

Dear Actuary:



I recently read your column regarding ASOP 51 risk disclosures and interest rate risk. I'd also like to know more about demographic and longevity risks. What are they and how do they impact my public pension plan?

- Wondering in Winchester

Dear Wondering:

That's a great question and I'm glad to hear you read our previous column on interest rate risk. We'll start by discussing what demographic risks are (including longevity risk) and then we'll look at how they might impact your pension plan.

Longevity and demographic risks are described in ASOP 51 as the risk that longevity or other demographic experience will be different than expected. That's great, but what exactly does that mean? In brief, demographic experience relates to things like how long members will work for the plan sponsor, under what circumstances their employment will end, and the age at which they are likely to start collecting pension checks. There are several ways a member's employment can end: they can quit or be fired, they can become disabled, they can die, or they can remain employed until retirement. All of these factors ultimately determine the amount of benefits that will be paid by the plan over the coming decades. (Longevity is just one of the factors, but it receives a lot of attention so often it gets discussed separately from the others.) One of the most important things your actuary does is use their expertise to craft actuarial assumptions about how each of these factors is likely to play out in the future.

You might be thinking this is all great information, but where's the risk? The risk comes into play when we compare the actual patterns of retirement, turnover, deaths, and so forth to what the actuary *expected* would happen. When actual experience differs from expected experience, it can have a significant impact on the level of plan costs and plan sponsor contributions going forward.

Let's take a closer look at the different types of actuarial assumptions and the associated risks.

The **Mortality** assumption relates to how long the pension plan members are expected to be alive and collecting their benefit checks. While you may not be familiar with mortality tables, there is a good chance you've heard or read a news story about

changes in life expectancy. There are regularly published stories that let us know that people are generally living longer than they used to. Fortunately, your actuary is an expert on mortality tables and will select a table that they believe best reflects how long your plan's population is likely to live.

When people talk about longevity risk they are really talking about the risk associated with mortality. Since pension plans make cash payments for a member's lifetime, the risk is that members will live for a longer or shorter number of years than expected, and therefore collect more or less benefits than expected. If the members are living longer than expected, the costs to the plan sponsor will be larger than expected, and vice versa. A member living to 100 is fantastic for that individual member, but will be more costly for the plan sponsor!

The **Withdrawal** assumption is used to anticipate when an active member will leave employment prior to retirement. Each year that a member works they earn additional pension benefits. The longer a member works, the larger those benefit checks will be upon retirement. Your actuary takes into account things like age, length of service, gender, and type of employment to build an assumption about withdrawal patterns. The risk is that members will leave employment sooner or later than expected, resulting in smaller or larger benefits than expected.

The **Disability** assumption is used to estimate the probability that a member will become disabled. Many pension plans provide disability benefits if a member meets certain requirements. Plans that cover public safety workers often provide generous disability benefits, especially if the disability occurs in the line of duty. The size of the monthly check a disabled member receives might even be bigger than the amount of a standard retirement check. On the flip side, the nature of the disability might be such that the disabled member has a shorter life expectancy than a standard retiree. Your actuary will use assumptions to determine the probability that members become disabled along with a mortality assumption that is specific to disabled members.

The Retirement assumption is used to anticipate when members are likely to retire. Some people have a countdown to the first day they are eligible to retire, while others plan to work as long as they can. Many folks fall somewhere in between. They may target key ages like 62 or 65 or perhaps a service milestone of 25 or 30 years. The plan's retirement eligibility requirements will have a significant impact on when members choose to retire, and oftentimes a workplace has a culture that plays a part in retirement decisions.

The benefits for members who retire earlier are often smaller than the pensions for the folks who retire later. On the other hand, members who retire earlier will collect pension checks for more years than the folks who keep working. Your actuary takes a careful look at what retirement patterns have looked like in the past and uses their expertise to anticipate what those patterns might look like in the future. The risk is that members will start retiring sooner or later than they used to—perhaps there's a rough patch in the economy and people start holding onto their jobs longer, or perhaps there's a stock market boom and people feel financially comfortable going into retirement—either way, it will mean that actual retirement experience differs from what the actuary expected, which in turn will mean that the benefits that will be paid from the plan won't line up with what was expected, and this in turn will impact the cost for the plan sponsor.

Whew! That was a lot of technical stuff—good job hanging in there with me! At the end of the day, all of these demographic factors are what drive how and when benefits are paid from the pension plan, and by extension how much the plan sponsor will need to contribute to the pension plan in order to make sure there's enough money to pay benefits. The actuary's goal is to do as good a job as possible in making assumptions about the demographic factors. Fortunately, actuaries have a tool called an Experience Study that they can use to help craft the demographic assumptions for a particular plan. Some of the demographic assumptions, particularly mortality and disability, can be studied on a country-wide basis. On the other hand, turnover and retirement patterns are often very specific to a particular workplace and should therefore be studied based specifically on your plan's experience.

Actuaries are not fortune tellers and we'll never know exactly what will happen in the future, but by looking at the past we can better predict what will be coming down the road.

Your Milliman Actuary

P.S. Thanks so much to Daniel Colby, FSA, EA for providing technical assistance!



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For more information about defined benefit pension plans, see prior letters [here](#).

Do you have a question about your defined benefit pension plan? Write to us at dear.actuary@milliman.com.