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Simply Unlocking Explaining non-traditional DAC and SOP reserve movements to non-actuarial audiences

By Steve Malerich

“Most investors have limited understanding of the meaning and impact of retrospective DAC unlocking for FAS 97...”

With that introduction, the Financial Reporting Committee of the American Academy of Actuaries suggested that the Financial Accounting Standards Board (FASB) eliminate retrospective DAC unlocking.¹ Though FASB is considering this suggestion, they have tentatively decided to extend unlocking of reserve assumptions to traditional long duration contracts. If they settle on retrospective unlocking for reserves, we may see a greater scope of the requirement, even if it is removed from DAC.

Regardless of progress in FASB’s Targeted Improvements, we will continue to report unlocking results for several years. If we are to live with it for even a few more years, it’s worth some effort to improve our explanation. It’s worth even more if it helps us prepare for longer-term needs.

The goal of this article is to build a structure for actuaries to help non-actuaries understand the meaning and impact of retrospective unlocking. The key lies with a simple shift in how we explain the effect of any deviation from expected experience.

There are three steps to framing the dynamics of DAC and related liabilities for universal life-type contracts.² First, review some of the fundamental principles underlying FAS 97. Second, understand three key concepts—cash profits, net amortization rates, and historical ratio. Third, fit those concepts into simple, meaningful formulas for estimating results.

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Content Managers

Michael Fruchter, Newsletter Editor
e: mfruchter@kpmg.com

Marc Whinston, Associate Editor
e: mwhinston@tiaa-cref.org

SOA Staff

Sam Phillips, Staff Editor
e: sphillips@soa.org

James Miles, Staff Partner
e: jmiles@soa.org

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WHAT CAN WE DO FOR YOU? Chairperson's Corner

By Tara Hansen

I know JFK would have said, "Ask not what your section can do for you, but what you can do for your section!" But, we'll come back to that in a little bit. I would rather focus for the moment on what your section can do for you. The section council held its annual face-to-face meeting in Chicago earlier this week, so this is all fresh and at the top of my mind in terms of making sure the council serves the needs of our members to the best of our ability. We held a lengthy "blue sky" discussion about how we can better serve our membership and make being a member of the Financial Reporting Section a worthwhile investment each year. Knowing how valuable the section activities and research are to each of us and to the industry more generally, I thought I would take this opportunity to point out the tremendous contributions the section makes each year and solicit feedback from the membership as to ways we can improve upon these contributions in the future.

Each year, the section contributes much in the way of educational materials including:

- Sponsoring various research projects and whitepapers,
- Coordinating six to 12 webcasts,
- Publishing quarterly newsletters, and
- Organizing financial reporting panel discussions for the three big face-to-face SOA meetings.

At this point, we have a fairly well-oiled machine to deliver these things to the section, through the section council, friends of the section and the numerous volunteers that pull these materials together each year.

But as a section, what else can we be doing? That is the question that we posed to ourselves earlier this week. At length, we discussed the possibilities and we decided on a few things in particular on which we will invest some additional time. These include investigating the possibility of a one-stop shop for financial reporting educational resources and revival of the US GAAP Seminars. Over the next six months, we'll be putting together a group to revive the US GAAP seminars and to investigate the creation of an app or some web-based resource that would provide all of the financial reporting related resources that we might need on any given day. These two should augment our already healthy list of section benefits. But what else is on your mind? What other activities can we engage in as a section to further enhance the value of our membership? Please do forward any ideas you may have to me at the contact details listed on this page.

Once we get input on ways that we can further provide value to our members, section leadership will reach back out to our friends and members to assist with making these ideas a reality. At that point, we'll heed JFK's famous sentiment and look for you to ask what you can do for your section! ■



Tara Hansen, FSA, MAAA, is principal at Ernst & Young in New York. She can be contacted at tara.hansen@ey.com.

With that framework, explaining actual results requires three more steps. First, apply the formulas to actual results. Second, identify the significant pieces. Third, fit the pieces into the framework to provide a narrative.

Remember, our purpose is to explain, not perform precise calculations. We can, therefore, afford the luxury of approximation. We can also combine DAC and related liabilities and explain their total bottom-line effect. Think of the question as, “What is the total offset to a variance from normal experience?” or, “What is the total effect of unlocking?” Usually, these approximations will explain nearly 100 percent of actual movements if applied separately to each cohort. They can even work well when applied using reasonably calculated averages for a book of business, except when large variances occur on individual cohorts that differ significantly from average in age or in net amortization rates. Even then, an aggregate estimate may serve as a useful anchor from which to explain actual results.

UNDERLYING PRINCIPLES

In part, insurance accounting is built upon the *matching principle* (that costs be matched with revenue). Beginning with FAS 60 and continuing with FAS 97, GAAP recognizes that insurance contract sales produce an asset and a liability, and that the two are linked. The obvious liability is the company’s contractual obligations. The asset is the company’s ability to profit from pooling of contracts with similar risks.

FAS 60 and FAS 97 capitalize and amortize acquisition costs to align the expense with revenue. FAS 97 recognizes, however, that universal life-type contracts have too many moving parts to reasonably match revenue using a fixed schedule or fixed assumptions. FAS 97 therefore requires frequent reassessment of the incidence of costs and revenue, and adjusting the valuation accordingly.

Dynamic FAS 97 unlocking preserves the matching principle by sacrificing some of the smoothness of amortized cost. It also makes today’s valuation *independent of prior assumptions*.

Together, these principles mean unlocking has little effect on earnings early in the life of a portfolio. As the business ages, however, a greater adjustment is needed for the balance sheet to be independent of the old assumption.

SOP 03-1 complicated FAS 97 mathematics, but it did not alter the fundamental principles. In fact, it sought to return to principle in light of new product designs—to better match the cost of benefits with revenue.

KEY CONCEPTS

Cash Profits

Cash profits (CP) are the amounts explicitly recognized as “estimated gross profit” in FAS 97—investment, mortality and expense spreads, surrender charges, and “other expected assessments and credits, however characterized.” SOP 03-1 introduced additional liabilities (SOP reserves) and stipulated that “estimated gross profits used for the amortization of deferred acquisition costs shall be adjusted to reflect the recognition of the liability. . . .” That adjustment converts cash profit into estimated gross profit.

By separating the reserve adjustment from cash profit, we can explain movements in relation to actual contract experience. The change in the amortization rate disappears from the explanation and the reserve change becomes part of the explained, not the explanation.

To understand movements of DAC and related liabilities, we need to separate cash profits into three components—the ABC of cash profits:

- A. Non-deferred Assessments include the general account investment spread and all fees, loads and charges, except front-end loads (deferrable revenue).
- B. Deferrable Benefits are claims under a contract provision for which an SOP reserve is required.
- C. Non-deferred Costs include any claims under a contract provision for which an SOP reserve is not required and any non-deferred expenses incurred to acquire or administer the business.

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Two other cash items relevant to FAS 97 movements, but not in cash profits, are deferrable expenses (DE) and deferrable revenue (DR). (For this analysis, sales inducements can be included in DE. Though amortized into benefits rather than expenses, their bottom-line effects are the same.)

We thus have three deferrable items and three components of cash profits. Deferrable benefits (DB) are common to both. Because deferrable revenue is an assessment, it is included with non-deferred amounts in cash assessments (CA). Referring to non-deferred costs as cash costs (CC) we find:

$$\text{Net deferred} = DE - DR + DB$$

$$CP = (CA - DR) - DB - CC$$

Net Amortization Rates

Before SOP 03-1, net amortization rates were simply the expense (DAC) amortization rate minus the revenue (URL) amortization rate. Often called k-factors, we represent this as:

$$(a) \quad k = k^E - k^R$$

With SOP 03-1, additional reserve requirements complicate the dynamics, especially since the reserve accrues on a different basis (assessments) than used to amortize DAC and URL (gross profit). Further, with both URL and SOP reserves, assessments are a function of URL amortization and gross profit is a function of the reserve change. With amortization a function of gross profit and reserve change a function of assessments, URL and SOP reserve calculations depend on each other.

Ignoring the circular dependence, net amortization rates including the reserve accrual are more complicated than formula (a) but still not difficult. Part of the complication is that the net rate now varies among the three components of cash profits.

Since we include deferrable sales inducements in DE, k remains as defined in formula (a). With b representing the SOP 03-1 benefit ratio, we can now structure FAS 97 dynamics as shown in Table 1.

	(i) Cash Profit	(ii) Reserve Accrual ³	(iii) Gross Profit	(iv) DAC & URL Amortization	(v) Net Amortization
A	$CA-DR$	$(CA-DR) \times b$	$(CA-DR) \times (1-b)$	$(CA-DR) \times (k-k \times b)$	$(CA-DR) \times (k+b-k \times b)$
B	DB	$DB \times 1$			$DB \times 1$
C	CC		CC	$k \times CC$	$CC \times k$
Total	$(CA-DR)$ $-DB-CC$	$(CA-DR) \times b$ $-DB$	$(CA-DR) \times (1-b)$ $-CC$	$(CA-DR) \times (k-k \times b)$ $-k \times CC$	$(CA-DR) \times (k+b-k \times b)$ $-DB-CC \times k$

Key relationships shown in this table include:

- Each total is derived by subtracting rows B and C from A.
- Column (iii) combines the pieces of gross profit, subtracting (ii)'s reserve accrual from (i)'s cash profit.
- Column (v) net amortization is the sum of (iv)'s DAC and URL amortization and (ii)'s reserve accrual.

Column (v) shows (i)'s cash profit components together with their net amortization rates. Since we're ignoring the circular relationship between SOP reserves and URL, we'll call these tentative net amortization rates.

$$(b) \bar{k}_{CA} = k + b - k \times b$$

$$(c) \bar{k}_{CD} = 1$$

$$(d) \bar{k}_{CC} = k$$

The “CD” in formula (c) indicates that it applies to all deferred cash items (DE, DB and DR).

Explaining the three tentative net amortization rates is fairly simple.

- Non-deferred cash assessments result directly in amortization of DAC and URL at the net k-factor of formula (a) and in the accrual of the SOP reserve at the benefit ratio. The reserve accrual, as a cost component of gross profit, reduces DAC and URL amortization at the net k-factor. Thus, total amortization and accrual is the sum of direct effects (k+b) minus the secondary effect (k×b).
- Cash deferred items are all applied directly, dollar for dollar, to their respective intangible asset or liability. Hence, a net amortization rate of one.
- Non-deferred cash costs have a direct effect on amortization at formula (a)’s net k-factor but not on SOP reserve accrual.

If there are no front-end loads, there is no unearned revenue, k^R is zero, and formulas (b), (c) and (d) are all we need to calculate the net amortization and accrual for each type of income.

If an SOP reserve is not required, all benefits are in non-deferred cash costs, the benefit ratio is zero, and gross profit equals cash profit. In effect, we return to the simpler world before SOP 03-1 and all gross profit components produce amortization at formula (a)’s net k-factor.

Returning to the circularity between URL and SOP reserve, I have no short explanation of its effect on net amortization rates. However, one simple formula solves the circularity for all three net amortization rates:

$$(e) k_{cx} = \frac{\bar{k}_{cx} + b \times k^R}{1 + b \times k^R}$$

With non-negative benefit ratio and URL amortization rate, each net amortization rate is between the tentative

rate and one. As the product of the benefit ratio and the URL amortization rate approaches zero, the actual net amortization rates approach the tentative rates.

Inserting formulas (b), (c) and (d) into (e) produces actual net amortization rates.

$$(f) k_{CA} = \frac{k + b - k \times b + b \times k^R}{1 + b \times k^R}$$

$$(g) k_{CD} = \frac{1 + b \times k^R}{1 + b \times k^R} = 1$$

$$(h) k_{CC} = \frac{k + b \times k^R}{1 + b \times k^R}$$

Most of our audiences don’t need the precise details of calculating net amortization rates. For those who want to understand why three rates are needed, the earlier explanation should suffice (ignoring the circular relationship). For those who want to understand movements, however, it is important to know approximate values of the three net amortization rates and their applicability to cash profits.

Historical Ratio

The historical ratio is a simple measure of the age of the business. It grows from zero at inception to one when the business ends.

The ratio is simple to calculate—divide the present value of all prior gross profit by the present value of all prior and estimated future gross profit. The time to which profit is discounted (or accumulated) is unimportant, as long as it’s the same for all pieces. My preference is the time of the prior valuation. We can then accumulate history (AVGP) and discount the future (PVGP) so that:

$$(i) h_p = AVGP / (AVGP + PVGP)$$

Alternatively, we can express the historical ratio in terms of cash profits using similar notation.

$$(j) h_p = (AVCP - SOP) / (AVCP + PVCP)$$

If interest accrual on the SOP reserve is excluded from gross profit or offset by an interest adjustment at the crediting rate, formulas (i) and (j) are equivalent. Other methods of applying the SOP may result in slight differences, but either formula can be used.

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When estimated for an established, open book of long-duration business, perhaps including multiple cohorts, the ratio will be fairly stable. At a high level, people who regularly review the business should know the approximate overall historical ratio.

PUTTING THE PIECES TOGETHER

Whenever product cash flows or their projection differ from expected, there is a change from expected amortization, accrual or deferral. The change includes a true up and may include an adjustment to normal amortization. While some prefer to see amortization and true up separately, others prefer to see a net “DAC effect” or “marginal amortization” for the variance. With these tools, we can accommodate either preference.

To effectively explain any variance, current period or present value, it needs to be identified by the three types (deferrable, other assessment or other cost). If more than one has a significant variance, then each must be known.

However the analysis is presented, remember that these formulas measure the combined effect on DAC and related liabilities, including the reserve. If anyone wants to know, for example, the effect on DAC apart from the effect on the SOP reserve, we can accommodate, but that is not needed to explain the bottom-line effect.

Calculations are nearly precise if either the net amortization rate or the historical ratio (but not both) include the variance and if variances of multiple types are applied sequentially.

Such precision, however, would significantly complicate the analysis and would make the explanation dependent upon the explained.

For this purpose, simpler is better—calculate both without variances.

Estimating Amortization and True up Separately

To see true up separately from amortization, we begin with amortization. Once a current cash variance is identified, its effect on total amortization and accrual is simply the product of the variance and the net amortization rate:

$$(k) \text{ Additional amortization} \approx \text{Variance} \times k_{cx}$$

For a variance in a current cash item, a true up will partly offset the additional amortization. For a change in the projection, only the true up is significant. Whatever the difference, true up is approximately the product of the variance, the net amortization rate, and the historical ratio:

$$(l) \text{ True up} \approx \text{Variance} \times k_{cx} \times h_p$$

Estimating the Net DAC Effect

To see the effect of a deviation from expected current cash items in a single number, we simply combine formulas (k) and (l), subtracting true up from amortization:

$$(m) \text{ DAC effect} \approx \text{Variance} \times k_{cx} \times (1 - h_p)$$

For a change in the projection, with no significant effect on normal amortization, the DAC effect is the same as formula (l):

$$\text{True up} \approx \text{Variance} \times k_{cx} \times h_p$$

(Substitute Unlocking or Cumulative effect for True up if you prefer; the formula is the same regardless of terminology.)

EXAMPLES

Having built the framework for understanding, we turn now to examples illustrating its application to real world situations.

Example 1 – A Claim Variance

We begin with a cohort of fixed universal life insurance contracts for which an SOP reserve is required.

From our prior valuation, we find the amounts in table 2 (pg. 7, top).

	Accumulated Value	Present Value		Expected
Deferrable expenses	30,000 <i>AVDE</i>	0 <i>PVDE</i>	300% k^E	0
Cash assessments ⁴	25,000 <i>AVCA</i>	42,000 <i>PVCA</i>		1,500
Deferrable revenue	15,000 <i>AVDR</i>	10,000 <i>PVDR</i>	250% k^R	1,000
Deferrable benefits	3,000 <i>AVDB</i>	20,000 <i>PVDB</i>	34.3% b	500
Other cash costs	4,000 <i>AVCC</i>	5,000 <i>PVCC</i>		300
Cash profits	3,000 <i>AVCP</i>	7,000 <i>PVCP</i>		-300
Intangible asset		25,855 <i>DAC</i>		
Unearned revenue		11,546 <i>URL</i>		
Additional reserve		1,618 <i>SOP</i>		
Net asset		12,691		

From this information, we can calculate the net amortization rates and historical ratio:

$$82.3\% k_{CA}$$

$$100.0\% k_{CD}$$

$$73.1\% k_{CC}$$

$$14\% h_p$$

If everything goes as expected, we will see a \$692 decrease in net intangible asset, including: -\$1,000 from URL deferral; +\$500 from release of reserve; -\$412 (82.3%) from net amortization and accrual on \$500 of non-deferred assessments; and +\$219 (73.1%) from net amortization on \$300 of other costs.

If, however, we see a \$1,000 variation from expected benefits, the k-factors and benefit ratio will change. If there are no other variances, a complete revaluation after the current period will show a \$153 increase in net asset—an \$845 difference from expected to offset the claim variance. Bottom line, the \$1,000 variance costs \$155 in the current reporting period.

To explain this result, we need two ratios: 100 percent net amortization rate and 14 percent historical ratio.

As a reserved-for benefit, we can release \$1,000 of the SOP reserve to offset 100 percent of the extra claim. With a 14 percent historical ratio, we need approximately 14 percent true up (\$140) for an estimated net offset of \$860—within 2 percent of the actual \$845 offset. As a young book of business, GAAP charges most of the cost against future revenue.

In this example, claims were three times expected. That

fact may draw more attention than the DAC effect. Assuming we can deal with that concern, the question may become either (or both of):

Why doesn't the reserve absorb all of the \$1,000 variance?

Why does a \$1,000 variance affect the bottom line by just \$155?

To explain, with 14 percent of expected earnings already recognized, the matching principle requires 14 percent of the added cost to be recognized in current earnings. Because 86 percent of profits are expected to occur in the future, 86 percent of the added cost is spread over that future.

With multiple cohorts in any given line of business, we will inevitably see disproportionate differences between similar variances over successive time periods. The \$1,000 claim variance may follow within a few quarters a \$500 variance that had an offset of just \$190. We're then faced with a different question:

Why does a \$1,000 variance cost half as much as the \$500 variance?

(Net cost of \$155 vs. \$310 after offsets of \$845 and \$190, respectively.)

Understanding the dynamics, we see two possible explanations. Either (1) we made a mistake, or (2) the variances occurred in significantly different cohorts. Assuming no mistakes, we recognize that the earlier variance almost certainly occurred in an older cohort.

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It may also have been in a cohort with no SOP reserve. Working the numbers for both variances will show the relative significance of these effects.

The narrative may be that under the matching principle, GAAP will defer variances only in proportion to remaining revenue. A later variance has less room for deferral.

If the absence of a reserve is a factor, the narrative might explain that GAAP is more forgiving if we fund a reserve to support later claims. With the second variance, we had incurred the cost of accruing a reserve that was now available to release. In the first, we didn't, leaving only partial offset through DAC.

Example 2 – A Large Surrender Variance

Looking at the same cohort as example 1, suppose we experience a significant increase in surrenders. The present value of cash profits drops 5 percent below expected while \$300 of additional surrender charges are realized.

In this example, the net asset will decrease \$988—a \$295 difference from expected. With that offset, the \$300 variance adds \$5 to earnings.

To explain this result, we begin by reviewing the pieces. We now need all three net amortization rates, the historical ratio, and the effect of the additional surrenders on the components of current and projected

Table 3

	Variance	Amortization	True Up	DAC Effect
Current surrender charge	+300	-247	+35	-212
PV of deferrable revenue	-450		-63	-63
PV of non-deferred cash assessments	-1,575		-182	-182
PV of deferrable cash benefits	-975		+137	+137
PV of non-deferred cash costs	-235		+24	+24
Total current period	+300	-247	-49	-296

cash profits. The results of applying formulas (k) and (l) to the variances are shown in table 3 (above).

That's probably more detail than we need to explain. At an estimated \$296 DAC effect, it is little different from the actual \$295 effect.

To explain the result, we first note that this is a large

variance—losing 5 percent more than expected in just one quarter. That's 5 percent of the business, not 5 percent of the expected terminations. Among the present value losses, the two most significant are lower revenue (more than \$2,000 lost value) and lower claims (nearly \$1,000 lower cost). Thus, there are three principal effects of this variance:

- In the current period are \$300 of additional surrender charges, but 70 percent is offset by amortization and reserve accrual—the 82 percent net amortization rate reduced 14 percent for the historical share. That's a DAC offset of roughly \$210.
- Most of the lost revenue is not deferrable, and the 82 percent net amortization rate can approximate the 100 percent rate on the small deferrable share. That leaves about 82 percent of \$2,000 to charge against remaining profits. However, since only 14 percent of profits have been previously reported, only 14 percent is charged to current income—about \$230 of immediate adverse true up. The remainder increases the net amortization rate applied to future assessments.
- On the positive side, the loss of future claims reduces the need to accrue the reserve. Though the reserve need is reduced dollar for dollar with the claim projection, we can allocate only 14 percent to prior profits. The remainder reduces the need for future reserve accruals. Applying 14 percent to the \$1,000 change produces a \$140 favorable true up.

To summarize:

- \$300 additional surrender charge has an immediate \$210 DAC offset.
- Loss of future profits has an additional DAC effect of about \$90.
- Other DAC effects are +\$5 (lower projection of other costs, and residual effects not captured in the approximations).

As in example 1, the biggest “why” question may concern the experience itself:

Why did we have such a deviation from expected surrenders?

Is our assumption bad?

Answers to such questions won't be found in the DAC effects and are outside the scope of this article.

Once the event is explained, we address questions about the net effect on DAC and related liabilities. Perhaps:

Why is the persistency offset as big as the extra surrender charge?

Shouldn't we see some of the extra charge in earnings?

As our analysis demonstrates, some of the additional surrender charge would be allowed into current earnings. However, the additional surrenders hurt future profitability, which also has an immediate DAC effect. A portion of what was expected to amortize in the future must now be charged to the past. In this particular instance, that was sufficient to offset the immediate gain from the surrender charges.

Example 3 – A Mortality Assumption Change

Returning to the original topic, unlocking, we now look at an assumption change. We start with the same business as the first two examples, except the large persistency variance was only a bad dream; it didn't really happen. Several years later, we find that despite some quarters with bad claim experience, mortality has generally been lower than expected. We decide it is time to unlock our mortality assumption.

As a result of unlocking, DAC and URL increase and the SOP reserve decreases, for net favorable unlocking of \$461. To explain the result, we begin with the numbers, first updating the key variables:

80.1% k_{CA}

100.0% k_{CD}

70.2% k_{CC}

97% h_p

In comparing these to previous values, we see evidence of the favorable claim history in the lower net amortization rates. We also notice that, in terms of total estimated gross profit, there isn't much remaining.

As a result of the assumption change, the present value of cash profit increases \$480. Of that, \$475 is in reduced PV of claim costs. The remainder comes from a small positive effect on persistency—\$10 more revenue less \$5 more expense.

Next, we apply formula (1) to the change in present value of each component to determine that net unlocking should be approximately \$465—within 1 percent of the actual result. Of that, the effect of the change in PV of claim costs is estimated to be \$461 ($\$475 \times 100\% \times 97\%$), equal (after rounding) to the actual result.

In this instance, the secondary persistency effect is insignificant. DAC and URL unlocking are insignificant and largely offsetting. These can be ignored in our summary of the numbers.

We now note that the unlocking amount is very close to the total change in present value. To explain, we observe that, given the age of the business, nearly all of the reserve accrual occurred in the past. There is little left except to release the reserve as we pay future claims. Since we now estimate a significantly lower amount of future claims, we can release a portion of accrued reserve.

As the numerical evaluation of this example highlights, GAAP is very unforgiving of significant assumption changes made late in the life of a book of business. The implication of a large unlocking is:

We were wrong, and it took us a long time to realize it.

Though that might never be stated explicitly, it can be seen in some of the "why" questions.

If the old assumption was so bad, why didn't we change it sooner?

Why did we have such a poor assumption before?

If the questioner is familiar with the dynamics described in this article, particularly with respect to age of the business, the questions may be more direct.

Why didn't we improve the assumption sooner, when we had indications that it was bad and when the effect would have been smaller?

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Even if the change had been imperfect, couldn't we at least have avoided such a huge unlocking now?

Such questions are clearly loaded. There may be no safe way to answer them after the fact. Theoretical arguments about credibility and the need for solid evidence as a foundation for a new assumption may seem scientifically valid and emotionally neutral, but they still leave the impression of, "We were wrong—big time!" That, in turn, conveys the message that our judgment can't be trusted.

Sometimes, the honest answer might be, "I wanted to change sooner, but ... wouldn't let me." That answer, however, will not win acceptance or trust.

Perhaps the best way to address such questions is preemptive. Don't wait for the evidence to become overwhelming. In fact, the actual wording of the standard suggests that we shouldn't wait. ASC 944-30-35-7 (FAS 97 ¶25) includes the statement, "Estimates of expected gross profits ... shall be evaluated regularly, and the total amortization recorded to date shall be adjusted ... if actual experience or other evidence suggests that earlier estimates should be revised." If we take this statement literally, we should be unlocking whenever evidence **suggests** a need for revision rather than waiting for evidence to prove a need.

The standard, however, does not guide us in setting new assumptions when evidence is limited. Perhaps that simply recognizes that such changes require actuarial expertise, not accounting.

Combining actuarial expertise with accounting guidance—once you see evidence suggesting a need for revision, become an advocate for change. Partly because evidence is not yet overwhelming or credible enough to warrant a large change, start small.

Using this understanding of FAS 97 dynamics, emphasize that GAAP is much friendlier to small changes than large, especially when they are made early. Emphasize that failure to act would be inconsistent with the accounting standard and may eventually

LOOKING AHEAD – GAAP TARGETED IMPROVEMENT

As I write this, FASB intends to require regular unlocking of traditional (FAS 60) reserve assumptions and move DAC amortization for all long-duration insurance contracts to amount in force. How these will be implemented is still subject to discussion and analysis.

One approach would eliminate DAC retrospective unlocking, but otherwise align traditional reserve unlocking with SOP 03-1 reserve unlocking.

Under such an approach, non-traditional unlocking would change:

- Assessments will have no effect on DAC or URL, removing k-factors from their net amortization rate, leaving only the benefit ratio.
- Other costs will have no effect on the reserve or on DAC, effectively making their net amortization rate equal zero.
- Assessments will replace gross profits in the historical ratio.

For traditional products, the dynamics will be essentially the same as non-traditional except:

- Gross premium replaces gross profit in the historical ratio and assessments in the other calculations.
- A net premium ratio is used in place of the benefit ratio.
- Maintenance expenses are added to benefits in the calculations.

lead to a large, unpleasant result.

Then carefully monitor experience. Make further adjustments when warranted. Eventually, the evidence will provide a sufficient basis for a solid new assumption. With prior adjustments, the effect of a major unlocking effort should be much smaller than it would be by waiting for overwhelming evidence.

SUMMARY

This article introduced a new toolkit for explaining the dynamics of non-traditional (FAS 97) DAC and (SOP 03-1) reserve valuation when experience or new assumptions differ from prior assumptions.

To help put a narrative around these effects, we first visited some fundamental concepts underlying the accounting standards—the matching principle and independence from prior assumptions. We saw how these principles lead to certain effects that have long puzzled many people.

We learned a few simple concepts to help explain DAC effects.

- Cash profits
- Net amortization rates
- Historical ratio

We found that net effects, including the reserve change, can be reliably estimated even without a completed current valuation.

$$\text{Amortization} \approx \text{Cash profit variance} \\ \times \text{Net amortization rate}$$

$$\text{Unlocking} \approx \text{Cash profit variance} \\ \times \text{Net amortization rate} \\ \times \text{Historical ratio}$$

We then saw, through example, how to apply the new toolkit to real events, to identify the principal effects of those events, and to explain the effects. ■



Steve Malerich, FSA, MAAA, is a director at AIG. He can be reached at steven.malerich@aig.com.

ENDNOTES

- ¹ See page 4 of Academy letter to FASB on Targeted Improvements (June 30, 2014): http://www.actuary.org/files/AAA_letter_on_targeted_improvements_063014.pdf.
- ² Originally adopted as FAS 97, subsequently interpreted by SOP 03-1, and eventually codified in various provisions of ASC 944 of the accounting standards codification project. Under these requirements, "DAC and related liabilities" include intangible assets for deferred acquisition costs and deferred sales inducements, and liabilities for deferred front-end loads and additional SOP reserves.
- ³ Anyone familiar with SOP 03-1 will notice that the reserve accrual in column (ii) does not include the interest component of the reserve change. There are different interpretations about how SOP reserve interest should enter into gross profit. One interpretation simply excludes it from gross profit. Two others include the interest, but have an offsetting interest income adjustment—at either the crediting rate or the asset earned rate. In either, interest accrual is part of column (i)'s cash assessments and excluded from column (ii).
- ⁴ Cash assessments include front-end loads (deferrable revenue) but exclude URL amortization. Cash profits exclude both front-end load and URL amortization.

Major Activity at FASB

By Leonard Reback



Leonard J. Reback, FSA, MAAA, is vice president and actuary at Metropolitan Life Insurance Company in Bridgewater, N.J. He can be reached at lreback@metlife.com.

The Financial Accounting Standards Board (FASB) has continued working on its targeted improvements to US GAAP accounting for insurance contracts. During the 4th quarter of 2014 and the 1st quarter of 2015 it made some key tentative decisions on measurement of long-duration insurance contracts, and effectively concluded its project on disclosures for short-duration contracts.

SHORT-DURATION CONTRACTS

Decisions on short-duration contracts probably impact P&C actuaries more than life actuaries. But some life lines of business, such as group or credit insurance, may be impacted by the short-duration contracts project. FASB previously decided not to change the measurement model for short-duration contracts, but determined that some additional disclosures were needed. In March, it apparently finalized the package of additional required disclosures, including:

1. Claims development tables up to 10 years: These are similar to the claim loss triangles in Schedule P of the P&C statutory statements and Schedule O of the Life statements. The tables could cover a period shorter than 10 years if the uncertainty over the claims is resolved over a shorter period.

2. Information about claim frequency: The precise nature of the information will be up to the reporting entity.
3. Development of IBNR and reported claim liabilities.
4. Information about the effect of discounting on claim liabilities: This includes the amount by which the liability is reduced due to discounting, the amount of interest expense recognized in the current period, and the income statement line item within which the interest accretion is recognized.
5. Information about the history of claims duration: This is not required for health insurance.
6. Information about material changes in judgment in the calculation of claims liabilities: This includes the reasons for and the impact of the change.

These new disclosure requirements are due to take effect at year-end 2016 for public companies, and a year later for all other companies.

LONG-DURATION CONTRACTS

Decisions to date:

FASB has previously decided to make targeted improvements to the measurement of long-duration insurance contracts. It began the process in August 2014 with tentative decisions about assumptions for FAS 60 and FAS 97 limited pay reserves (and possibly FAS 120 reserves). It decided to no longer lock-in assumptions, but rather to update assumptions annually in the 4th quarter. It also decided that since assumptions were being updated, there was no longer a need for provisions for adverse deviation (PADs) or for loss recognition/premium deficiency testing on these contracts.

In November, FASB made tentative decisions about the discount rate to be used when calculating reserves for FAS 60 and FAS 97 limited pay contracts, as well as some other liabilities, such as FAS 120 terminal dividend liabilities. It decided that these should use a current discount rate, rather than the locked-in discount



rate used today. It also decided that the current discount rate should be a rate based on a portfolio of high-quality, fixed-income investments. This is similar language to that used in GAAP valuation of pension liabilities, and may not necessarily represent the actual portfolio of assets backing the liabilities.

In February, FASB made some tentative decisions about DAC amortization for all long-duration insurance contracts. It decided to no longer amortize DAC in proportion to premiums or EGPs or EGMs. Rather, DAC would be amortized in proportion to the amount of expected insurance in force over the expected life of the contract. If the amount in force cannot be reliably determined or predicted (such as with variable annuities), straight line amortization over the life of the contract would be used. There would no longer be interest accretion on DAC.

The new DAC amortization approach would also apply to other asset and liability balances that are currently amortized like DAC, such as unearned revenue liabilities and deferred sales inducement assets. However, the effective yield method would continue to be used to amortize DAC for investment contracts that use that method today.

Next steps:

None of these changes will take effect for a few more years, and some may be revised in the interim. We expect that FASB will address a few more issues before issuing an exposure draft of the proposed accounting changes. As of March 2015, some of the issues that are likely to be addressed in the future include accounting for variable annuity guarantees and disclosures. In

addition, some constituents have raised questions about some of the tentative decisions made to date, and these may also be addressed prior to an exposure draft. These questions include:

- When updating FAS 60 reserve assumptions, would the net premium to gross premium ratio be updated as well? Doing so would mitigate financial statement volatility, but raises other questions, such as whether the update would be retrospective or prospective and whether the ratio would be subject to a cap.
- Would the current discount rate be updated every quarter, or only in the 4th quarter as with assumption changes?
- When amortizing DAC, would the expected life of the contracts be updated? If so, would the update be prospective or retrospective?
- With different valuation bases for DAC and reserves, does the elimination of loss recognition testing need to be revisited?
- Does the requirement to update reserve assumptions apply to FAS 120 reserves, and if so does that imply a need to project expected dividends as well as expenses and lapses?

So clearly there is some work to do before FASB can issue an exposure draft, let alone a final standard revising long-duration insurance contract accounting. But FASB has been moving more quickly and more extensively on this project than some constituents were expecting, so we need to keep paying attention. ■

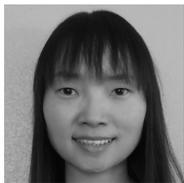
A Refreshed Look at Assumption Governance

SOA Assumption Development and Governance Discussion—1Q15 Calls

By Michael Chan and Min Xu



Michael Chan, FSA, is a manager at PwC. He can be reached at michael.ky.chan@us.pwc.com.



Min Xu, FSA, MAAA, is an assistant vice president at Pacific Life. She can be reached at min.xu@pacificlife.com.

With increased scrutiny on assumptions, companies are ramping up efforts and resources to increase governance around assumptions. This is the third year since the formation of the Assumption Development and Governance Group (the Group).¹ It offers a forum for actuaries to discuss current topics and establish industry contacts. This year the Group established formalized contacts with the SOA Product Development, Financial Reporting, Modeling, and Technology sections to better coordinate assumption-related activities.

The 2015 first quarter discussions took place on two conference calls on March 2 and 3. Representatives from approximately 30 companies were in attendance, and additional participants from these companies listened in. Topics of discussion included 2014 accomplishments and “a-ha” moments, 2015 focus, as well as questions for the group. Several common themes emerged. The most frequently discussed topics include governance structure, documentation requirements, and increasingly, the role of data and advanced analytics in assumptions development. The most common drivers cited for interest/activity in this area include:

- Increased regulatory demands, from both state regulators and federal authorities;
- Anticipation of Principle Based Reserves (PBR);
- Elevated governance and documentation expectations from auditors (internal and external); and
- Good business practice.

We focus below on assumption governance discussions. For people interested in the assumption development discussions, please refer to our article “A Refreshed Look At Assumption Development” in the June 2015 issue of Product Matters.²

FORMAL ASSUMPTION GOVERNANCE COMMITTEES

Companies participating in the calls represented various maturity levels with respect to their governance process. Some are in the beginning stages of setting up a formal governance structure (e.g., newer or smaller companies) while others are already two to three years

into the formal governance processes and looking to fine-tune their processes, and still others have been formally revisiting the established process and contemplating larger changes in response to the business and regulatory environment. One area of consensus is that there remains significant room for improvement and a large amount of work ahead. The participants on the calls were very candid on the realities of their existing processes and findings, making it easy to exchange real insights and better understand different practices. How to handle the increased demands is one of the key challenges that we discuss in detail below.

ANATOMY OF ASSUMPTION COMMITTEES

While consensus is that having formal assumption committees is good governance, across the Group there exists a wide variety of committee structures. However, there are common themes about what constitutes “good practices.”

The first is the centralization of the assumption review and governance committees, across business functions and business units. Having representatives across various “business silos” promotes consistency that may otherwise be lacking. It’s important to note that centralization isn’t about giving up control and decision-making authority, or imposing the same assumptions across business or functional areas, but ensuring that consistent standards and processes apply throughout the company and that any differences are identified, logically supported, and documented.

The Group exchanged other ideas on the governance structure:

- Assumption development versus governance groups: The development groups focus on experience studies, PADs, and peer reviews, while the governance groups focus on the time lines, responsibilities, and documentation standards.
- Insurance versus economic assumptions: Different assumption development processes and expertise necessary to properly review the assumptions could warrant separate governance committees for insurance versus economic assumptions.

- Working versus approval groups: Identify a working group that handles much of the initial iterations of assumption reviews and a separate approval group that handles the final review and approval.
- Stakeholder representation: The governance committees can achieve a balanced view by having representatives across different groups so that decisions are not dominated by certain groups or views. Early involvement of senior management in the review process is key to a more efficient approval process.
- Three lines of defense: A structure often used in large organizations includes divisional technical review and peer review, ERM in-depth review, and audit independent validation. It may be a challenge to coordinate the three lines of defense to avoid duplicating efforts.
- Model governance is closely related to and sometimes overlaps with assumption governance's goals; accordingly, model governance roles and responsibilities should be clear to avoid any gap and duplication. For example, it's important that the approved assumptions are actually implemented as intended in all the models that should use the assumption. At times, an approved assumption (e.g., expenses) needs to be translated into different formats and structures for input to different models ("assumptions of assumptions"); these different assumptions should be reviewed and documented. These tasks and documentation responsibilities may fall under the oversight of the assumption governance committee.

For smaller insurance companies such distinctions may be less meaningful, but they have other unique challenges. The Group plans to continue hosting calls for actuaries from smaller insurance companies in 2015.

BUREAUCRATIC OVERLOAD?

As additional committees and approval bodies come into being, an obvious question comes to mind: Does good governance necessarily introduce bureaucracy and red tape that significantly slows down the decision-making process?

Experiences that participants shared during the calls suggest that some of them have found that assumption governance actually improves decision-making by promoting ongoing involvement and communication among different groups.

The increasing demand for good documentation was frequently mentioned during the calls. This includes the formalization of approvals and assumption implementations (in contrast to older practices of verbal/email confirmations). For example, auditors often look for meeting minutes and reports to understand if actuaries use a good governance process in setting the assumptions. While such a process requires extra work, particularly for actuaries who are not accustomed to thorough documentation, the benefits can far outweigh the additional time required:

- Improve risk management: Enforcing an inventory and documentation of the assumptions draws attention to the areas that were easy to overlook (e.g., older models with assumptions that do not have supporting documentation and may not have been reviewed or updated for many years). Properly documenting assumptions also reduces key-person risk.
- Meet stakeholder needs: Good documentation can be re-used to meet the demands of different stakeholders, including senior management, state and federal regulators, and internal and external auditors.
- Prepare for PBR: Participants expect increasing demands for documentation to support future PBR processes.

Having a formalized template to document and review assumptions is one method to help ensure a more consistent and efficient process. The Group plans to schedule further discussion on this topic in 2015 and we welcome your contributions.

COPING WITH THE INCREASED DEMANDS

A challenge many participants cited is general environmental change. In other words, the formalization

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of assumption committees and increased engagement with senior management has led to significantly increased demands on actuaries to perform additional analysis, fill in any perceived gaps, and in general answer many questions about the assumptions. The Group discussed how best to adapt to the increased demands.

Some participants noted that a formal structure facilitates better engagement and transparency with senior management (which can help actuarial departments more readily justify additional resource requests). Another option suggested was to consider how the assumption governance process can be effectively “triaged.” For example, are there ways to categorize the different assumptions into different materiality levels (whether quantitative or qualitative) to allocate resources more efficiently? Should there be varying “tiers” of review, perhaps at different levels of the organization or based on assumption importance, business size and risk, or the level of judgment involved?

A related governance topic is whether or not quantifications of the financial impacts should be reviewed before determining the assumptions, or whether it’s better to have independent assumption development processes to protect against potential biases in assumption setting. This is an evolving area and even with the best governance, there are situations where assumptions remain more art than science, especially when credibility is limited. While different methods have been tested, it does not appear that a consensus on what may be a “good” approach has emerged yet.

LOOKING AHEAD

We expect 2015 to be another busy year for actuaries who have assumption development and governance responsibilities. Many Group participants plan to continue building their assumption inventories and fill in any remaining gaps. Those with a more complete inventory plan to begin categorizing the assumptions to better establish the differences between their best estimate assumptions versus prudent assumptions, and what margins are embedded across the assumptions.

Many participants also expect to expand their use of predictive analytics, considering the advent of increasingly diverse data sets and sophisticated statistical models. It will be interesting to see how this may affect the governance processes. The increased use of data science for assumption development is covered in more detail in our aforementioned article, “A Refreshed Look At Assumption Development,” in *Product Matters*.

GET IN TOUCH

Discussions take place quarterly. If you are interested in participating or just being in the loop, please contact Liz Olson at olsonl@nationwide.com or 614.249.0605 to get on the distribution list. There is no on-going commitment. Also, please look for our group on LinkedIn by searching for “SOA Assumption Development.” ■

ENDNOTES

- ¹ The Group is sponsored by the Financial Reporting and Product Development Sections.
- ² *Product Matters* newsletters can be found on the SOA website: <https://www.soa.org/news-and-publications/newsletters/product-development/pub-product-development-details.aspx>

The Impact on the IFRS 4 Profit Pattern from Locking in the Interest Rate Yield Curve

By Henry Qi and Emily Zhang

The views expressed herein are those of the authors and do not necessarily reflect the views of their employers.

The OCI-Solution of IASB's IFRS 4 Phase II requires that interest expense for the Profit and Loss (P&L) calculation be based on a yield curve instead of a flat rate locked-in at policy issue. This requirement is different from the approaches used by the other accounting standards. For example, a flat earned rate is used to measure interest expense under US GAAP SFAS 60. Below is a discussion of analysis of the impact from locking in the yield curve on the IFRS 4 profit pattern as well as general conclusions reached.

LOCKED-IN RATE FOR IFRS 4 PROFIT CALCULATION

In order to mitigate the profit volatility caused by interest rate changes, the IASB's IFRS 4 Phase II 2013 Exposure Draft (the 2013 ED) proposed an OCI-Solution:

- the interest expense used to calculate the IFRS 4 P&L is based on the locked-in rate at policy inception; and
- the change in the liability due to interest rate movement flows through Other Comprehensive Income (OCI).

Paragraph 60 in the 2013 ED says: "An entity shall recognise in profit or loss: interest expense on insurance contract liabilities determined using the discount rates specified in paragraph 25 that applied at the date that the contract was initially recognised." The discount rate specified in paragraph 25 is an illiquid risk free interest rate curve.¹ Therefore the discount rate curve derived from the bond market at policy inception must be used for all financial reporting dates to calculate interest expense.

At the IASB March 2014 meeting it was tentatively decided that the option to present the changes in insurance liabilities due to interest rate movements in OCI or P&L is an accounting policy choice. All discussion in this article is for non-participating contracts with an OCI accounting policy; correspondingly, the bonds

backing the contracts are classified as Fair Value through OCI (FVOCI in IFRS 9).

POTENTIAL IMPACT ON IFRS 4 PROFIT EMERGENCE

The IFRS 4 P&L is composed of underwriting gain or loss and investment gain or loss. Investment gain or loss equals investment income less interest expense. If the OCI-Solution is adopted for IFRS 4 liability accounting, the backing assets can be classified as FVOCI in order to have consistent accounting bases for liabilities and assets. The book yields of FVOCI assets become investment income, and the changes in asset market values due to interest rate changes flow through OCI. The FVOCI classification is similar to the Available-For-Sale classification under IAS 39. Both the book values and market values of bonds are tracked. The market values are used for the balance sheet, while the book values are used for the income statement P&L calculation.

Likewise, the liability carrying amount on the balance sheet is measured using the current discount rate curve (Mark-To-Market), and the interest expense for the IFRS 4 P&L is measured using the discount rate curve locked-in at policy inception.

The following is the formula for the IFRS 4 investment gain or loss calculation:

$$\text{Investment Gain } (t) = \text{Bond book value } (t-1) \times \text{Book Yield Rate} + \text{Book Return on Reinvestment this period } (t) - [\text{Liability book value } (t-1) + \text{Time-Weighted Insurance Cash Flow } (t)] \times \text{Locked-in One-Year Forward Rate } (t)$$

Investment gain comes from the spread between the bonds book yield rate and the liability locked-in rate. The bond book yield rate is a flat effective yield, and the typical liability locked-in forward rate is low in the early years and higher in the later years. Therefore, compared to the investment gain measured based on the use of a flat discount rate for interest expense, the IFRS 4 investment gain is expected to be higher in the early years and lower in the later years.



Henry (Xiaodong) Qi, FSA, FCIA, is an actuary with a Canadian life insurance company. He can be contacted at HenryQi2000@gmail.com.



Emily (Yao) Zhang, FSA, FCIA, is an actuary with a Canadian regulator. She can be contacted at EmilyYaoZhang@gmail.com.

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PROFIT PATTERN STUDY ON A SINGLE PREMIUM IMMEDIATE ANNUITY (SPIA)

In this example, a SPIA product was launched in Dec. 2012. The modified duration of its liability cash flows at issue was 14 years. Corporate single A bonds with a 4 percent effective return rate and 14 years duration were used to back the liability. To simplify the analysis, illiquidity premium was ignored and the risk-free yield curve was used to derive the forward yield curve, i.e., the Locked-in One-Year Forward Rate (t) in the investment gain formula above.

Derived from the risk-free spot curve of Dec. 2012, the one-year forward rate increases from 1.1 percent for the first year to 3.71 percent for the 20th year. Therefore, the spread between the bond book yield rate and the liability locked-in discount rate decreases from 2.9 percent in the first year to 0.29 percent in the 20th year. Graph 1 illustrates that the IFRS 4 investment gain is measured based on the decreasing spread.

The following are the discount rates used for the liabilities and the interest expense measurements:

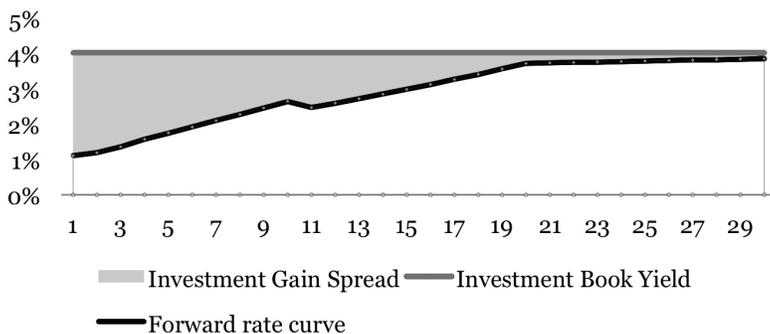
- IFRS 4 liabilities were measured using this one-year forward rate vector (Valuation interest rate or VIR) for each financial reporting date (valuation day): 1.10 percent, 1.19 percent, 1.36 percent, 1.57 percent, 1.75 percent, 1.92 percent, ... 3.85 percent. The discount rate for the year immediately after the valuation day was 1.10 percent, 1.19 percent was the discount rate for the 2nd year after the valuation day, and 3.85 percent was the ultimate discount rate.
- Interest expense was based on a locked-in yield curve, 1.10 percent for the 2013 financial year, 1.19 percent for 2014, 1.36 percent for 2015, etc. with the ultimate discount rate of 3.85 percent for 2042 and later.
- For purposes of comparison, interest expense was also calculated based on a locked-in flat yield, 2.26 percent through all the financial years.²

The interest rate assumptions and the modeling are illustrated in Graph 2. The liability modeling and the financial projections were conducted using AXIS software. The investment income was calculated as the book return (4 percent yield rate) earned on the IFRS 4 liability and the liability cash flow.

Graph 3 illustrates the profits of the SPIA product assumed in this example. Two sets of profits were projected with the interest expense calculated based on the locked-in yield curve and the effective flat rate.

The difference between these two profit patterns is substantial. In the early years, the profits based on the locked-in yield curve are observed to be 40 percent to 60 percent higher than the profits based on the effective flat rate for the interest expense calculation. The profits accelerated to the early years account for 46 percent of the total profits.³

Graph 1
Forward rate curve, bond effective yield and the gap between them (December 31, 2012)





Using a locked-in yield curve instead of a flat rate accelerates the SPIA IFRS 4 profit emergence. Correspondingly, the OCI resulting from the liability side is negative in the early years and then becomes positive, even if the interest rate environment is unchanged.

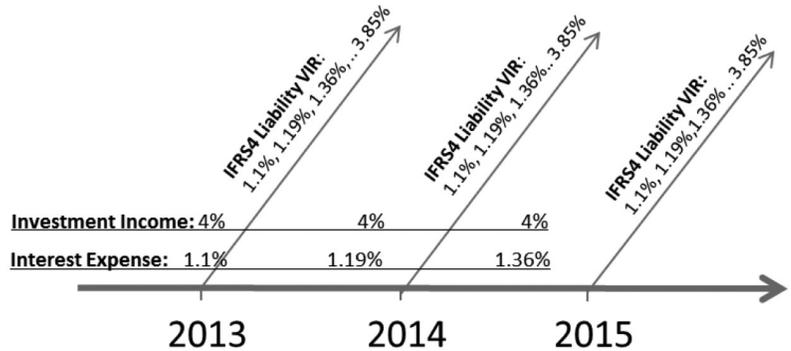
IMPACTS ON OTHER LIFE INSURANCE PRODUCTS AND ANALYSIS

The significance of the profit acceleration effect from the IFRS 4 interest expense approach can be very different for other insurance products. A similar test was conducted on a 20-Year Term policy (Male, issue age 60 and no renewal, issued in Dec. 2012). All the interest rate assumptions were the same as the SPIA study above except that the equivalent discount rate for the liability cash flow was 2.5 percent. The profit pattern of this Term 20 policy is displayed in Graph 4. The difference between the two profit patterns is trivial. The profit accelerated to the early years is only 6 percent of the total profit.

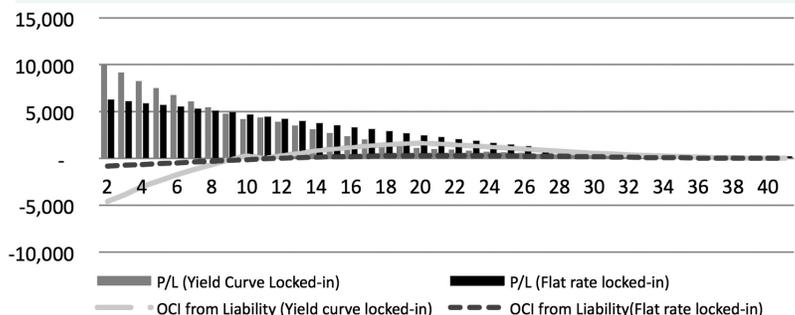
Why are the impacts from the IFRS 4 investment expense approach so different for the different insurance products?

First, the impact is more significant on products with a large interest rate margin component in the present value of profit at policy inception. If the actual experience is the same as the expected assumptions, the IFRS 4 profit is composed of the interest rate margin, the release of risk adjustment, and the release of contractual service margin (CSM). The CSM was ignored in the

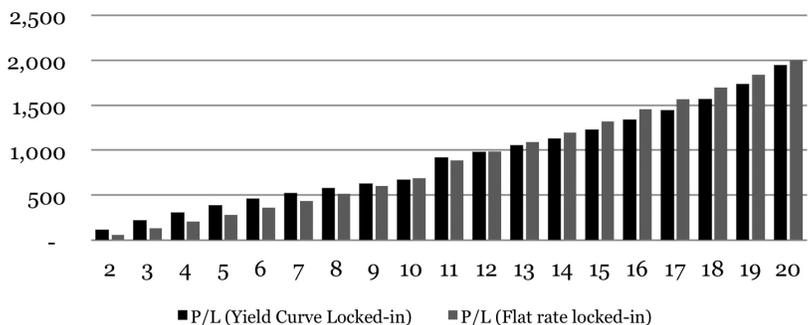
Graph 2 Interest Rates Assumptions for SPIA Financial Projection



Graph 3 SPIA P&L and OCI



Graph 4 T20 P&L



studies as it relies on the premium charged. Therefore the PV of the profit in the studies is made up of interest rate margin and the release of risk adjustment. As illustrated in Graph 5, the interest rate margin dominates the SPIA product's profit while the mortality margin is more prominent for the Term 20 product. As such, the change in the timing of the interest margin release has a more significant impact on the SPIA P&L pattern.

early years and decreases gradually. The SPIA's IFRS 4 liability has a similar shape. In contrast, a Term 20 product's liability has a bell shape (small at the beginning and increases gradually, then decreases). The investment gain is the product of the spread and the liability. The synchrony between the SPIA's liability and the interest rate spread enhances the profit acceleration in the early years.

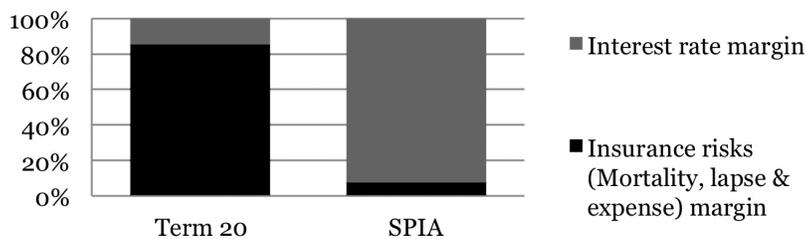
CONCLUSION

The IFRS 4 interest expense presentation approach can accelerate profit emergence, because the locked-in discount rate curve is low in early years and high in later years. The impact differs by product. A product with profit mainly from the interest rate margin and with a large liability in early years will have a noteworthy profit acceleration. ■

ENDNOTES

- ¹ This is not true for participating policies. This paper is only for policies without participating features.
- ² The present values of the fulfillment cash flows at policy inception, calculated using the forward rate curve and the flat 2.26 percent rate are the same.
- ³ Calculated as $\text{Sum}[\max(\text{P\&L from locking in yield curve} - \text{P\&L from locking in flat rate}, 0)] / \text{Sum}[\text{P\&L for all the coverage periods}]$

Graph 5
Earning By Source



Second, the impact is more significant on products with a large liability at the early policy years. As shown in Graph 1, the spread between the asset book return rate and the locked-in yield curve is large in the

On the Research Front

VBT RECOMMENDATION RELEASED ON MORTALITY IMPROVEMENT RATES

The SOA released a recommendation from the Preferred Mortality Project Oversight Group's Valuation Basic Table (VBT) Team for a set of improvement factors that vary by gender and attained age to be used in conjunction with the 2008 VBT for AG-38 purposes for year-end 2014. Excel files are available on the smoothed rates and the mortality improvement rates smoothed and rounded.

Automating and Optimizing Financial Processes

By Andrew Chan

In 2012, JPMorgan's Chief Investment Office (CIO) suffered large trading losses. In its internal investigative task force's report, it disclosed that its Value-at-Risk (VaR) model "operated through a series of Excel spreadsheets, which had to be completed manually, by a process of copying and pasting data from one spreadsheet to another."¹

Does this sound familiar? There are manual processes in most of our Excel reports. After the losses, the internal Model Review Group also identified other errors. For example, "After subtracting the old rate from the new rate, the spreadsheet divided by their sum instead of their average, as the modeler had intended. This error likely had the effect of muting volatility by a factor of two and of lowering the VaR ..."

This sounds remarkable and you may wonder why the Model Review Group did not discover the errors during their initial review. The report explained:

"the trader to whom the modeler reported wrote that he should "keep the pressure on our friends in Model Validation and [Quantitative Research]." There is some evidence the Model Review Group accelerated its review as a result of this pressure, and in so doing it may have been more willing to overlook the operational flaws apparent during the approval process."

Most model reviewers probably have the same experience; the modeler uses all the project time to develop the model and then forces the reviewer to get the job done in an impossible timeframe. In order to meet the deadline, the modeler often suggests that a high level review would be sufficient; the reviewer simply does not have time to review every single formula. Even if the reviewer finds something obviously wrong, the modeler would still push the model to production and promise to fix it as soon as possible (and often doesn't follow through because the modeler has other higher priorities).

We are in the 21st century! So why are we still having this problem?

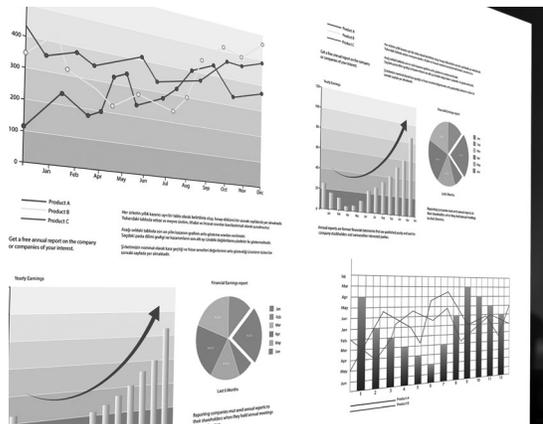
AUTOMATION

Automation can significantly increase productivity and release resources for other more critical initiatives. It can also minimize human error and even improve team morale. So why are there still so many processes that are not fully automated?

It is a chicken and egg question. We are so busy because we do not have time to automate our processes and we do not have time to automate our processes because we are so busy! We all have a hard time meeting the deadlines from yesterday and we do not have free time to familiarize themselves with available technology. Some Excel users probably only know 10



Andrew Chan, ASA, is an Actuarial Systems Consultant at ALG Inc. He can be contacted at chan_a@algconsultings.com.



percent of Excel features; they may be still using Excel 95 features when they have been using Excel 2010 for more than two years. They use Excel for everything because they do not know that there are other tools that would fully automate their processes.

Another problem is that not all applications are designed for automation. They crash a lot and often require manual intervention to recover from error. Unfortunately, the owners prefer quick fixes rather than a long-term solution.

There may be other reasons, but the bottom line is that automating a routine report process can streamline the whole process.

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Knowledge is power! If you know the right tool, then you will find automation can be quite straightforward. And if you know the right methodology, you can even reuse the same processes to handle all reports.

OPTIMIZATION

“There is nothing broken!”

Whenever it is suggested to companies to optimize their processes, this is the number one reply: “Nothing is broken.” That may be true in the sense that the results are correct. However, the application may take days or even weeks to run. They may be able to meet the routine deadline, but if their senior management wants to run a few more scenarios for tomorrow’s management meeting, then they have to provide guestimates. And when there is any unexpected result, they have no time margin for extra analysis.

One of the main challenges for End User Computing (EUC) applications is key man syndrome, i.e., only one person knows the application. Without any proper system documentation or review, how can someone else understand such gigantic, spaghetti structure Excel applications? As a matter of fact, sometimes even the owner has difficulty enhancing his or her own applications; adding a simple reporting line can take days or even weeks. If he or she leaves the company, the application may become a black box that no one else will be able to operate or enhance.

We can proactively optimize our applications in an organized manner or wait until the fire burns us. The JP Morgan 2012 CIO loss may be a good lesson for those who still say “Nothing is broken!”

QUALITY ASSURANCE

One of the big misconceptions about EUC Quality Assurance (QA) is that modelers are the users and they are very knowledgeable so there must be no bugs. The truth is that we are human beings and we all create bugs, so EUC applications need QA. Another misconception is that high level checking is sufficient. There can be multiple bugs that offset each other. As a matter of fact, sometimes when we fix a bug the high level results actually shift away from our expected results because we simply broke the balance. The most common QA challenge is that we do not have enough time. If the JP Morgan trader had a time machine to go back to 2012, I believe he would definitely assign enough time to allow the Model Review Group to do its job. Once we understand the importance of QA, we will allocate sufficient time.

CONCLUSION

There are costs associated with automation, optimization, and QA. The tasks can be very demanding. Unfortunately, most business units do not have their own development teams. The application owners are part-time programmers who do not have any formal training; they do not have the expertise to choose the appropriate tools and they do not have sufficient time to develop a proper process. Developing a robust, fully-automated, and highly effective financial process requires investment in training, qualified professionals and a shift in working culture, i.e., working smart rather than working hard. ■

ENDNOTE

- ¹ Report of JP Morgan Chase & Co. Management Task Force Regarding 2012 CIO Losses http://files.shareholder.com/downloads/ONE/2272984969x0x628656/4cb574a0-0bf5-4728-9582-625e4519b5ab/Task_Force_Report.pdf

Continuing Education

By Henry Siegel

Actuaries and other professionals rightly put great importance on continuing education (CE). After all, without remaining knowledgeable about recent developments in one's field, actuaries cannot truly claim to be competent at what they are doing, the first requirement for being a professional. This is why our professional organizations have continuing education requirements. To my surprise I received a request a few days ago from the Society of Actuaries (SOA) to provide documentation that I had met the SOA's CPD requirement, as I had maintained in the Actuarial Directory.

There must be, however, a point at which one stops being educated and actually starts to do things; continuing education should not be for its own sake.

The International Accounting Standards Board seems to have taken the concept of continuing education to new extremes. It has been working on the insurance contracts project for well over a decade now and is still having educational sessions on basic issues. It may well be that by the time this article is being read, education will have been abandoned and decisions will have been reached. I hope so, just as I hope those decisions make sense.

In the first quarter of 2015, however, education was still largely the order of the day. Those educational sessions covered levels of aggregation for participating and non-participating contracts and profit recognition for certain participating contracts. These issues cover the vast bulk of long-duration contracts issued in Europe and might cover a substantial portion of contracts in North America as well.

JANUARY MEETING

In its only decision-making session of the quarter, the IASB met on January 22 to discuss transition relief. It did so because the earliest possible effective date of the new insurance contracts standard will be after the mandatory effective date of the new IFRS 9 on Financial Instruments.

"The IASB tentatively confirmed the transition relief proposals in the 2013 Exposure Draft that, on the initial application of the new insurance contracts Standard:

- a. an entity is permitted to newly designate financial assets under the fair value option as measured at fair value through profit or loss to eliminate (or significantly reduce) an accounting mismatch in accordance with paragraph 4.1.5 of IFRS 9;
- b. an entity is required to revoke previous fair value option designations for financial assets if the accounting mismatch that led to the previous designation in accordance with paragraph 4.1.5 of IFRS 9 no longer exists; and
- c. an entity is permitted to newly designate an investment in an equity instrument as measured at fair value through other comprehensive income in accordance with paragraph 5.7.5 of IFRS 9 and is permitted to revoke previous designations."¹

The board also tentatively decided:

- "a. to consider providing further transition relief to permit or require an entity to reassess the business model for financial assets at the date of initial application of the new insurance contracts Standard. This reassessment would be based on the conditions for assessing the business model in paragraphs 4.1.2(a) or 4.1.2A(a) of IFRS 9 and the facts and circumstances that exist at the date of the first application of the new insurance contracts Standard; and
- b. not to consider deferring the mandatory effective date of IFRS 9 for entities that issue insurance contracts."²

These decisions were relatively non-controversial since they would allow entities to measure their assets and liabilities consistently in certain circumstances that would otherwise be difficult to achieve due to the differing effective dates of the new standards.



Henry W. Siegel, FSA, MAAA, is a semi-retired actuary most recently with New York Life Insurance Company. He can be reached at henryactuary@gmail.com.

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FEBRUARY MEETING

The IASB met on February 19 at an education session. The topic of this session was on the level of aggregation required for issues such as initial loss recognition and unlocking of the Contractual Service Margin (CSM) for participating and non-participating contracts. While no decisions were made at this meeting, there appeared to be a clear consensus on the approach the board preferred.

The board clearly stated that entities should recognize at issue losses on all contracts that are expected to be loss-making over their lifetime. This is in parallel to the decision to not recognize at issue profits on profitable contracts by setting up the CSM. The problem with this position, however, is that it states it at the contract level. Not only could this cause significant administrative issues, but it's contrary to both the principle of insurance, which relies on the performance of large groups of contracts, and the manner in which companies manage their business.

In further discussion, industry members have raised significant problems with this approach. Consider, for instance, situations in which companies are required to use unisex pricing on annuities. In this situation, all policies issued to women would be loss-making while those issued to men would be profitable. Companies manage this situation by looking at the combined results and attempting to manage the relative percentage of males and females. The board's position would require the losses on the policies issued to women to be recognized at issue, however, while the profits on those issued to men would only be recognized over the lifetime of the policies. This would result in financial statements that give an impression of the results far different from how management looks at them.

There are other situations where similar things happen. Sometimes companies have a broad range of underwriting policies where "standard" can be a maximum of 30 percent of expected mortality or more. Those at the top of the range may have expected losses.

Consider further the situation after issue. Certain groups of policies may evidence losses. For instance, an entity may have underpriced morbidity for issue ages 40-45. Should the entity be required to recognize those losses immediately while there are unanticipated gains for other age groups that are absorbed by the CSM? Where is the line drawn?

The precise guidance the board gives on this issue will greatly affect the results a company shows soon after the effective date. Companies that have not been showing losses under US GAAP, for instance, may well need to show them here. Furthermore, going back and reconstructing potential loss recognition from the past will not be an easy task.

For reasons I don't completely understand, the board seems to be extremely concerned that insurers are hiding the effects of loss-making contracts on their financial statements by combining their results with profitable contracts. I can understand this concern to some extent, but the solution seems unduly extreme. The level at which loss recognition should be done is at the product level, not the individual contract level. Hopefully when this issue is discussed for a decision, a more reasonable view will prevail.

MARCH MEETING

The IASB met on March 19 at another education session. The IASB discussed three key issues concerning contracts with participation features:

- “• if and how the contractual service margin should be adjusted to reflect changes in entity's share of underlying items;
- how to determine interest expense in profit or loss; and
- how the amounts in the contractual service margin should be allocated to profit or loss as the entity provides services to the policyholder.”³

The first issue dealt primarily with contracts that have a direct relation between participating payments and

investment performance.⁴ A pure variable annuity would be an example of such a contract. The staff also opined that European-style 90/10 contracts, where the policyholder is guaranteed 90 percent of the profits on the book of business, or unit-linked contracts would also be covered. Of some interest, U.K.-style participating contracts are also anticipated to be covered since they promise distribution of most of the profits of the company. Staff did not think Universal Life contracts would be included.

The precise criteria for when contracts would be covered by this concept were debated at some length. Staff proposed three criteria that would need to be met:

“(a) the contract specifies that the policyholder participates in a clearly identified pool of underlying items. ...

(b) the entity expects that a substantial proportion of cash flows from the contract will vary with changes in underlying items. ...

(c) the entity expects the policyholder to receive an amount representing a substantial share of the returns from underlying items.”⁵

If a contract met these criteria, it would be treated as if it was a variable investment fee arrangement and profits would emerge as a percentage of assets. Specifically, variances in investment results, as well as changes in embedded derivatives, would be absorbed by the CSM while they would not be for other contracts. In addition, interest expense in the income statement would be set equal to the investment income on the underlying assets rather than the book yield or effective yield as were previously proposed.

There are several issues with these criteria. What does a “clearly identified pool” mean? Could it mean the entire company? Could it mean a pro-rata share of a general account? Guidance would be needed to clarify this. How this is resolved could have significant impacts on U.S. contracts.

For instance, a variable annuity contract with a fixed account might not qualify under these criteria if the fixed portion is not participating in a clearly identified pool. Would participating contracts issued in the United States qualify if they don’t specify participating in a pool of assets, only that dividends will be paid? How about a variable annuity with a fixed annuity payout option? All these contracts were written before these accounting standards, of course. Could they be given some kind of dispensation if the clear intent and practice meet the criteria even if the contractual language is absent?

Hopefully the staff and board members will think this issue through prior to any decisions being made. The concept has benefits, particularly for pure variable and unit-linked contracts.

The board’s discussion on how the CSM should be recognized was not without controversy. Staff and some board members proposed recognizing it over time. Others proposed using a driver such as mortality costs as the basis. Using time as the basis has some appeal since it’s simple to understand and explain. However, it may result in recognizing profit in a manner that is not consistent with how services are provided under the contract or how risk is released. More discussion should be had on this issue as well.

It has indeed been a long time that the IASB has been discussing insurance accounting. We need to stay involved because, as I’ve also said many times

Insurance Accounting is too important to be left to the accountants! ■

ENDNOTES

¹ From the January IASB Update

² Ibid

³ From the IASB Update for March, 2015.

⁴ It can also be things other than assets such as the performance of the entire company or some kind of external index.

⁵ From Staff Paper 2A for the March IASB Meeting

Update on Regulatory Development

By Francis de Regnaucourt



Francis de Regnaucourt, FSA, CERA, FCIA, MAAA, is a director at KPMG. He can be reached at fderegnacourt@kpmg.com.

This is a quarterly update on developments at the National Association of Insurance Commissioners (NAIC), the International Association of Insurance Supervisors (IAIS), as well as other groups who may get involved in group supervision, with emphasis on those that may be important to members of the Financial Reporting Section.

The Life Actuarial Task Force (LATF) met at the NAIC Spring Meeting in March. I report below on a few items that may be of interest to members of the section.

In March, the Federal Reserve reported on the results of the 2015 Comprehensive Capital Analysis and Review (CCAR) for the 31 largest banks. The Board objected to two of the banks' plans, did not object to 28 of them, and conditionally did not object to the last one. It is expected that the Fed will also require CCAR from non-bank Systemically Important Financial Institutions (SIFIs) once it defines a capital framework for them.

On the international side, the IAIS published the compiled non-confidential responses to its Consultation Document on Insurance Capital Standards (ICS) for Internationally Active Insurance Groups (IAIG) that were due in mid-February.

LATF MEETING AT THE NAIC FALL MEETING, PHOENIX, MARCH 26 AND 27, 2015

I report here only the highlights of the meeting; complete details are in the minutes produced by the NAIC and available on their website. There was forward progress on many ongoing projects, but without notable landmarks; I do not report on those.

NEW VALUATION MORTALITY TABLE

Mary Bahna-Nolan (AAA Life Experience Subcommittee) presented developments on the 2014 VBT and the accompanying CSO table. Risk rating tables are now complete; there will still be 10 tables (in order to not require system changes), but the proposed structure is being changed. The lowest is now the RR50 table (previously RR70). The tables are currently being exposed by LATF for adoption.

Proposed margins for the draft CSO 2017 table are about 18 percent in aggregate. This is lower than in the past because there is more data than in the past (439 percent additional exposures by face, 52 percent by number of policies), resulting in greater statistical significance of the data. No explicit margins are proposed for catastrophes, or random variations; the idea is that those events are covered by capital, not reserves. The CSO table will be exposed once the impact study (on cash values and statutory and tax reserves) is complete.

There remains an open question of having different margins by rating class, to reflect the different statistical credibility of the different classes, but several regulators questioned this approach.

VM-22 WORKING GROUP

The Working Group took a step back this quarter to re-evaluate its approach. The scope of VM-22 (non-variable annuities) includes a broad variety of annuity products:

- Deferred Annuities, Deposit Funds
- Immediate Annuities, Structured Settlements
- Two-tiered Annuities
- Deposit Funds
- GICs, Stable Value
- Longevity Insurance
- Indexed Annuities
- Guaranteed Living Benefits on Annuity Products
- Contingent Deferred Annuities
- Modified Guaranteed Annuities

The table below summarizes the three possible approaches considered by the Working Group, and the advantages and disadvantages identified to date:

Proposed Method	Specifics	Advantages	Disadvantages
Replicate VM-20	<ul style="list-style-type: none"> • Include formulaic floor, similar to AG 33 • Develop stochastic exclusion test for non-variable annuities • Stochastic reserve assumptions parallel VM-20, use economic scenario generator, and set reserve at CTE70 	<ul style="list-style-type: none"> • Internal consistency • Most flexible with respect to new features 	<ul style="list-style-type: none"> • Greatest complexity • Heavy work burden for small companies
Representative Scenario Method	<ul style="list-style-type: none"> • Use a small number of representative, deterministic scenarios to approximate stochastic results • Base scenario, plus four alternative scenarios (+1, -1, +3, and -3 standard deviations) for each key product risk driver 	<ul style="list-style-type: none"> • Simplifies stochastic calculations • Readily adaptable to product features 	<ul style="list-style-type: none"> • Needs validation
Modernized Formulas	<ul style="list-style-type: none"> • Keep current SVL framework • Propose fixes to "right-size" reserves 	<ul style="list-style-type: none"> • Pragmatic • Reduces work burden 	<ul style="list-style-type: none"> • Needs product by product assessment • New products may require special study

CONTINGENT DEFERRED ANNUITY (CDA) SUBGROUP

This subgroup has three charges:

- Exempting CDAs from nonforfeiture regulations;
- Clarification and consistency with Stable Value requirements;¹ and
- Proposing revisions to AG43 for CDAs.

Bernie Birnbaum (Center for Economic Justice) opined that the first charge was controversial. Much of the discussion was focused on proposed wording for AG43 amendments to cover CDA valuation.

IUL ILLUSTRATIONS

IUL illustrations remain a hot topic, and there was a 90-minute discussion of a draft Model IUL Illustration Regulation presented by Fred Andersen (Minn). A delegation of industry representatives and the Academy, as well as Bernie Birnbaum, participated in the discussion. A new draft is expected shortly for exposure as a result. Mike Cebula (N.Y.) stated that New York was working on amendments to its own Regulation 74, and voted against exposure of the new draft.

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AGGREGATE MARGINS

Mark Birdsall (Kan.) and Steve Strommen made a presentation on aggregate margins for VM-20. They argued that stacking individual margins for different risks may not be appropriate, as it can: (a) be overly conservative, and (b) ignore correlations between individual risks. Implicit margins may further obscure the measurement of conservatism. They propose a total aggregate margin around a true central estimate in order to better measure conservatism and create more consistency around product types based on risk.²

2015 CCAR RESULTS FOR BANKS

On March 11, 2015, the Federal Reserve published the results of the 2015 CCAR results for the 31 largest Bank Holding Companies (BHC).³ Based on the results of the review, BHCs may proceed with their capital plans if the Fed does not object. Objection may occur on quantitative grounds—if the CCAR shows capital levels falling below required levels in one of the scenarios; or qualitative grounds—if the Fed does not believe the BHC's capital models are robust enough to support a conclusion.

This year, it objected to only two plans, both on qualitative grounds. In a few instances, BHCs adjusted their capital plans before obtaining non-objection. In another instance, the Fed did not object to the capital plan, but is requiring the BHC to submit a new capital plan to address weaknesses in its capital planning process.

These 31 banks represent more than 80 percent of assets held by domestic BHCs. CCAR is in its fifth year, and the Fed commented that average capitalization ratios increased from 5.5 percent to 12.5 percent since 2009, the first year of CCAR.

IAIS CONSULTATION DOCUMENT ON ICS

On March 6, 2015, the IAIS published a compilation of responses to its Consultation Document on International Capital Standards (ICS)⁴ (confidential comments excluded). There were 55 respondents including actuarial associations and industry associations from several countries, regulators, audit firms, industry consultants, the U.S. Chamber of Commerce, the Central Bank of the Russian Federation, and a number of insurance groups:

- ACE Group
- Aegon NV
- Aflac
- AIA Group
- American International Group, Inc.
- Cathay Life Insurance Company
- Cincinnati Insurance Company
- CNA
- Genworth
- Liberty Mutual Insurance Group
- MassMutual Financial Group
- New York Life
- Northwestern Mutual Life
- Prudential Financial, Inc.
- Swiss Reinsurance Company
- Transatlantic Reinsurance Company
- Zurich Insurance Group

Readers are warned that the summary of responses has more than 1,300 pages. That said, the responses should form the foundation of the next version of ICS. ■

ENDNOTE

- ¹ CDAs and Stable Value products have this in common: both can have benefits tied to the value of a block of assets not on the insurer's books.
- ² The results of a study sponsored by the Kansas Insurance Department can be obtained from Steve Strommen at stevestrommen@blufftop.com.
- ³ Press release available at: <http://www.federalreserve.gov/newsevents/press/bcreg/20150311a.htm>
- ⁴ Responses available at: <http://iaisweb.org/index.cfm?event=getPage&nodeId=25229>

PBA Corner

By Karen Rudolph

The views expressed in this article are those of the author and do not necessarily reflect the views of Milliman nor are they intended as methods of regulatory or tax compliance.

UPDATE ON STATE ADOPTION STATUS OF PRINCIPLE-BASED RESERVES

As of mid-March 2015, 21 states have passed the Standard Valuation Law revised to require principle-based reserve (“PBR”) valuations. These states include: Ariz., Conn., Fla., Hawaii, Ind., Iowa, La., Maine, Mich., Miss., Neb., N.H., N.J., N.M., Ohio, Okla., R.I., S.D., Tenn., Va., and W.V. Total premium contributed by these 21 states, based on 2008 annual statement data, is 36 percent. This implies a gap of 21 states and 39 percent of premium in achieving an operative date for the Valuation Manual. Thirteen other states (Colo., Kan., Ky., Md., Wash, Texas, Mo., Mont., Nev., N.D., Ill., Ga. Vt.) have introduced the legislation and are in various stages of approval. These 13 states represent approximately 24 percent of premium. Should the states with bills in-progress complete the adoption during 2015 sessions, the gap narrows to eight states and 15 percent of premium.

SMALL COMPANY EXEMPTION PROVISION

During a Life Actuarial Task Force (LATF) conference call in mid-March, this group adopted an exemption that permits qualifying companies to forgo the requirements of VM-20 and instead allows them to follow VM-A and VM-C for their Ordinary Life policies. VM-A and VM-C are appendices of the Valuation Manual which include the minimum reserve requirements for policies issued before the operative date of the Valuation Manual. This has the effect of maintaining status quo for qualifying companies with respect to methodology. These companies would be allowed to recognize changes in valuation mortality tables and valuation interest rates, as is done currently.

The qualifying criteria include:

1. The company has less than \$300 million of ordinary life premiums and, if the company is a member of an NAIC group of life insurers, the group has combined ordinary life premium of less than \$600 million; and
2. The company reported Total Adjusted Capital of at least 450 percent of the authorized control level

RBC in its most recent RBC report, and the appointed actuary has provided an unqualified opinion on the reserves; and

3. Any ULSG policies issued or assumed by the company with an issue date on or after the operative date of the Valuation Manual meet the definition of a non-material secondary guarantee ULSG product.

The premium amounts noted in item 1 above are to be measured as direct plus reinsurance assumed from unaffiliated companies from the Ordinary Life line of business reported in the prior calendar year’s annual statement, Exhibit 1, Part 1. Companies that qualify need not demonstrate any product-level exclusion tests. The company would file a statement of exemption with its domestic commissioner prior to July 1 of the year of exemption. The statement is assumed approved unless the Commissioner rejects the statement, which must be communicated prior to September 1 of the same year. Should the Commissioner reject the statement of exemption, the company is required to follow the VM-20 requirements for its Ordinary Life policies. This implies the company could elect to perform the product-level exclusion tests, if applicable.

Along with this new amendment, a definition of ‘non-material secondary guarantee’ becomes necessary. The definition, approved in concert with the small company exemption described above, consists of a premium limitation and a guarantee length limitation.

1. The policy can have only one secondary guarantee provision in the form of a required premium type, not a shadow account type; and
2. The duration of the secondary guarantee is no longer than 20 years from issue for issue ages through age 60, grading down by 2/3 year for each higher issue age to age 82, and limited to five years for issue ages 83 and higher; and
3. The present value of the required minimum premiums under the secondary guarantee must be at least as great as the present value of net premiums over the maximum secondary guarantee duration allowable under the contract. This is an aggregate test and the basis for calculating the net premiums uses



Karen Rudolph, FSA, MAAA, is a consulting actuary at Milliman Inc. She can be reached at Karen.rudolph@milliman.com

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VBT rates (preferred structure allowed, but subject to existing qualification requirements) and the maximum valuation interest rate specified by VM-20 Section 3.

The motivation for this amendment was two-fold. First, it was felt that the product-level exclusion tests were onerous for a small-size company to perform, and companies in this size tier are content to continue with current reserving methods and practices. Second, the regulators sensed that advancing PBR legislation through states considering adoption would be facilitated by small company considerations.

NEW CSO VALUATION TABLE DEVELOPMENT

Preliminary versions of both the 2017 unloaded CSO and the 2017 CSO have been made available to companies participating in the research jointly sponsored by the Society of Actuaries (SOA) and American Council of Life Insurers (ACLI). Historically, when a new valuation table was developed, the actuarial team responsible for its development would evaluate its effect on simple term and whole life product designs. With this table the approach chosen is to put it through its paces via a “field test” of sorts. During first quarter 2015 participating companies evaluated all the various versions of the new valuation tables (preferred structure, smoking-distinct structure, composite structure) as well as the formats (select and ultimate; ultimate). Several actuarial conferences have highlighted this table and its development in breakout sessions. By publication time of this article, preliminary results should be available for review.

As part of the field test, companies are also evaluating the 2014 VBT, which is the underlying basis for the 2017 CSO. A VM-20 deterministic reserve calculation will be used to calibrate not only the new table against the current table, but also the net premium reserve (NPR) against the deterministic reserve. Insights gained through this analysis will inform future definitions of NPR. ■

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