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## Pension innovation

**Thomas Bernhardt and Catherine Donnelly** describe how pooled annuity funds are an attractive alternative to lifetime annuities and income drawdown in providing a retirement income for life

Pension Freedoms, announced in March 2014, sent a cataclysmic shockwave to the UK pensions and insurance industry. Retirees no longer had to use their pension savings to buy a life annuity; few have since opted to do so.

Life annuities offer an income guaranteed for life, with no risk for the annuitant. For the alternative of income drawdown, the retiree bears all the risk, one of the largest of which is longevity risk. Savings must last for an unknown time; they may run out before death, or the retiree may have an unnecessarily penurious retirement by trying to conserve their savings.

### The third way

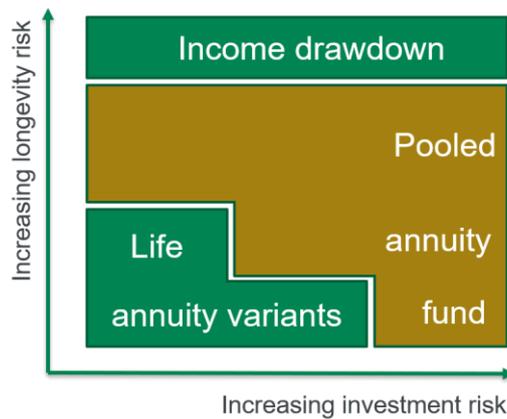
Pooled annuity funds provide a solution to this problem by pooling longevity risk between the participants, similar to what happens with a life annuity. Longevity credits, which are the re-distribution of the funds of those who have recently died, are paid regularly to all surviving participants.

There are two benefits of pooled annuity funds compared with life annuities and income drawdown:

- (i) They provide substantially better protection against running out of money in retirement than drawdown;
- (ii) They can give a higher expected income than life annuities, in return for accepting some fluctuations in that income. With no guarantee on the income, a higher return-seeking investment strategy can be followed and much less capital held.

Pooled annuity funds bridge the gap between life annuities and income drawdown, in terms of the level of longevity and investment risk borne by retirees. By adding guarantees to the 'pure' pooled annuity fund and using different investment strategies, the level of longevity and investment risk borne by the fund participants can be adjusted, as illustrated in Figure 1.

**Figure 1. Risk profile of alternative decumulation products**



### **Comparison with drawdown**

To illustrate the benefit of longevity pooling, suppose each participant has an expected future mortality experience underlying the life table S1PMA. For a 70-year-old with an initial fund of £100,000 and assuming zero future investment return, the pooled annuity fund can pay a lifetime income of around £6,500 p.a. (subject to certain constraints discussed later).

With income drawdown, the £100,000 could pay an income of £6,500 p.a. for only about 15 years before the savings are exhausted. In order to extend the duration of the income, it would be necessary to take investment risk, to compensate for the absence of longevity credits. Indeed, the older the individual at the outset, the higher the investment risk which must be taken. This is because the longevity credits are proportional to the probability of death, so income drawdown must work harder to give the same expected income as the pooled annuity fund. . But a higher level of investment risk then increases the chance that investments could underperform. In turn, a substantial reduction in income drawn may be required to preserve the savings.

In contrast, the pooled annuity fund provides the important longevity protection without the need to take any significant investment risk.

This longevity protection is provided in exchange for the loss of some features of income drawdown. Firstly, a member's fund falls into the pool on death, for distribution to other pool participants instead of to the member's named beneficiaries. Secondly, the member loses all or most of the flexibility to vary the level of income drawn or to control the investment strategy; this is to protect the integrity of the longevity pool against adverse selection.

### **Size matters**

Participants in a pooled annuity fund must be willing to accept fluctuations in their income. This arises from variations in the number of actual deaths of the participants against the expected number (idiosyncratic longevity risk), as well as the risk that the distribution of deaths has been wrongly chosen (systematic longevity risk). These risks are in addition to investment risk.

How much will the income vary? We have studied this question in our recent paper (referenced at the end of this article).

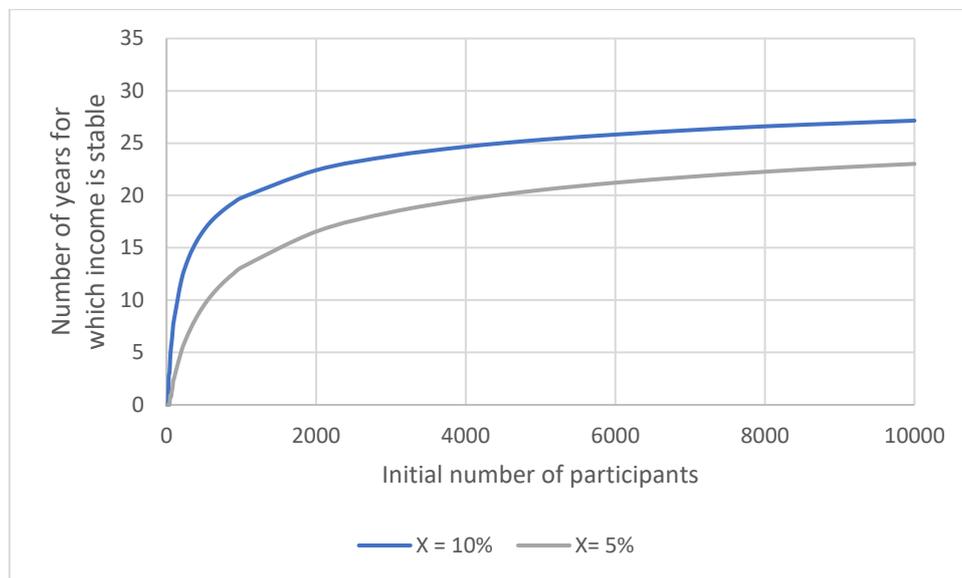
Consider a simple pooled annuity fund comprising a closed group of identical members, who are each age 70 and bring the same amount of money to the fund. We assumed no systemic longevity risk or investment risk. The members' future lifetimes are modelled as independent and identically distributed random variables. The variability in the income paid to surviving participants reflects purely the variation in number of deaths around the expected number. This variation reduces as the number of members in the group increases.

The account value of each member is credited monthly with investment returns (assumed risk free and constant) and longevity credits, calculated as an actuarially fair distribution of the total account value of the participants who died in the last month. If more participants die than expected, then the longevity credits will be greater than expected, and *vice versa*.

Income is deducted monthly from each member's account and paid to them. The income paid is recalculated monthly by dividing the member's account value by a single life annuity factor  $a_x$ , where  $x$  is the age at the calculation date. Fluctuations in the income occur because of deviations in the longevity credits from their expected value.

The stability of income is measured relative to the first month's calculated income value. The income is deemed stable over a given period if it lies at most either 5% or 10% below the initial income in 90% of future scenarios throughout the period. The results are shown in Figure 2 and show a remarkable stability of income; with 2,000 participants stability is achieved for 16 years (with the 5% below test) and 22 years (for 10% below). These results use the mortality table S1PMA. For the lighter mortality table S1PFA, the number of years are each increased by approximately one. Income stability improves with larger numbers of participants.

**Figure 2. Number of years for which income is stable**



In future research we will conduct similar investigations based on more complex examples, taking into account systematic longevity risk, investment risk, open funds and a heterogenous membership.

### In conclusion

Pooled annuity funds could be offered in other markets, other than the retail one. Under the Pension Schemes Act 2021, they could be packaged as a decumulation-only collective defined contribution

(CDC) pension plan. At the heart of any CDC plan is longevity risk pooling and this is the feature which defines the pooled annuity fund. Although the fund outlined above works only for a homogeneous membership, it can be easily adapted for a heterogeneous group of participants. The broad point is that an implementation of the pooled annuity fund, whether in the retail market or as a CDC plan, would use the knowledge, skills and experience of actuaries to give people what they want: a sufficient income to last their lifetime.

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