

Dear Actuary:



The town next to mine is using a 6.75% interest rate assumption to measure its pension liability. Why is my actuary telling me we should be using a 6.25% interest rate assumption?

- Perplexed in Portland

Dear Perplexed:

This is a vital question because the interest rate assumption is perhaps the single most important assumption that plan sponsors make to ensure that their pension plans have enough money to pay their promised benefits. Your actuary performs periodic “valuations” of your pension plan (generally every year) to determine the present value of the promised benefits and develop a contribution schedule that will allow the plan to pay those benefits in the future. A lower interest rate assumption means a higher liability and hence a higher contribution amount. For governmental pension plans, the interest rate assumption is typically based on the plan’s expected long-term return on assets. It is therefore sometimes referred to as the “investment return” assumption. For purposes of this discussion, I will use these two terms interchangeably.

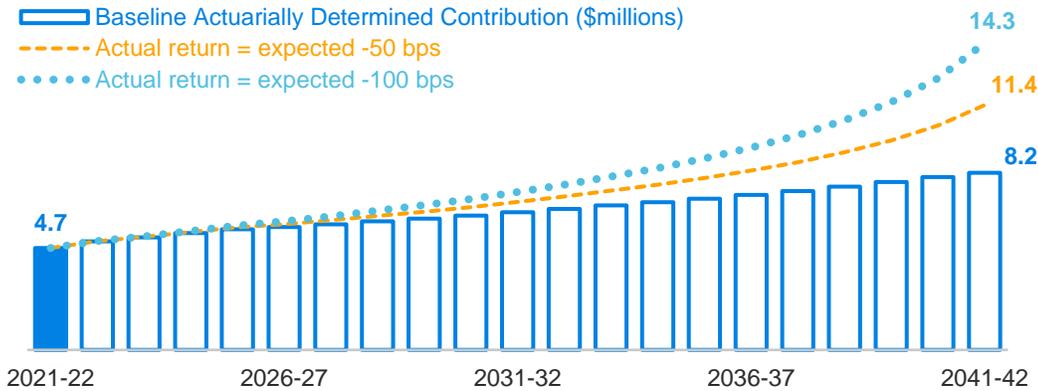
As Figure 1 illustrates, the money to pay benefits to the plan’s retirees comes from two sources: investment income and contributions. Your actuary starts with a projection of the benefits that are expected to be paid from the plan over the coming decades, then moves on to an analysis of how much investment income the assets are expected to earn, and ends by working out how much the contributions need to be to make up the difference between the benefits and the investment income. Investment earnings account for the majority of revenues in most pension plans (on average, about 60% over the last 30 years). Because investment earnings account for such a significant amount of revenue, being able to accurately anticipate future investment earnings is very important in determining how much should be contributed to the plan.

FIGURE 1: PUBLIC PENSION FUNDING



Suppose the investment return assumption is set too low. This would mean the contributions being paid by current taxpayers would be higher than they need to be, while future taxpayers will be undercharged. Likewise, suppose the investment return assumption is set too high. In this situation, the current taxpayers would be paying too little, leaving future taxpayers on the hook to make up the shortfall. Under either scenario, pension costs are not being fairly distributed among different generations of taxpayers. Everyone’s goal should be to get it just right! Figure 2 shows what happens to the actuarially determined contribution if the investment return assumption is set too high, so the plan’s assets consistently underperform relative to the assumption. As you can see, 20 years of chronic underperformance could cause contributions to increase by 75%!

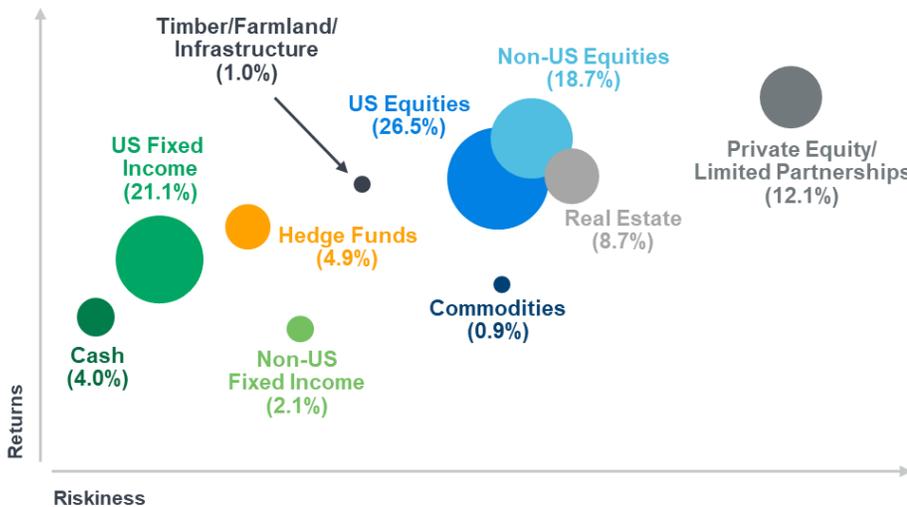
FIGURE 2: IMPACT OF INVESTMENT RETURNS



So how exactly does your actuary come up with a recommended investment return assumption?

The assets of a pension plan are usually invested in a mix of asset classes. These asset classes have different risk/return characteristics: some may be low-earning but not very risky, and others may generate higher returns over the long run but may experience a lot of ups and downs along the way. Your actuary will take these characteristics into consideration and develop an estimate of the expected investment returns for the overall portfolio. Figure 3 represents a hypothetical asset allocation for a typical pension plan.

FIGURE 3: HYPOTHETICAL ASSET ALLOCATION



In any given year, the plan’s investment return can range from very high to very low. As we look at longer and longer time periods, though, the high and low years tend to balance one another out and the range of annualized returns narrows. Figure 4 illustrates this process, with a wide range of possible investment returns over a five-year time horizon but progressively narrower ranges as the time horizon lengthens. Because pension obligations are long-term in nature, it is important to consider a long time horizon. Remember, the purpose of pension plan assets is to provide benefits for the lifetime of its members, which can be upwards of 70 or 80 years for the plan’s youngest member. In math-speak, we talk about the “50th percentile,” or the “median,” when we look at the investment return a portfolio is converging to over very long time periods. For this particular portfolio, Milliman’s capital market assumptions as of June 30, 2021, indicate that the expected median return over a 30-year period is 6.48%. So for this particular portfolio, using an investment return of about 6.48% would be appropriate.

FIGURE 4: DISTRIBUTION OF EXPECTED RETURNS OVER TIME



However, a plan that is invested in a different mix of asset classes with different risk/return characteristics will likely yield a different result when we analyze its expected long-term returns. In other words, your investment return assumption reflects your plan’s own specific asset allocation. When you compare your investment return assumption to that of your neighbors, it is important that you don’t look at it in a vacuum. Perhaps your neighbor has decided to take on more investment risk in return for lower but potentially more volatile contributions; their investment return assumption would rightly be higher than yours. There is no right answer to the question of “What is the appropriate amount of risk?” because every plan sponsor answers that question differently. You would never ask your neighbor what size shoe she wears, and then buy the same size shoe for yourself, because it likely wouldn’t fit! The same goes for decisions about the asset allocation and the investment return assumption that follows. You need to choose the asset allocation that best fits your own circumstances, and select the investment return assumption that best matches your own plan’s expected long-term return.

Your Milliman Actuary

P.S. Thanks so much to Jenn Castelhana, FSA for providing key factors to consider when determining the interest rate assumption for a pension plan!



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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.