Pensions: A sustainable social contract

A pension scheme is an arrangement by which an individual can make provision during their working life (usually with an employer contribution) for everything they will need to live on when they have given up working. The principle is simple but its practical implementation raises many problems.

It is clearly impossible to literally purchase the goods and services that will be needed in retirement and put them aside during one's working life. Even if a person *could* forecast just what their needs would be after they have retired, something impossible given the uncertainties, the practical difficulties would be insurmountable - and it is anyway impossible to store services. The assumption, found in textbooks of theoretical economics, that individuals maximize a well defined lifetime utility function defined over a universal domain covering all eventualities, is impossible to reconcile with real life. The idea that a rational agent can choose an optimal consumption and saving trajectory over time is further undermined by the fact that the length of retirement is unknown since nobody knows the date of their death.

All this is rather obvious. We are therefore left with the fundamental principle that goods and services consumed by the retired must be produced by the *currently* active workforce. In this sense all pensions provision involves intergenerational transfers, all pensions – understood as the supply of consumer goods and services to the retired - being produced by the working population. All pensions are pay-as-you-go.

How can this relationship between the generations be managed? There are two commonly used principles involving money payments: social contract, or pay-as-you-go, and funding, which essentially entails financial speculation. The social contract approach is very simple: one generation's pensions are paid for by the working generation, and in exchange their pensions, in turn, will be paid for by the next generation.

The other approach, funding, in which each member pays for their pension out of invested funds they have saved and accumulated over their working lifetime, involves great uncertainty because it is impossible to predict if the market value of the assets will be enough when they are required to provide pensions.

The usual objection to the social contract model is that it may not be sustainable and result in intergenerational inequity due to demographic or economic changes. It is sometimes disparagingly dismissed as a Ponzi scheme if subsequent generations have to pay more than the previous one. However the design of the pension scheme enshrined in its rules should ensure that it is sustainable and it need not be a cause of intergenerational unfairness. Demographic changes can be managed by the simple rule of regular valuations, for example triennially, allowing trends in longevity and membership to be detected and appropriate changes made.

The question of financial sustainability can be investigated by finding the scheme's internal rate of return. That is the rate of return on investments required so that the fund is exactly used up at the date of the member's life expectancy. The fund in respect of each member

starts at zero when they join, accumulates when they work, decumulates when they are retired and goes back to zero when they die. Comparing this required rate of investment return with rates achievable in the real economy tells us whether the scheme is sustainable.

Simple indicative calculations are presented below for various example assumptions about contribution rates, life expectancy, inflation and salary growth. Despite their simplicity, these examples strongly suggest that social contract pension schemes are perfectly sustainable, requiring in most cases only fairly modest investment returns. They also show that the schemes are not too sensitive to longevity assumptions. The results are shown in Table 1 and 2.

Table 1 shows a range of illustrative calculations for final salary schemes. I assume that the member contributes for forty years then retires with an indexed pension of half final salary, plus a lump sum of three years' pension. This is a typical final salary scheme that was common before the move to career average that has taken place in recent years. A range of assumptions about contribution rates, salary growth, inflation and longevity are considered.

According to the latest Barclays Equity Gilt Study, the average inflation adjusted annual return from UK equities over the past 50 years has been 5.6 per cent. Over the past 20 years it is 3.2 per cent. The results in the table suggest that the required rate of return is quite low in all cases except where the contribution rate is relatively low and the salary growth and inflation rates are high.

As far as the USS is concerned we can perhaps draw the conclusion from Table 1 columns 9 and 10, which approximate the old final salary scheme that was closed in 2016, that, whatever its undesirable features, unsustainability was not one of them.

Anecdotally, Con Keating has reported that when he asked a senior member of the USS executive what the internal rate of return of the scheme was, he was told it was 4.6 percent. That seems to be in agreement with the results in Table 1, particularly column 9.

Table 2 presents the calculations for career average schemes. The assumption here is that members pay in for forty years, each year's contribution is worth $1/75^{th}$ of the pension, revalued by the inflation rate, the pension is index linked with a lump sum of three times pension. Not surprisingly these findings suggest that the required rate of return is even lower.

Although they are only indicative, assuming a stylised world of steady state growth and inflation, these calculations ought to lead us to question the belief that pension schemes are unsustainable and need to be closed. They undermine the idea that pension schemes have become unaffordable because of low investment returns, when the returns achievable in the real world are higher than those required.

Table 1: Required Rate of Investment Return: Final Salary Schemes[*]

Scheme Details: Pension 50%FS + Lump Sum (3xPension); Inflation proof pension; 40 years contributions.					
	1	2	3	4	5
Starting salary	1000	1000	1000	1000	1000
Contribution rate (%)	20	20	20	20	15
Salary growth (%)	0	0	3	3	3
Price Inflation (%)	0	0	2	2	2
Salary at retirement	1000	1000	3167	3167	3167
Pension at retirement	500	500	1584	1584	1584
Retirement period (yrs.)	20	25	20	25	20
Required Investment Return (%)	1.25	1.78	3.94	4.44	4.96
Real Required Inv. Return (%)	**1.25**	**1.78**	**1.94**	**2.44**	**2.95**

Table 1 (cont.): Required Rate of Investment Return: Final Salary Schemes

Scheme Details: Pension 50%FS + Lump Sum (3xPension); Inflation proof pension; 40 years contributions.					
	6	7	8	9	10
Starting salary	1000	1000	1000	1000	1000
Contribution rate (%)	15	15	15	21	21
Salary growth (%)	3	4	4	4	4
Price Inflation (%)	2	3	3	3	3
Salary at retirement	3167	4616	4616	4616	4616
Pension at retirement	1584	2308	2308	2308	2308
Retirement period (yrs.)	25	20	25	20	25
Required Investment Return (%)	5.40	5.95	6.40	4.74	5.27
Real Required Inv. Return (%)	**3.40**	**2.95**	**3.40**	**1.74**	**2.27**

[*] The calculations have been done using the Excel procedure Goal Seek.

Table 2: Required Rate of Investment Return: Career Average Schemes

Scheme Details**:** Contributions salary/75 revalued by inflation rate. Inflation proof pension + Lump Sum (3xPension); 40 years contributions.					
	1	2	3	4	5
Starting salary	1000	1000	1000	1000	1000
Contribution Rate (%)	21	21	26	26	15
Salary Growth (%)	4	4	4	4	4
Price Inflation (%)	3	3	3	3	3
Salary at retirement	4616	4616	4616	4616	4616
Pension at retirement	2052	2052	2052	2052	2052
Retirement period (yrs)	20	25	20	25	20
Required Investment Return (%)	4.31	4.87	3.52	4.15	5.53
Real Required Inv. Return (%)	**1.31**	**1.87**	**0.52**	**1.15**	**2.53**

Table 2 (cont.): Required Rate of Investment Return: Career Average Schemes

Scheme Details: Contributions salary/75 revalued by inflation rate. Inflation proof pension + Lump Sum (3xPension); 40 years contributions.					
	6	7	8	9	10
Starting salary	1000	1000	1000	1000	1000
Contribution Rate (%)	15	15	15	15	21
Salary Growth (%)	4	0	0	3	3
Price Inflation (%)	3	0	0	2	2
Salary at retirement	4616	1000	1000	3167	3167
Pension at retirement	2052	533	533	1405	1405
Retirement period (yrs)	25	20	25	20	20
Required Investment Return (%)	6.00	2.43	2.88	4.53	3.33
Real Required Inv. Return (%)	**3.00**	**2.43**	**2.88**	**2.53**	**1.33**