

Survey of annuity pricing

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In this report we provide a survey of the market for life annuities in the UK. Annuities represent the decumulation phase of a Defined Contribution (DC) pension scheme and form a large and growing part of the pension system in the UK. A life annuity enables an individual to convert a stock of wealth (paid to a life insurer in a single premium) into an income that is received with certainty until the end of life. The advantage of such a financial instrument is that it insures the individual against out-living their wealth in the event of living longer than expected.

Personal pensions were introduced into the UK by the 1956 Finance Act, which expanded the existing annuity market (now called the 'voluntary-purchase' market) due to more favourable tax treatment, and created a new 'compulsory-purchase' market, selling annuities to those individuals who had taken out a tax-efficient DC personal pension. The compulsory-purchase market is much larger than the voluntary-purchase market: in 2004 premiums in the two markets were £56.4 million and £7,478 million respectively. Estimates of the projected demand for compulsory-purchase annuities by the Association of British Insurers suggest a substantial increase in demand in the next decade: this is partly due to an increasing number of maturing personal pensions (which were first taken out in 1988); and partly because of the switch from occupational Defined Benefit (DB) to DC schemes. Although the proposed A-Day changes will reduce the compulsory annuitisation constraint to some extent, the magnitude of this change will be small and it will still be important to have a well-functioning annuity market to provide pension income.

The most popular type of annuity is the single-life level annuity, which pays a constant nominal income stream over the remaining life time of the insured person. Joint-life annuities continue to pay an income to a surviving spouse. Guaranteed annuities are add-on features where the income payments for the guarantee period are paid to his or her estate, even if the annuitant dies. Index-linked annuities pay an income which is constant in real terms, and investment-linked annuities pay a variable income per month dependent upon the investment performance of the equity market.

The price of annuities depends upon a variety of factors:

- Interest rates at the time the annuity is purchased: since life insurers tend to match their annuity liabilities either with government bonds or similarly safe assets such as corporate bonds or mortgages.
- Information about the life expectancy of the annuitant: age at time of purchase, gender and health (through either **enhanced** or **impaired-life** annuities).
- The size of the premium paid for the annuity: premium size may also be related to life expectancy, as wealthier individuals tend to live longer. Most annuity providers currently offer less favourable annuity rates (charge higher prices) to either very large or small annuity purchases. In the case of small annuity purchases this may be due to fixed administrative cost of setting up an annuity.
- The type of annuity purchased: Finkelstein and Poterba (2002) compare the expected present value of different annuity products and find

that level annuities are worth more than escalating or indexed annuities. This may be due either to higher costs of providing escalating or indexed annuities (because of an absence of matching index-linked assets for the annuity provider to purchase) or due to adverse selection, which we discuss below.

- The mark-up paid to the life insurer to cover its costs and profits. A variety of studies conducted on different countries and for different time periods suggest that the money's worth (the ratio of the expected net present value to premium) is usually in the range 0.85 – 1.05. Since these results may be distorted due to selection effects, this is not strong evidence for an excessive mark-up.

Yaari (1965) demonstrates the advantages of annuitisation under a number of stylised assumptions, and suggests that demand for voluntary annuities should be strong. Subject to the individual living, an annuity provides a higher return than a standard savings product, because the annuity is an insurance product in which the individuals who die early cross-subsidise those who survive – a phenomenon called **mortality drag**.

Given Yaari's result, the fact that annuity demand is typically low (ie, the voluntary-purchase market is small) constitutes the 'annuity puzzle'. This puzzle in the voluntary market could provide relevant insights as to why the annuitisation requirement of pensions is unpopular and how people will react to the small relaxation of this requirement following A-day. Important reasons for the annuity puzzle are:

- Illiquidity: Yaari's result relies upon annuities being both reversible and highly liquid after the point of purchase and in practice annuities are both irreversible and illiquid.
- Low rates of return: annuity rates are higher than bond rates, but lower than average rates of return on equity. If the higher rates of return to equity, suitably adjusted for risk, exceed mortality drag, then individuals would prefer to hold equity. Alternatively they could hold equity-backed annuities, but these products are rare.

- The optimal age to annuitise: the equity premium mentioned in the previous point could affect the optimal timing of annuity purchase: as mortality drag rises with age, at some point the equity premium will be outweighed by the mortality drag and it would be optimal to switch from equity to a bond-based annuity. Milevsky (2002) calculates the optimal age to annuitise is about 75, the current statutory age.
- Individuals are already heavily annuitised through the state system: for such individuals the utility of additional annuitisation might be relatively low.
- Selection effects: there are also strong advantages for individuals with known lower life expectancy to avoid purchasing an annuity. This is likely to be more of an issue in the voluntary-purchase market than the compulsory-purchase market, but even in the latter market adverse selection may lead to longer-lived annuitants preferring different types of annuity (escalating or indexed).
- Behavioural factors: modern economic analysis is increasingly explaining behaviour by looking at more sophisticated psychological representations of savings behaviour, such as habit formation, loss aversion and framing effects. All of these may provide reasons why demand for annuities is low (such low demand may be rational or irrational depending upon the model).

Annuities in the UK are written by a small number of large life insurers (with the Prudential accounting for 40 per cent of total sales of new annuities and a five-firm concentration ratio of 70 per cent) who take on annuity liabilities that are very similar to bonds and hence they match these liabilities with large holdings of government bonds, augmented by close substitutes such as corporate bonds or mortgages. Although the annuity market is highly concentrated, the evidence presented in Cannon and Tonks (2004) that the money's worth is only a little less than unity suggests that monopoly power is not in operation.

The supply of annuities depends upon the availability of inputs (bonds and near substitutes) and the success with which the insurance industry can cope with longevity risk. Wadsworth (2005) suggests that there may be a shortage of long-term government debt available for life insurers relative to potential demand, and this may result in lower interest rates and lower annuity rates. This would not cause problems for the insurance industry *per se*, but it may result in lower pension incomes, which would be of concern for public policy.

Life insurers are largely able to hedge interest rate risk through matching annuity liabilities with appropriate assets (even if the price paid for this hedging may change over time as demand for annuities increases). This means that the major additional source of risk is changes in cohort longevity. From the point of view of the consumer the main advantage of the annuity is to insure against personal (idiosyncratic) longevity risk and insurance companies are sufficiently large that this is not an issue. However, cohort longevity risk is borne by the life insurer. There are three potential routes by which life insurers can reduce their exposure to cohort longevity risk:

- Insurance companies buy longevity bonds. These are bonds whose coupons fall gradually over time in line with longevity. Increases in cohort longevity would result in higher coupon payments.
- Pass the risk on to re-insurers: the effect of this is to spread the risks more widely within the whole insurance industry. Further re-insurers could issue mortality bonds. In contrast to a longevity bond, a mortality bond has coupons that **rise** over time: these could rise in line with the proportion of individuals from a reference cohort who have *not* survived. With a mortality bond the effect of an increase in cohort longevity is to **reduce** coupon payments.
- Cohort longevity risk could be loaded on to the pensioners themselves, through annuities whose annual payments changed in line with cohort longevity.

Our broad conclusion is that the UK annuity market works satisfactorily, but that there are a number of issues for policy makers.

- The supply of annuity providers has shrunk dramatically over the last fifty years, and there are currently only a small number of annuity providers writing annuities. Although there is no evidence of abuse of market power, there is a question whether these providers have the capacity to absorb the extra risk of increased annuity demand.
- Cohort longevity risk could be solved through a combination of longevity bonds, mortality bonds or making annuity payments conditional on cohort survival probabilities. Such changes to current practice might be facilitated by the government.
- Annuity providers would be better able to minimise the risks of an asset-liability mismatch by the availability of more longer-term government bonds. The DMO's recent issue of longer term gilts has addressed this problem, and the maturity of future debt issues needs to be flexible with respect to the preferred holdings of annuity providers.
- Demand for voluntary annuities is low and compulsory annuitisation appears unpopular. This may be due to a combination of rational reasons and a misunderstanding of the nature of mortality drag. Better explanations of the annuity products may reduce this second type of annuity aversion.

The full report of these research findings is published for the Department for Work and Pensions by Corporate Document Services (ISBN 1 84123 958 5. Research Report 318. February 2006).

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