November 15, 2014

ASOPs and Public Pension Plan Funding and Accounting
Actuarial Standards Board
1850 M Street, NW, Suite 300
Washington DC 20036-4601

Sent by email to comments@ actuary.org

Dear Sirs:

Thank you for the opportunity to comment on the question of an ASOP for public pension plans. The opinions presented here are strictly my own, and do not represent the opinions of my employer. In my opinion, a separate ASOP or ASOP section is not needed for public pension plans. I agree that the correct basis of pension ASOPs is the set of relevant principles that apply to actuarial valuations, and not on prescribing rules. Funding and accounting assumptions and methods are largely prescribed for private sector single employer pension plans by regulation, so the effect of pension ASOPs is strongest on less regulated areas, such as public, multiemployer and church plans.

However, I believe that pension ASOPs are in need of strengthening. This comment letter addresses the discount rate used in contribution budgeting. Section 3.9(a) of ASOP 27 gives two choices for such a discount rate; either i) the traditional approach of using the expected investment return on plan assets, or ii) a market-consistent, defeasement, or settlement basis. (US public pension plans virtually all use an expected investment return on plan assets to budget contributions.) This letter is organized into the following sections:

- A weakness of the traditional 'expected return' discount rate approach;
- Weaknesses of the 20th century financial economics approach;
- A proposed financial economics approach based on first principles;
- Principles underlying the proposed approach;
- Public pension plan practical considerations;
- Conclusion

To clarify, the discount rate purpose described by 'budgeting contributions' in ASOP 27 Section 3.9(a) refers to 'evaluating the sufficiency of a plan's contribution policy', not to the contribution policy itself. In other words, the discount rate used for budgeting contributions is the rate used in calculating the plan's actuarial accrued liability, normal cost, and present value of future benefits under the plan's cost actuarial cost method used for the funding valuation. The contribution policy, on the other hand, is set by the plan and plan sponsor, with advice provided by the actuary.

A weakness of the traditional 'expected return' discount rate approach

A weakness of the traditional approach of using the expected investment return on plan assets is that the investment return assumption is applied to the time period from the present to when future contributions are expected to be made. Specifically, the problem with using an investment return assumption for these periods is that they are not associated with any actual investment. An appropriate discount rate to use from the present until a future contribution is expected is the plan sponsor's borrowing rate. For example, if the expected future payments were debt repayment instead of pension contributions, they would be discounted at the plan sponsor's borrowing rate. Some have made a distinction between the liabilities of repaying debt and funding a pension plan, but there is no justification for using an investment return rate to discount expected future sponsor contributions.

To use an extreme example, using the traditional approach, the liability measured for a plan whose accrued liability is 100% funded is the same as that for an identical plan which is only 10% funded, despite the enormous difference in investment return available to help fund the plan.

Here is a simple example of how a pension liability discount rate can be calculated as a blend of expected investment return and the plan sponsor's borrowing rate:

Plan sponsor borrowing rate: 4%
Expected return on plan assets: 8%

The plan benefit liability is a single payment of $3,607,581 at time 10.

Time	Initial Assets & Contributions	Accumulation to Time 10	PVFC at 8% Discount	PVFC at 4% Discount
0	1,000,000	2,158,925		
1	100,000	199,900	92,593	96,154
2	100,000	185,093	85,734	92,456
3	100,000	171,382	79,383	88,900
4	100,000	158,687	73,503	85,480
5	100,000	146,933	68,058	82,193
6	100,000	136,049	63,017	79,031
7	100,000	125,971	58,349	75,992
8	100,000	116,640	54,027	73,069
9	100,000	108,000	50,025	70,259
10	100,000	100,000	46,319	67,556
Total		3,607,581	671,008	811,090

Walking across the columns:

- There is an initial $1,000,000 balance, with annual $100,000 contributions made at the end of each of ten years, so that the fund value just equals the required $3,607,581 payment if the fund earns a constant 8%.
- The traditional approach produces a present value of future benefits (PVFB) of $1,671,008, which is $3,607,581 discounted for 10 years at 8%.
- Of this $1,671,008, $671,008 is the present value of future contributions (PVFC), discounted at 8%.
- As there is no investment associated with the time periods from now until each future contribution, it is appropriate to use the plan borrowing rate of 4% to discount the contributions (not 8%), producing a PVFC of $811,090.
- Using the equation PVFB = Assets + PVFC, we calculate a PVFB under the blended discount rate approach of $1,811,090.
- The blended discount rate in this example is 7.13% = ($3,607,581/$1,811,090)$^{1/10}$ - 1

A potential second weakness of the expected investment return approach is that no adjustment is made for the riskiness of the assets used to pre-fund the liability. A great deal of theoretical research supports the statement that investors are risk-averse, and therefore require a premium to compensate them for accepting a risky investment. However, empirical research demonstrating the value that stakeholders place on pension liabilities (and thus the risk adjustment they make) hasn't been conducted at this writing.

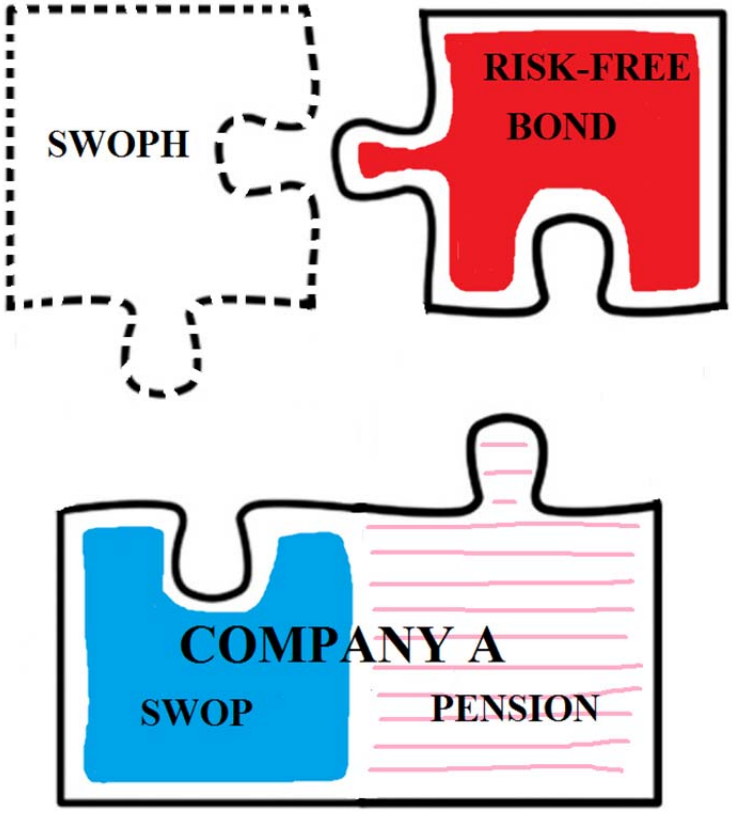
Weaknesses of the 20th century financial economics approach

I am using the term **20th century financial economics** to refer to a range of approaches, including the use of a discount rate which is some version of a risk-free rate, or a high-quality corporate borrowing rate. This approach is seen as a corollary to the development of asset pricing models. US and international pension accounting, and US funding requirements are currently based on this approach. However, this approach is at its core dogmatic, and not supported by theory. Hence, I apply the adjective '20th century' in order to clearly distinguish between proven, tested financial economics – i.e., the asset pricing models that are empirically and theoretically supported, and unproven, untested financial economics – i.e., the shortcut under which it is pretended that conglomerated liabilities such as pensions are securities subject to asset pricing models. Two theoretical weaknesses of 20th century financial economics are discussed below; namely i) that the no-arbitrage principle does not apply to pension liabilities, and ii) that the risk adjustment an investor would theoretically make in valuing partially funded pension liabilities may differ from that called for by 20th century financial economics.

The no-arbitrage principle does not apply to pension liabilities. The following argument is illustrated by a diagram on the next page. Say that an investor who subscribes to 20th century financial economics tenets recognizes that the market places a value on Company A's pension liabilities which is less in absolute value than

the price of a risk-free bond with the same cash flows. He may then attempt to gain an arbitrage profit by selling short Company A, which he perceives as overvalued, due to the pension liability valuation. Indeed, if Company A's pension liability were available as a stand-alone security (with the same valuation), he could execute the arbitrage by shorting Company A's pension liability (equivalent to buying a bond at a bargain price) and shorting a risk-free bond with the same cash flows.

However, Company A's pension liability is not available as a stand-alone security. In order to execute the arbitrage, the investor must also find a perfect hedge for the rest of Company A (shaded in blue, labeled SWOP – Sponsor without pension). The perfect hedge (SWOPH, or Sponsor without pension hedge) does not, however exist; hence, there is only a pretend arbitrage opportunity, not a genuine one. Imperfect hedges may exist, but not as a riskless arbitrage. Conclusion: Pricing of pension liabilities by the market which is not in accordance with 20th century financial economics does not create an arbitrage opportunity.



The 20th century financial economics risk adjustment for funded pension liabilities is unproven. Say an investor is estimating the value of pension liabilities which are partially funded with risky assets. Under the 20th century financial economics approach, the investor would first take into account the expected return and standard deviation of the return of the assets used to fund the plan. Then, he would make a risk adjustment, essentially taking out the entire market risk

premium of the pension fund assets, ending with a risk-free or high quality corporate bond rate.

The market risk premium for stocks is compensation to the investor for the variance in the stock's return over time. How much time? The US stock market turnover was 189 in 2010 and 148 in 2012[1], meaning that the average holding period for a US stock is about 1 or 2 business days. Thus, it appears that stock prices (and thus risk premiums) may be driven by market participants with a very short-term perspective. In contrast, the holding period for pension plan investments must be significantly longer (although I don't have data on that). Also, pension plan investment managers tend to use stable asset allocations, so that as securities are sold or mature, they are generally replaced by a security of the same asset class. Furthermore, pension asset allocations are typically well diversified, and pension investment managers seek out asset classes with negatively or low correlated returns.

Although 20th century financial economics dates back to at least 1981[2], there has been no published empirical evidence in support (or in opposition) of the contention that neither the holding period nor asset diversification affects the risk adjustment to pension liabilities that stakeholders (including stock market participants) make for risky pension assets. By 8/31/2015, I plan to examine the ratio of shareholder equity to market capitalization for US corporations, and perform a regression, determining coefficients relating to pension assets, dividends, GICS sector and sub-industry. I hope to show how the market values pension liabilities, vs. the ASC 715 (FAS 87) valuation, which uses high-quality corporate bond rates to discount pension liabilities – a 20th century financial economics approach.

A proposed financial economics approach based on first principles

What follows is a proposed first step and possible second step of determining a discount rate based on the first principles of financial economics, rather than the 20th century financial economics approach. The two steps are:

- An expected cost calculation of the preliminary discount rate; and
- A possible adjustment based on the riskiness of the pension plan assets.

Expected cost calculation of the preliminary discount rate: The rationale behind this calculation begins with the equilibrium funding equation:

Contributions + Investment Income = Benefits + Expenses (1)

With no change in plan assets, this equation must hold, as the variables comprise the causes of plan asset increases and decreases. A snapshot version of this equation is:

Expected full liability (EFL) = Assets + PVFC + PVFE; (2)

Explaining the terms above: PVFC is the present value of future contributions introduced in the first section above, and PVFE is the present value of future expenses. Expected full liability, or EFL, is a term adapted from the term full economic liability (or FEL), coined by Burton Waring[3]. The phrase 'full liability' refers to the present value of all future benefits, including benefits for future hires. Waring's FEL discounts these cash flows at a risk-free rate, and is thus a 20th century financial economics concept. Expected full liability (EFL) uses a discount rate that is solved for by using the above equation.

The PVFE term in equation 2 implicitly assumes that expenses are paid from outside the plan. A simplification is to assume that annual expenses are paid from inside the plan from the current year's contribution (thus including the PVFE term in PVFC). In that case, the calculation of the right side of the equation just involves calculating PVFC.

PVFC is calculated via a forecast actuarial valuation, using the plan sponsor's current funding policy to project the contributions. The expected contributions are then discounted at the plan sponsor's borrowing rate. It may be the case that the plan sponsor's current funding policy may be insufficient to sustain the plan, and that the plan is forecasted to run out of assets at some point in the future (and become pay-as-you-go). At that point, the projected plan benefit payout becomes the projected contribution, if greater than the funding policy contribution.

It's useful to compare and contrast the PVFC calculation, with the GASB 67/68 calculation of a projected pension asset depletion date, which also seeks to project when a plan will become pay-as-you-go, and involves a plan sponsor borrowing rate:

- The GASB 67/68 projection is a deterministic projection, whereas the PVFC calculation is more accurate with the use of a set of stochastic forecasts, from which the mean is taken.
- All sponsor and employee contributions are discounted at the plan sponsor borrowing rate in the PVFC calculation, whereas the GASB 67/68 discount for a plan expected to run out of assets begins with an investment return discount rate (until the projected exhaustion date).
- The forecasts for the PVFC calculation include full new entrant liabilities, while the GASB 67/68 projection does not.

Despite these differences, and the fact that GASB 67/68 will not be used to budget contributions, the projection of an asset depletion date (if applicable) is a significant step that GASB made in improving public pension accounting.

Upon calculating PVFC (and PVFE if necessary), the preliminary discount rate is the rate used for EFL that makes equation 2 true.

Possible discount rate adjustment based on the riskiness of the plan assets: If the pension assets are risky, a further adjustment may be made in the form of a risk penalty; i.e., a reduction to the discount rate. Empirical research and the theoretical explanation of such findings have not yet been conducted yet.

Principles underlying the proposed approach

Having advertised the proposed approach as first principles-based, I feel obligated to list those principles, which I have boiled down to three:

1. In determining the value of a liability, a stakeholder first determines the expected cost of meeting the liability, and if there is risk associated with the plan for meeting the liability, he requires appropriate compensation for the risk. The magnitude of the compensation for risky assets should first be measured empirically, and then explained theoretically, rather than extrapolated from dogma.

As a sub-principle, in determining the expected cost of meeting the pension plan liabilities, the stakeholder will logically only associate expected investment returns with expected periods of investment.

2. The funding and investment policy for a pension plan are considered by stakeholders to be the similar to other long-term strategies of the plan sponsor, which form components of the plan sponsor's value. Therefore, the pension asset risk adjustment is well represented by that made by a long-term stakeholder; e.g., a buy-and-hold investor in the corporate plan sponsor, or a taxpayer or participant in a public pension plan.

Thus, even an investor with a two-day holding period will evaluate the risk of a company's pension investment strategy as a corporate strategy; i.e., on a long-term basis.

3. The discount rate used in calculating the plan's actuarial accrued liability, normal cost and present value of future benefits should not exceed the discount rate used to calculate the plan's expected full liability (EFL).

Public pension plan practical considerations

The chart below summarizes public pension plan practical concerns with the two contribution budgeting discount rate approaches stated in ASOP 27 Section 3.9 and the proposed first-principles financial economics approach, discussed further below:

Issue	Traditional: Expected Investment Return	20th Century Financial Economics	1st principles Financial Economics
Valuation of liabilities	Understates	Believed to overstate by many	Theoretically more correct than traditional
Valuation of plan amendments	Understates	May over- or understate	Theoretically more correct than traditional
Riskiness of plan investments	Does not address	Does not address	More research needed
Penalty for underfunding	Understates	Not relevant for public plans	Theoretically more correct than traditional

- The proposed approach (first step only) lies in between the traditional expected return approach and the 20th century financial economics approach; closer to the traditional approach for a plan that is well-funded, with a funding and investment policy designed to systematically pay off the plan's unfunded actuarial accrued liability. Because it is believed to overstate the cost (I share this belief), the 20th century financial economics approach has been rejected as a practical approach to budgeting contributions for public pension plans.
- In part due to the typical shared employer-employee funding paradigm of public pension plans, there is a constant pressure on plan sponsors to increase benefits, typically as the plan approaches funding adequacy. The benefit increase worsens the financial position of the plan, which is not fully recognized under the traditional approach. Under the proposed approach, not only do future benefit cashflows increase, the discount rate also decreases because the PVFC increases. Thus, the traditional approach understates the cost of benefit increases.
- Benefits can also be decreased, typically by creating a lower tier of benefits for new hires. Plan sponsors currently sometimes recognize a savings in this case by changing the cost method to an exotic method (e.g., the Ultimate Entry Age Normal Method); otherwise, no savings are recognized. Under the proposed method, a savings would be recognized (without a funding method change) due to an increase in the discount rate, due to a reduction in PVFC.
- If it were used for contribution budgeting, the 20th century financial economics approach might overstate the cost of a benefit increase (due to the baseline overstatement) or understate the cost, because the discount rate does not change.

- There has been a trend toward increasingly risky investments in public pension plans, as plan sponsors strive to justify the expected return assumptions used in the traditional method. Neither the traditional approach nor the 20th century financial economics approach offers any means of addressing this issue. More research is needed to develop an empirically-validated risk penalty adjustment.
- The worst underfunding of public pension plans can generally be blamed on the tendency of some plan sponsors to underfund the plan. This tendency is enabled by the traditional expected return approach, which calculates the plan actuarial accrued liability the same way whether it is 100% funded or 10% funded. The full cost of underfunding the plan is masked by the traditional approach.

Conclusion

I urge the Actuarial Standards Board to replace the 'expected investment return' approach in ASOP 27 Section 3.9(a) with the 'expected cost' approach to determining the discount rate – i.e., the first step in the proposed approach beginning on page 5 above. I believe this is a significant strengthening of the pension ASOPs that both sides of the pension funding debate can and should agree to. Alternatively, those who favor the status quo 'expected return' approach can explain why it is appropriate to use an expected investment return to discount over periods of non-investment. And, those who support the 20th century financial economics approach can present the empirical support for their position that is 33 years overdue.

Sincerely,

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[1] Source: http://data.worldbank.org/indicator/CM.MKT.TRNR

[2] Tepper, Irwin. 1981. "Taxation and Corporate Pension Policy." Journal of Finance, vol. 34, no. 1 (March) 1-13.

[3] Waring, Burton. 2012. "Pension Finance: Putting the Risks and Costs of Defined Benefit Plans under Your Control." Wiley Finance