The effect on pensions of increasing life expectancy

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Abstract The average age at which people die has increased dramatically during the 20th century and looks likely to go on rising for the foreseeable future. As a result of this, the cost of providing a given level of pension benefit has gone up significantly, and no one really knows how far and how quickly life expectancy will continue to improve. Consequently, there are severe doubts about whether or not employers who have offered their employees pension schemes in the past will be able to afford to provide a similar level of benefits in the future. Something is likely to have to 'give' to compensate, and the most logical approach would seem to be to reverse the recent trend to early retirement and increase the average age at which people stop work and take their pension benefits. A recent European Union Directive may help bring about the necessary change in attitudes to the employment of older people.

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Improvements in the 20th century

Most people are well aware that the 20th century saw significant improvements in life expectancy. According to tables published by the Government¹ and based on the population as a whole, a boy born in 1991 could have looked forward to an average lifespan of 73 years, whereas his great-grandfather, say, born in 1911, would have expected on average to live only to age 52. For girls, the corresponding figures would have been 79 and 55.

In large part, this improvement reflects a dramatic reduction in the number of 'premature' deaths, resulting from various important medical advances and an accompanying general rise in living

standards. However, the mortality improvements have not only increased the number of people who survive to retirement age, but have also substantially increased the average time for which a new pensioner is expected to live. The same tables as quoted above indicate an increase in the life expectancy of a 65-year-old man from 11.0 in 1911 to 14.3 years in 1991, and a 60-year-old woman from 15.5 to 22.1 years. In percentage terms, these increases are almost as great as those for the increase in life expectancy at birth.

The length of a pensioner's life is one of the most critical factors in determining the ultimate cost of a given pension scheme benefit. Actuaries therefore regularly analyse these trends in life

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Mortality tables used		Age 65	
1970: a(55)	2000: PMA92(B = 1935)	a(55)	14.30655 1970
1980: PA90	2020: PMA92(B = 1955)	PA90	14.59226 1980
1990: PA90 — 2 yrs	2040: PMA92(B = 1975)	PA90-2	15.91567 1990
Females: Women have traditionally had a longer life expectancy than men. Female expectation of life at age 65 was about 3½ years higher than for a male in the older mortality tables above, and about 3 years higher in the most recent tables.		PMA80(B = 1930)	16.68048 1995
		PMA92(N = 1935)	19.06638 2000
		PMA92(B = 1955)	20.60953 2020
		PMA92(B = 1975)	21.52211 2040

Figure 1: Male expectation of life at 65

expectancy and update their 'mortality tables' to take account of the most recent developments. These tables differ significantly from those published by the Government, partly because pension scheme members do not represent a typical cross-section of the population as a whole (in particular they tend on average to be healthier and live for longer). A further important feature is that these tables used for pension scheme work also include an allowance for future improvements in mortality, but estimating such improvements is, of course, a very imprecise science because the extent and effect of factors like new medical treatments cannot be readily predicted.

In recent years, the trend to a longer life expectancy has accelerated in a way not previously anticipated. Figure 1 shows the 'expectation of life' of a

65-year-old man, as indicated by a succession of different standard mortality tables. The a(55) table was commonly used in pension scheme valuations before the new PA90 table (which allowed for projected mortality improvements to 1990) came into use around 1980.

As evidence subsequently grew of continuing improvements in life expectancy, actuaries first reacted by, in effect, pretending that people were (say) two years younger than their actual age, and then by switching to a new set of tables (the PMA80 series) that was first published in 1990. This meant that a typical assumed expectation of life for a man aged 65 for a valuation undertaken in the early 1990s was about 16 years, compared with a figure of nearly 15 years in the early 1980s.

The big shock, however, came towards the end of the 1990s. New

tables (the PMA92 series), first proposed in 1998 by the Continuous Mortality Investigation Bureau (CMIB) of the Institute and Faculty of Actuaries,² indicated that such a person's life expectancy had by then risen to over 19 years, and was set to continue rising steeply for those employees who would not be retiring until well into the 21st century (see Figure 1). (The PMA92 tables are part of a wider set referred to here as the P92 tables. Like the PMA80 tables, they are known as 'double entry' tables. These enable a separate table to be generated for each year of use, with an ongoing allowance for projected mortality improvements; the annex 'B = 1935', for example, means that that table is considered to be appropriate for valuing the benefits of a person born in the year 1935.)

The impact in 2001

So, what is the impact for a pension scheme that until recently had expected its average new pensioner to live for 15 years, but now anticipates that this is more likely to be 20 years? A simple arithmetical approximation might suggest that the cost of providing the pension would increase by around one-third, so that (other things being equal) a cost of £100,000 becomes about £133,000. In fact, a more rigorous actuarial assessment comes up with a slightly lower increase, but there is some other 'bad news' to take into account.

This 'accelerating life expectancy' effect is just one part of a 'double whammy', in that it is taking place at the same time as schemes are coming under financial pressure because of falling inflation and investment returns. Figure 2 shows how the cost of investing (in 'matching' gilts) to provide a typical pension, for a newly retiring 65-year-old, has varied since 1985. The cost depends

on two main factors: the assumed life expectancy and the market yield on gilt-edged securities at the time of retirement. The lower line on the graph reflects only the changes in market yields, showing a trend of gradually increasing cost as yields have fallen, especially in the second half of the 1990s. The higher line adds in the impact of new improvements in life expectancy, with the extra increase being particularly noticeable in the last two years or so (since the latest actuarial tables were published). The overall effect over the last 15 years has been to increase the pension cost by about 80 per cent. (It may, though, be noted that more than half of this rise (an increase of about 50 per cent) is attributable to the falling market yields, with the remaining 30 per cent increase resulting from the improved life expectancy.)

The immediate effect on schemes

The effect of all of this on an employer's contribution rate could be very substantial indeed. A reasonably generous final salary scheme might until recently have had a cost of future service benefits (assessed on prudent actuarial assumptions and on the basis that the past can look after itself, with no surplus or deficit) of, say, 15 per cent of salaries, with employees perhaps contributing 5 per cent and leaving the employer with the 'balance of cost' of 10 per cent of salaries.

If the full effect of the fall in gilt yields and increase in life expectancy described above is factored in, this future service rate could rise to more than 25 per cent of salaries, particularly if allowance is also made for lower investment returns and lighter mortality before retirement. In practice, a lesser adjustment may be thought to be

Date	Male JL LPI Anny	Male JL LPI Anny pa90 mort
31-Dec-85	10.14855	9.939431
31-Dec-86	10.29063	10.07531
31-Dec-87	10.94085	10.47770
31-Dec-88	10.95301	10.48881
31-Dec-89	10.81542	10.36317
31-Dec-90	10.40925	9.84477
31-Dec-91	11.06070	10.41031
31-Dec-92	11.84545	11.08778
31-Dec-93	13.98788	12.93710
31-Dec-94	11.81025	11.02418
31-Dec-95	12.80954	11.87890
31-Dec-96	12.94303	11.97779
31-Dec-97	14.15050	12.99789
31-Dec-98	16.66215	15.10208
31-Dec-99	17.39400	14.69093
31-Dec-00	17.86059	14.98835

Figure 2: Cost of purchasing a pension of 1£ pa at 31 December for male aged 65 (with LPI increases and 50% to surviving spouse)

justifiable on the grounds that the trustees might hope to achieve a higher yield post-retirement than the risk-free gilt yield, but the employer could still be looking at an increase in his cost, for future service benefits, from 10 per cent to between 15 per cent and 20 per cent of salaries.

On top of this, though, there is also likely to be some adverse impact on past service benefits. Suppose the scheme was previously considered to be comfortably

in surplus, to the extent of, say, 15 per cent of assets, which might have been being used to justify a reduction of 5 per cent of salaries in the employer's contribution rate (the reduction being expected to last for five, or perhaps even ten, years). On strengthening the mortality assumption in the actuarial basis, the scheme may find that that surplus has now disappeared, so magnifying the amount of the immediate increase in rate required.

To what extent have companies and trustees already reacted to these developments? Various survey results suggest many have yet to do so (or perhaps have only done so very recently, since the effective date of the data underlying the survey). For example, the 2001 version³ of Bacon & Woodrow's annual survey of pension costs disclosed by FTSE100 companies under the accounting standard SSAP24 actually indicated a lower average disclosed pension cost figure than in any of the previous four years (although it was the appearance of a trend towards more schemes being reported as 'underfunded' that caught the imagination of newspaper headline writers). Furthermore, the National Association of Pension Funds (NAPF) also produces an annual survey⁴ covering (predominantly) the larger occupational schemes, and their most recent survey (2000) quoted an average employer's contribution rate which was lower by 2 per cent of salaries than in the previous survey (1999).

The same issues arise, although from a somewhat different perspective, in a defined contribution ('money purchase') scheme. A member benefiting from overall contributions of 15 per cent of salary (throughout a working lifetime) to such a scheme might previously have been hoping for a pension benefit of something like 60 per cent of final salary (albeit heavily dependent on actual investment returns). But if mortality does continue to improve in the way indicated in the latest tables, and interest rates stay low, it looks as if he will be lucky to get even 40 per cent of final salary for the same level of contributions.

Reacting to the increased cost

An employer faced with the kind of contribution increase discussed above has a fairly stark choice:

- find the extra money, from somewhere, or
- reduce the value of the benefits, somehow.

It is a prosperous and fortunate employer indeed who is able to take this sort of cost increase in his stride. For most employers, a substantial rise in pension scheme contributions is likely to have a noticeable impact on profitability, with an adverse effect on shareholders and possibly even on the continued viability of the business. An attempt to offset this could potentially be made by trying to pass on at least some of the cost to employees, either directly (by increasing their contribution rate) or indirectly (by reducing the value of some other part of the remuneration package to compensate). But most employees are probably no different from their employers in feeling that they have little, if any, spare capacity in their budgets to absorb higher pension costs, so in practice it seems likely that negotiations are much more likely to be successful if they are steered in the direction of a reduction in benefit value, especially if this is an implicit (or hidden) reduction rather than an explicit (or obvious) one.

One popular way of 'reducing benefit value' is to change from providing a defined benefit (DB) scheme (usually a 'final salary' scheme) to a defined contribution (DC) scheme. This often reduces the benefit value in two distinct ways:

- First, it can be used to bring down the overall expected cost, simply by setting the DC contribution rate lower than would have been expected under the DB scheme. Where this happens, it is not always as obvious as it might be, because the effect differs greatly between members (in particular, younger and more mobile

members typically gain from the switch to DC while older and longer-serving members would have been better off with DB).

- Secondly, and more subtly, it can be regarded as reducing value for the employee by replacing a guaranteed benefit (DB) with a much riskier benefit (DC).

Future trends

It may be tempting to think that the figures quoted above for the effect of increased life expectancy are an example of actuaries 'playing safe' and being overcautious. Only time will tell whether or not this is in fact the case, but it should be pointed out that the P92 series of tables should not be regarded as a 'worst-case' scenario and there are many commentators who think that these latest published standard tables are still likely to understate actual life expectancy by a considerable amount.

The allowance for mortality improvement in the P92 series of tables cannot really be described as an 'estimate'; rather, it is a largely mechanical mathematical adjustment reflecting what might happen if mortality improvements initially continue at a similar rate to those seen over the previous 20 years, but then (after a while) slow down so that eventually any further improvements are assumed to be insignificant.⁵ In particular, therefore, no attempt is made to 'guess' the extent of any effect that might result from a major new medical breakthrough. (On the other hand, neither is any attempt made to anticipate the effect of various lifestyle and environmental changes that many observers feel will tend to reduce life expectancy.)

A paper presented to the Staple Inn Actuarial Society in 1999⁶ considered this matter in some detail. It discussed one

specific observed feature of recent mortality improvements which is known as the 'cohort effect', under which the generation of people born between 1925 and 1945 have experienced much faster improvements than the population as a whole, and estimated that if this feature continues for this generation the cost of providing a given pension for a newly-retired 65-year-old could be around 10 per cent higher than indicated by the P92 tables.

As its name suggests, the CMIB keeps the situation under constant review, and in the autumn of 2000 it issued a report⁷ comparing actual mortality experience for the years 1995 to 1998 with that projected in the P92 tables. Although it is perhaps too early to draw conclusions on the longer-term implications, the evidence available from that report does support the view that mortality is improving faster than allowed for in these most recent standard tables.

The role of the State

Considerable doubt was expressed above about whether or not employers and/or employees would be willing, even assuming that they can afford it, to set aside the extra money required, as a result of increased life expectancy and lower investment returns, to support current levels of pension provision. Against this background, it is clear that the Government is likely to experience some difficulty in achieving its stated objective⁸ of changing the balance of pension provision, from 60 per cent provided by the State to 60 per cent provided by the private sector, by 2050.

One approach that the Government could adopt would be to extend compulsion, and force workers (and/or their employers) to increase their level of saving for retirement. However, even if such a policy could be successfully

initiated, it is by no means certain that it would actually work in practice, in the sense of enabling society adequately to support an ageing population. There is an underlying problem in that, because of changes in birth rates as well as increasing life expectancy, the so-called 'pensioner support ratio', which represents the number of people of working age in Great Britain for each person above State pension age, is projected⁹ to fall in the first half of the 21st century from its current level of 3.4 to around 2.4.

To what extent an increase in saving (or 'advance funding') would make up for this change in 'support ratio' has been the subject of some heated debate, the details of which are outside the scope of this paper.¹⁰ Essentially, the argument on one side is that, although advance funding might change the distribution of the available resources between different people, it makes no difference across the economy as a whole because 'tomorrow's consumption' can only be met from 'tomorrow's production'. The counter-argument is that extra resources tomorrow are also generated by capital investment made today, but this does of course assume that the saved money has been effectively invested in the meantime.

So, what is the best way out of this problem? The author's view is that the average age of retirement must increase. This seems a logical consequence of increased life expectancy, and does not necessarily mean that everyone should work flat out to age 70 or 75 and then stop. In the first place, this requires a reduction in levels of early retirement, when in the past too many people have left the workplace in their 50s and never returned. This was one of the key concerns raised by a Cabinet Office report¹¹ on opportunities for people aged

50 to 65; when the report was published in April 2000 the expectation was that many of its recommendations would be implemented quickly, but there does not seem to have been much progress so far.

Help in achieving this objective could, though, be at hand in the form of a recent European Union Directive¹² on 'equal treatment'. One of the aims of this Directive is to prevent 'age discrimination', and it is expected to result in the removal of mandatory 'retirement ages' from employment contracts, with the employee being able to continue in employment for as long as he or she is competent to carry out the requirements of the job. Perhaps this piece of European intervention will act as a catalyst for the necessary change in retirement patterns.

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