



Comments on the Proposed Principle-Based Reserves and Principle-Based Capital Requirements Methodology

By David V. Smith

The currently proposed principle-based capital and reserve methodologies devolved from the Unified Valuation System (UVS) proposal. UVS sought to determine the level of assets required by a company to remain solvent at a given level of tail risk. The original UVS incorporated all of the material obligations of an insurance company for the full duration of those obligations. The current principle-based approach (PBA) is limited to certain life and annuity products and only stochastically varies the interest rates and other dependent variables such as lapse and policyholder behavior. The current PBA approach cannot directly quantify the probability of insolvency due to the limited breadth of the products covered and the limited variables that are stochastically tested.

This article will view the principle-based methodologies largely from a future perspective, in which aspects of a company are considered on both a capital and reserve basis. It will attempt to identify some inconsistencies in the proposed approach, and present some simpler and more consistent alternatives.

The following aspects of principle-based capital and reserve methodologies will be reviewed:

1. The use of value at risk (VAR) rather than conditional tail expectation (CTE).
2. The discount rate of 105 percent of the scenario-specific after-tax one-year Treasury rate for capital requirements and a before-tax rate for principle-based reserves (PBR).
3. Whether PBR adds any value from the regulator's perspective or the insurer's perspective.
4. Should regulators use VAR levels rather than risk based capital (RBC) levels to determine regulatory action levels?

5. Whether to include multivariate stochastic analysis for the major independent variables in cash flow projections. In other words, stochastically model not just interest and equity returns but mortality, morbidity, lapses and other pertinent policyholder behavior. Some of these may be made functions of one another.

For the purpose of this discussion, certain assumptions have been made. Full principle-based capital and reserve methodologies have been implemented for all products of a company. Total assets required (TAR), which must be sustained in order to avoid state control are at CTE(90). PBRs are calculated at CTE(70).

To calculate TAR using the PBA approach for principle-based capital, accumulated cash flows are projected. This calculation is done on an after-tax basis using anticipated experience assumptions with added margins for all non-stochastically modeled variables. It also uses one of the stochastically generated investment yield scenarios. Any accumulated cash flow deficiencies within a given economic scenario are discounted back to the valuation date. The greatest present value of the deficiencies is the scenario TAR. This scenario TAR is stored, and another scenario TAR is generated and stored. This process is repeated for each investment yield scenario. The scenario TARs are ordered from smallest to largest. The CTE(90) is the average of the largest 10 percent of the scenario TARs. Currently, the CTE(90) is used as the measure to determine the minimum PBA capital TAR. The CTE(70) is used as the minimum reserve under PBR. This value is calculated similarly to the TAR for capital; but on a before-tax basis and using different margins. The largest 30 percent of the calculated amounts are averaged; this is the CTE (70) PBR.

The use of an after-tax calculation for capital TAR is necessary to incorporate all future cash flows. The reason is that for a company to remain solvent, the existing assets must cover any future operating deficiencies including tax expenditures. The pretax nature of PBA reserves is logical in that taxes are calculated using tax reserves, and tax reserves must relate to PBA reserves in that tax reserves must be less than or equal to PBA reserves. Likewise, tax reserves must be greater than or equal to any cash values. Using pretax reserves would be double-counting the effect of taxes. A more rigorous explanation of this topic is in an article by Ed Robbins in the February 2008 issue of *TAXING TIMES* (Volume 4, Issue 1).

The use of the CTE blurs the meaning of the TAR assets associated with it because of the distribution of the tail assets and the possibility of some extreme outlier TARs in the last few scenarios. Including these outliers in the TAR calculation makes little sense because there is no possibility of having enough assets to account for them or even a small percentage of them if they are too large.

Value at risk (VAR) is the scenario TAR value that would approximate the amount of assets required to limit the probability of insolvency to a given percentage, in this case about 5 percent. An alternative and perhaps improved metric is to use an approximate 95 percent VAR calculated by averaging all TARs between and including 94 to 96 percent. This approximate 95 percent VAR would remove much of the variability that would result from using a single TAR for the 95 percent VAR.

An alternative to the use of the CTE(90) measure for TAR would be the approximate 95 percent VAR described above. This method of calculating the VAR would eliminate the noise that may result from using a single number. The use of a VAR measurement has the advantage of quantifying the asset associated with a given probability of bankruptcy.

Currently, RBC-based action levels are determined by the multiples of authorized control level of RBC maintained by the company. A consistent approach under a principle-based capital methodology would be to set regulatory action levels based on VAR TAR measures, such as 95 percent VAR for a no action level and corresponding VAR TAR metrics.

The original methodology used to calculate the scenario TAR was an iterative approach. Because of the intensive calculations required to do the stochastic projections, the current approach was proposed. This approach begins the cash flow projection with a given amount of starting assets, then subtracts from that value the smallest discounted value of any accumulated asset values at the end of each projection year. If this value is calculated by discounting the year-end asset values at 105 percent of the one-year Treasury rate for each year of the scenario and subtracting the minimum value from the starting assets, then this value becomes the TAR for this scenario. This calculation is done only once per scenario, and the amount of the resulting TAR is significantly influenced by the starting value.

A more theoretically correct TAR may be calculated by an alternate method of starting with a beginning asset large enough that there are no future negative accumulated cash flows, then discounting the minimum assets at the net earned after-tax interest rate path, rather than 105 percent of the Treasury rate for the scenario duration. Subtract this discounted value from the starting assets; that is the scenario TAR.

“The use of the CTE blurs the meaning of the TAR assets associated with it because of the distribution of the tail assets. . . .”

The TAR under PBA capital is the minimum amount of assets the company must possess to continue to operate without state supervision. In other words, any assets above the amount of the TAR are eligible to be distributed as a corporate dividend, subject to state dividend restrictions. The

same cannot be said about assets in excess of the PBA reserve, or factor-based statutory reserves for that matter. Assets in excess of reserves calculated on any basis, whether PBR or statutory, but less than TAR, may not be distributed as dividends. The capital requirements are unchanged, regardless of the level or method of calculation of reserves, except to the extent reserves affect policyholder dividends, or to the extent that a corresponding change in tax reserves affects the company’s operating results due to the change in the level of federal income tax. Tax reserves also determine the qualification of an insurance company as a life insurance company for federal income tax purposes.

There is value added for regulators and management in using a PBA to capital requirements. This value results from being able to quantify the amount of assets needed to ensure

Continued on **page 16**

solvency for a given scenario or grouping of scenarios, and being able to associate a probability of default with a given level of assets. This allows management to design investment strategies to mitigate unfavorable results of a scenario. It also allows regulators a more effective yardstick to measure a company's financial strength and the overall default risk of a company. No further benefit is derived by calculating reserves on a principle-based methodology. The use of PBR merely creates more expense for the company. In addition, the IRS has concerns about the level of tax reserves that will be calculated under the PBA approach. Additionally, from the insurance company's viewpoint, if PBA reduces reserves,

this will result in increased federal taxable income and increased income tax expense for the company.

Currently, only interest and equity returns are stochastically modeled. This limits the variability of the TAR, which may not be captured by an increased load on other variables. Stochastically modeling any variable with significant variability will capture these variances in the TAR calculation, and enhance the value of the principle-based analysis. ●

Copyright David V. Smith 2010



David V. Smith, FSA, MAAA, CERA, CLU, FLMI, is vice president and chief actuary at National Teachers Associates in Addison, Tex. He can be reached at david.smith@ntalife.com.

SOCIETY OF ACTUARIES

CPD STANDARD COMPLIANCE

It's 2010, the second year of the 2009-2010 SOA CPD Requirement cycle. Here are three simple steps to keep you on track.

1-2-3

- STEP 1:** Know your CPD compliance path.
- STEP 2:** Track and earn CPD credits.
- STEP 3:** Attest at year-end.

Visit SOA.org for more information on Continuing Professional Development.