



AMERICAN ACADEMY *of* ACTUARIES

**Response to Society of Actuaries' "Analysis of Proposed Principle-Based Approach"  
From the American Academy of Actuaries' Life Reserves Work Group**

**Presented to the National Association of Insurance Commissioners'  
Life and Health Actuarial Task Force**

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Per a request from the Life and Health Actuarial Task Force (LHATF) at the NAIC Winter 2009 National Meeting, this document provides commentary by the Life Reserves Work Group (LRWG) on the Sept 24, 2009, report entitled “Analysis of Proposed Principle-Based Approach” (SOA Report) prepared by Milliman, Inc., for the Society of Actuaries. The comments have been structured such that they are first provided on key observations made in the Executive Summary, along with any other general comments, then specifically on the observations for each product category.

## **Key Observations / General Comments**

In general, we agree with the key observations contained in the SOA report.

We agree that the cash value (CV) floor requirement has a material impact on all products tested, including term. For all products it is assumed that the CV floor is defined as the greater of zero and the actual cash value.

There is a wide range of reserve outcomes when using a principle-based approach versus meeting current statutory minimum requirements. We agree with the factors identified that influence this range, however:

- Greater clarification on the level/direction of margins on risk factors may be warranted.
- Competitiveness/significance of guarantee is also driving reserve.

The stochastic exclusion test (SET) will not predict whether a stochastic excess will result, but rather will identify situations where there is at least a certain degree of variation in the stochastic results. To reiterate, if the SET is passed, then the modified deterministic reserve will be held as the VM-20 reserve, whereas if the SET is failed, then the stochastic reserve will be held as the VM-20 reserve. In order to illustrate the operation of the Modified Deterministic Reserve and the Stochastic Reserve and enable comparison between the two, the study has included both reserves for each product regardless of the status of the SET. The relationship between these two values is referenced in the universal life (UL) section below and for this purpose the term Excess Stochastic Reserve has been used to describe the excess of the stochastic reserve over the modified deterministic reserve. The LRWG made the following observations regarding the SET:

- How products are grouped together for reserve calculation purposes could allow a block to be introduced that wouldn't pass the SET on its own, but when combined with other blocks might not require stochastic reserves.
- The degree of variation in the stochastic reserve is dependent in part on the assets that have been allocated to support the block of business. Therefore, the SET can also be thought of as a test of the appropriateness of the allocated assets to support the liability cash flows for the block of business.
- The products that failed the stochastic exclusion test are those that the test was intended to flag, including UL with aggressive secondary guarantees and term insurance with a

level premium period exceeding 20 years. These results seem to validate the 4% pass mark that was set for the SET.

- The report indicated that some blocks that passed the SET could have had slightly higher minimum reserves if full stochastic calculations had been required. However, the difference in those cases was small, indicating that the SET was successful in identifying blocks where full stochastic calculations would not result in a materially higher minimum reserve.
- The magnitude of the stochastic reserve is heavily influenced by the composition of the starting assets and the reinvestment strategy. There seems to be significant variation between companies.
- In only two of the products tested did the stochastic reserve exceed the modified deterministic reserve, but the products passed the SET (products T2 and WL1). The excess was 1.6% for the whole life product, but 6% for the term product, which is larger than what we would expect.
- Extensive runtime was required, necessitating some type of grid/distributed processing.

The results in the report indicate that the effect of modeling YRT reinsurance cash flows within a principle-based regime can produce a difference in the resulting VM-20 reserves compared to reserves net of reinsurance under current statutory rules. Based on the products modeled, the reinsurance credit under VM-20 has been shown to be greater than the corresponding statutory reinsurance credit. The study also notes that the NAIC's position on reinsurance within VM-20 and specifically the reinsurance reserve credit was not settled at the time of the study.

### **Term Insurance**

In general, we agree with the observations in the report.

For term, PBR reserves are significantly lower than statutory.

The cash surrender value (CSV) floor has a big impact on deterministic reserve for term life products. Without the floor, half of the term products studied have a negative reserve when all business is aggregated.

We agree with the observation made in the report that for a competitively priced block, the CV floor has little impact, but for a less competitive block, the floor is significant. The T-2 product passes the SET, yet produces a stochastic excess, which has been calculated for informational purposes only. While these excess reserves might not be considered material, the report does not make it clear why they are produced when compared to other products that also pass the SET, but do not produce any stochastic reserves.

For term products, the VM-20 YRT reinsurance reserve credit exceeds the normal statutory reinsurance credit in some cases by a wide margin. This has been attributed to the present value

nature of the deterministic reserve taking account of future reinsurance benefits and premiums (i.e., beyond the current year).

### **Universal Life (UL) Insurance**

In general, we agree with the observations in the report.

We agree that the deterministic reserve is significantly influenced by the CV floor.

Of the UL blocks that failed the SET, stochastic reserves ended up not being used anyway since the deterministic reserves were in excess of the stochastic reserves for these blocks.

Investment/reinvestment strategies will affect the level of stochastic reserves. For example, a reinvestment strategy that is extremely mismatched to liability cash flows will produce high stochastic reserves.

Only one block produced an excess stochastic reserve (i.e., a stochastic reserve higher than the modified deterministic reserve) and this was a block that passed the SET and thus would not have required that stochastic excess reserves be calculated. It may be worth noting that for this block (UL5), the final VM-20 reserve would have been nearly identical, regardless of whether the SET was passed or failed because the modified deterministic reserve was essentially equal to the stochastic reserve.

We agree that the direction of margins will vary on a contract level and on a policy year level. Careful analysis of product characteristics will be required when setting margins to ensure that they truly add conservatism.

For UL, the report defines the reinsurance credit under VM-20 as the difference between the Per Policy Reserves that are produced by reflecting projected cash flows that reflect reinsurance versus the cash flows that would be projected if reinsurance were not in place and the same ceding company assumptions remained appropriate. It should be noted that three of the companies indicated that they did not determine a statutory reinsurance reserve credit. For the products that calculated a statutory reserve credit, it has been demonstrated that the reinsurance “credit” produced by this method on a Per Policy Reserve basis exceeds the statutory reinsurance reserve credit (in some cases by a wide margin). However, similar to its effect on margins, applying the cash value floor to the deterministic reserve ultimately reduces the effect of the reinsurance credit with the net result being a reinsurance credit that is more similar in magnitude to the statutory reserve credit (see the UL5 analysis on page 30 of the SOA report).

### **Whole Life (WL) Insurance**

In general, we agree with the observations in the report.

Relative to UL, WL shows a slightly tighter range of ratios from the deterministic to formulaic statistical reserve.

SET percentages are very low, yet one of the blocks produced a stochastic excess (i.e., modified deterministic reserve in excess of the deterministic reserve). It is not clear why.

The SOA report suggests that if the impact on stochastic reserves is large, it might make sense to exclude extreme scenarios if time does not permit resolution. We are not sure that this is the proper approach, given that the stochastic testing is specifically being incorporated to identify possible reserve insufficiencies in certain scenarios. The report identifies the issue of extreme outlier scenarios that may or may not be caused by modeling errors or distortion related to assumptions. However, other combinations of factors that are not tangible and require considerable time to understand fully may also be a cause. Exclusion may be the right answer in these cases but we feel that greater guidance may be needed on how to proceed in these situations or to provide guidance on when the actuary's judgment can be used.

Analysis of the effects of reinsurance on WL reserves was not possible because the modeled blocks either did not reflect reinsurance or reinsurance was not applicable.

### **Deferred Annuity**

Deferred annuities are outside the scope of the LRWG. Please contact Jim Lamson, chair of the Academy's Annuity Reserves Work Group, for comments on the modeling results of annuity products.