

## PAYOUT PHASE, ANNUITIES AND FINANCIAL MARKETS

DAF/CMF(2008)22<sup>1</sup>

While the immediate concern is the current financial market crisis, the key challenge for pension systems over the medium and long-term is dealing with the implications of population ageing, the design of the payout phase of pensions, in particular the type of products to channel assets accumulated in defined contribution (DC) pension plans (e.g. life annuities), as well as to examine the role that financial markets can play in providing adequate private pensions.

Population ageing is the result of steady increases in life expectancy and of fertilities rates falling back from the high level reached in the 1950s and 1960s.<sup>2</sup> This hump-shaped profile of fertility rates has created the so-called the “baby boom”, that is, a generation or cohorts that are larger than the preceding and subsequent cohorts.<sup>3</sup> Consequently, the impact of the “baby boom” is temporary as the cohorts born during the high fertility years pass away.<sup>4</sup> The impact of increases in life expectancy, on the other hand, is of a more permanent nature, bar wars or pandemics.

The implication of population ageing is an increase in the number of people of retirement age as a share of the working age population. The retirement of the baby boom generations will increase this share as those cohorts retiring will be followed by smaller cohorts. Similarly, improvements in life expectancy directly increase the number of people in retirement, *ceteris paribus*, as people live longer.<sup>2</sup>

The increase in the number of people in retirement relative to the number of people in working age create serious financial troubles to PAYG-financed pensions (generally public pensions) as well as to funded pensions (generally, private pensions). Public pensions would see the number of people contributing dwindle relative to those withdrawing benefits, increasing public expenditure on pensions.<sup>5</sup> Moreover, the manner public pension systems are designed create incentives to people to retire early, compounding the demographic impact on public pension expenditures (Duval, 2003). Population ageing will also affect private pensions through its impact on financial markets, in particular, on portfolio allocation and returns on investment. Portfolios based on life-cycle considerations may increase their share of bonds as the average age of the working age population increases. Consequently, returns on investment may fall slightly while risk decreases. Additionally, increasing life expectancy also directly raises the amount of savings needed to maintain a certain standard of living at retirement.

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<sup>2</sup> Throughout this paper population ageing refer to the increase in the share of old-age people (those aged 65+) over the working age population (those aged 16 to 64).

<sup>3</sup> See annex for historical data on fertility, improvements in life expectancy, the evolution of the old-age dependency (OAD) ratio, and for projections of the OAD ratio for the next 45 years.

<sup>4</sup> The structure of the population won't change as long as fertility rates remain constant (independently on whether they are high or low).

<sup>5</sup> Dang *et al.* (2001) and EC (2006) provide an estimation of the impact of ageing in public finances.

The impact of ageing is broader than its financial impact on public budgets; ageing will affect the economy as a whole by lowering employment rates and potential GDP growth; and by affecting productivity, savings, consumption, interest rates and asset valuations. The retirement of the “baby boom” generation will reduce the number of people in working age, lowering total employment unless policies succeed in increasing employment rates, in particular for old-age workers and women, and in delaying the effective age of retirement. Lower employment would have an impact on potential growth that may translate into lower GDP growth. The impact on productivity growth depends on whether those entering the labour market are more or less productive than those retiring. Moreover, if, according to the life-cycle hypothesis, older people have higher propensity to consume out of income, a higher share of old-age people over the working age population would reduce total savings. In contrast, a lower aggregate saving would be expected as a smaller rate of capital accumulation would be needed to equip a dwindling labour force. The impact of population ageing could also alter the structure of consumption and induce shifts in economic sectors within the economy. Those shifts are a reflection of changes in preferences and depending on the type of goods and services most in demand, those shifts may affect aggregate productivity gains. For example, certain types of services demanded by older people, such as long-term care, are often seen as having low potential for productivity gains compared with manufactured goods. The impact of ageing on interest rates is expected to be minor (Oliveira *et al.* 2005). On the one hand, the dwindling labour force would require a smaller rate of capital accumulation reducing the cost of capital. On the other hand, lower savings may push interest rates up. Finally, ageing, but in particular the retirement of the “baby boom” generation may have an effect on asset values (*i.e.* the asset meltdown proposition) as larger cohorts reach retirement and sell their assets to finance their retirement depressing prices. However, this sale of assets will not occur all at once, it is not a static equilibrium but a dynamic one and agents’ behaviour will adjust accordingly. In the end, a downward adjustment of assets prices may be expected, but far from an asset meltdown (DAF/CMF(2008)23/ADD1).

This seminar focuses on the impact of ageing on the payout phase of private pensions, in particular DC pension plans, and the role that financial markets can play in facilitating private pensions in helping households to manage retirement wealth. Population ageing has led to reforms in public pensions and, as a consequence, more and more people rely on private provision to finance their retirement. Yet, population ageing will also affect retirement income stemming from defined benefit (DB) or defined contribution (DC) pension plans. The increase in the number of people in retirement will have important consequences of how to finance retirement and how financial market could help out in managing accumulated assets and the risks involved, as well as in providing suitable products or instruments to deliver stable incomes in retirement over long periods (*e.g.* annuities) and to hedge against longevity risk (*e.g.* longevity bonds).

The main impact of ageing on private pension systems results from improvements in life expectancy, in particular the uncertainty surrounding these improvements (*i.e.* longevity risk). The retiring of the “baby boom” generation may slightly affect potential retirement incomes in both DB and DC pensions depending on the downward adjustment of assets values. However, the biggest impact would stem from the failure to account for improvements in life expectancy. Improvements in life expectancy lengthen the time people may remain in retirement increasing the liabilities of DB pension plans and annuity providers (Antolin, 2007), and affecting the capability of DB pension funds to provide the levels of retirement income participants were promised. In the context of DC, longer life spans can only be counterbalanced by either saving more, working for longer, or fantasizing about unrealistic returns on their investments. However, the impact of improvements in life expectancy could be relatively small as long as these improvements are foreseeable and are taken into account when planning for retirement. Unfortunately, future improvements in life expectancy are uncertain. This uncertainty (*i.e.* longevity risk) carries important risks. Individuals with retirement income stemming from balances accumulated in DC pensions run the risk of outliving their resources, thereby forcing them to reduce their standard of living when they are old. Otherwise, they can use their balances accumulated in DC plans to buy life annuities and thus shifting the longevity risk onto financial institutions providing annuities. Defined-benefit pension schemes as well as annuity providers run

the risk that the net present value of their pension promises and annuity payments will turn out higher than expected, as they will have to pay out a periodic sum of income that will last for an uncertain life span.

This seminar is structured into three panel sessions addressing the impact of population ageing in the context of the payout phase and financial markets, retirement income and instruments to hedge risks, in particular longevity risk. Financial markets need to be sufficiently developed and structured to encourage savings, allocate these investments more efficiently, deliver adequate returns, and to cope with changes in relative asset prices and in the composition of portfolios. Financial markets also must be able to provide suitable products to deliver stable incomes in retirement over long periods. For example, annuity markets need to provide products which fit individuals' needs, whilst developing reverse mortgage schemes could make it easier for illiquid assets, such as real estate, to be used more efficiently and to provide streams of income in retirement. Additionally, financial instruments may need to be developed to help pension funds and annuity providers cope with the longevity risks they bear, and therefore to ensure that risks are spread effectively and shared as broadly as possible. Finally, the current financial crisis may have a negative impact on the availability of financial instruments to hedge risks. The freezing of capital markets, esp. derivative and swaps markets, and their unlikely recovery to previous levels, may complicate risk management by pension funds and annuity providers. Moreover, the use of longevity swaps to hedge longevity risk may be now defunct.

### **Panel session 1: Ageing and the impact of the payout phase on financial markets<sup>6</sup>**

Population ageing would increase the liabilities of pension funds providing DB pensions as long as they have not accounted for the improvements in life expectancy. It may also affect their balance sheets through its impact on asset valuations. Pension providers of DB plans have traditionally managed their risks (investment, inflation and longevity risks) as part of their internal risk managing systems – they have made capital provisions as a general buffer against fluctuation in the value of their pension commitments. However, they have begun to turn to financial markets for instruments to hedge against investment, inflation and longevity risk.

The shift from DB to DC pension arrangements combined with population ageing brings in additional challenges. People would need to save more and in order to encourage greater savings, financial markets need to be sufficiently developed and structured so that investments can be allocated efficiently, they can deliver adequate returns, and they can cope with changes in relative assets prices and in the composition of portfolios.

Population ageing may have major implications for financial markets, in particular for the relative attractiveness of different asset classes and the role of different financial institutions. The retirement of the baby boom generation is likely to increase the demand for fixed income instruments at the expense of equities and may raise the role of insurance companies at the expense of pension funds, especially in countries where DC plans dominate. The average individual investor of a DC plan may also be expected to be more conservative than the average DB pension fund, further heightening the shift away from equities.

The role of pension funds as long-term, stable, countercyclical investors may also be called into question in the emerging landscape of funds directed by individual investors and mark-to-market funding and accounting standards applied to DB pension plans. Financial market stability may suffer from greater volatility, pro-cyclicality and herding in pension fund investments.

The exposure to longevity risk and the lack of financial instruments to hedge this risk, and the insufficient quantities of appropriate asset types to hedge other risks such as interest rate and inflation risk

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<sup>6</sup> Background papers include DAF/CMF(2008)23 and DAF/CMF(2008)23/ADD1.

partly explain the limited interest that financial intermediaries appear to show in offering annuity products. Financial markets are able to offer decumulation products with fixed payment promises to the extent they are able to invest in financial assets that allow them to hedge a considerable part of the risks associated with the payment promises they extend. The decumulation phase involves investment, as well as longevity, challenges, especially if specific patterns of payouts such as regular payouts of fixed amounts are aimed at. As it turns out, suitable hedging instruments are scarce, shortfall that also extends to hedging interest rate risk (DAF/CMF(2008)23). Such hedging products create liabilities similar to those of defined benefit funds, and the value of these liabilities can change substantially in the case of even small changes in interest rates.

Private market solutions to help managing the various types of risks, such as longevity, inflation and interest rates risks are actually forthcoming. However, the question is at what speed markets will develop and whether they are moving rapidly enough. Moreover, private market solutions also raise new issues, as the market for interest rate swaps clearly shows (DAF/CMF(2008)23). The market for credit swaps could help pension funds hedge some of their interest rate risk exposure, but at the cost of exposing them to counterparty credit risk. The recent financial turbulence has underscored the challenges in managing credit risks and highlighted that even sophisticated credit risk managers and financial institutions whose core business includes credit risk management can get the assessment wrong. Under the circumstances, one might well question whether exposure to significant credit risk is at all appropriate for institutions with a fiduciary duty to ensure a high degree of retirement benefit security.

Participants are invited to address the following issues during the discussion:

- What is the impact of ageing and pensions on financial markets: asset meltdown, funding gaps (mainly DB plans), and hedging instruments -interest rate, inflation and longevity (mainly DC plans)?
- DC pension arrangements shift the risk onto individuals. Individuals are able to protect themselves against longevity risk by buying life annuities. However, annuity markets suffer of some problems (both supply and demand) that constrain their role in pension provision. How could financial markets help in addressing some of the problems facing annuity markets (in particular, adverse selection, incomplete markets, appropriate asset types, lack of hedging products (please note that the issue of long-term financial instruments will be dealt with in the third panel session)?
- What implications the fallout from the recent financial market distress may have on pension funds and annuity providers? The freezing of capital markets (*e.g.* derivatives, swaps) may affect the way pension funds and annuity providers can manage their risks (interest rate, inflation and longevity).

## **Panel session 2: The payout phase and retirement income<sup>7</sup>**

The shift from DB - in which the amount of retirement benefits is determined largely by years of service - to DC pension plans, whereby retirement wealth depends on how much workers save and how successfully they allocate their assets accumulated in DC, brings to the fore policy issues related to the design of the payout phase and instruments to transform these assets accumulated into a stream of income at retirement. This session will deal with the main options available for the payout phase, the impact that the country and the market context may have on the choice of retirement payout options, the entities that should be allowed to provide annuity products and the type of annuity products that should be allowed.

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<sup>7</sup> Background papers for this session include DAF/CMF(2008)24, DAF/CMF(2008)25 and DAF/CMF(2008)26.

Moreover, the efficient allocation of assets accumulated in DC plans requires the managing of risks, such as the timing of annuitisation and longevity risk. Finally, the adequacy of retirement income in pension systems based mainly on DC pension arrangements depends not only on the efficient allocation of assets and returns on investment, but also on the amounts contributed, the contribution period and the length of retirement, which in turns depends on the age of retirement and on longevity.

The main forms of retirement payout options available for allocating assets accumulated in DC pension plans include lump-sums, programmed or phased withdrawals, annuities and any combination of them. The choice among them depends on the balance to strike between flexibility and protection from longevity risk and the country context. Life annuities protect from longevity risk, but they are illiquid, and consequently lack the flexibility to address contingencies that people may face at retirement (*e.g.* need to pay down debt, health care expenses). Programmed withdrawals and lump-sums provide more flexibility in using these balances but do not protect retirees from longevity risk. Given this trade-off between flexibility and protection from longevity risk, countries that provide a significant level of retirement income already annuitized from their PAYG-financed public pensions (in absolute as well as relative replacement rate terms) may be better off allowing more choice and flexibility by letting people allocate their accumulated assets in DC plans as they please - into lump-sums, programmed withdrawals, life annuities or any combination of the above. On the contrary, retirees in countries for which most of their retirement income comes from DC plans may need to annuitize a larger share of their accumulated assets. Finally, one (potentially economical) way to achieve this balance between flexibility and protection is to combine arrangements – such as a programmed withdrawal with a deferred life annuity bought at the time of retirement (the programme withdrawal providing some flexibility and liquidity to face any contingencies and the deferred annuity insuring against longevity risk at a cost of only a relatively small portion of the assets accumulated in DC plans).<sup>8</sup>

Unfortunately, empirical evidence (DAF/CMF(2008)24) fails to provide any evidence of a negative correlation between flexibility and replacement rates from PAYG-financed pensions or housing wealth. As a result, countries may need to reconsider they way their payout phase is structured in line with the argument put forward previously.

A practical constraint that regulators face when considering life annuities is whether there is a well functioning annuity market (*i.e.* financial institutions are willing to provide annuities and the instruments to hedge the risks involved are easily available). Therefore, a second policy issue to address, once the decision taken is to promote annuitisation, is how to do it and how to deal with the problems facing annuity markets. Annuitisation can be mandated, which directly eliminates most problems associated with adverse selection. However, some countries may prefer less severe approaches such as annuitisation as the default option with an opt-out clause. Countries may also promote annuitisation by introducing tax incentives and improving financial education. When using tax incentives care needs to be taken as regard their design and their relationship with income levels. Independently of the way annuitisation is promoted, policy makers may need to make sure that all retirees are annuitized at very old ages in order to safeguard them from longevity risk or falling back on state pensions. Regarding the main problems facing annuity markets, most stem from adverse selection, lack of competition among providers, and difficulties of dealing with longevity risk, which affects pricing and costs. Adequate regulation is probably the best approach to deal with these problems and promote further expansion of annuity markets. However, it should be noted that the lack of a developed market need not prevent policy makers from requiring or encouraging annuitisation – as the case of Chile shows.

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<sup>8</sup> A deferred annuity bought at the time retirement that begins paying benefits at later age (*e.g.* 85) would protect individual from outliving their resources. Calculations of the costs of this deferred annuity indicate that it may not be more that 15% of the assets accumulated at retirement, allowing individual to use the remaining assets in a more flexible manner during the intervening period.

The third issue that needs to be addressed relates to the factors determining which institutions should provide annuities and how to promote competition in annuity markets. In practical terms, life insurance companies are better prepared to offer life annuities as they have the technical capabilities, the expertise and, in theory, may be naturally hedged as they may operate in both sides of the market (life expectancy and mortality). However life insurance companies seem uninterested in participating in the market for life annuities, which has the effect of reducing competition and increasing costs. One of the main arguments to explain this lack of participation relates to the problems in dealing with longevity risk, in particular, the lack of financial instruments to hedge against longevity risk and the need to use well defined mortality tables, so that provision and capital put aside can be adequate.<sup>9</sup> Possible alternative providers to insurance companies include pension funds (though care should be taken about capital adequacy requirements), separate financial institutions (though these may lack the broad-based business), and a single entity or state annuity fund. This latter alternative is attracting interest among policy makers, though the issue of how to combine a state annuity fund and life insurance companies competing in the same market may need to be considered further, as well as issues related to crowding out and incentives to private markets.

Focusing on the type of annuity products that should be allowed, this decision involves a trade-off between choice, risks and costs. A wide variety of annuity products exist, which are designed to address different annuitants' needs (*e.g.* bequest, access to stock market returns, inflation protection). However, the direct relationship between cost and the guarantees involved in these products needs to be considered by policy makers – as does the shifting of risk between providers and individuals these products may involve. On the relationship between costs and guarantees, surveys show that potential annuitants would like products that address as many as their needs as possible, which increases the costs of such product; while at the same time they express a need for reasonably priced, straightforward and easy to understand annuity products. There have been calls for new and innovative annuity products, for example products that combine both pension and health considerations. However, care needs to be taken with the design of such products as pension payment flows are constant and certain but health disbursements can be unpredictable and quite large.

Again, how much risk individuals can and should bear through their DC pensions depends on how large a part these pensions play in overall retirement incomes. Additionally, buying annuities is fraught with risks, in particular the risk associated with the time of purchasing. One product with the potential to address many of these problems are deferred life annuities, which apart from insuring against longevity risk, partially address the time of purchasing risk. Moreover, buying the deferred life annuity at the time of joining a DC plan may help bridge the accumulation and the payout phases. Unfortunately, they do not seem to attract much interest from providers (as they expose providers to the full length of longevity risk) or consumers (financial education studies show that most individuals are unable to assess accurately the advantages of deferring payments). The negative impact on retirement savings of the risk of time of purchasing can also be ameliorated by an electronic quotation system and more a flexible timing of annuitisation.

The main policy recommendation for policy makers (DAF/CMF(2008)24) is to mandate deferred life annuities that start paying at very old ages (*e.g.* at age 85) and allow for the remaining assets accumulated in DC accounts to be allocated as programmed withdrawals (preferably with flexibility to face contingencies).<sup>10</sup> With these arrangements policy makers accomplish a balance between flexibility and protection from longevity risk. Moreover, the cost of a deferred life annuity that starts paying at very old

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<sup>9</sup> Mortality and life tables should include stochastic forecasts of future improvements in mortality and life expectancy. The attached probabilities permit to better assess the degree of uncertainty and to price risks accurately (Antolin, 2007). Moreover, they should be updated continuously as new data comes along.

<sup>10</sup> Yet, people may be free to allocate them as they wish, as long as a minimum periodic payment schedule (*e.g.* minimum pension) is agreed for the period between retirement and age 85.

age is only around 10-15% of the assets accumulated at retirement. In addition, these arrangements, apart from eliminating the risk of outliving one own resources and falling into poverty, largely offset the timing risk.

Policy proposals to mandate deferred annuitisation of parts of household wealth can only be operational if there is supply of adequate financial instruments. In this context, there must be an entity, most likely a financial institution that is willing to take the other side of the transaction. Such willingness is likely to depend on the existence of sufficient quantities of suitable financial instruments to enable them to hedge considerable parts of the associated risks.

Furthermore, mandating a deferred life annuity that starts paying at old age removes any worries about the type of annuity products to allow. People should be allowed to use their remaining balances to buy any type of annuity products if they wish, as protection from longevity risk is guarantee. Additionally, this may encourage further development of annuity markets and attract providers as well. In the context of providers, the discussion suggests that policy makers should allow any provider as long as they are sufficiently regulated and competition is guaranteed.

Finally, the current financial turmoil has brought to the fore the importance of the timing of retirement for the adequacy of retirement income when holding assets in DC pensions to finance retirement. In this context, investment strategies designed to reduce during the last years before purchasing a deferred annuity the exposure of prospective retirees to equities, could help in addressing adequacy problems.<sup>11</sup>

Participants are cordially invited to address the following issues:

- What is the right balance to achieve between flexibility and protection from longevity risk, given the country context and the main forms of retirement payout options (lump-sums, programmed withdrawals and life annuities)?
- What do participants think about the proposal of mandating deferred life annuities that start paying at very old ages guaranteeing therefore full protection from longevity and avoiding people falling into poverty or into the state safety net at very old age?
- How to promote and deal with some of the problems facing annuity markets, in particular the existence of competing more flexible alternative forms of retirement such as programmed withdrawals; and the dichotomy between the demand for straightforward products (easy to understand) and products that address several needs (e.g. bequest motives) which are more complicated and pricier?
- What type of annuity products can or should be allowed?
- Who should provide annuities?
- How does the regulatory context affect the provision of annuities?
- How can worries about the adequacy of retirement income in the context of DC pension plans be better addressed?

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<sup>11</sup> Retirement adequacy issues in DC pension plans also arise because participants' contributions or periods of contribution are not large or long enough.

### **Panel session 3: Ultra long-term financial instruments<sup>12</sup>**

Longevity risk poses a challenge to defined benefit and annuity providers, and to the development of annuity markets. Longevity is steadily increasing in OECD countries and it is expected to increase even further. This is a positive development, but one that may have dire consequences to pension finances. At the heart of longevity as a problem for society is uncertainty about the rate of future improvements in life expectancy, that is, longevity risk. Longevity risk is a problem for defined benefit and annuity providers as they run the risk that the net present value of their pension promises and annuity payments will turn out higher than expected, as they will have to pay out a periodic sum of income that will last for an uncertain life span. Moreover, to encourage the supply of annuities, providers need to be able to manage longevity risk by off-loading, hedging or sharing some of their long-term and longevity risks.

Unfortunately, there is a lack of financial instruments to hedge against this longevity risk. Pension funds and annuity providers would like to transfer longevity risk away to institutions better placed to deal with it. However, although financial instruments to hedge against interest rate and inflation risks are readily available, there is a lack of similar instruments to hedge against longevity risk, thereby complicating risk management by pension funds and hindering the expansion of the annuity market.

Private markets solution to providing financial instruments to hedge longevity risks has so far failed (DAF/CMF(2008)27, DAF/CMF(2008)28). There has been a developments in the market based on mortality linked derivatives, which in some respect resemble longevity bonds, but are nevertheless significantly different in that they are based on mortality while longevity bonds are base on survivor rates. The only longevity bond issuance project, the EIB longevity bond, never materialised as a result of design problem and primarily because coverage was considered too expensive.

There are several reasons why the market for longevity bonds remains inactive (DAF/CMF(2008)27). The market is short of investors in longevity risk, the obvious challenge for a market in longevity bonds is the lack of natural investors who would benefit from an unexpected rise in life expectancy (e.g. health insurance companies). Additionally, longevity bonds are instruments with limited opportunities to exit the transaction for many years. This lack of liquidity has led investors to demand a liquidity premium, so that the resulting price of hedging has been unattractive for the pension sector. Another impact factor explaining the problems facing a market for longevity bond is the cohort or aggregate longevity risk (DAF/CMF(2008)28). Financial markets (including insurance) work efficiently for sharing individual risks and short-term risks between cohorts (with largely overlapping lifetimes) but not for the long-term life risks of older cohorts that are largely known when the younger cohorts arrive. Ex ante efficient intergenerational risk sharing via private markets is therefore not possible as future generations cannot be included. These considerations have set the stage for a central public policy issue: what (capital market) role (if any) the government can play in overcoming these hindrances?

Suggestions that governments could encourage ways in which annuity providers and DB-plan sponsors could better hedge their life expectancy risks, for example, by supporting market-based solutions to addressing longevity risk issuing longevity bonds (Blake, 2002) may face practical problems as they are themselves heavily exposed to longevity risk through public pension systems and social security schemes (DAF/CMF(2008)28). Other suggestions like using swap markets to hedge longevity risk may not be feasible after the recent market turmoil. Additionally, the lack of large quantities of long dated government bonds to match liabilities does not help pension funds or annuity providers either.

However, governments can take other steps to encourage the development of a private market in longevity hedging products by producing a longevity index. Governments, through their national statistical

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<sup>12</sup> Background papers for this session include DAF/CMF(2008)27 and DAF/CMF(2008)28.

institutes, could produce a reliable and widely accepted longevity index to be used as a benchmark for pricing hedging products.

Participants are cordially invited to address the following issues during the discussion:

- The respective roles of the private and public sectors in issuing financial instruments to hedge longevity risk: advantages, approaches and barriers.
- Types of instruments for hedging longevity risk
- Annuity providers may also need long-term instruments to hedge interest rates on top of longevity risk.

## MAIN POLICY RECOMMENDATIONS

### *Regarding the type of retirement payout options and annuities*

- Countries should allow full choice and flexibility to allocate assets accumulated in DC pensions when retirees already receive a relatively large part of their retirement income annuitized through PAYG-financed pensions and DB pensions.
- Countries where assets accumulated in DC pensions are the main source of retirement income should make sure that retirees allocate part of their assets to buy a life annuity that protects them from longevity risk and provide enough retirement income at old age.
- In this context, the main recommendation is for policy makers to mandate a deferred life annuity with longevity insurance to be bought at the time of retirement that starts paying at very old ages (e.g. at 85 years old). Buying this deferred annuity will cost around 10-15% of the assets at retirement. Individuals should then be given full choice and flexibility to allocate the remaining assets as they see fit.
- Having mandated a deferred life annuity, countries should allow any type of annuity products.
- Policy proposals to encourage or even to mandate deferred annuitisation of parts of household wealth require the supply of adequate financial instruments to become operational. In this context, there must be an entity, most likely a financial institution that is willing to take the other side of the transaction. Such willingness is likely to depend on the existence of sufficient quantities of suitable financial instruments to enable them to hedge considerable parts of the associated risks.

### *Regarding providers*

- Countries should allow any provider as long as they are sufficiently regulated and competition is guaranteed. In particular, solvency ratios should be relatively high to protect retirement income from default on the part of the provider.
- Countries where annuity markets are small or not existent at all should institute a centralised annuity fund provider, but allow insurance companies and other providers to enter the market in the same footing. Full equal competition should be guaranteed. Moreover, the role of the centralised annuity fund provider should dwindle down as the market develops. Countries that decide for pension funds providing annuities should make sure that appropriate prudential regulation is in place to protect retirement income.

### *Regarding other measures to promote annuitisation*

- Tax incentives when participation in DC plans and annuitisation is mandatory are far from a priority. However, when it is voluntary, tax incentives can play a useful role. Yet, care is needed with its design.

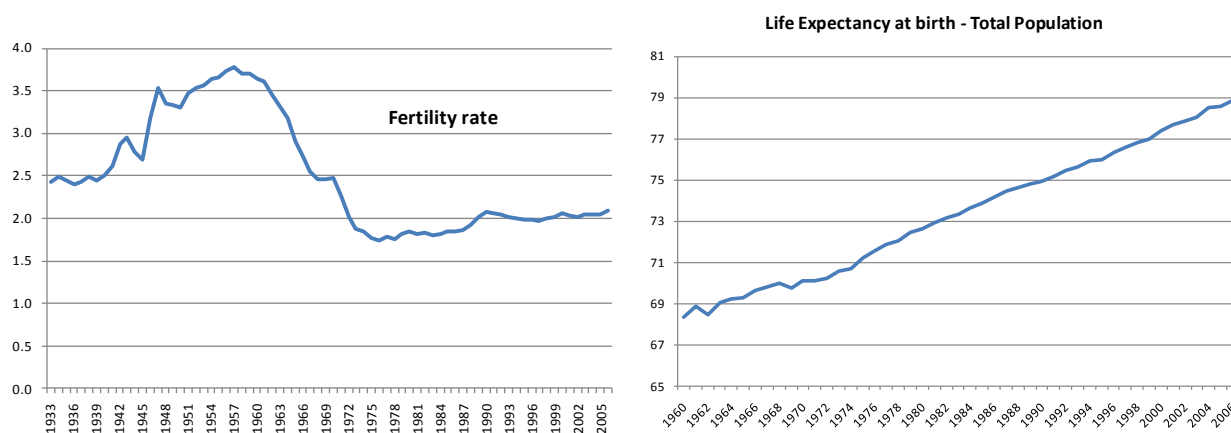
- On financial education, there is a need to implement programs aiming at improving the financial literacy and financial awareness of individuals, as well as improving the qualification of pension and annuity intermediaries using, for example, certification programs.
- Financial institutions should be encouraged to develop annuity products that address needs such as health care contingency expenses. However, care needs to be taken with the design of such products as pension payment flows are constant and certain but health disbursements can be unpredictable and quite large.
- Mortality and life tables should include stochastic forecasts of future improvements in mortality and life expectancy. The attached probabilities permit to better assess the degree of uncertainty and to price risks accurately. Moreover, they should be updated continuously as new data comes along.
- Government should encourage the development of a market for longevity hedging products by developing a reliable longevity index (DAF/CMF(2008)28). In countries where liabilities from PAYG-financed pensions are relatively small, governments should consider issuing longevity-indexed bonds.

## ANNEX: POPULATION AGEING

This annex shows the causes behind population ageing, measured as the increase in the number of people aged 65 and older over the working age population, that is the old-age dependency ratio. Additionally, this annex, with the use of a simple shift-share analysis, shows the separated impacts of changes in the working age population and in the old-age population on the old-age dependency ratio.

Figure 1 shows the fertility rate from 1933 to 2050 and life expectancy at birth since the 1960s for a typical OECD country. The “baby boom” is the result of sharp increases in fertility rates around the 1950s until the mid-1960s and a return of these fertility rates to more moderate levels, more in sync with past levels. This hum-shaped profile of fertility rates means that the “baby boom” generation comprises cohorts much larger than the preceding and following cohorts. Once the “baby boom” generations pass away their effect will disappear. Improvements in life expectancy, on the other hand, seem to be here to stay (bar wars and pandemics).

Figure 1. Population ageing



Source: OECD Health Database, 2007

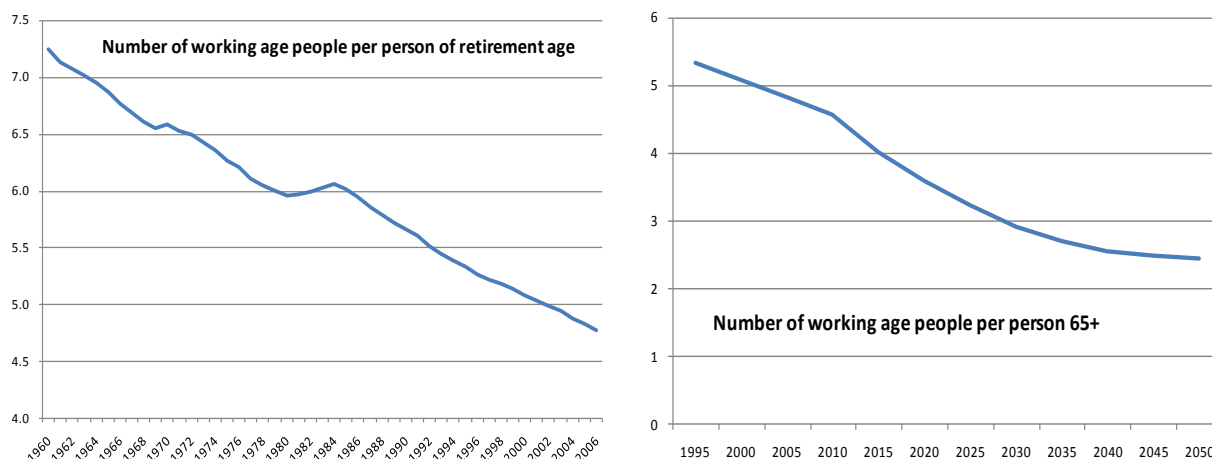
These increases in life expectancy and the return of fertility rates to previous lower levels explain the increase in the share of people aged 65 or older (*i.e.* the number of retirees) over the working age population (*i.e.* those aged 16 to 64). The evolution of this ratio is a measure of the ageing of population (Figure 2, panel A). The number of working age people for each person in retirement age has fallen considerable from more than 7 people to below 5 people per retiree. Most worryingly, it is the projected decline in this ratio to just above 2 people in working age for each person in retirement age (Figure 2, panel b).

Finally, figure 3 shows how the dependency ratio would have evolved in the case the baby boom would not have happen (*i.e.* fertility did not increase in the 1950s and 1960s). This is achieved by removing the large cohorts entering the labour market. Figure 3 also shows how the dependency ratio would have moved in the case life expectancy would have remained constant at its level in 1960. Hence, figure 3 reports the decrease in the number of people in working age per retiree resulting from the baby

boom and from improvements in life expectancy separately. The impact from the baby boom is much lower as the baby boom will begin retiring in the coming years.

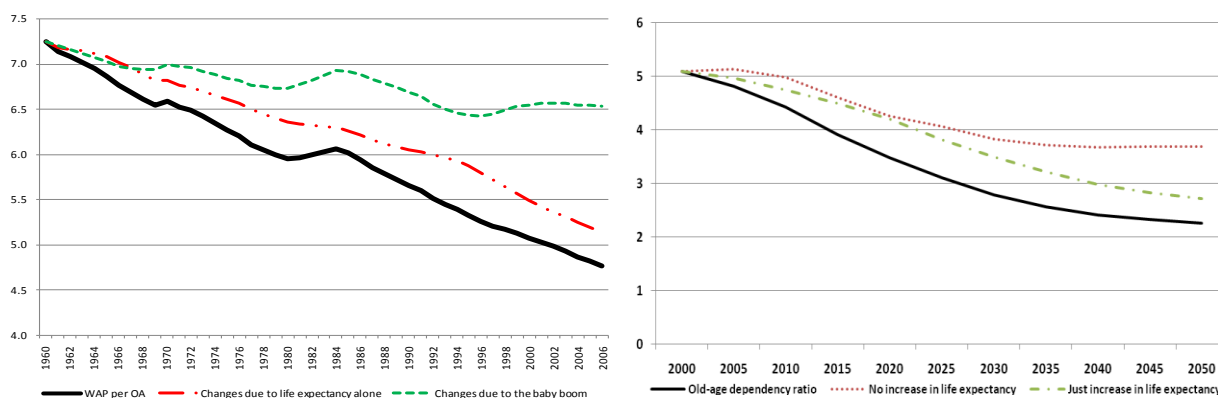
The second panel of figure 3 shows the expected evolution of the OAD due to the baby boom retiring and to changes in life expectancy. During the first 25 years of the decade the impact on the OAD of both factors is quite similar. However, after 2035, when the baby boom generation will begin to pass away the impact on the OAD ratio of improvements in life expectancy will again dominate.<sup>13</sup>

**Figure 2. Old-age dependency ratio, 1960-2005-2050**



Source: OECD Health Database, 2007.

**Figure 3. The separate impact of the baby boom and life expectancy on the old-age dependency ratio 1960-2005 and 2000-2050**



Source: OECD Health Database, 2007 and OECD (2005).

<sup>13</sup> It is interesting to point out that projections until 2050 assume that life expectancy improvements will be only half of those occurred since the 1960 (Antolin, 2007).

## REFERENCES

- Antolin, P. (2007), "Longevity Risk and Private Pensions", *OECD Working Paper Series in Insurance and Private Pensions No. 3*
- Dang, T.T., P. Antolin and H. Oxley (2001), "Fiscal Implications of Ageing Populations: Projections of Age Related Spending" *OECD Economics Department Working Paper No. 305*
- Duval, R. (2003), "The retirement effects of old-age pension systems and other social transfer programmes in OECD countries" *OECD Economics Department Working Paper No. 370*
- European Commission (2006), "The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, health care, long-term care, education and unemployment transfers (2004-2050)" Report prepared by the European Policy Committee and the European Commission (DG ECFIN), *European Economy Special Report 1/2006*
- Oliveira, J., F. Gonand, P. Antolin, C. Maisonneuve, and K. Yoo (2005), "The impact of ageing on demand, factor markets and growth" *OECD Economics Department Working Paper No. 420*