GAAP Targeted Improvements—Traditional Contract Analytics

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On Aug. 15, 2018, the Financial Accounting Standards Board (FASB) released Accounting Standards Update (ASU) 2018-12, Targeted Improvements to the Accounting for Long-Duration Contracts.

For traditional contracts, the old standards tied the measurement of both assets and liabilities to premium revenue with interest accretion and assumptions fixed at issue. The updates break this integration. This article discusses the changes and different update methods that will be needed, as well as analytical formulas and their benefits.

Under the new standard, deferred acquisition cost (DAC) amortization will be on a constant level basis without interest accretion. Reserves, however, will continue to accrue in proportion to premium revenue with interest. Deferred profit liabilities for limited-pay contracts will still amortize based on amount of insurance in force with interest accretion, but the amount deferred will no longer be reduced for acquisition and maintenance expenses. Accrued interest will reflect market upper-medium grade yields, rather than the company's own portfolio yields.

Actual cash flows will have no effect on DAC amortization but will need to be included in the recalculation of reserve net premium ratios. Experience variances and assumption changes affecting the projection will require prospective adjustment of the DAC amortization rate but retrospective adjustment of the liabilities. Expected future expenses will no longer be considered when calculating a current DAC amortization rate. Maintenance expenses will no longer be considered when calculating reserves. Loss recognition testing will no longer apply to traditional reserves, but net premium ratios will be capped at 100 percent for each cohort.

With these changes, the new standards require three update methods for different circumstances.

- The prospective update method spreads the effect of a change across future income and is required for amortization of new acquisition expenses and for changes in the expected term for DAC amortization.[1]

- The immediate update method applies the full effect of a change to the current balance, and is required for the effect of excess lapses on DAC and for updates to the discount rate assumption used in the liability calculations. This method will effectively apply, as well, when the net premium ratio is held constant between annual assumption reviews or at the 100 percent cap.

- The retrospective update method allocates a change among past and future income in proportion to the relevant base, and is required for updates to the cash flow assumptions used in liability calculations, including effects of assumption changes as well as true-up for actual experience.

Annual remeasurement will be disclosed in financial reports as of the beginning of the current reporting period. Changes in liabilities attributed to interest rate updates will be reported as other comprehensive income. All other remeasurement will be

based on the original discount rate used at contract issue date and reported through net income.

Specific applications of these methods to different conditions, and benefits related to earnings attribution, control, forecasting and sensitivity testing, and bias avoidance, are explored below.[2]

Note that applying the calculations discussed in this article sequentially or simultaneously to multiple causes of change is partly a matter of necessity, partly of preference. Sequential measurement is necessary when switching between immediate and prospective DAC effects, and between retrospective and immediate reserve effects. In these situations, specific circumstances will usually dictate which effect to measure first. For sequential measurements, "Prior" rates in the following formulas will include the effects of changes measured earlier in the sequence and "New" sums and present values in the denominators must be measured without the effects of changes measured later in the sequence.

For multiple causes requiring the same update method, simultaneous measurement is possible. Amounts of each change in the numerators must each be calculated separately, but "Prior" rates exclude effects of all simultaneous changes and "New" sums and present values include effects of all simultaneous changes.

DAC ASSET

For the DAC asset, the new standards:

- Remove discounting and interest accretion from all DAC calculations.
- Do not allow expected future expenses to be considered in the current amortization rate.
- Require prospective update of the DAC amortization rate for new acquisition expenses and for changes in expected term.
- Require immediate update of the unamortized balance for excess terminations.
- Do not explicitly address lower terminations. Whether they should be treated as negative excess terminations or as a change in expected term is unclear.

Prospective Updates

New acquisition expenses are added to the unamortized DAC balance. The amortization rate is updated prospectively for the new balance and for changes in expected term (as captured within the sum of projected amounts in force), whether for assumption changes or for additions to the amortization basis associated with the new expenses.

[1] $$\Delta DAC = New\ Expense$$

[2] $$\Delta k^E = \frac{\left[New\ Expense - k^E_{Prior} \times \Delta \sum in\ Force\right]}{\sum in\ Force_{New}}$$

Where:

ΔDAC	is the change in the unamortized DAC balance.
$New\ Expense$	is the newly deferred acquisition expenses.
Δk^E	is the change in the expense amortization rate.
k^E_{Prior}	is the amortization rate before the change.
$in\ Force$	is the constant basis used for amortizing DAC.
$\Delta \sum in\ Force$	is the change in the sum of projected amounts in force.
$\sum in\ Force_{New}$	is the sum of projected amounts in force after the change.

When adding new acquisition expenses, formula [2] reveals that the amortization rate won't change if the ratio of new expense to the sum of incremental in force equals the prior amortization rate. Otherwise, the difference is spread over the remaining projected amounts in force through an adjustment to the amortization rate.

When updating the expected term, formula [2] shows an intuitive relationship between the changes in projected in force and in the amortization rate. If amortization continued at the old rate, too much or too little would be amortized over the new remaining term. The amortization rate is adjusted to eliminate the difference.

Immediate Updates

Excess terminations require immediate adjustment to the unamortized balance, as shown in formula [3] below, but do not affect the amortization rate.

[3] $$\Delta DAC = \left[k^E_{Prior} \times \Delta \sum in\ Force\right]$$

[4] $$\Delta k^E = 0$$

Applying the adjustment to the change in projected in force captures both the immediate effect of the excess terminations on the amount remaining in force and their effect on the remaining expected term as captured by the projected amounts in force. This will more properly relate the change in expected term to its cause—excess lapse in this case.[3]

LIABILITIES

For the benefit reserve and deferred profit liability, the new standards require:

- Immediate update of the liabilities for a current inventory of contracts in force, except when updating for actual cash flows and assumption changes.
- Immediate update of the liabilities when the net premium ratio reaches the 100 percent cap.
- Immediate update of the liabilities for the current discount rate.
- Annual review of cash flow assumptions and update of assumptions when appropriate.
- Recalculation of the net premium ratio, before or during the annual assumption review process, using actual cash flows in place of expected cash flows.
- Retrospective update of the liabilities for actual cash flows and assumption changes, using the original discount rate.

Immediate Updates

Immediate update of liabilities, under the three conditions described above, does not affect the net premium ratio or the deferred profit amortization rate. The benefit reserve and total liabilities will change as noted in the formulas below.

[5] $$\Delta V = [\Delta PV(Benefits) - b_{Prior} \times \Delta PV(Premiums)]$$

[6] $$\Delta b = 0$$

[7] $$\Delta L = \left[\Delta PV(Benefits) - \Delta PV(Premiums) + k^R_{Prior} \times \Delta PV(in\ Force)\right]$$

[8] $$\Delta k^R = 0$$

Where:

ΔV is the change in the benefit reserve.

$\Delta PV(Benefits)$ is the change in the present value of expected benefits (excluding expected change for the passage of time).

b_{Prior} is the net premium ratio from the prior valuation.

$\Delta PV(Premiums)$ is the change in the present value of expected gross premiums (excluding expected change for the passage of time).

Δb is the change in the net premium ratio.

ΔL is the change in total liabilities (benefit reserve plus deferred profit liability).

k^R_{Prior} is the deferred profit amortization rate from the previous valuation.

Δk^R is the change in the deferred profit amortization rate.

$in\ Force$ is the basis used for amortizing the deferred profit liability (not necessarily the same in force basis used for DAC amortization).

$\Delta PV(in\ Force)$ is the change in the present value of expected in force amounts (excluding expected change for the passage of time).

With an unchanging net premium ratio, formula [5] looks much the same as a normal reserve formula—the present value of future benefits minus the present value of future net premiums. Under the immediate update method, incremental present values translate directly into incremental reserve. The same is true for total limited-pay contract liabilities in formula [7].

Retrospective Updates

Changes in cash flow assumptions and true up for actual cash flows require retrospective updating of the liabilities, the net premium ratio, and the deferred profit amortization rate as of the beginning of the current reporting period.[4] An historical ratio is used in formulas [9] and [11]. It measures the age of the business and matches a portion of the update to past revenue.

[9] $$\Delta V = [\Delta PV(Benefits) - b_{Prior} \times \Delta PV(Premiums)] \times h_{New}(Premium)$$

[10] $$\Delta b = \frac{[\Delta PV(Benefits) - b_{Prior} \times \Delta PV(Premiums)]}{AV(Premium) + PV_{New}(Premium)}$$

[11] $$\Delta L = \left[\Delta PV(Benefits) - \Delta PV(Premiums) + k^R_{Prior} \times \Delta PV(in\ Force)\right] \times h_{New}(in\ Force)$$

[12] $$\Delta k^R = -\frac{[\Delta PV(Benefits) - \Delta PV(Premiums) + k^R_{Prior} \times \Delta PV(in\ Force)]}{AV(in\ Force) + PV_{New}(in\ Force)}$$

[13] $$h_{New}(x) = \frac{AV(x)}{AV(x) + PV_{New}(x)}$$, with 'x' representing "premium" or "in Force"

Formula elements are as defined before, except:

$AV(Premium)$ is the accumulated value of actual gross premiums collected since issue.

$PV_{New}(Premium)$ is the present value of all expected future gross premiums in the new projection.

$AV(in\ Force)$ is the accumulated value of actual in force amounts for each period since issue.

$PV_{New}(in\ Force)$ is the present value of all expected in force amounts for each period in the new projection.

$\Delta PV(Benefits)$ is the change in the present value of expected benefits.

$\Delta PV(Premiums)$ is the change in the present value of expected gross premiums.

$\Delta PV(in\ Force)$ is the change in the present value of expected amounts in force.

Since GAAP considers the use of actual experience to be part of an assumption update, these present value changes must also include variances from expected experience. How actual variances affect the update depends on the timing of the true up measurement.

- For annual true up, variances since the prior true up are accumulated at the original discount rate to the beginning of the current reporting period. The current liability true up will also include immediate release of the accumulated excess benefits and immediate accrual of the net premium ratio multiplied by the accumulated excess premium.

- For immediate true up, variances will be discounted at the original discount rate to the beginning of the current reporting period, with normal release and accrual in the current period then treating the variances as if they were expected.

Except for matching a portion of the change to past revenue, accomplished by the historical ratio, formulas [9] and [11] are identical to the immediate method's formulas [5] and [7] where 100 percent of the change is applied immediately to the reserve.

Adverse and Favorable Trends in Experience

If assumptions go unadjusted for actual experience, trends that differ from underlying assumptions will cause gradual change in the net premium ratio. Since changes in the net premium ratio push the reserve in the opposite direction, the drift in the ratio will create bias in the reserve. As bias accumulates, potential for a future assumption change grows. By the time the trend is recognized, the accumulated bias can become large.

The following simple measure, with zero representing the time when current assumptions were set, can provide warning.

[14] $$Accumulated\ True\ Up = (b_{New} - b_0) \times PV(Premium)$$

The accumulated amount over an extended time period may signal a need to update assumptions and may provide a rough estimate of the potential effect from an assumption change.

To reduce assumption update volatility caused by accumulated bias, projected claims can be adjusted based on extrapolation from actual claim variances.[5]

[15] $$\Delta Claims = \frac{[AV(Excess\ Claims) - Expected\ AV(Excess\ Claims)]}{h_{New}(in\ Force)}$$

[16] $$Expected\ AV(Excess\ Claims) = AV(in\ Force) \times \frac{AV_{Prior}(Excess\ Claims)}{AV_{Prior}(in\ Force)}$$

Where all accumulated values are based on the original discount rate and:

$\Delta Claims$ is the adjusted variance from expected claims to be included in $\Delta PV(Benefits)$ in formulas [9] to [12].

$Excess\ Claims$	is actual claims minus expected claims based on cash flow assumptions.
$AV(Excess\ Claims)$	is the accumulated value of excess claims since the most recent cash flow assumption update.
$AV(in\ Force)$	is the accumulated value of actual in force amounts for each period since issue.
$AV_{Prior}(Excess\ Claims)$	is the accumulated value of excess claims as measured at the most recent prior extrapolation date.
$AV_{Prior}(in\ Force)$	is the accumulated value of actual in force amounts as measured at the most recent prior extrapolation date.
$in\ Force$	is the basis used for extrapolation.[6]

The method to adjust projected claims based on trends described in this section adds complexity to the liability calculations, but reduces volatility and makes analysis of variances simpler. For example, claim variances will have no effect on the total liability of limited pay contracts. Similarly, claim variances will have minimal effect on the benefit reserve for other contracts if premiums are a constant proportion of the amount of insurance in force for the entire life of the cohort. In each case, the claim variance is divided by an historical ratio in formula [15] then multiplied by an identical or nearly identical historical ratio when inserted into formulas [11] and [9], respectively. The resulting adjustment is then offset by the release of reserve for actual claims.

BENEFITS OF ANALYTICAL FORMULAS

The analytical formulas described in this article can prove helpful for a variety of purposes.

Earnings Attribution

When deviation from expected cash flows or persistency can be measured separately, applying the appropriate formulas to each variance will measure its effect without having to recalculate the reserve multiple times in sequential valuation runs. Residual differences between the sum of the influences and the ending reserve should be small and may be allocated among the causes or identified as a residual.

Control

When the effects of deviations from expected cash flows or persistency are calculated incrementally, either by desire or by necessity, these formulas can be applied as a check of those measurements. Control tolerances can be expressed in dollar amounts and results can easily be summed for aggregate controls. Whether separate or in aggregate, assessing materiality will be easier than would be possible with percentage tolerances or simple trends.

Observing trends in these may help to identify inconsistencies between assumptions and emerging experience sooner than experience studies.

Forecasting and Sensitivity Testing

These formulas can be used with cash flow forecasts and sensitivities to estimate the corresponding reserve and DAC effects.

Bias Avoidance

Accumulated bias that develops in liabilities until assumptions are unlocked can be avoided by the methodological extrapolation outlined above. ■

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ENDNOTES

1 DAC amortization over expected term may be performed either on an individual contract or a grouped contract basis. Calculations in this article apply most naturally to the grouped contract approach.

2 Space limitations do not allow us to show derivations of the formulas in this article. To get a copy of the derivations, contact one of the authors.

3 Formula [3] may seem to be more complicated than a proportionate write-off based on amount remaining in force rather than projected in force. A simple write-off, however, would not account for the effect of the terminations on the remaining expected term and a change in the amortization rate would also be needed.

4 Using prior present values in the denominators of formulas [10], [12] and [13] would usually produce good approximations. For controls or sensitivity testing, the prior projection would have the added benefit of making the historical ratios (formula [13]) independent of the new projection.

5 Until here, we've been referring to benefits, which include both insurance claims and surrender benefits. This extrapolation is applied only to insurance claims. See "Unlocking 2.0" (*The Financial Reporter,* December 2017).

6 "Unlocking 2.0" uses the amount of insurance in force as an extrapolation basis but adds that another basis may be judged appropriate under some circumstances.