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## LONGEVITY AND PENSION RISK MANAGEMENT

Mr. Chris Westfall, Investment Governance, Inc. contributing editor, interviews Dr. David Blake to get his thoughts about the impact of longevity on the financial health of pension plans. Dr. Blake is Professor of Pension Economics at Cass Business School, City University in the United Kingdom and Director of the Pensions Institute and Chairman of Square Mile Consultants.

**Chris:** As much as investment risk is at the top of the list of fiduciary pain points today, the growing threat of longevity risk is starting to grab people's attention around the world. Let me start by asking you why pension funds need to take a harder look at longevity risk. Could you describe what the overriding issue is for the industry?

**David:** The reason why longevity has become a prominent concern for pension fund decision-makers worldwide is that the valuation of liabilities is now forcing more transparency about plan economics. In the past, a deterministic process was used to assess longevity-related inputs with a heavy reliance on mortality tables. However, over the past ten or fifteen years, actuaries have come to recognize that mortality and longevity are not properly modeled by a deterministic process. Instead, what statisticians refer to as a stochastic process is needed to properly model longevity and mortality. Using this more modern approach, it's now clear that trends in life expectancy are worse than initially anticipated. Moreover, we have observed that mortality rates vary from year to year so reliance on static mortality tables makes no sense. The old certainties have gone away. What we have discovered is that life expectancy is increasing by about two and a half years on average, per person, in advanced countries. Someone who was born ten years after someone else will not live ten years longer. They won't die ten years later. They will die, on average, twelve and a half years later. That increase in life expectancy has carried on for some time now. To repeat, old actuarial assumptions are no longer valid. And we know for example, in the UK, that one extra year of life expectancy for someone currently aged 65 years adds three percent to the cost of that individual's pension. This is a genuine problem that plan sponsors are facing anew because the underlying model that the actuaries used in the past was incorrectly based on a deterministic model in which life expectancy was easily predictable. That model is wrong.

**Chris:** How big is the learning curve for trustees and other types of fiduciaries around this issue? You have said they have started to understand the new paradigm. Please elaborate.

**David:** The UK has led the world here because we have a very large proportion of the accumulated entitlement being paid to the pension and not as a lump sum. We have to work around statutory indexation rules which require pensions to be adjusted for inflation. If a trustee is paying attention, he or she will necessarily be informed by the actuaries that the plan cash flows are growing – not only for inflation adjustments but also because people are living longer. Moreover, around about ten years ago, accounting rules changed in the UK. Whereas pension costs were hidden in the footnotes and sometimes not disclosed at all, financial statements now

included much more information. As a result, analysts started to ask questions about the pension plan. What began to emerge, particularly with the end of the dotcom boom, was a fall in stock market prices. The high equity weighting in the portfolios of pension funds led to a big drop in values on the asset side. Coupled with the increase in liabilities, because of increasing life expectancy, meant deficits in the pension plans. Sometimes the deficits were of the same order or magnitude as the market value of the company. British Airways is a classic example of the impact of new accounting rules in terms of disclosure, with the company being described as a large hedge fund with a small airline business attached to it.

**Chris:** Is longevity an issue in North America and/or Asia?

**David:** That is a good question. The risk will be partly related to increases in life expectancy and partly related to the benefit rules and the way that benefits can be drawn. The increase of life expectancy is fairly widespread across the planet. Life expectancy is increasing in most countries with one exception that we know about being Zimbabwe where life expectancy is actually falling. Now it might not be increasing everywhere at the same rate but it is increasing because of an improvement in diet, better lifestyle, giving up smoking and so on. That is happening worldwide. Some differences include a problem with obesity that seems more prominent in the United States. The biggest difference will be the nature of the benefit rules in each country. In the US, costly defined benefit plans were terminated in the late 1970's or 1980's versus the UK experience wherein plans were terminated about a decade later. The US move towards defined contribution plans meant that longevity risk was transferred to employees and away from the sponsor. Additionally, in the US, one can take benefits as a lump sum which removes defined benefit plan risk from the balance sheet of the sponsor. You mentioned Asia. Life expectancy is increasing dramatically there as well but they don't have a history of defined benefit pension plans. The plans that are being set up in Asia and some emerging market nations take the form of defined contribution plans. Longevity risk hasn't gone away but it is certainly in the hands of the plan member and not the sponsor. To recap, the rules of the plan and the type of benefits that participants earn mean that longevity risk varies across countries and sponsors. Nevertheless, collectively as societies, that risk is there. And particularly if people don't annuitize, if they don't take their lump sum and buy an annuity, which on a voluntary basis is not very common anywhere in the world, then you have the danger that people spend their pension savings too quickly. If they spend the monies before they die and then look to the state for help, taxpayers are going to fret, particularly the younger generation of workers. The baby boom generation is beginning to retire in 2010. As a result, the dependency ratio – the ration of retired persons to persons in the workforce - in North America and Europe is going to increase dramatically.

**Chris:** What are some of the solutions to this, other than falling back on the state to provide benefits? As I understand it, there are some private market risk transfer ideas that are being discussed.

**David:** Again the UK has led the world on solutions here. There are private market solutions and there are public market solutions. The private market solutions are classified under three headings: buy-outs, buy-ins, and longevity swaps. About five years ago, insurance companies in the UK set out to buy the pension liabilities of closed company pension plans. As I mentioned earlier, the boom years of the late 1990's saw companies such as those in the financial services industry, banking in particular, recognizing the risks associated with equity heavy defined benefit plans. Absent management of the liability risk, these organizations started to worry and responded by shutting down their traditional schemes to new members, ceased new accruals by existing members and set up or enhanced their defined contribution plans. Then people began

to question the spending on asset management services of these plans, along with the financial statement impact for deferred entitlements, including those of persons who no longer worked with the company. So insurance companies came along and offered to buy the assets and liabilities of a pension plan, sometimes at a price that was twenty-five percent higher than the accounting value of the liabilities. Despite this premium, more than a few plan sponsors were willing to get rid of the plan(s). With the recent volatility in the stock markets in the past couple of years, the pension buyout market activity has slowed rapidly. In the meantime, the risk hasn't gone away. Some companies have decided to buy annuities to hedge the risks since there are fewer purchasers of the liabilities. With annuities, you can hedge the longevity risk by transferring that longevity risk to an insurance company that sells the annuity. This "buy in" market is the mechanism that matches the pension payments with the appropriate sets of annuities, group annuities purchased from insurance companies. Unfortunately, falling interest rates have pushed up the prices of annuities. That in turn has led to the third private market solution, the development of longevity swaps. Simply put, this is a market in which a plan sponsor hedges its longevity risk using a standard swap, very similar in structure to an interest rate swap, in which there is a fixed leg and floating leg. The pension plan plays the role of the Fixed Rate Payor. The counterparty, usually an investment bank, pays the floating leg in an amount equal to the pension cash flow obligations. The longevity risk premium reflects the notion that the fixed swap leg is equal to the market's best expectation about what the future cash flows will be, which we base on the market's best expectation of what future life expectancy is going to be, plus a risk premium that ranges between three and six percent of the total value of the liabilities. The longevity swap allows companies to hedge their exposure out to fifty years in some cases. The advantage of this particular private market solution, the longevity swap, is that no upfront capital is needed. The plan sponsor is not buying a set of annuities as in a buyout nor does it need to finance the full cost of the buyout in the case of the new buyout market. Longevity swaps are growing rapidly. On the public solutions front, there is talk about the government in various countries issuing longevity bonds to further develop the related swaps market. These are bonds in which the cash flows - the coupon payments on the bond - are linked to the survivorship of a particular cohort of the population. Consider sixty-five year old males. The coupon on a related bond, say in ten year's time, when that cohort is aged seventy-five, will be proportional to the percentage of the original cohort who survived to age seventy-five. If more (less) than the anticipated percentage survives to age seventy-five, the bond's coupon will be higher (lower). If governments issue longevity bonds, they serve as a hedge for society's aggregate longevity risk. In contrast, a private market solution hedges idiosyncratic risk. Consider the typical insurance company scenario. If a company takes on a lot of uncorrelated risks, as in the case of auto insurance or household property insurance, the more risk assumed, the total risk falls - because risks are uncorrelated. As a result, risk premiums can fall. Regarding longevity risk, there is an idiosyncratic component. The more lives you include in a particular pool, the more predictable the assessments are with respect to when people are going to die. However, all those lives are subject to that trend improvement we discussed at the beginning of this conversation and that trend risk is a risk that can't be hedged by the private sector. A missing component is a longevity bond that is issued by a government to help the private sector hedge this trend element, i.e. the aggregate risk element of longevity risk. I have been trying to persuade the UK government for ten years to issue this kind of bond. They are not really keen to do so but we understand that the World Bank is working on the design of a longevity bond for Chile. The World Bank, if you remember, began with Chile when it started a worldwide model for pension plans in emerging markets - the three pillar model as it is called. What policy-makers didn't think about was what happens when people retire and need to buy an annuity. They never developed an annuity market in Chile and so there was a risk that new and inexperienced Chilean annuity providers would not price them to reflect the true longevity risk

and might face insolvency. The World Bank recommended that the Chilean government issue a longevity bond to help the private annuity market properly develop.

**Chris:** What do you think are the chances of this program coming to fruition in Chile and what would that mean for the development of this market?

**David:** If the Chilean government issues such a bond and if it was successfully purchased, then this would provide a powerful catalyst to encourage other countries to issue such a bond. I have talked to people in the US Treasury Department about this. They kind of like the idea but the topic is not high on the agenda at the moment. As I stated earlier, I have likewise spoken to the UK government too. Lawmakers are becoming increasingly aware of pension related challenges, notably longevity risk. This is especially true for countries with legacy defined benefit plans that have slowed benefits to new members and/or where pensions are paid and lump sums are not given. There is an increasing awareness of the important role that government could play in risk sharing in return for a competitive risk premium. Again, the government, will on average, be rewarded by receiving a longevity risk premium that is between three and four percent of the value of the issued bond. Governments are accustomed to this kind of structure. For example, regarding inflation, there is a TIPS market in the US and what we call a linker market in the UK. The government issues index-linked bonds and earns a small inflation risk premium from doing so. That inflation risk premium compensates the sovereign issuer for the fact that it might have to pay a higher nominal cash flow as inflation rises.

**Chris:** Wrapping this up, what do you think are the top five issues that a fiduciary or a pension trustee needs to keep in mind when thinking about longevity risk and what they need to do?

**David:** They have to look at the age distribution of their members. They have to look at where longevity risk is concentrated. We have developed visual charts called Survivor Fan Charts and Longevity Fan Charts to help trustees quantify where the age element of the risk is concentrated. Clearly gender is important. There are differences in life expectancy between males and females so the kind of gender composition of the membership is important. Socioeconomic status information is important too, whether you are a professional or a manager versus an unskilled worker. A male professional manager is going to live four to five years longer than an unskilled worker on average. One of the ways of trying to identify the socioeconomic status of members is to look at their zip code. The size of a lump sum, if allowed, is another factor. People with large lump sums tend to be more senior directors of a company and are known to live longer. Getting that trend risk right is yet another issue, particularly how the trend varies by gender, age and socioeconomic status. Getting that trend right is the critical input to being able to quantify a sponsor's exposure to longevity risk as precisely as possible.

**Chris:** I really appreciate your time. This discussion has been very informative.

**David:** Okay. Good.

**Chris:** Okay. Terrific. Thank you very much.