

ANNUITIES IN PENSION PLANS
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PURPOSE OF A PENSION PLAN

The purpose of a pension plan is to provide retirement income security for the remaining life of the plan member. In short:

To eliminate the risk that the pensioner outlives his/her resources.

A pension plan is not intended to provide the resources for people to go on a world cruise when they retire or even necessarily to pay off their mortgage. Instead its purpose is to provide them with the means by which they can maintain a reasonable living standard after they retire, and so avoid the need to fall back on the state or on other people in their final years.

Most pension plans being set up around the world today are funded defined contribution pension plans. The contributions are invested in stock markets around the world and a fund is accumulated. When the plan member retires, he often has to use the proceeds from the pension fund to purchase a life annuity.

DEFINITION OF A LIFE ANNUITY

What is a life annuity?

It is a financial contract that provides regular income to the annuitant for their remaining life in exchange for a premium.

So clearly life annuities have a role to play in pension provision. But what precisely is their role? Also what are the alternatives to life annuities and how effectively do these alternatives meet the definition of a life annuity?

TYPES OF ANNUITIES

The principal types of life annuities are:

- *Level annuity*, which provides a constant nominal money income for the remaining life of the annuitant; annuity providers invest the premium in fixed-income bonds and the coupon

payments on these are used to make the annuity payments.

- *Escalating annuity*, where the annuitant benefits from an annual increase in the annuity paid; clearly because the annuity will be growing, the initial payment on this annuity will be lower than that on a level annuity.

- *Index-linked annuity*, a particular type of escalating annuity which provides a growing income in line with rises in the consumer price index; annuity providers invest the premium in index-linked bonds and the coupon payments on these are used to make the annuity payments.

- *Limited price indexed (LPI) annuity*, a particular type of index-linked annuity which compensates for inflation but only up to a stated limit (such as 5% pa); the initial payment will be higher than with an index-linked annuity and therefore provides a compromise between full indexation and the income from a level annuity.

- *Investment-linked annuity*, the main examples of which are the with-profit and unit-linked (or variable) annuity: the premium is invested in an equity fund and part of the profits are allocated as a bonus to the annuitant every year. If the investment performance is poor, then the income from the annuity can fall, although if the investment performance is strong, the income from the annuity will rise.

Given that many pensioners can expect to live for 17 or more years, one can reasonably expect that over such a horizon the return on equities will exceed the return on bonds; therefore investment-linked annuities are likely, over this horizon, to generate higher income than, say, a level annuity whose income is linked to the yield on bonds.

ALTERNATIVES TO ANNUITIES

- *Lump sum*: the pension fund that has accumulated over the working life is given to the

pensioner on retirement and he can spend or reinvest it as he wishes.

- *State provision*: the state provides social security pensions on a pay-as-you-go basis.

- *Income drawdown (managed annuity or managed pension)*: this was introduced in the UK in 1995 because falling annuity rates since 1990 had led to a substantial reduction in the income paid on annuities. So the UK government came under considerable pressure to introduce drawdown.

With drawdown, the pension fund remains invested in earning assets, equity assets in particular, and the pensioner draws an income from the fund of between 35% and 100% of a corresponding single-life level annuity.

Under the UK regulatory framework, there is another condition that must be met. This facility is only available from the retirement age until age 75: what remains of the fund must be used to purchase an annuity by age 75 at the latest.

Nevertheless, one of the advantages of drawdown is that if the pensioner dies before age 75, the balance of the fund goes to his estate as a lump sum. This contrasts with an annuity: when an annuitant dies, any remaining value to the annuity is lost completely, unless a minimum guarantee was also purchased when the annuity was first taken out.

ARE ANNUITIES NECESSARY?

Should pensioners be obliged to purchase annuities or should they have some other choice? The answer depends in part on the benefits and risks associated with each alternative.

EFFECTIVENESS OF PROVISION

Annuity markets, even in countries with a long history of annuity provision, tend to be highly concentrated.

For example, in the UK, there are around 240 authorized life companies that could offer annuities but at any one time only around 10 of these are serious providers of annuities in the sense of actively competing for business. This suggests that annuities could be poor value for money, despite the risks that they hedge.

At the same time, we must ask whether the alternatives to annuities will offer any better value.

RISKS WITH ANNUITIES

Adverse selection and mortality risk

If there is the voluntary option to purchase annuities, then those who believe from their own family medical histories that they are likely to live longer than average will be amongst those most likely to purchase annuities. This leads to what is known as an adverse selection risk.

To hedge this risk, the insurance company will base its annuity rates, not on the mortality experience of the population as a whole, but on that 'select group' that it believes is most likely to purchase annuities. Why is this?

It is because it is difficult for insurance companies to differentiate between prospective purchasers who will experience heavier than average mortality, die early on and so make a mortality profit for the insurance company, and those who will experience lighter than average mortality and hence make a loss for the insurance company. The mortality profit from those who die early is shared between the insurance company and those who live much longer than average.

So annuities will be very poor value for members of the first group, those who will die very shortly after taking out the annuity. But if the insurance company underestimates the number of its annuitants who are in the second group of longer-living people, then it will make a loss.

There is also another type of risk that insurance companies face. This is mortality risk, the risk of systematically underestimating improvements in mortality over time.

To illustrate, a man born in the UK in 1900 could expect to live until he was about 50. When universal state pensions were introduced in the UK in 1948, men could expect to live until they were 68. With a male retirement age of 65, the expected length of time that a man would enjoy the pension would therefore be 3 years. Today, British men can expect to live into their late 70s or early 80s.

UK insurance companies have underestimated the average life expectancy of their current pool of annuitants by up to two years. They are therefore paying out pensions for about 2 years longer than they had forecast.

In an attempt to protect against these risks, insurance companies add cost loadings of about 12%. This 12% figure is obtained by comparing the price of a zero-cost annuity in which the average member of the population as a whole participates and the price of the same annuity if only members of the select group that voluntarily purchase annuities participates. The difference in prices is around 12%.

Inflation Risk

The next risk that we have to deal with is inflation risk. Unanticipated high inflation rapidly reduces the real value of a pension that is fixed in nominal terms. An assumption about the rate of inflation is embodied in the yield on all level annuities, but if inflation is higher than this anticipated rate, then the real income provided by the annuity will be lower than expected.

Many countries have experienced at various times very high inflation. For example, inflation during the 1970s in the UK averaged 25% per year, so that people who bought level annuities at the beginning of the 1970s experienced a very substantial fall in the real value of their pension by the end of 1970s. It was this experience of inflation that persuaded the UK government to introduce index-linked bonds in the early 1980s. It was the first western government to do so. The bonds enabled insurance companies to offer index-linked annuities for the first time.

Interest rate risk.

Annuity rates vary substantially over the interest rate cycle. Annuity rates are related to the yields on government bonds of the same expected term, about 17 years. But over the interest yield cycle, these yields can vary by as much as 150%. This means that if a person retires during an interest rate trough, the pension will be permanently low.

PROBLEMS WITH ALTERNATIVE TO ANNUITIES

Lump sum

With a lump sum, the pensioner now bears his/her own mortality risk. Part of the

justification for giving somebody a lump sum is that they can take personal responsibility for themselves. But this does not get around the problem that none of us has a good idea of when we are going to die.

This leads to a moral hazard problem, since it is perfectly possible for someone to spend their lump sum too quickly and then go back to the state for help. This is known as 'double dipping'. The state has no real alternative to provide them with help, since they are now genuinely poor and will otherwise be destitute.

State Provision

The second alternative is state provision, but virtually every country in the world is facing a demographic timebomb. There are not enough young workers in work to pay for the growing elderly population. This is true in Japan. It is also true in European countries such as Germany and Italy where in 30 years' time there will be more people in retirement than in work. There will just not be sufficient people in work to pay for the pensions of all these old people.

Income drawdown

One problem with income drawdown is that annuity rates might be even lower when the annuity is eventually purchased.

A second problem is that investment performance during the deferral period might be poor and that the fund, rather than growing in value, actually falls in value. Consequently annuitants risk having a smaller sum with which to buy an annuity.

Another problem is that individuals forego what is called the 'mortality cross-subsidy'. As we pointed out above, when someone dies shortly after taking out an annuity, they create a mortality profit that is shared out amongst the annuitants who live a long time.

This mortality cross-subsidy is cumulative over time, which means that by delaying the purchase of an annuity, individuals are subject to what is called a 'mortality drag'. The mortality drag is the additional rate of return that the investments left in the fund have to generate above the yield on an annuity in order for income drawdown to provide a higher overall pension in retirement. The mortality drag in a given year is equal to the proportion of the original group of annuitants

who die that year. Since this rises monotonically over time, it eventually becomes virtually impossible for the return on the fund to beat that from an annuity.

HOW ARE THE PROBLEMS WITH ANNUITIES CURRENTLY MANAGED?

Insurance companies use the government bond market to protect against both interest rate and inflation risk arising after the annuity is purchased. In other words, when an annuitant purchases a level annuity, the insurance company uses the premium to buy a government bond with the same term as the annuitant's life expectancy (17 years) and pays the pension using the coupon payments received on the bond. If, on the other hand, the annuitant buys an index-linked annuity, the insurance company will buy an index-linked bond and pay the pension from the coupons received. The coupons and annuity payments will rise over time if there is inflation. But the insurance company bears no interest rate risk or inflation risk after the annuity is purchased.

Annuitants themselves can be exposed to interest and inflation risk, however.

If the pension plan member retires during an interest rate trough as happened in the UK in the mid 1990s, then he can end up with a low pension for the rest of his life.

Similarly if a 65-year old man chooses an indexed annuity, he will receive an initial pension that is about 30% lower than for a level annuity. Now with inflation at 3% p.a., it takes 11 years for the indexed annuity to exceed the level annuity in cash terms, and it takes a further 19 years before the total cash payments are equalized.

Most people choose the level annuity and so retain the inflation risk.

OUTCOME

Insurance companies use the financial markets to hedge the interest rate and inflation rate risks that they face from the purchase date

Interest rate risk up until the date of retirement is borne by future annuitants: they might be unlucky enough to retire at a point when interest rates and therefore annuity rates are very low.

Inflation risk is borne after the retirement date by those who choose a level annuity.

Mortality risk and the risk of underestimating improvements in mortality seem to be shared between insurance companies and (new) annuitants. Insurance companies in the UK claim to lose money on their annuity business. This follows because they have underestimated the life expectancy of their annuitant pool by up to two years. These losses will be reflected in higher charges for new annuitants.

CAN MANDATORY ANNUITIES HELP TO AMELIORATE THESE PROBLEMS?

The main weaknesses in private sector annuity provision relate to adverse selection and mortality risk.

Mandatory annuities and mandatory membership of supplementary pension plans would help to remove the adverse selection bias in the demand for annuities. This follows because if everyone has to buy an annuity, then the annuity rates offered will equal those of the population as a whole and not of the select group that voluntarily purchases annuities.

CAN SURVIVOR BONDS HELP?

Can the government help insurance companies hedge the aggregate mortality risk they face? Yes, if they introduce a new type of bond called Survivor Bonds. These are government bonds in which the coupons are linked to the realized mortality experience of the population of retirement age on the date that the bond is issued. The coupons decline at the same rate as members of this group die, but the coupons continue indefinitely until every member of the group has died. If an insurance company buys these bonds, then it will be perfectly hedged from aggregate improvements in mortality. In other words, survivor bonds remove the risk from underestimating mortality improvements. This is because coupons stay high if the rate at which people die slows down.

Since insurance companies would now bear no aggregate mortality risk, cost loadings on annuities would fall.

Insurance companies could still face specific mortality risks, however. For example, if they sell annuities to non-smokers, they would be

bearing the specific mortality risks of that select group of annuitants who would be expected to live longer than average. But that would be a commercial decision of the insurance company.

CAN MANDATED PROVIDERS HELP, AND HOW MANY ANNUITY PROVIDERS SHOULD THERE BE?

These are questions of interest to those developing countries that do not have well-established annuity markets. Let's consider the question of whether the state should be a monopoly provider of annuities or whether a small group of competing specially licensed providers might be a solution.

The state as monopoly provider

The potential advantages of the state as monopoly provider are:

- Substantial economies of scale in the provision of annuities lowers unit costs.
- The state bears large aggregate risks relating to mortality and mortality improvements that private insurance companies find difficult to bear.
- The state would, in effect, be issuing survivor bonds and the purchase of these by insurance companies would help to fund the national debt.
- The state could also assume interest rate risk by offering 'smoothed' annuities, i.e., annuities that are smoothed across the interest rate cycle.

A potential disadvantage is that there are few examples anywhere in the world where state organizations run on commercial lines are efficient.

A small group of competing specially licensed providers

The potential advantages are:

- Allows the private sector to offer annuities and also permits each provider to gain sufficient market share to justify entry to the market.

- Efficiency results from the limited competition between these providers.

The potential disadvantages are:

- There is the danger of collusion when there is only a small number of providers.
- There is also the danger of 'wasteful' rather than 'efficiency-enhancing' competition. This is seen in Chile, for example, where there are costly marketing campaigns by the AFPs to attract new customers, and these have to be paid for by the annuitants.

Solution

One way to avoid collusion is to artificially segment the market. The providers would have to compete for a particular segment of the market, but the winning provider would then be a monopoly provider in that segment. The segments could be along professional lines, along industry lines, regional lines or by other means. Competitive forces still operate since the annuitants in one region, say, can still compare their annuities with those being offered in another region by a competing company.

The government could help these companies keep costs down by offering both index-linked and survivor bonds.

OTHER ISSUES

Should organizations selling annuities be restricted solely to the provision of annuities or should they be permitted to sell other life assurance products as well?

This question is important because of what is happening in Poland. Providers of annuities in Poland are permitted to sell annuities only: they therefore cannot offset the mortality risk they face by selling complementary life assurance products, such as whole life assurance.

Further, if the domestic annuity market is small and poorly developed, should foreign annuity providers be allowed to enter that market? There is a big question mark about whether they would want to do so, however. This is because the mortality data in many countries is often very inaccurate and without reliable mortality data, international annuity providers would probably be very reluctant to enter such markets.

CONCLUSION

In the light of this analysis, the simple answer to the question of whether there is an alternative to annuities is: no.

The real question is: what type of annuities should there be and who should provide them?

We might consider a *four tier* structure to annuity provision:

- *Indexed-linked annuity tier*: for the first tranche of retirement income up to a given threshold, there should be the mandatory purchase of an indexed-linked annuity; this would guarantee that people do not run out of resources before they die and that they are covered for inflation.

- *Level annuity tier*: for individuals with income above this threshold, they should be able to take out a level annuity; they take on some inflation risk, but have higher nominal incomes early on in comparison with a corresponding index-linked annuity.

- *Investment-linked annuity tier*: for individuals with income above an even higher threshold, they should be able to enjoy the benefits of some investment performance by purchasing an investment-linked annuity, and then finally:

- *Lump sum*, for people with high net worth, they should be given the chance of just taking the lump sum or income drawdown.

Now the thresholds separating these tiers will differ between countries, but at least this framework provides a compromise between the benefits of personal responsibility and the costs of the risks (mortality and inflation risk) that individuals are unable to hedge themselves.

There is also an inevitable role for the state: annuities cannot effectively exist without the state being either a monopoly provider or issuing financial instruments that enable private sector providers to purchase matching assets against their liabilities.

The state must establish an institutional framework for the pension annuity business that offers the appropriate incentives for annuity providers to compete effectively and economically. This requires mandatory pension annuities, since these help to reduce the costs

associated with both adverse selection and the marketing of voluntary arrangements.

Annuities are a shared responsibility between the public and the private sectors. It is a key role of the state to collect reliable data on mortality: this is a basic ingredient that insurance companies need. Also, the private sector needs to be much more inventive in its use of the financial system to hedge some of the other financial risks discussed above, especially interest rate risk.

Finally in small, developing countries with inadequate mortality data and unsophisticated financial systems, the state may have to provide annuities directly or it may have to 'kick-start' the private annuity market with index-linked bonds and survivor bonds.