IS THE PENSIONS INDUSTRY BURYING ITS HEAD IN THE SAND?

New models present a graphic picture of a future where many more people will live longer than expected. Will pension companies pull their heads out of the sand to act? By Gill Wadsworth

The pensions industry is usually rather sluggish to respond to change, even if change threatens the industry's financial well being.

The pension industry's response to the impact that increasing life expectancy has on retirement plans is no exception. Despite a gradual acceptance that rising longevity is hazardous for pensions, there has been an alarming lack of urgency in taking action to address this.

One of the major obstacles to dealing with increasing life expectancy has been the lack of a reliable and transparent method for predicting just how long we are going to live. Actuaries were saddled with measuring the immeasurable, often relying on simple deterministic projections.

However, this is set to change with the publication of a series of fan charts which show future survivorship and life expectancy. Developed by Professors David Blake (Pensions Institute, Cass Business School), Kevin Dowd (Nottingham University Business School) and Andrew Cairns (Heriot-Watt University), the fan charts present a much more accurate picture of the likelihood of people living well into their nineties. The charts highlight just how serious this prospect is for the retirement industry.

"The idea was to find a visual way to explain longevity risk to people and to quantify it accurately," Professor Blake explains. Inspired by the inflation fan charts used by the Bank of England to project the increasing funnel of uncertainty in inflation rates, the professors applied the same principles to longevity and survivorship.

How long have we got?

"Mortality rates are not only improving but doing so in a random and stochastic way," says Professor Blake.

"We therefore built a stochastic mortality model – the Cairns-Blake-Dowd or CBD model* – and then looked to fan charts to provide the visual representation of the uncertainty attached to mortality improvements that we needed. We developed two sets of fan charts: longevity fan charts** and survivor fan charts***."

The longevity fan charts, for example, show the increasing funnel of uncertainty surrounding future life expectancy. Each fan corresponds to a ten per cent confidence interval: the nine fans that make up a longevity fan chart add up to a 90 per cent confidence interval. This means that one can be 90 per cent confident that the average length of future lifetimes will lie somewhere within the fan chart.

Currently in England and Wales 65 year-old men can expect to live about 18 years. According to the CBD model, this will have risen to 26 years on average by 2050. But the longevity fan chart shows with 90 per cent confidence that a 65 year-old male could actually survive anywhere between 21 and 32 years.

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The cost of living

This clearly has enormous cost implications for anyone in the business of delivering pensions. "According to the Pensions Regulator, every additional year of life expectancy costs a pension plan between three and four per cent in present value terms. So if the plan actuary guessed that the plan's current 22 year-old male workers, who will be 65 in 2050, might live for a further 26 years and they actually live for 32 years, we are talking about an underestimate of 18-24 per cent in the potential cost of providing these members' pensions," Professor Blake says.

And the survivor fan chart shows an equally stark picture. It follows a 'cohort' of male lives from age 65 until they all die out. The chart shows there is very little uncertainty in the first 10 years: there is a high degree of confidence that 25 per cent will die before they reach age 75. Where the uncertainty is greatest is around age 90. The fan chart predicts that, on average, 25 per cent of today's 65 year-old males will reach age 90, but it could be almost 40 per cent.

Professor Blake explains: "If you have 100,000 65 year-old pensioners in your pension plan, your actuary might tell you that you will be paying out 25,000 pensions in 25 years' time. But it is perfectly possible that you will be paying out nearly 40,000 pensions. And beyond age 90 you get what we call the 'toxic tail' - pensioners who live very long lives and do not die out until between 2035 and 2045. The cost implications of this are huge."

Professor Blake argues that the industry has been blind to the reality of longevity risk until now. For the first time, he claims, we have the tools to quantify this risk properly. "Pension fund managers, actuaries, annuity providers, and finance directors have, for the first time, a useful and accurate way to measure longevity risk," he says. "In addition, survivor fan charts can be used to determine the optimal asset allocation strategies in liability-driven investment programmes."

Facing up to the future

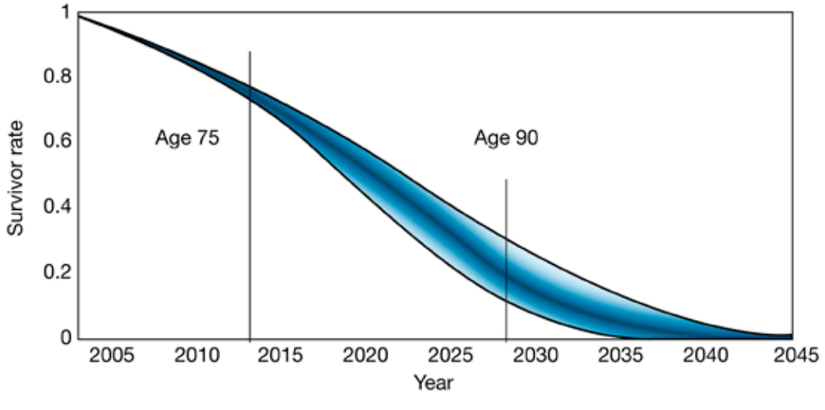
So does all this clarity mean we shall see annuity providers, buyout companies and scheme sponsors crushed under the weight of rocketing pension costs?

Mark Wood, founder of buyout firm Paternoster, says: "An insurance company certainly needs to be sure to reserve adequately and if the profit margin is to remain unchanged then the price will rise." However, Mr Wood claims pricing and reserving are different things. He argues that some companies can make their target rate of return and reserve properly while charging less for the buyout. "This is because their costs are lower, their capital structure more efficient or their ability to evaluate life expectancy life by life enables a more precise price which for some schemes will be lower than others offer," Mr Wood says.

Ros Altmann, an independent pensions consultant, agrees with Professor Blake that the charts show just how imprecise and potentially cripplingly expensive it has become to offer pensions. And although the industry may be more willing to face up to the increased costs and uncertainty, there is little it can do to protect itself.

Dr Altmann notes: "One big problem is that providers cannot hedge themselves against longevity and mortality risk. Pension providers should probably consider building in an assumption that increasing life expectancy will add between two and three per cent a year to their costs - that is two to five per cent above the inflation increase." But she adds: "This is a hugely expensive hurdle to overcome and is far larger than most companies have been providing for."

Survivor fan chart for 65 year-old English & Welsh males



Source: Figure 2 from Blake, D., Cairns, A., and Dowd, K. (2007) *Longevity Risk and the Grim Reaper's Toxic Tail: The Survivor Fan Charts*, Pensions Institute Discussion Paper PI-0705.

"The charts show just how imprecise and potentially cripplingly expensive it has become to offer pensions."

While this perhaps seems a very bleak picture, Professor Blake argues that for too long pension providers have been burying their heads in the sand. While the news isn't good for the industry on the whole, it does provide a more solid foundation on which to build.

Professor Blake concludes: "The fan charts let everybody know what their own risks are and what they should be looking at. They represent a major breakthrough for everyone running pension plans." ■

** 'A Two-Factor Model for Stochastic Mortality with Parameter Uncertainty: Theory and Calibration', Journal of Risk and Insurance, December 2006, vol 73, pp 687-718, by Andrew Cairns, David Blake and Kevin Dowd.*

*** 'Facing Up to the Uncertainty of Life: The Longevity Fan Charts' by Kevin Dowd, David Blake and Andrew Cairns (www.pensions-institute.org/workingpapers/wp0703.pdf).*

**** 'Longevity Risk and the Grim Reaper's Toxic Tail: The Survivor Fan Charts' by David Blake, Kevin Dowd and Andrew Cairns (www.pensions-institute.org/workingpapers/wp0705.pdf).*

For further information on the research featured in this story contact Professor David Blake at **d.blake@city.ac.uk**

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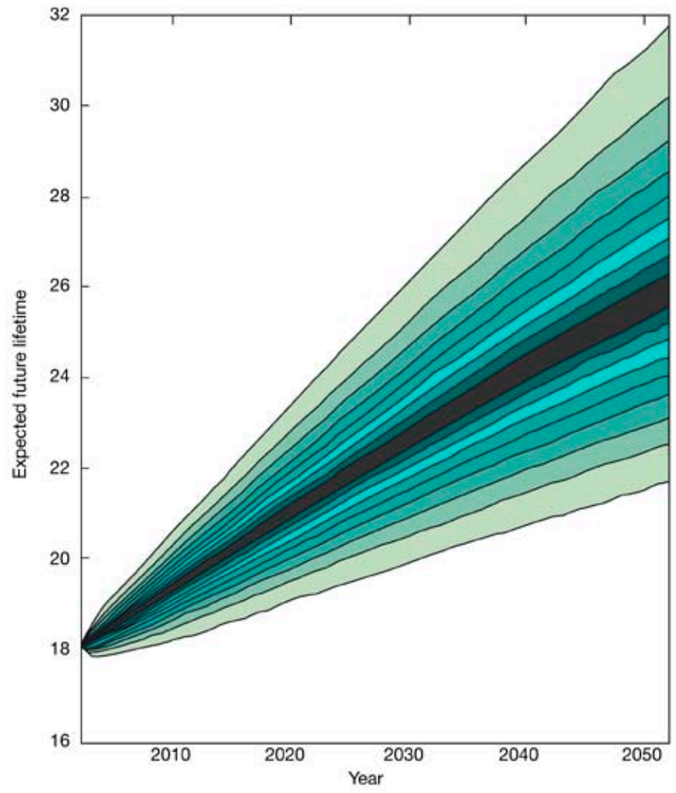
Longevity fan chart for 65-year old English & Welsh males



Source: Figure 3 from Dowd, K., Blake, D., and Cairns, A.(2007) *Facing Up to the Uncertainty of Life: The Longevity Fan Charts*, Pensions Institute Discussion Paper PI-0703.

The magic cohort effect

We are all living longer but one section of society is placing a particular burden on the UK's social and financial infrastructure.

People born between 1925 and 1945 – the so called 'magic cohort' – who are now aged roughly between 60 and 80, have refused to follow the standard longevity predictions and are living far longer than anyone expected. This has serious consequences for the retirement and healthcare systems which had not catered for such life expectancy.

Groundbreaking research* from Cass Business School now makes it possible to measure with much more certainty the effect that improved longevity for this 'cohort' of people will have now and in the future. Cass's research is based on the well-known Lee-Carter model, which has been the benchmark for measuring the effects of trends in life expectancy for public planning. The new research extends the model to incorporate the effects of year of birth for the first time.

Steve Haberman, Deputy Dean at Cass and Professor of Actuarial Science, says government and financial institutions will be those most alarmed by the research.

"The statistics are particularly worrying for government departments and financial institutions involved with annuities and pension products. If this cohort effect is extrapolated into the future, we can expect rapid improvements in life expectancy in the UK for people currently in their 60s and 70s. In ten years' time this group will be in their 70s and 80s and so the effect will be propagated into the future," Professor Haberman says.

He argues the research will enable annuity providers, retirement planners and pension scheme sponsors to better prepare for the future drain on their resources. He adds: "Many businesses across the UK have already closed their defined benefit pension schemes to new members as these have become too costly. For both closed schemes and schemes that remain open, this research will help in determining the increased funding levels needed to meet the costs."

**'Mortality Reduction Factors Incorporating Cohort Effects', by Steve Haberman and Arthur Renshaw. The paper is accepted for publication in Insurance: Mathematics and Economics.*

For more information on this research email Professor Haberman at **s.haberman@city.ac.uk**