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THE IMPACT OF BOND DEFAULT RISK ON RETIREMENT BENEFIT OBLIGATIONS

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Retirement benefits are subject to a variety of risks that must be considered when planning for the future. As actuaries, we evaluate the likelihood of future events. That evaluation sets us apart from other financial professionals. We combine the present value calculation with the likelihood of payment to determine actuarial present value. But are we accounting for all the risks to retirement benefits?

While this is not standard actuarial practice, it may be time to consider how uncertain bond cash flows are used to develop the discount rate assumption. A comparison to mortality is useful. Even though the chance of death for healthy young employees is very low, reasonable mortality is assumed rather than dismissed as immaterial. This is consistent with our actuarial standards that require a best estimate for each assumption.

Since we take other risks into account, why don't actuaries consider default risk in a bond match? Just as there is a chance that a retiree will not live to receive a retirement benefit 20 years from now, the bond purchased to fund that benefit may not pay its full face value. The following table illustrates parallel risks on both sides of a retirement plan cash flow match.

In this example, the chance of default is considered as part of the yield to maturity for the bond, so a default adjusted discount rate is used rather than the market yield of 5.21 percent. This is because the market price of a bond includes provision for the default risk. In other words, part of the market yield compensates the investor for defaults that are inevitable on a large portfolio. When using this approach, a gain will result when fewer than expected defaults occur between measurement dates. Losses result when more defaults than expected occur.

US GAAP accounting requires actuaries to value an obligation based on high-quality

ASSET/LIABILITY CASH FLOW MATCH			
	Liability		Asset
Retiree payment due in 20 years	\$1,200	20-year bond face value ¹	\$1,000
Probability of survival	80%	Probability of payment ²	96%
Expected payment cash flow	\$960	Expected bond cash flow	\$960
Default adjusted discount rate	5.0%	Default adjusted discount rate	5.0%
Interest rate/discount factor	0.377	Interest rate/discount factor	0.377
Present value — pension payment	\$362	Market value of bond	\$362
¹ Select zero coupon AA bond, \$1,000 face value payable in 20 years and market value of \$362 (yield of 5.21%).			
² Probability estimate assumes 25% of a hypothetical 91 bps yield spread over AAA bonds is related to default risk.			

bonds that could be purchased to effectively settle the obligation. The Securities and Exchange Commission's guidance is that bonds with one of the two highest ratings by a recognized ratings agency should be considered high-quality. This keeps the risk of default low in the short term, but cash flows for actuarial valuations are projected decades into the future. Accordingly, shouldn't we estimate the risk that these bonds may default or be downgraded? The adjustment may be small, but without it, an obligation based on matching projected cash flows to high-quality bonds will only effectively settle the obligation in a world with no risk of the bonds defaulting. Since actuaries specialize in assigning probability to contingent events based on past experience, we are uniquely qualified to study the historical rates of default or downgrade for bonds used to develop retirement discount curves.

RELEVANT LITERATURE

Relevant actuarial and accounting literature does not proscribe the use of a default assumption, but some references support this approach.

1. **Society of Actuaries resources.** The Society of Actuaries (SOA) has repub-



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lished an article on SOA.org dedicated to understanding and using bond yield curves. “Understanding the Corporate Bond Yield Curve,” by Hofling, Keisel and Loffler, recommends accounting for default risk in valuing liabilities.

Since the SOA posted this article alongside the Citigroup Pension Discount Curve (CPDC), some actuaries might incorrectly assume that the CPDC has been adjusted to reflect default risk. However, the SOA was not involved in making the CPDC, and the CPDC designers did not contribute to the article. Martin Bernstein, the Citigroup contact for the CPDC, confirmed that no adjustment has been made for default risk. Consequently, actuaries need to determine any appropriate adjustment for default risk.

2. **Accounting literature.** Accounting Standards Codification (ASC) 715 provides helpful definitions to describe the amount needed to effectively settle the obligation. The Discount Rate definition references the Actuarial Present Value definition, which includes both the time value of money and the probability of payment. The discount rate should not be used in isolation without considering probability of payment. Furthermore, ASC 715-35-44 states:

The objective of selecting assumed discount rates using that method is to measure the single amount that, if invested at the measurement date in a portfolio of high-quality debt instruments, would provide the necessary future cash flows to pay the pension benefits when due.

Unless the risk-free treasury curve is used, expected bond payments will fall short of face amounts in aggregate. The only way to have expected bond payments equal the projected benefit pay-

ments, on average, is to take expected default rates into account.

Taking the risk of default into account by purchasing additional bonds to make up for the expected loss from defaults is analogous to using a lower discount when calculating the present value of the plan cash flows.

The accounting literature references rates implicit in annuity contracts that could be used to effect settlement of the obligation, but it then points directly to high-quality bond yields which allows plan sponsors to avoid incorporating the insurer risk/profit premium into their obligation. As a result, plan sponsors are effectively their own insurer and bear the risk that defaults may be higher or lower than expected.

3. **American Academy of Actuaries practice notes.** Actuaries in other practice areas are accounting for default risk in their projections. The public policy practice note, Market Consistent Embedded Values, specifies that default risk should be taken into account when matching asset cash flows to benefit payments.

PRACTICAL IMPLICATIONS

As a practical matter, high-quality bond defaults are infrequent. Losses related to default risk occur most often when a bond is downgraded between valuations. If all other assumptions were met perfectly, the bond will still match the projected cash flows. However, assuming the market price included the probability of an impending downgrade, the bond will be likely replaced by a lower-yielding AA-rated bond, resulting in a liability loss.

The SOA website explains that a similar event occurred in June 2012. The yield of the Citigroup Pension Liability Index (CPLI) dropped by 0.20 percent be-

cause bonds issued by five banks were downgraded and removed from the CPLI.

What can actuaries do to balance the risk of gains and losses? One approach might be to select the highest-quality bonds among those in the AA rating class such that the risk of a downgrade to an A rating is offset by the risk of an upgrade to an AAA rating. This approach would minimize losses from downgrades or defaults, but may not completely eliminate them.

Another idea would be to develop an assumption for the portion of the yield curve's spread over the risk-free rate that is applicable to default risk and back it out. This leaves intact the portions of the spread attributable to other factors such as the liquidity premium and the default risk premium.

The consideration of bond default risk on retirement benefit obligations may offer a possible area for improvement in pension and retiree medical actuarial practice. Moving forward, those with deeper expertise may examine it further and propose solutions. ■

The views expressed are those of the author and do not necessarily reflect the views of Ernst & Young LLP.