Enhancing Annuities with Equity

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We know that the life annuity is the **only** financial contract in existence that provides retirement income security for however long a pension plan member lives. We also know that in a low nominal interest rate environment annuities are perceived to be poor value for money. 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.

The government made a major concession in 1995 when it permitted personal 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 traditional annuities. The search was initiated by the Retirement Income Working Party (see Blake and Hudson (2000)). The motivation for the search rested on the following facts: bond yields were very low historically, retirees were facing the risk of low annuity rates at retirement, equities historically generate higher returns, and retirees were living longer. The question that needed to be answered is: would it be better to maintain some equity exposure during retirement?

A detailed analysis of key ILRIPS was conducted by Blake, Cairns and Dowd (2000). This study compares various ILRIPs with an annuity using Monte Carlo analysis (this involves stochastic simulations of the returns on the various ILRIPs), taking into account the attitude to risk of the retiree. Two possibilities are considered 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 are assumed to retire at 65. The various programmes considered were as follows (all except the first programmes come in bequest or mortality bonus variants).

The **annuity programme**:

- Converts the fund into a standard annuity on retirement
- 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** with an annuity purchased at 75**:**

- Converts the retirement fund to a managed fund (of equities and bonds)
- 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** with an annuity purchased at 75**:**

- Converts the retirement fund to a managed fund
- 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
- Converts the residual fund to an annuity at 75.

The **flexible income programme with a deferred annuity**:
- 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** with an annuity purchased at 75**:**
- 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** with an annuity purchased at 75**:**
- Is similar to the flexible income programme but involves a zero-cost collar to smooth returns (rather like an endowment policy)
- 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 subject to the floor and ceiling
- Uses the residual fund to purchase an annuity at 75.

The **floored income programme** with an annuity purchased at 75**:**
- 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.

The study 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 (the same as stakeholder pensions)
- Analysis in real (RPI-adjusted) terms.

The objective of the Monte Carlo simulations is to compare the benefits 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 best programme was found to have 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 deferred annuities or derivatives (the latter turn out to be a waste of time over a 10-year investment horizon)
- It depends on the retiree's degree of risk aversion:
  - A low degree of 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

- The analysis gives an indication of how quickly (as a function of the degree of risk aversion) the policy should shift from bonds to equities.

So enhancing annuities with some equity exposure (while at the same time preserving the key feature of an annuity, namely its life-long income security) is a suitable strategy for all but the most extreme risk averse retirees. You may say that this is obvious: it certainly seems obvious to us. So why does no one sell this type of policy?

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)