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GAAP Targeted Improvements— Illustrated Term Insurance Earnings

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Having completed its preliminary decision-making process for targeted improvements to U.S. GAAP for long-duration insurance contracts, the Financial Accounting Standards Board has directed its staff to prepare an exposure draft for the changes. Among the most significant decisions are those relating to traditional contracts. In this article we compare earnings emergence from traditional contracts under the current and improved standards.

For a hypothetical non-participating term insurance portfolio, we'll examine pre-tax earnings with expected experience, with random variations from expected, and with recurring deviations from expected. To highlight key changes and avoid overly complex explanations, we look at results by policy year, make several simplifying assumptions, and exclude characteristics that are expected to remain unchanged or to have insignificant changes.

Highlighted changes include: elimination of interest on DAC; write off of DAC for excess terminations; elimination of the provision for adverse deviation (PAD); annual unlocking of valuation assumptions and true up for actual experience (both with retrospective recalculation of the reserve).

Other changes affecting non-participating traditional contracts include: change DAC amortization base to amount of insurance in force; unlock DAC amortization rates for assumption changes but without retrospective recalculation of the existing balance; cap the reserve valuation net premium ratio at 100 percent; eliminate loss recognition testing; change the reserve valuation interest rate to a high-quality fixed-income instrument yield; and update the reserve valuation interest rate each quarter, but with the effect of the change recorded in other comprehensive income.

These illustrations reflect my understanding of the tentative board decisions. (The exposure draft is not yet available.) Final standards may differ.

EXPECTED EXPERIENCE

We begin with experience emerging exactly as expected under original best estimate assumptions.

Table 1

Expected Income Statement	Current	Improved	Difference
Premium Income	8,494	8,494	-
Investment Income	486	486	-
Total Revenue	8,981	8,981	-
Death Benefits	2,687	2,687	-
Reserve Increase	3,440	3,127	(313)
Net Benefit	6,127	5,814	(313)
DAC Amortization	1,254	1,539	285
Total Benefits & Expenses	7,381	7,353	(28)
Pre-Tax Earnings	1,599	1,628	28

Early Years

Table 1 illustrates key elements of earnings during an early year of the cohort. Accounting has no effect on cash flows (premium income, investment income, and claims), but differences appear in reserve accrual and DAC amortization.

- Under current GAAP the PAD accrues each year in proportion to premium and is released each year for the associated risk margin. Properly designed, the PAD increases reserve accrual in early years. GAAP improvements eliminate the PAD, for 313 less in reserve accrual.
- Under current GAAP, interest accrual slows DAC amortization in early years when DAC is high. GAAP improvements remove DAC interest, for 285 more in DAC amortization.

Numerous factors affect the relative significance of the changes on reserve accrual and DAC amortization. In this example, the reserve effect is greater, such that the total of benefits and expenses is 28 lower under the GAAP improvements and earnings are 28 higher.

Table 2

Expected Income Statement	Current	Improved	Difference
Premium Income	2,180	2,180	-
Investment Income	536	536	-
Total Revenue	2,716	2,716	-
Death Benefits	3,317	3,317	-
Reserve Increase	(1,610)	(1,464)	146
Net Benefit	1,707	1,854	146
DAC Amortization	424	223	(200)
Total Benefits & Expenses	2,131	2,077	(54)
Pre-Tax Earnings	585	639	54

Later Years

Table 2 illustrates key elements of earnings later in the life of the cohort. Again, accounting changes have no effect on cash

flows, but differences appear in reserve accrual and DAC amortization.

- Here, under current GAAP the release of PAD outweighs accrual of the PAD. GAAP improvements, without any PAD, release 146 less reserve.
- Although interest reduces DAC amortization under current GAAP, in later years this is outweighed by the adverse effect discounting has on the amortization rate. By removing interest from DAC calculations, GAAP improvements result in 200 less in DAC amortization.

In this example, the DAC effect is greater, such that the total of benefits and expenses is 54 lower under the GAAP improvements, and earnings are 54 higher.

Lifetime

Chart A illustrates earnings over time under current GAAP and under improved GAAP. Remember, current GAAP has two features that are eliminated in GAAP improvements—PADs and interest on DAC.

DAC interest reduces the expense charge, but accruing a PAD increases the benefit charge. Since DAC must eventually amortize to zero and the reserve is ultimately released, these give rise to opposing differences—amortizing the DAC interest and releasing the PAD.

How these work together varies over time. DAC interest is greatest when DAC is highest. The PAD accrues and DAC interest amortizes in proportion to premium income. Release of the PAD will be greatest in later years, when expected claims and the associated risk margins are greatest.

In the illustration, the percent of premium accruals clearly dominate current GAAP in the first year. For the next few years, interest on DAC and accrual of PAD largely offset. Between years seven and 20, the interest on DAC and release of the PAD result in higher earnings under current GAAP compared to improved. Presumably, DAC interest dominates the earlier years and release of PAD dominates the later years, though it is impossible to tell from the illustration. By year 21, amortization of DAC interest exceeds the accrual of DAC interest by more than the excess of PAD release over accrual, pushing current GAAP earnings below improved GAAP.

Random Variances

Of course, actual experience never matches assumptions perfectly. We will see some of the biggest differences between current and improved GAAP when experience deviates from expected.

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Chart A

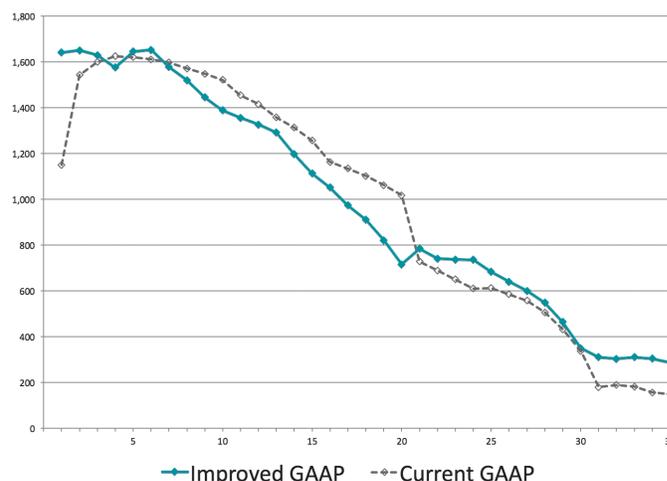


Table 3

Variance from Expected	Current	Improved	Difference
Premium Income	(12)	(12)	-
Investment Income	(1)	(1)	-
Total Revenue	(13)	(13)	-
Death Benefits	2,687	2,687	-
Reserve Increase	(39)	(2,017)	(1,977)
Net Benefit	2,648	670	(1,977)
DAC Amortization	57	55	(2)
Total Benefits & Expenses	2,705	725	(1,979)
Pre-Tax Earnings	(2,718)	(738)	1,979

Early Years. To understand these differences, we return to the early year example. Table 3 shows only a claim variance and its effects. Here, we have a large variance—doubling the amount

of claims from expected. Though large, this is within the range of statistical likelihood and we do not yet doubt our mortality assumption. This variance is large enough to have a slight noticeable effect on premium and investment income, but again the accounting changes have no effect on cash flows.

- Though current GAAP locks-in valuation assumptions, the increased terminations result in a release of the reserve and elimination of the DAC that was held on the terminated policies. In this example, DAC is greater than the reserve, such that their elimination magnifies the effect of the extra claims on earnings.
- Improved GAAP requires a recalculation of the reserve taking into account actual experience. This effectively forces traditional life into a cohort-level reserve valuation. With the recalculation, we see a substantial reserve offset to the extra claims. For a claim variance of 2,687, we have an offsetting reserve true up of 2,017. As we'll examine more closely later, the principal components of that true up are: (a) a cumulative catch-up adjustment (unlocking) that results from the recalculation; (b) faster accrual based on the now-higher net premium ratio; and (c) a dollar-for-dollar release to fund the extra claims.
- When terminations are higher than expected, improved GAAP still requires DAC write off for the extra terminations.

Altogether, the different reserve treatment dominates the comparison and is clearly significant to this particular situation. With the slight favorable effect that we saw on expected earnings (+28 in Table 1), GAAP improvements provide a significant boost to earnings in this example.

Table 4

Variance from Expected	Current	Improved	Difference
Premium Income	9	9	-
Investment Income	2	2	-
Total Revenue	11	11	-
Death Benefits	(1,106)	(1,106)	-
Reserve Increase	93	123	30
Net Benefit	(1,012)	(983)	30
DAC Amortization	(23)	-	23
Total Benefits & Expenses	(1,035)	(983)	52
Pre-Tax Earnings	1,046	994	(52)

Later Years. Moving again to a later year, Table 4 shows a favorable claim variance and its effects. The variance is again large enough to have a slight noticeable effect on premium



and investment income but, again, the accounting changes have no effect on cash flows.

- Though current GAAP locks-in valuation assumptions, the lower terminations do result in higher than expected in force and retention of the reserve and DAC on the policies we expected to terminate. Here, the reserve is greater than DAC such that retaining both reduces the effect of the claim variance on earnings.
- The reserve recalculation under improved GAAP again produces a partial offset to the variance. Compared to the early year, however, this offset is much smaller. The 1,106 variance has an offsetting reserve true up of just 123. As before, the principal components of the true up are: (a) unlocking; (b) slower accrual based on the now-lower net premium ratio; and (c) a dollar-for-dollar adjustment to the amount released to fund claims. We'll see later why the reserve behaves so differently in this case.
- Improved GAAP does not allow us to slow DAC amortization when terminations are lower than expected. This one-sided provision means that amortization can only be accelerated.

In this example, the reserve and DAC improvements both have a modestly adverse effect. Together with the slight favorable effect on expected earnings (+54 in Table 2), the changes have a negligible effect on earnings.

Analyzing the Reserve Change

For both early and late variances, we noted three principal components of the reserve true up—unlocking, additional accrual, and direct offset. Table 5 illustrates those components, with all numbers signed as positive or negative to earnings. The early and late years are as we saw before, and we have a middle year variance for comparison. (Differences between the true up and the sum of the three pieces result from small effects¹ not captured in this attribution.)

- GAAP improvements require a recalculation of the reserve as if the actual claim amount had been expected from inception. This unlocking is small in the early year and grows as the business ages. This predictable effect is a direct result of the matching principle. Since the primary purpose of the reserve is to match costs with revenue, the portion of any variance to be matched with past revenue grows with the accumulation of actual revenue. We'll look more closely at this shortly.
- Recalculation also changes the rate (net premium ratio) at which we accrue the reserve. An adverse claim variance increases the ratio and thus requires an increased accrual. A favorable variance decreases the ratio and thus allows a lower accrual. In practice, variances aren't usually so dramatic, and this effect will tend to be small.
- Regardless of the age of the business, improved GAAP adjusts the reserve with a direct, dollar-for-dollar offset to claim variances.

The true up is the share of the variance that, under the matching principle, will be charged against future revenue. It is not random that the relatively small early unlocking coincides with a relatively large true up and that the opposite is true later—the entire variance must be realized in earnings during the life of the business.

Explaining the Unlocking

To better understand how the matching principle affects unlocking, Table 6 illustrates unlocking at different points in time.

- The offset rate depends on the type of cash variance. For benefits, the offset is always 100 percent. Total unlocking would include the premium variance, with an offset rate equal to the net premium ratio.
- The historical ratio is a simple tool to account for the matching principle. This ratio of past premium to expected lifetime premium (both measured as present values) deter-

Table 5

	Claim Variance	Unlocking	Additional Accrual	Direct Offset	Total True Up
Early Year	-2,687	-515	-211	+2,687	+2,017
Middle Year	+2,368	+1,340	+101	-2,368	-1,000
Late Year	+1,106	+1,058	+8	-1,106	-123

Table 6

	Claim Variance	Offset Rate	Historical Ratio	Estimated Unlocking
Early Year	-2,687	100%	19%	-515
Middle Year	+2,368	100%	57%	+1,340
Late Year	+1,106	100%	96%	+1,058

mines the portion of the offset that must be matched with past revenue.

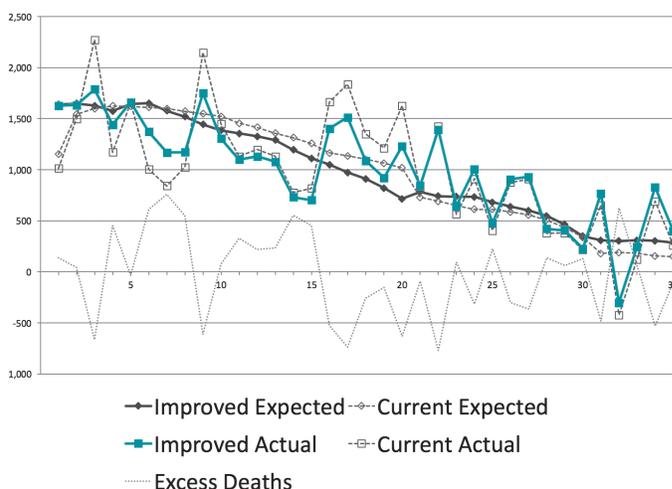
Estimated unlocking is simply the product of the variance, the offset rate, and the historical ratio.

Lifetime

Chart B illustrates random variances over the life of the cohort. The variances largely pass through current GAAP earnings, with little offset, as they happen. For improved GAAP, the earnings effect depends on the age of the business.

- With little unlocking, variances are substantially neutralized in the first few years by the direct offset.
- With the large variances in years seven and eight, we clearly see a significant effect on earnings, though not as severe as in current GAAP. With the historical ratio near 50 per-

Chart B



cent, about half of the excess claim is charged immediately through unlocking.

- After about 15 years, when the historical ratio tops 80 percent and unlocking charges nearly all of the variance immediately to earnings, we see effects similar to those of current GAAP.

RECURRING VARIANCES

So far, we've seen how GAAP improvements spread the cost of a variance, with proportionately larger offsets to early year variances. In a sense, we might say that GAAP improvements are more forgiving of early variances. What happens, however, if experience is consistently better or worse than expected?

Without Changing Assumptions

Chart C illustrates what happens to earnings if experience is consistently worse than original assumptions, but the assumption is never changed.

- With little offset, variances largely pass through current GAAP earnings as they happen. If variances are consistently in one direction, the whole earnings curve shifts in that direction.
- For improved GAAP, early earnings are close to expected as most of each variance passes into the reserve to be charged in later years. As time passes, earnings must absorb

increasing proportions of new variances and the accumulating costs of earlier variances. The combined effects quickly compound and earnings deteriorate rapidly.

Unlocking of Assumptions

Eventually, consistent deviations from expected experience will cause us to question our assumptions. Current GAAP requires loss recognition testing based on a new assumption but, in the absence of a deficiency, locks in the original valuation assumptions. GAAP improvements, however, require a change in the assumptions when warranted.

Chart D illustrates how earnings would look before and after an assumption change, and the amount of unlocking that would result from unlocking in any year.

As in Chart C, the boxes show earnings without an assumption change. The balls show what earnings would look like after an assumption change. This is also what earnings would look like if the new assumption had been expected from the outset.

In practice, earnings will look like the boxes until the assumption change and approximately² like the balls after the change. When the assumption is changed, earnings will take the unlocking charge as represented by the diamonds. For the same assumption change, the amount of unlocking depends heavily on the timing of the change.

Chart C

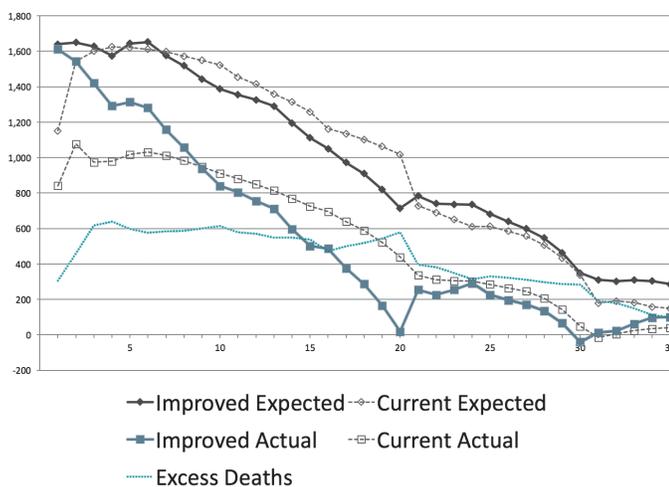
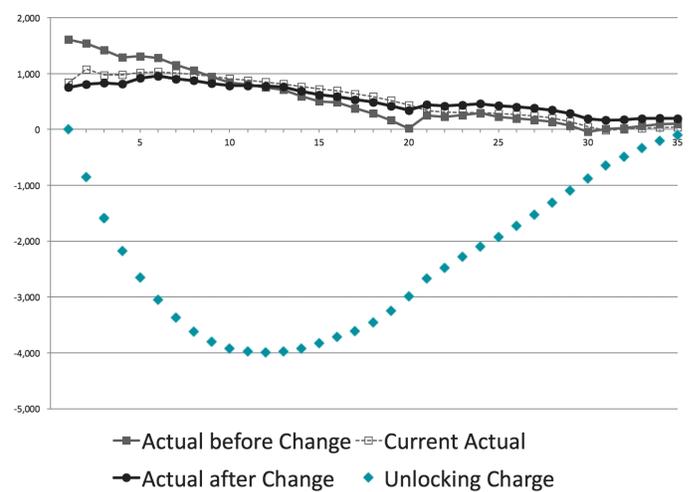


Chart D



If we think of the balls as the ideal earnings pattern given the actual experience over the life of the business, unlocking at any point in time would equal the accumulated difference between ideal and reported earnings. For as long as reported earnings exceed the ideal, the amount of potential unlocking grows. Not until reported earnings fall below ideal will the potential unlocking decline. Given these dynamics, it is best to recognize the need for an assumption change as early as possible. Most likely, evidence will suggest a need for change before there is sufficient data to support a new assumption. In that event, smaller adjustments might balance the credibility of available data with the need or desire to avoid a large unlocking event at a later date.

OTHER ISSUES

Constraints

Nowhere in these illustrations did we bump into constraints.

Board decisions do not mention the current floor (zero) on the reserve, which probably means it will remain in place. With dynamic true up, however, it will have new significance. If a claim variance is so severe that total claims exceed the reserve, the offset will be limited to the amount of reserve.

GAAP improvements will cap the net premium ratio at 100 percent. Together with regular unlocking of assumptions, this eliminates the need for loss recognition by forcing the reserve for each cohort to be sufficient. Practically, the effect will be similar to loss recognition, but at a cohort level and without the extra effort of testing and aggregation.

Discount Rates

The change to a market-based discount rate will affect earnings, but I do not expect to see much effect on earnings patterns. The requirement for quarterly changes in the discount rate might have significant effects on the balance sheet, but will not affect earnings. ■

Board decisions do not mention the current floor (zero) on the reserve, which probably means it will remain in place.

ENDNOTES

- 1 A precise calculation would include additional accrual and unlocking on the premium variance, include unlocking for changes in projected premiums and benefits, discount all variances to unlock as of the prior valuation date, and account for unlocking's nonlinearity and interaction between claim and premium variances.
- 2 An assumption change will also alter projected amounts in force. Though there is no immediate change in the DAC balance, the subsequent amortization pattern will change based on the new projection. It is not possible to illustrate that effect in a two-dimensional chart because, unlike the reserve accrual, post-unlocking DAC amortization depends on the timing of the assumption change.



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