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# Retrospective Assumption Monitoring: GAAP Long-Duration Targeted Improvements

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*Editor's note: The views expressed in this article are those of the author and do not necessarily reflect the views of the author's firm.*

In 1987, Statement of Financial Accounting Standards No. 97 brought retrospective assumption updates to accounting for universal life (UL) contracts. Since then, insurers have struggled with questions of when to change assumptions and how to explain the effect of a change. Accounting Standards Update (ASU) 2018-12 eliminates retrospective updating of the deferred acquisition cost asset but adds it to reserving for traditional nonparticipating (TL) contracts.

Part of the difficulty stems from effects that are unique to the retrospective update method. Unlike other methods, retrospective updating requires recalculation of net premiums for actual experience as well as for changes to projection assumptions. As a result, actual cash flows change the reserve even when assumptions aren't changed. Furthermore, the effects of such updates are opposite the effects of changing assumptions—adverse experience reduces the reserve and favorable experience increases it. When experience trends better or worse than expected, the adjustments accumulate. Eventually, an assumption change reverses the accumulated adjustments.

This article describes the use of a new tool that is tailored to the specific challenges of this valuation method.<sup>1</sup> As an addition to the actuarial toolkit, this can help insurers and their auditors monitor the significance of actual claim experience to reported reserves and can establish a baseline from which to anticipate or evaluate the effect of an assumption change.

## A NEW TOOL

This tool depends only on three amounts drawn from actual valuation models. From the current model, it needs the appropriate reserve ratio (UL benefit ratio or TL net premium ratio, both represented here by  $b$ ) and the present value of future revenue (TL gross premiums or UL assessments). It also needs the ratio ( $b_0$ ) from the first model to use current assumptions.

$$(b-b_0) \times PV(\text{Revenue})$$

[This tool is a supplement, not a substitute for statistical tools used in evaluating the credibility of new data or for any of the disclosures required by ASU 2018-12.]

## Why Add a New Tool?

The simplicity of this formula and its dependence only on output from actual valuation models make it convenient for filling gaps left by other tools.

When actual experience differs from expected, traditional measures give no indication of how far retrospective adjustments have moved a reserve away from its expected levels or that there even is any drift away from those levels. This tool reveals just how much reserves are distorted by the accumulation of actual experience since the last assumption update.



Evaluations of mortality and morbidity assumptions typically start with a baseline of zero. The presumption (null hypothesis) is that current assumptions are good until proven otherwise. Statistical measures evaluate the credibility of new data and significance in relation to the null hypothesis. They say nothing, however, about the credibility of the data underlying the current assumption or its relevance to the product. And they are slow to identify all but extreme trends away from expected. By measuring the cumulative effect of experience variances, this tool may identify a need for change sooner than statistical measures alone.

When contemplating a possible assumption change or explaining an actual change, a baseline of zero provides no help. This tool provides a useful baseline.

**Who Benefits?**

Valuation actuaries can easily identify where experience variances have significantly altered reserves. Monitoring its growth can help to distinguish random variances from trends. It won't say how to change an assumption, but it can help to identify when a change is needed.

Executives can see how much actual experience has altered reported reserves. And the tool offers them a first rough estimate of how much an assumption change might affect the reserve. Since it can be summed across products, it can be seen at any level that they consider important.

Auditors benefit in the same ways as valuation actuaries and might use the information to look most closely where the effect of variances is most significant.

Ultimately, financial statement users will benefit if this helps companies produce more timely assumption updates or helps them better explain those updates.

**When and How to Use it**

During annual assumption review, a large result from this tool could call into question the relevance of the data underlying the existing assumption or the technique used to extrapolate from that data. A persistent positive or negative result could do the same even if the absolute amount is not large. Either might suggest that something is causing experience to differ from what's behind the current assumption. It may, therefore, signal

that some sort of change is needed even if new experience alone cannot yet support an entirely new assumption.

For assumption changes, this tool gives a first estimate of the remeasurement gain or loss. For this purpose, however, it is too crude to stand on its own. By understanding both the tool and the business, an actuary can adjust the estimate to better anticipate the result of a change or to help explain a change. (See below under "Limitations—And What to do With Them.")

**HOW IT WORKS**

**Reserve Drift**

A net premium reserve for contracts currently in force can be expressed in present values:

$$PV(Benefits) - b \times PV(Revenue)$$

Here, only the ratio (b) depends on actual experience. Changes in the ratio will be driven mostly by claim variances; the effect of persistency variances will usually be small. If it weren't for changes in the ratio since the last assumption update, the reserve would be:

$$PV(Benefits) - b_0 \times PV(Revenue)$$

It takes little effort to see that the new tool equals the difference between these two formulas.

**Baseline Assumption Change Estimate**

As an assumption change estimate, this tool expects future claims to vary from the current assumption by the same percent of revenue as past claims.<sup>2</sup> Though crude, this will usually be better than not having an estimate at all.

Understanding the tool and how it relates to cohort characteristics will enable an actuary to further refine the estimate. (See below under "Limitations—And What to do With Them.")

**Example**

To illustrate the tool, let's begin with the projection of a new cohort shown in Figure 1. (The net premium ratio is in the lower right corner.) For ease of illustration, assume no terminations and a zero percent discount rate.

Figure 1  
Projection of a New Cohort

Year	1	2	3	4	5	6	7	8	9	10	Total
Premium	100	100	100	100	100	100	100	100	100	100	1,000
Benefit	25	35	45	55	65	75	85	95	105	115	700
Reserve	45	80	105	120	125	120	105	80	45	-	70%

If actual benefits are higher than expected each year, true-ups will increase the net premium ratio and defer a piece of each variance in proportion to the remaining lifetime premium. The cumulative true-up will increase for new deferrals and decrease for amortization of prior deferrals.

Figure 2  
Variance and True-Up by Year

Year	1	2	3	4	Unlock
Variance	10	10	10	10	60
Prem Ratio	71%	72%	73%	74%	80%
True Up	-9	-8	-7	-6	
Cumulative	-9	-16	-21	-24	24
Reserve	36	64	84	96	120

In practice, the originally expected reserve is generally not available for direct comparison to the reported reserve. But if we remember the original net premium ratio, we can use it with current information to calculate the cumulative true-up. Looking at year four in Figure 2, the difference between the current and original net premium ratios (4 percent) times the present value of expected future premiums (600) gives the accumulated difference between actual and expected reserves (24).

Now consider an assumption change at the beginning of year five that increases expected future claims by the same 10 percent of premium as experienced in the first four years. With six years left, that’s an increase of 60 in the present value of future claims. With 40 percent of expected lifetime premiums already passed, 40 percent of this increase is added immediately to the reserve. And 40 percent of 60 equals 24.

In this example, because the change increases expected claims by the same percentage of premium as actual claim variances, the effect of unlocking precisely reverses the cumulative true-up and the updated reserve increases to its originally expected level.

### LIMITATIONS—AND WHAT TO DO WITH THEM

Whether evaluating accumulated reserve drift or estimating the effect of an assumption change, this tool is limited. Understanding its limitations, however, can enhance its value.

When one of the following is identified as relevant to a product, an actuary can adjust expectations. Except for persistency, the results of the tool will still measure the cumulative effect of past variances on the current reserve. These adjustments can be used to improve the estimated effect of an assumption change.

### Persistency Variances

The tool won’t measure the cumulative effect of persistency variances or estimate the effect of a change in a persistency assumption.

For lapse supported products, persistency variances can significantly alter the net premium or benefit ratio. Further analysis may be needed to assess the relative significance of claim and persistency variances.

### New Cohorts

For new cohorts, extrapolating may overstate the ultimate cost difference. In this situation, an actuary might expect the effect of an assumption change to be less than indicated by this tool.

### Late Emerging Trends

Sometimes, experience will track well with original assumptions or assumption changes will realign the assumption with actual experience. In either case, claims may diverge from a current assumption several years into the life of a cohort. In this situation, the tool is likely to underestimate the effect of an assumption change, perhaps greatly. It could, therefore, be especially important to monitor the trend in this metric as well as its absolute level. Even a small but persistent or growing result can signal the need for an assumption change.

### Increasing Revenue

For products with an increasing revenue pattern, extrapolating on revenue will magnify the estimate of ultimate claim costs. This may be especially significant to new cohorts, where extrapolation from select experience variances may already overstate the likely ultimate costs. In extreme cases, the results of an actual assumption update may be closer to zero than to this result.

### Decreasing Revenue

If revenues are expected to decrease for reasons other than contract termination (including decreases to zero on limited-payment contracts) then extrapolating on revenue will tend to underestimate ultimate claim costs. How much it underestimates will depend in part on how soon or fast revenues are expected to decline.

This tool reveals just how much reserves are distorted by the accumulation of actual experience since the last assumption update.

### Very Small Cohorts

For segments of business with few expected claims in any given period, proportionately large claim variances are common. An extrapolation based on revenue can still be a reasonable starting point, but an actuary may need to look closely at actual experience to determine whether the extrapolation is likely to over or under estimate future variances and adjust expectations accordingly.

### CONCLUSIONS

Challenges with retrospective accounting for universal life contracts over the past 30 years will soon affect traditional nonparticipating contracts, as well.

With the simple tool discussed in this article, the actuary can fill gaps in existing tools. Monitoring it regularly will help a company and its auditors evaluate the strength of reserve estimates and explain the results of assumption changes. ■



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#### ENDNOTE

- 1 The tool itself was introduced in two earlier articles, "Traditional Contract Analytics" by Malerich, Scotchie and Winawer, *The Financial Reporter*, December 2018, and "Universal Life Contract Analytics" by Malerich and Tsai, *The Financial Reporter*, December 2019.
- 2 Space limitations do not allow me to show the derivation of the new tool as an assumption change estimate. To get a copy of the derivation, contact the author.