Funding Public Pension Plans

MOST PUBLIC PENSION PLANS are in good shape, and traditional actuarial methods seem to work relatively well under many conditions. But they may not be sufficient in all cases, such as when the funded share falls below 60 percent. To strengthen these plans, there's a need for rules that require plan sponsors to make progress toward full funding without actually mandating it.

For mature public plans that are less than 60 percent funded, the amortization payment should be based on a descending period, with a minimum payment of the interest on the unfunded actuarial accrued liability (UAAL). As a starting point for discussion, consideration should be given to requiring an overriding minimum contribution (OMC) and a recommended contribution that is the greater of the amount determined using traditional actuarial methods and the OMC.

To ensure that public pension plans are more accurately reviewed for fiscal soundness, I would recommend the following for regulating cost, asset, and amortization:

- The cost method should calculate liabilities on a projected basis, including pay increases and cost-of-living adjustments (COLAs). It should calculate benefits on a projected basis and reflect all plan provisions in the liability calculations. Unlike projected-unit-credit and entry-age-normal methods, the unprojected-unit-credit method doesn't reflect projected benefits in the liability and isn't a reasonable actuarial cost method for ongoing pay-related plans with active members. Any method that excludes benefit features such as deferred retirement option plans, overtime included in the benefit calculation, or regularly granted COLAs shouldn't be considered reasonable. It would be preferable to have liabilities for contingent COLAs based on investment gains included in the liabilities for funding purposes, but if that isn't the case, the liability for contingent COLAs should still be calculated and disclosed.
- The asset method should minimize the smoothing of investment gains and losses. I would recommend limiting the period for smoothing gains and losses to five years and setting the value range from 80 to 120 percent of market value.
- The amortization method should provide for amortizing the UAAL over a closed or fixed period or by a fixed date. Otherwise, the UAAL grows to infinity and the responsibility for paying it is passed on to future taxpayers.

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The point is to make progress on funding the UAAL. Traditional public plan methods work for closed groups, but the payroll growth assumption in open groups, combined with constant resetting of the amortization period, can lead to perpetual negative amortization in which payments are never sufficient to pay the interest on the UAAL. This is analogous to a nontraditional mortgage product in which a borrower makes payments that are less than the interest, except that the mortgage has a property serving as collateral for the debt while the UAAL has no such underlying asset. Also, most mortgages that did allow negative amortization had limits. Many of these mortgages allowed negative amortization for only five years or less and had terms to recast the payment to a fully amortizing schedule if the principal grew to a pre-specified amount, such as 110 to 125 percent of the original balance.

Determining the OMC

Contributing either the annually required contribution (ARC) or the recommended contribution under traditional actuarial methods will not necessarily ensure a plan's actuarial soundness. Guidance from the Governmental Accounting Standards Board and the Actuarial Standards Board allows for methods and assumptions that can result in no progress being made on the amortization of the UAAL

FIGURE 1

Funded Ratio (FR)	Overriding Minimum Contribution (OMC)
0% ≤ FR < 50%	NC + BP
50% ≤ FR	NC + [(1 – FR)/FR] BP, not less than 0

and a deterioration of the plan's funded ratio.

Instead, I would recommend that all contributions be tested against an OMC calculation (and that this calculation be applied automatically to all plans that are less than 60 percent funded). Doing this, plans could avoid unreasonable payroll growth assumptions and perpetual negative amortization from the extension or resetting of amortization periods. Because it would use the market value of assets (MVA), it would avoid the distortions caused by excessive smoothing of investment gains and losses. An OMC calculation that is independent of amortization and asset-smoothing methods can also help preserve funded ratios. The proposed required contribution would be the greater of the amount determined using traditional methods and the OMC.

For example, the OMC for a public pension plan can be expressed as a function of the normal cost (NC), the beginning-of-year funded ratio (FR), and the expected annual current year benefit payments (BP), as shown in Figure 1.

The OMC is the NC plus the FR factor times the BP. The FR factor is the ratio of 1 minus the FR divided by the FR, with a maximum of 1. The NC and expected BP would include interest adjustments to match the timing of the contributions. The FR would be based on the ratio of the MVA to the actuarial accrued liability (AAL).

The formula for the OMC is derived by assuming that when the FR is less than 100 percent, the rate of asset growth should equal or exceed the rate of liability growth to avoid an actuarially unsound scenario. The ratio of the MVA at the end of the year, MVA_1, to the MVA at the beginning of the year, MVA_0, must be greater than the ratio of the AAL at the end of the year, AAL_1, to the AAL at the beginning of the year, AAL_0.

For example, a plan with $2 million in liabilities and a market value of assets of $1 million is 50 percent funded at the beginning of the year. Suppose the NC is $100,000, the BP are $200,000, the cash flows are at the beginning of the year, the interest-rate assumption is 8 percent, and the contributions determined under traditional methods are $140,000. The FR would be expected to decline to 49 percent at the end of the year, based on an AAL_1 of $2,052,000 and an MVA_1 of $1,015,200. Using the OMC of $300,000 (the NC plus the BP for a plan that is 50 percent funded), the expected FR would be 58 percent, based on an AAL_1 of $2,052,000 and an MVA_1 of $1,188,000.

Using the same numbers as in the previous example but with starting assets of $1.6 million and contributions, determined under traditional methods, of $110,000, the FR would be expected to decline from 80 percent to 79 percent at the end of the year, based on an AAL_1 of $2,052,000 and an MVA_1 of $1,630,800. Using the OMC of $150, 000, the NC plus 25 percent of the BP for a plan that is 80 percent funded, the expected FR would be 82 percent, based on al AAL_1 of $2,052,000 and an MVA_1 of $1,674,000.

This formula was developed to make sure that the contribution doesn't allow the funded ratio to deteriorate for plans with unfunded liabilities. As a starting point for discussion, consideration should be given to making the recommended contribution for funding purposes subject to an OMC calculation.

It's not necessary to target 100 percent funding as the ultimate goal. The UAAL amortization period doesn't need to descend to zero but could descend for 10 years and then become a rolling 10-year amortization period.

There are several reasons for not funding at the 100 percent level. When a plan is below 100 percent funding, there's no question about ownership of any excess. The contributions carry through the plan to cover the last remaining member. Also, pressure to improve benefits once the funded ratio is 100 percent or greater can reduce a plan sponsor's interest in increasing the funding. I would recommend that plan sponsors be required to make progress toward 100 percent funding, without requiring them to do so.

Selecting a Best-Estimate Range

Risk is measured using the standard deviation. Actuarial Standard of Practice No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, defines the best-estimate range as the narrowest range within which the actuary can reasonably anticipate that the actual results, compounded over the measurement period, are most likely to fall. I would recommend determining the long-term compounded annual rate of return by taking the expected arithmetic annual return and adjusting it for variance drain or volatility drag, resulting in a reduction of about one-half of the variance.

Using the standard deviation of a portfolio, a best-estimate range of the long-term compounded rate of return would be developed and expressed as a range between the 25th and 75th percentiles of the expected results, with the range around the expected compounded return plus or minus one-tenth of the standard deviation.

The compounded return would be lower than the expected annual return because of volatility. The reasons for the volatility drag are explained in an article by James D. MacBeth in his 1995 *Financial Analysts Journal* article "What's the Long-Term Expected Return to Your Portfolio?" The variance drain would be about half the variance of the portfolio.

To improve on the estimate for the variance drain, a factor of 0.46 could be used instead of one-half. Using the 0.46 factor reproduces the results from an exact formula (developed by Olivier de La Grandville in his 1998 *Financial Analysts Journal* article "The Long-Term Expected Rate of Return: Setting It Right") with-

in about two basis points for portfolios with standard deviations less than 17 percent. Standard deviations that are greater than 17 percent are found in portfolios that are more than 90 percent invested in equities, an uncommon occurrence in pension funds.

Annual Compounded Rate of Return
= Expected Annual Return – [0.46 (Variance)]
= $\mu_p - .46\ \sigma_p^2$

For example, a sample portfolio of 100 percent equities with an annual expected rate of return of 10 percent and a standard deviation of 20 percent would have variance drain of about 200 basis points, and the compounded expected return would be about 8.2 percent before expenses.

The best-estimate range of the expected return is the range in which the results are more likely to fall. This is the range from the 25th to 75th percentile, or the inter-quartile range. The inter-quartile range would be constructed using the long-term expected standard deviation, which will decrease over time. The inter-quartile range for the 50-year compounded rate of return would be the return plus or minus the standard deviation, divided by 10.

A formula exists for the amount of reduction in the standard deviation over time. After 50 trials, the standard deviation will be reduced by dividing the original standard deviation by 50½. Using Chebyshev's theorem, the half of the results that fall in the inter-quartile range must be within 1/(2½) standard deviations of the mean. The formula for the corridor for the inter-quartile range after 50 years is 1 divided by the product of 50½ times 2½, or 1 divided by 100½, 100½ equals 10.

Based on the asset mix, the expected compounded-return assumption before expenses can be developed by taking the expected annual return and subtracting about one-half, or 0.46, of the variance. The inter-quartile range can be developed by using a corridor within one-tenth of a standard deviation around the expected compounded return.

Best-Estimate Range of Annual Compounded Rate of Return
= Expected Annual Return – [Variance/2] ± [Standard Deviation/10]
= $\mu_p - .46\ \sigma_p^2 \pm [\sigma_p/10]$

For example, for a sample portfolio with 60 percent in equities and 40 percent in fixed-income investments, with an annual expected return of 8 percent, a standard deviation of 12 percent, and expenses of 30 basis points, the net expected compounded return is in the 5.8 to 8.2 percent range, with a best estimate of about 7 percent.

To sum up, we should consider making the recommended contribution for funding public plans subject to an OMC calculation. When determining the actuarial value of assets, I would recommend limiting the period for smoothing gains and losses. I would also recommend limiting the corridor or range around the market value to prevent excessive smoothing from distorting the results. Regarding actuarial cost methods, all of the plan provisions should be reflected in the liabilities. I believe that the OMC would be sufficient to keep plans progressing toward full funding. ●

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