

Should Bond Yields and Asset Returns be Smoothed?



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In my September 7, 2009, and October 26, 2009, articles in *ING Investment Weekly*, I discussed the importance of linking the discount rate method (i.e., pension plan sponsors must choose between a one-month average of A-Aaa rated corporate bond yields or a 24-month average of these same yields, under the Pension Protection Act of 2006) with the asset valuation method in order to reduce funded-status volatility.

In this article, I am comparing the range of funded-status outcomes over a five-year time period based on 10,000 economic scenarios for two basic policy sets. The policy sets, which are described in the table below, represent choices that many plan sponsors are considering right now. Policy set #1 combines smoothed asset and liability values with short-duration bonds; policy set #2 combines minimally smoothed asset and liability values with long-duration bonds. Each policy set is modeled for three asset allocations with varying levels of equity exposure (50%, 60% and 70%), resulting in six distinct policy combinations. The contribution strategy was set at \$8 million per year for each.

		Asset Allocation					Liability Definition	Asset Smoothing
		U.S. Equity – All Cap	Non-U.S. Equity – Developed Markets	Core Fixed Income	20-Year Treasury Bonds	Long Corporate Bonds		
Policy Set #1 - A	50% Eq / 50% FI - Dur 4.5	37.5%	12.5%	50%	0%	0%	24-Mth Avg of A-Aaa Rated Corp Bond Yields	Yes: over 3 years subject to 90-110% MV corridor
Policy Set #2 - A	50% Eq / 50% FI - Dur 13.2	37.5%	12.5%	0%	25%	25%	1-Mth Avg of A-Aaa Rated Corp Bond Yields	No; use MV
Policy Set #1 - B	60% Eq / 40% FI - Dur 4.5	45%	15%	40%	0%	0%	24-Mth Avg of A-Aaa Rated Corp Bond Yields	Yes: over 3 years subject to 90-110% MV corridor
Policy Set #2 - B	60% Eq / 40% FI - Dur 13.2	45%	15%	0%	20%	20%	1-Mth Avg of A-Aaa Rated Corp Bond Yields	No; use MV
Policy Set #1 - C	70% Eq / 30% FI - Dur 4.5	52.5%	17.5%	30%	0%	0%	24-Mth Avg of A-Aaa Rated Corp Bond Yields	Yes: over 3 years subject to 90-110% MV corridor
Policy Set #2 - C	70% Eq / 30% FI - Dur 13.2	52.5%	17.5%	0%	15%	15%	1-Mth Avg of A-Aaa Rated Corp Bond Yields	No; use MV

Source: *ING Investment Management*

Note: MV = market value

The next table shows the starting values used for the forecasts under each policy set. Note that the funded status is currently 100% under policy set #1 (with smoothing) but only 81% under policy set #2 (with minimal smoothing) because the discount rate under policy set #1 is 6.65% as opposed to 5.76% under policy set #2.

	Policy Set #1	Policy Set #2
Assets (millions)	\$143.2	\$130.4
Funding Target Liability (millions)	\$143.0	\$160.4
Funded Status – \$ (millions)	\$0.2	(\$30.0)
Funded Status – %	100%	81%
Target Normal Cost (millions)	\$3.24	\$3.79
Effective Discount Rate*	6.65%	5.76%
Duration of Liability	12.6	13.5
Expected Annual Liability Growth Rate**		
a. Discount Rate	6.65%	5.76%
b. Funding Target Normal Cost as % of Liability	2.26%	2.36%
c. Impact of the Assumed Change in the Discount Rate		
During 5-Year Projection Period***	0.94%	-1.52%
Total = (1 + a) × (1 + b) × (1 + c) - 1	10.09%	6.62%

* The effective discount rates are based on interest rates published by the IRS for pension plans with a November 1, 2010, valuation date.

** Assumes a constant number of active participants with a stable average age over the projection period.

*** 30-year Treasury yields assumed to increase by 0.85% in average over the next five years. 30-year Aa-rated corporate bond spreads assumed to decrease by 0.22% in average over the next five years.

Source: ING Investment Management

Next come the capital market assumptions used in this analysis.

	Standard Expected Deviation of Returns Returns Duration			Correlations				
				U.S. Equity – All Cap	Non-U.S. Equity – Developed Markets	Core Fixed Income	20-Year Treasury Bonds	Long Corporate & High-Quality Bonds
U.S. Equity – All Cap	8.76%	16.51%	N/A	1.00				
Non-U.S. Equity – Developed Markets	8.89%	18.72%	N/A	0.67	1.00			
Core Fixed Income	2.53%	4.94%	4.45	0.25	0.22	1.00		
20-Year Treasury Bonds	1.89%	12.27%	13.99	0.27	0.21	0.89	1.00	
Long Corporate Bonds	3.77%	12.68%	12.34	0.37	0.34	0.80	0.84	1.00
Plan's Liability (24-Mth Avg of A-Aaa Bond Yields)	10.09%	7.94%	12.65	0.09	0.08	0.07	0.16	0.24
Plan's Liability (1-Mth Avg of A-Aaa Bond Yields)	6.62%	14.54%	13.52	0.37	0.34	0.80	0.84	0.998

Source: Towers Perrin, ING Investment Management

As you can see from the table above, as expected, the liability under the 24-month-average method is much less volatile than under the one-month-average method (7.94% vs. 14.54%). However, that liability is expected to grow at a much higher rate (10.09% vs. 6.62%) over the forecast period. This is because the current level of A-Aaa yields is lower than their 24-month average, and the model expects the 24-month average to decline over the forecast period as the high corporate bond yield environment of 2008 disappears from the averaging period. Note also that the asset class returns are better correlated with the liability growth rates under the one-month average method versus the other liability definition because asset class returns are not smoothed in the calculation of those correlations.

The final table contains the range of funded-status outcomes projected to January 1, 2015, under each policy set based on 10,000 potential economic scenarios. Note that the "95th percentile outcome" means that 9,500 out of the 10,000 scenarios produced a lower outcome. The "average" outcome is the average of the 10,000 funded status outcomes five years from now.

		Funded Status as of 1/1/2015 (\$ millions & %)					Portfolio Statistics	
		5th Percentile ("Very Bad")	10th Percentile	20th Percentile	Average	95th Percentile ("Very Good")	Average Annual Portfolio Return	Standard Deviation of Portfolio Returns
Policy Set #1 - A	50% Eq / 50% FI - Dur 4.5	(\$69.0)	(\$55.4)	(\$39.2)	(\$11.0)	\$42.6	5.98%	10.2%
Policy Set #2 - A	50% Eq / 50% FI - Dur 13.2	(\$49.7)	(\$37.0)	(\$23.2)	\$1.1	\$49.2	6.17%	13.1%
Difference – #2 Minus #1		\$19.3	\$18.4	\$16.0	\$12.1	\$6.5		
Policy Set #1 - A	50% Eq / 50% FI - Dur 4.5	70.5%	75.4%	81.4%	96.7%	128.6%		
Policy Set #2 - A	50% Eq / 50% FI - Dur 13.2	77.6%	81.9%	88.1%	102.7%	132.8%		
Difference – #2 Minus #1		7.1%	6.5%	6.7%	6.0%	4.2%		
Policy Set #1 - B	60% Eq / 40% FI - Dur 4.5	(\$67.3)	(\$53.1)	(\$36.4)	(\$6.0)	\$52.9	6.61%	11.7%
Policy Set #2 - B	60% Eq / 40% FI - Dur 13.2	(\$51.3)	(\$37.6)	(\$21.9)	\$6.7	\$63.8	6.77%	13.8%
Difference – #2 Minus #1		\$16.0	\$15.4	\$14.5	\$12.7	\$10.8		
Policy Set #1 - B	60% Eq / 40% FI - Dur 4.5	70.6%	76.1%	82.4%	99.3%	134.8%		
Policy Set #2 - B	60% Eq / 40% FI - Dur 13.2	76.5%	81.6%	88.6%	106.0%	142.2%		
Difference – #2 Minus #1		5.9%	5.5%	6.2%	6.7%	7.4%		
Policy Set #1 - C	70% Eq / 30% FI - Dur 4.5	(\$66.5)	(\$51.3)	(\$34.2)	(\$0.9)	\$64.6	7.22%	13.3%
Policy Set #2 - C	70% Eq / 30% FI - Dur 13.2	(\$53.8)	(\$38.7)	(\$20.9)	\$12.3	\$78.7	7.34%	14.7%
Difference – #2 Minus #1		\$12.7	\$12.6	\$13.3	\$13.2	\$14.2		
Policy Set #1 - C	70% Eq / 30% FI - Dur 4.5	70.3%	76.3%	83.4%	102.0%	141.2%		
Policy Set #2 - C	70% Eq / 30% FI - Dur 13.2	74.8%	81.0%	89.0%	109.3%	152.0%		
Difference – #2 Minus #1		4.5%	4.7%	5.6%	7.3%	10.8%		

As can be seen from the results shown in the above table, policy set #2 (minimal smoothing) produces better funded status outcomes than policy set #1 (smoothing).

- This is true for the three equity allocations — 50%, 60% and 70% — included in the analysis.
- The lower the equity allocation, the greater the improvement in very bad outcomes (i.e., 5th percentile).
- The lower the equity allocation, the lesser the improvement in very good outcomes (i.e., 95th percentile).
- As discussed in my October 26 article, taking into account that the smoothed asset value must be within $\pm 10\%$ of the market value of assets by law under policy set #1, the correlation between the changes in asset and liability values due to interest rate movements is reduced significantly. This is one of the reasons why policy set #1 is inefficient.
- Note also that the funded-status outcomes five years from now are better under policy set #2 despite the fact that its funded status was 19% lower than under policy #1 at the start of the forecast. As mentioned before, the current discount rate under policy set #1 is artificially high because it reflects the high corporate bond yield environment of 2008 and is therefore expected to fall over the next several months.

As a result, it makes more sense for a plan sponsor to implement the discount rate method, asset valuation method and fixed income duration target from policy set #2 given current market conditions. For sponsors who are trying to match their liabilities as tightly as possible, it is even more important to do so. Quantifying the financial implications of possible policy choices in order to establish well-coordinated pension policies is critical for all plan sponsors that want to avoid bad surprises in the future. ■

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