

Comments on 'Developments in Decumulation: The Role of Annuity Products in Financing Retirement' by Olivia Mitchell

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Introduction

Olivia's paper provides a timely reminder of the importance of the decumulation phase of retirement provision. More and more countries are adopting the defined contribution (DC) model of funded pension provision. But virtually the entire public debate on DC pensions has been confined to the accumulation phase.

With the exception of the UK, where a vigorous debate has taken place since the mid-1990s, any discussion of the decumulation phase has been almost entirely lacking. The reason for this is very clear to me: the UK along with Holland and Ireland are the only countries in the world with DC plans that are actually **pension** plans. Every other country has **asset accumulation** plans but not **pension** plans. By this I mean that such plans do not provide, as an essential feature of their design, retirement income security for the remaining life of the plan member. This is because there is no mandatory requirement for members of these plans to purchase a life annuity at some point during their retirement, either at the point of retirement or by a certain age. Retirees can take the entire accumulated fund as a cash lump sum or they can draw down an income from the fund without any restrictions on minimum or maximum drawdown. In the UK, DC pension plan members are obliged to convert the accumulated fund into a life annuity by the age of 75 at the latest.

The life annuity is the **only** financial contract in existence that provides retirement income security for however long the plan member lives. When I went to Olivia's annual conference at the Pension Research Council a year ago, I discovered that the UK has the world's largest pension annuity market. The size of the UK pension annuity market is £6bn (\$8.5bn) p.a. In contrast the size of the US pension annuity market is just \$2bn p.a., less than one-quarter the size the UK market and the US is the world's largest market for DC 'pension' plans: more than half of US workers and nearly half of US pension assets are in DC plans. But these plans are tax-sheltered asset accumulation plans, not pension plans, because there is no requirement to purchase a life annuity. As long as workers maintain the plans until a certain age (59.5 years), they can take out the entire lump sum in cash.

This obviously leads to a moral hazard problem, since there is nothing to prevent members spending this money 'too quickly' and then falling back on the state (this is known as 'double dipping'). On the other hand, there is nothing to prevent, wealthier plan members spending the money 'too slowly' (since they can live comfortably on other resources) and leaving the bulk of their 'pension pot' as a tax-subsidised bequest to their children. Yet neither of these actions are compatible with the original purpose of a pension plan, namely the provision of retirement income security.

The US is not the only country in this position. The last time I saw Olivia was a month ago in Tokyo where we were discussing the new Japanese pension laws with economists from Australia. In Japan, Australia, as well as the US, there is no requirement to purchase an annuity with the accumulated fund. Today we meet in Germany, and again there is no requirement to purchase an annuity when a plan member retires.

I think the reason for this is clear. Such countries have relatively high social security payouts and so there is an effective safety net in place if plan members do spend their money too quickly. On the other hand, the number of wealthy individuals leaving bequests from tax-subsidised assets is currently sufficiently small that this has not generated any real political outcry. However, I cannot see this lasting. The whole purpose of introducing private funded pension plans is to deal with the demographic ageing problem and once the baby boomers begin to retire after 2010, we could begin to see huge sums of pension assets being subject to inter-generational transfers rather than being used for their primary purpose, namely intra-generational transfers from those who die early after retirement to those who live a long time after retirement.

The UK Experience

The debate concerning the role of annuities in pension provision has been going on in the UK since the mid-1990s, prompted by the fall in nominal interest rates during the early 1990s. Annuities in a low nominal interest rate environment were perceived to be poor value for money. DC plan members complained about having to convert their lump sums into annuities that were providing less than half of what annuitants retiring in 1990 had received. This is because the income from the annuity is related to interest rates at the retirement date. Plan members find themselves switching suddenly from an equity exposure to an interest-rate exposure.

Notwithstanding the money illusion aspect of this argument, the UK government made a major concession in 1995 when it permitted DC pension plan members to delay the purchase of an annuity from retirement age to a maximum age of 75 (1995 Finance Act). Instead, plan members could implement an 'income drawdown' strategy, whereby they could keep the fund fully invested in higher returning assets (mainly equities) and draw an income from the fund of between 35% and 100% of the corresponding annuity up to a maximum age of 75, at which time a life annuity has to be purchased with the residual assets.

The introduction of drawdown prompted a search for new investment-linked retirement-income programmes (ILRIPs) to replace annuities. The search was started by the Retirement Income Working Party (see Blake and Hudson (2000)). The motivation for the search rested on the following facts: bond yields were now very low, retirees were facing the risk of low interest rates at retirement, equities historically generate higher returns, and retirees were living longer. The question that needed to be answered was: would it be better to maintain some equity exposure during retirement?

An Analysis of Investment-linked Retirement Income Programmes

A detailed analysis of key ILRIPs was conducted by Blake, Cairns and Dowd (2000). This study compares various ILRIPs with an annuity by using stochastic simulations of discounted utilities. We then compare the simulated utility distributions, while allowing for two possibilities at the time of death: leave a bequest on death or surrender the bequest to the insurer in exchange for an annual mortality bonus payable while the plan member remains alive; the mortality bonus is a cross subsidy to those who live a long time from those who die early in retirement. In each case individuals were assumed to retire at 65.

The various programmes considered were:

- Annuity (the benchmark programme)
- Fixed income drawdown with annuity at 75
- Flexible income drawdown with annuity at 75
- Flexible income drawdown with deferred annuity
- Unit-linked drawdown with annuity at 75
- Collared income drawdown with annuity at 75
- Floored income drawdown with annuity at 75
- All except the first programmes come in bequest or mortality bonus variants.

The annuity programme:

- Converts the fund into an annuity on retirement
- Is the only programme that protects the policyholder against outliving his resources
- Has risks for the policyholder:
 - ◆ Low interest rates on retirement
 - ◆ Inflation risk (if a level annuity is chosen)
- Has risks for the insurer:
 - ◆ Reinvestment risk (if the insurer is unable to invest the lump sum in suitable long-maturing, income-generating assets on the retirement date)
 - ◆ Mortality improvement risk (arising because annuitants live longer than anticipated).

The fixed income programme (FXD):

- Converts the retirement fund to a managed fund (100% equity weighting)
- Provides the same income as under the annuity, where funds are available
- Converts the residual fund to an annuity at 75
- Has the danger that poor investment returns will exhaust the fund before 75, so that the policyholder outlives his resources (this happened in 10% of the simulations).

The flexible income programme (FLX):

- Converts the retirement fund to a managed fund (with four different choices of equity weighting: 25%, 50%, 75% and 100%; the remainder is in bonds)
- Provides an income that depends on investment performance, so that poor performance implies a lower income
- Involves no danger that poor investment returns will exhaust the fund before 75, although there is a danger of low interim income. This is because the income each year is determined by dividing the fund size available by the life expectancy of the annuitant for that year. The life expectancy adjusts in the light of mortality experience and is not fixed at the retirement age as is the case with a standard annuity. For example, someone with a life expectancy one year of 10 years might have a life expectancy the following year of 9.3 years because of improved mortality.
- Converts the residual fund to an annuity at 75.

The flexible income programme with a deferred annuity (DEF):

- Purchases an annuity at retirement to start at 75 which pays the same income as a traditional annuity from 75 on
- Converts the residual fund at retirement to a managed fund
- Receives a flexible income from the managed fund
- Involves no danger of outliving resources, although there is a danger of low interim income.

The unit-linked programme (UNI):

- Uses the retirement fund to purchase units in a managed fund, with the number of units depending on mortality forecasts
- Sells some units each year, with the income depending on the price of units
- Involves no danger of outliving resources, although there is a danger of low interim income.
- Uses the residual fund to purchase an annuity at 75.

The collared income programme (COL):

- Is similar to the flexible income programme but involves a zero-cost collar to smooth returns
- The collar is a combination of long put and short call options: the puts produce a floor on the income received, while the calls produce a ceiling
- Invests in a managed fund (100% equities) subject to the floor and ceiling
- Uses the residual fund to purchase an annuity at 75.

The floored income programme (FLR):

- Is similar to the flexible income programme but involves a put option to provide downside protection
- Sacrifices some upside potential to guarantee a minimum return
- Uses the residual fund to purchase an annuity at 75.

We used the following modelling assumptions:

- Equity returns in the managed fund follow geometric Brownian motion
- Returns on equities parameterised according to UK experience
- 1% annual charge on all distribution programmes
- Analysis in real (RPI-adjusted) terms.

The policyholder's utility function is the discounted present value of future per-period utility levels, until death, where the per-period utility is the negative exponential:

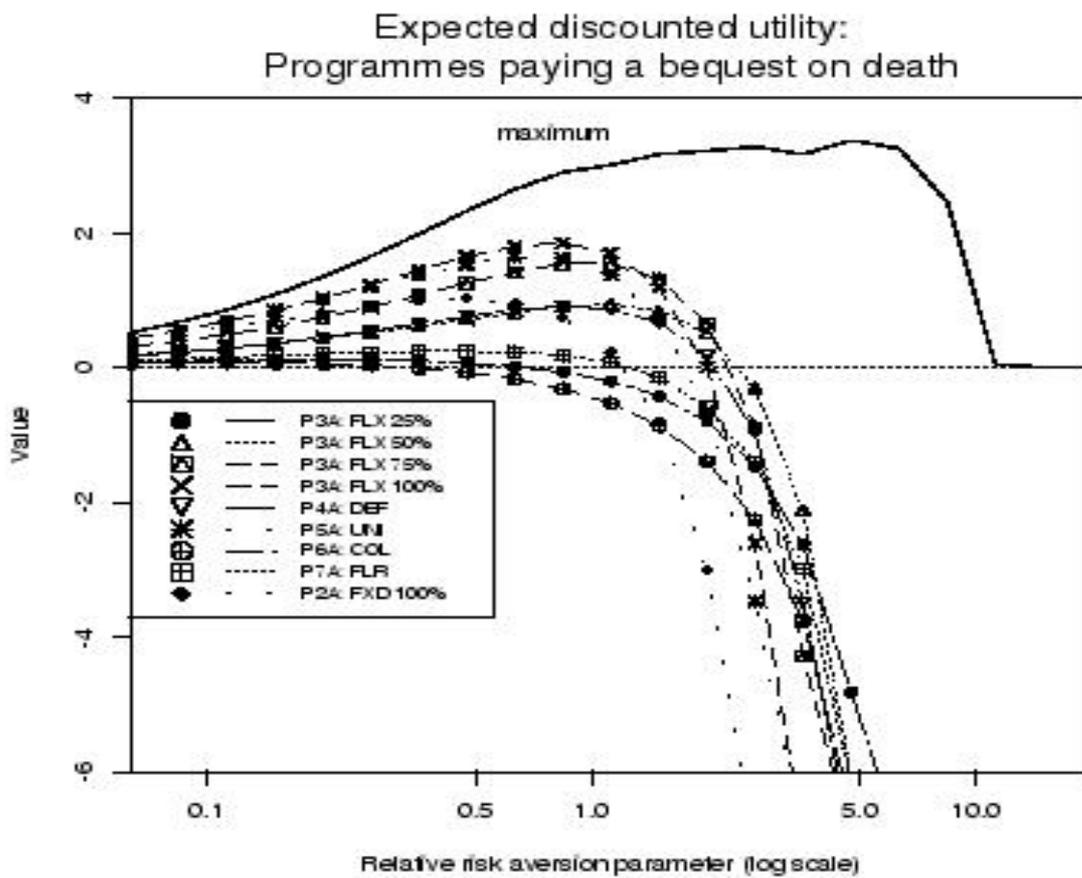
$$U(.) = 1 - \exp[-\gamma (\text{ILRIP income} - \text{annuity income})]$$

where a low value for γ reflects a low level of risk aversion. The incorporation of the level of annuity income in the utility function reflects the use of the annuity as a benchmark.

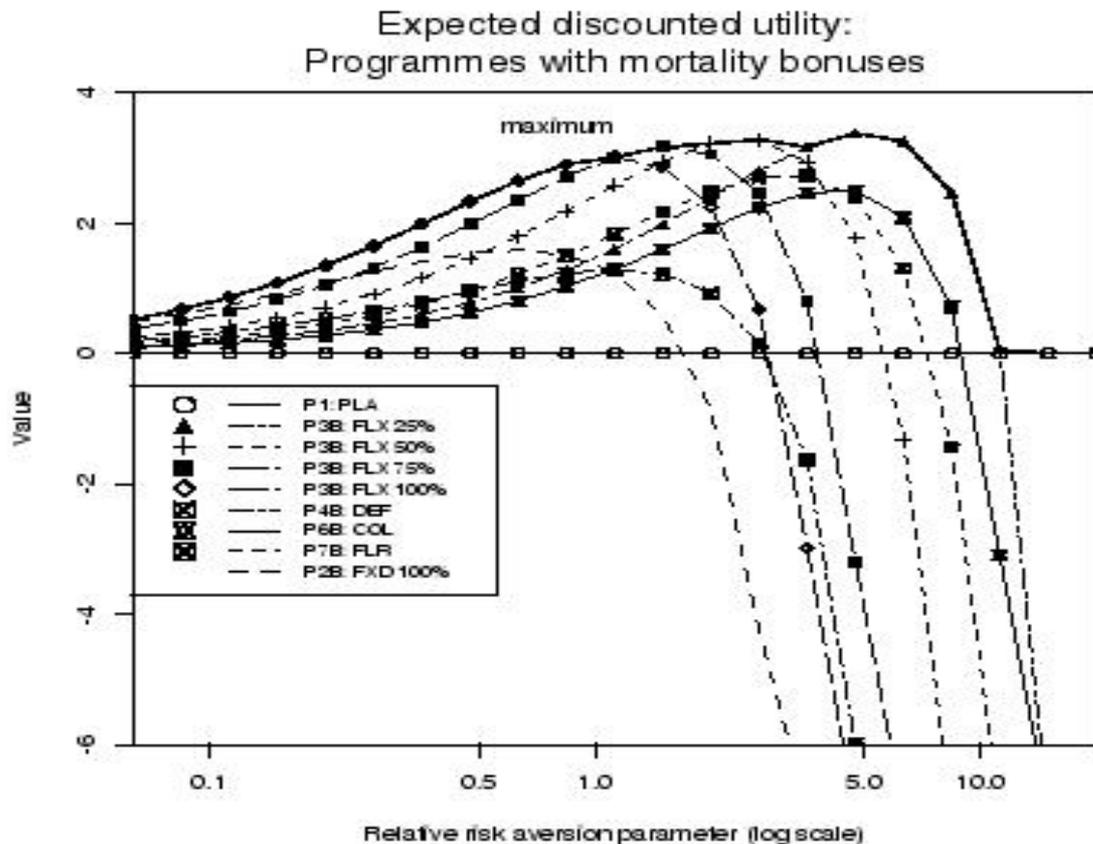
The objective of the exercise was to compare the utilities from alternative programmes on the basis of the following simulation exercise:

- 2,000 simulations of equity returns
- 45 simulations of age of death: 65, 66, ..., 110
- Mortality independent of equity returns
- 90,000 mortality/investment scenarios

The results when the programmes involve bequests is shown in the figure below:



The results when the programmes involve mortality bonuses is shown in the figure below:



The best programme has three key features:

- It never involves bequests, thereby highlighting the value of the mortality bonus (the principal feature of a life annuity)
- It involves a simple mix of equities and bonds, and does not involve derivatives or deferred annuities
- It depends on the retiree's degree of risk aversion:
 - ◆ Low risk aversion allows a high equity exposure
 - ◆ Greater risk aversion lowers the equity exposure
 - ◆ Extreme risk aversion leads to the standard annuity (a 100% bond-based investment) as the optimal programme.

So we have provided additional quantitative evidence backing up Olivia's hypothesis concerning the importance of annuities in retirement. However, I would like to reiterate the statement that life annuities (whether equity-enhanced or not) are an essential component of a DC pension plan, and are not simply one of three possible choices alongside cash lump sums or drawdown.

References

Blake, D. and Hudson, R. (2000), Retirement Income Working Party: Full Technical Report, Pensions Institute, London (www.pensions-institute.org)

Blake, D., Cairns, A. and Dowd, K. (2000), Stochastic Pension Plan Design during the Distribution Phase, Pensions Institute, London (www.pensions-institute.org)