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New Research on Pension Assumptions

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A Society of Actuaries (SOA) project oversight group recently approved a research paper titled, “Determining Discount Rates Required to Fund Defined Benefit Plans,” by John Turner and three other economists. This should be available soon on the SOA website under “Research.” This report will be of interest to all investment actuaries because it addresses the challenging issue of what to use for the liability discount rate.

The paper describes a new way to look at pension funding for ongoing plans that is a variant of using expected returns (currently used in public plans). This approach takes into account the risk that contributions will be needed in the future for this year’s benefit accruals. This risk arises from both asset returns and liability cash flows. Currently, both the expected return method and the bond rate method (used in private plans) assume the projected cash flows based upon actuarial assumptions are exactly realized.

This new approach (stochastic funding) has an explicit probability assumption that additional contribution for this year’s benefit accruals will not be needed (60 percent in models in this paper). It also assumes the existence of an employer to make additional contributions in the future. This could also be subject to a maximum amount of additional contributions. The expected return method used in public plans has fixed liability cash flows and a 50 percent chance of not requiring additional contributions. Both expected return and stochastic funding methods assume that the mean and standard deviation of returns for some historical period will apply in the future. Among other issues, they do not take into account parameter uncertainty in the projections.

The paper has a fairly complete literature review of all of the methods used in determining discount rates for defined-benefit plans. It then goes through a mathematical analysis of the methods. The method proposed in the paper answers the question, “What is the discount rate needed for determining contributions to assure that current contributions will be sufficient c percent of the time so that future contributions will not be needed to pay off the liability?”

The models used for methods in the paper begin with a simple two-period model where either assets or liabilities are risk-free, and move to a more complex, multi-period model where both assets and liabilities are risky. Using a 60 percent assumption of

no additional contributions and other simplifying assumptions, the paper runs scenarios with varying investment strategies. These runs showed that increases in returns from a riskier portfolio strategy are offset by the 60 percent requirement; there is no increase in discount rates from moving into riskier investments. One of the perverse incentives in the current expected return method used for public plans is that they encourage these plans to move into riskier investments to lower costs. This is happening at a time when plans are maturing with more retirees and an older workforce, which should be funded with more conservative investments.

The model is then generalized and tested where the 60 percent probability is modified such that contributions are needed if the assets fall below some amount (90 percent and 99 percent are used) such that there is a no more than a 10 percent chance that more than 10 percent additional contribution would be needed.

Even in a non-pension context, the method may have applications for dynamic strategies that benchmark the asset manager’s performance directly to a liability index.

Politicians want to provide maximum benefits for minimal taxes. Deferred compensation valued using aggressive actuarial assumptions is one way to do this. Advocates of expected return methods argue that valuing benefits using bond rates and investing in risk assets would result in a windfall to future taxpayers when higher returns are realized. Bond rate advocates argue that a dollar in bonds equals a dollar in risk assets, and any gains in the future belong in the future since those taxpayers took the risk of losses. The paper proposes a method that produces a rate in the middle, by factoring risk into the expected return method. ■



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