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Comments on ASOP 27 Exposure Draft
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610-608-1578

Thank you for the opportunity to comment on **ASOP 27** for selecting economic assumptions for pension valuations. These assumptions, in particular expected returns used as discount rates are of vital importance to our profession, plan sponsors, trustees, and most importantly the members of a pension plan whose financial security depends on the pensions they have been promised. Unfortunately, due to pressures on plan sponsors and actuarial and investment professionals, the practice in this area is aggressive and inappropriate support is being found for expected return assumptions that are too high. This puts benefit promises in jeopardy.

Methods for determining future returns have evolved significantly over the past decade and most actuaries and many investment professionals are simply not aware of the methods that are available or of the typical results that up-to-date methods will produce. Actuaries often rely on investment professionals to determine expected returns without being able to critically evaluate the investment professional's work, which may lack rigor or be biased.

The ASOP could facilitate more appropriate practice by emphasizing and clarifying two related aspects of setting and using expected returns as discount rates:

- The impact of prices and yields on expected returns, by period
- The application of return expectations to the specific cash flows for a pension plan

Both of these items have grown in importance for our profession in recent years because of the new methods being used to forecast returns and because of the maturity of pension plan populations, i.e. the shortening of the duration or cash flow time horizon. This is explained in more detail in my comments on section 3.8.4

3.8.4

The language in the ASOP includes the appropriate considerations, but many actuaries will not understand the significance of some of the factors included. For instance, the idea that the assumed market appreciation in one period should impact the assumed return in the next period is probably not commonly understood within the profession. This idea is particularly important today when potential changes in equity P/E ratios are a significant factor in an equity return forecast. It is especially important because the horizon over which the discount rate is applied is becoming shorter for most pension plans. Some forecasters include little or no decrease in P/E's and should therefore have a lower assumed return in the subsequent period than if they did assume a decrease in P/E's. This aspect of a forecast is vital for understanding the relationship between a 10-year forecast and a longer-term forecast. I believe that most actuaries are not aware of this concept enough to ask about it or analyze it when looking at the expected return provided by an investment professional. Of course, this idea of price changes impacting the expected returns in subsequent periods is common to virtually all financial assets.

Actuaries generally use an expected return for a 20-year period or longer with no explicit consideration of the actual time horizon for the plan. This provides results that can be quite different from applying expected returns identified for each period (e.g. for 0-10 years, 10-20 years, 20-30 years, etc.) to the cash flows expected in those periods. Since the intent of the discounting process is to calculate the discounted value of the cash flows, select and ultimate rates (even if converted to a single equivalent rate) are appropriate when the return expectation is different for different periods. Note that most forecasters have different return expectations for different periods, and therefore select and ultimate rates would almost always be appropriate (even if converted to a single equivalent rate for disclosure). For most plan valuations where expected returns are used for discounting it makes sense to apply the different rates to the benefit payment (PVB) cash flows.

The two concerns above are closely related, and they should be considered carefully and applied appropriately in every valuation that uses an expected return discount rate. It would make sense for the ASOP to elevate these considerations to something that would always be considered or applied in developing or evaluating an expected return. The use of a single equivalent rate may work fine, but the evaluation of the return assumption should consider the time frame and the underlying assumption about the development of prices and yields (price is inverse of yield) over the time frame associated with the liability cash flows.

The ASOP could say directly that when the relevant return forecast is for different levels of return during different time periods that the returns during each period should we weighted by the expected benefit payments from the plan.

3.8.1

I cannot think of a situation where historical plan return performance would be a relevant input into a process for determining a return expectation. The plan's performance is completely irrelevant and the only historical information that is relevant is for factors such as yields, growth, inflation, etc. and the relationship of those factors to returns – not the returns themselves. Even if there is some way that it is helpful, I think including this on the list of key data is misleading because in the past there was a substantial reliance on historical return information and continuance of this approach is leading to bad and outdated practice today.

Arithmetic v. Geometric

The pension committee may already have spent a lot of time on this topic, but the issue has become quite confused when it should be straightforward. Conference presentations and practice notes on this topic go to great lengths to allow for the potential use of arithmetic returns as discount rates. The arguments against this on both conceptual and practical grounds are very strong and there seems to be no reason to allow for arithmetic returns to be used as discount rates. The ASOP should directly discourage the use of arithmetic return information for discounting. On both conceptual and practical grounds, it is inappropriate.

Arithmetic returns are the appropriate input into a stochastic process where they will be applied together with volatility to generate a result that is equivalent to applying a single, fixed geometric return. Because the discounting process for an actuarial valuation does not include volatility, applying arithmetic returns as a discount rate will provide an answer that is too low. Some argue that compounding an arithmetic return provides the mean value on a dollar basis, but this number is essentially meaningless for a geometric process like return compounding (or discounting). After many years of compounding an arithmetic return without volatility the value becomes unreasonably high and provides little useful information (see link below).

The idea that an actuarial assumption should produce a "best estimate" without bias on one side or the other has caused confusion here. The standard of expecting zero dollar gain or loss (an arithmetic concept) is not a useful standard for a geometric process, especially when the results are compounded over long time periods. When actuaries interpret this standard to apply on a dollar basis, rather than a percent basis, confusion is created by applying an arithmetic standard (equal dollars on either side of the estimate) to a geometric process. The standard could state clearly that expected arithmetic returns are not appropriate for discounting.

The confusion on this topic is also unnecessary since few actuaries or investment professionals are actually using weighted averages of arithmetic returns as discount rates, so there is no significant actual practice to accommodate in this area.

Appendix 2

Appendix 2 is incomplete and confusing. The correct discount rate for a pension valuation based on this distribution of returns is 14.02% (the geometric average of 0% and 30% returns). Applying 14.02% or 0% and 30% (half of the time each) will provide the same answer. Thus the number 14.02% applied as a consistent unchanging number is the correct discount rate. The number 14.51% is not relevant for any purpose. It is the arithmetic average of the results from a geometric process and as such is a bit of an odd duck. While this number (the arithmetic average of geometric return averages from stochastic scenarios) is commonly plucked from a stochastic modeling exercise as a discount rate, this is just a sloppy process that makes no material difference over the periods for which these modeling exercises are performed (10+ years). The best number (that corresponds to 14.02% for the example in Appendix 2) is the median result which is immaterially different from the mean over periods longer than a few years. It is also very close to the geometric average of the geometric return averages from the scenarios, which can also be determined from a stochastic modeling exercise. The median of the information provided in Appendix 2 is 14.02%.

Note that compounding 15% returns over 100 years gives a result that is almost 2.5 times higher than compounding 14% returns. The probability of the actual end result being greater than or equal to the result from compounding a 15% return is about 25%. The probability of the end result being greater than 14.02% is about 50%.

It may make sense to remove Appendix 2 to avoid the confusion to which it seems to be contributing.

Here's a website on the topic of geometric and arithmetic means.

http://standardwisdom.com/softwarejournal/2012/01/defining-the-center-arithmetic-mean-geometric-mean/

Demonstration of possible estimates of the geometric mean

The table below shows calculations over four years similar to the two-year demonstration in Appendix 2. The median of returns or the geometric mean of geometric returns (both in italics) are good estimates of the geometric return which is the parameter that is to be estimated. The arithmetic average of geometric returns (referred to as the "forward looking expected geometric return" in Appendix 2) will only be a reasonable estimator over longer periods, but it is flawed conceptually and should be ignored, except perhaps to acknowledge that it may be used as a reasonable estimate of the geometric return over periods longer than 10 years. In the table below that number is 14.26% corresponding to the two-year number of 14.51% in Appendix 2.

					arithmetic average of geometric	arithmetic	geometric
				mean	**14.26%**	**15.00%**	***14.02%***
				median	***14.02%***	**15.00%**	**14.02%**
Year 1	Year 2	Year 3	Year 4				
30	30	30	30		30.00%	30.00%	130.00%
30	30	30	0		21.75%	22.50%	121.75%
30	30	0	30		21.75%	22.50%	121.75%
30	30	0	0		14.02%	15.00%	114.02%
30	0	30	30		21.75%	22.50%	121.75%
30	0	30	0		14.02%	15.00%	114.02%
30	0	0	30		14.02%	15.00%	114.02%
30	0	0	0		6.78%	7.50%	106.78%
0	30	30	30		21.75%	22.50%	121.75%
0	30	30	0		14.02%	15.00%	114.02%
0	30	0	30		14.02%	15.00%	114.02%
0	30	0	0		6.78%	7.50%	106.78%
0	0	30	30		14.02%	15.00%	114.02%
0	0	30	0		6.78%	7.50%	106.78%
0	0	0	30		6.78%	7.50%	106.78%
0	0	0	0		0.00%	0.00%	100.00%

If the distribution (30%/0%) represents the expected distribution of returns then a $1,000 payment in four years has a present value of $592, using 14.02% as the discount rate (ignoring the potential for other less risky returns). The result $572 (using 15%) is not valid because the volatility in the distribution is not part of the calculation. The result $587 (using 14.26%) is not as good an estimate as the estimate obtained using the median result.