better in terms of the probability distribution of replacement rates. Moreover, life-cycle strategies do not address the problem of volatility of retirement income resulting from market fluctuations or the problem of inadequate or low pensions.

Life-cycle strategies can be organised around a single fund or around several funds. The former are target date funds (e.g. as in the United States and for some schemes in the UK) in which the allocation to risky assets falls with age. In multi-funds or a life-styling funds system (e.g. Chile), each fund has different allocations to risky assets, with an upper and a lower limit to equity exposure, with the middle of the bracket as a possible default option. Individuals are shifted from one fund to the next according to their age. Multi-funds provide flexibility as people in each fund can have different exposures to risk depending on their risk tolerance parameter. Additionally, after a negative equity shock the multi-fund system with upper and lower limits allows for the exposure to equities to be increased and thus take advantage of a possible market rebound. Although this flexibility sounds attractive, the rationale behind a default strategy is precisely to avoid having people make these kinds of active investment decisions.

Finally on life-cycle strategies, the relative performance of investment strategies depends on the type of benefit during the pay-out phase. Using a stochastic model with different pay-out phases, life cycle strategies do best when benefits are paid as lifetime annuities but are less valuable when benefits are paid as programmed withdrawals. Dynamic strategies, in which rules link asset allocation to the performance of each asset class in each period of time, seem to work better with programmed withdrawals. However, dynamic management strategies fail to add much value. Such strategies provide at best a marginal improvement in the trade-off between median replacement rate and replacement rate at the 5th percentile than life-cycle strategies, and they are much more complicated to explain to the public in general.

Life-cycle investment strategies are the safest bet when sharp drops in retirement income as a result of extreme negative outcomes are the main concern. Moreover, life-cycle investment strategies are easier to explain to the public in general and much easier to implement than more sophisticated investment strategies.

7. Encourage annuitization as a protection against longevity risk

The design of the pay-out phase needs to strike a balance between flexibility and protection from longevity risk. Protection from longevity risk (from outliving your resources) is achieved through life-long pension benefits. Public PAYG-financed pensions and funded DB pension plans promise to pay a constant stream of income throughout retirement. However, retirement saving plans in which retirement income depends on accumulated assets shift this risk to individuals. In this case only by using part or all of the assets accumulated in these plans to buy lifetime annuities can individuals insure against longevity risk.

Unfortunately, lifetime annuities are illiquid and inflexible, and do not allow for bequests. The main alternative to buying an annuity is to draw down the accumulated funds gradually while leaving the remainder invested in the retirement saving account. These so-called phased or programmed withdrawals (also known as income drawdown) provide full flexibility and liquidity to face contingencies (e.g. health care, pay down debt), and permit bequests. Programmed withdrawals also offer access to portfolio investment gains that traditional annuities fail to provide, although variable annuities offer access to returns from capital market investments.

The key policy question to address, therefore, is which arrangement for the pay-out phase policymakers and regulators should promote or recommend. The OECD research suggests that a certain level of annuitization of accumulated balances should be set as the default mechanism for the pay-out phase, unless PAYG public pensions or the old-age safety net already provide for sufficient regular pension payments. A combination of programmed withdrawals with a deferred lifetime annuity (e.g. starting payments at the age of 85) that offers protection against inflation could be seen as an appropriate default. The demand for annuities could be also promoted by financial education initiatives stressing that they are insurance products designed to protect people from outliving their resources. Lump-sum payments may have to be discouraged as a form of benefit pay-out, except for small account balances.

Policy proposals encouraging partial annuitization of assets accumulated can only be operational if providers and annuity markets function appropriately.

8. Promote the supply of annuities and cost-efficient competition in the annuity market.

Different providers, such as public schemes, non-profit occupational plans, and insurance undertakings may provide different arrangements of risk-sharing in the pay-out phase that may help strengthen benefit adequacy and diversify risks in retirement income. Competition among different providers in the market for individual and group annuities should be promoted to ensure cost-efficient provision for plan members and to help develop the annuity sector as a whole.

9. Develop appropriate information and risk-hedging instruments to facilitate dealing with longevity risk

On the supply side, the market for annuities would benefit from certain actions aimed to making the management of longevity risk easier.

Annuity providers can manage longevity risk in-house as part of their internal risk management systems. They can retain the risk and hold enough capital to withstand fluctuations. This arrangement has traditionally been facilitated by the actuarial valuation process. Longevity risk can be reduced by using appropriate models to estimate future improvements in mortality and life expectancy, for example, through stochastic models that allow probabilities to be calculated, which enable risks to be priced accordingly.

Furthermore, reliable life tables should be made available by public statistical agencies; they should be regularly updated and incorporate stochastic forecasts of future improvements in mortality and life expectancy.

Pension funds and annuity providers can also use risk-sharing to manage longevity risk. Innovative products that link payments partially to life expectancy would allow all stakeholders to share longevity risk. Moreover, contributions determined in the actuarial valuations can also be partially linked to changes in mortality and life expectancy. These instruments may be quite useful in sharing, in particular, aggregate or cohort longevity risk. However, risk-sharing may lead to an unequal distribution of costs and benefits between, for example, males and females, the sick and the healthy, or between current and future generations.

Annuity providers could use capital markets to manage longevity risk and transfer the risk to third parties (e.g. reinsurance companies and investment banks). There are several mechanisms at their disposal: pension buy-outs, pension buy-ins, longevity hedges and derivatives. Pension buy-outs (passing the entire scheme to a specialist insurer) and pension buy-ins (insuring the liabilities) are generally used for defined benefit (DB) pension plans. Longevity hedges based on specific groups are over-the-counter and cannot be standardised. Index-based swaps by contrast have the potential to become one of the main instruments to partially transfer risk to third parties, once a standard longevity index is available.

There is a role for government here, as capital market solutions to longevity risk management could be promoted by producing standardised, publicly and readily available longevity indices. While there has been no successful example of longevity bonds thus far, governments could additionally consider in certain contexts issuing longevity indexed bonds and issuing very long-term bonds in enough quantities.

10. Ensure effective communication and to address financial illiteracy and lack of awareness

Effective communication includes providing regular individualised benefit statements. In addition, clear benefit projections under prudent assumptions, informing members about the possible impact of higher contributions or later retirement on their benefits could also be made available. Plan members should also have free and ready access to comparative information about costs and performance of different providers, and the language used in disclosed materials should be readily understood by them.