

# The Financial Reporter

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SECTION

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Chairperson's Corner

## PBR is Here ... Pricing, Valuation and Risk Management in a New Paradigm

By Leonard Mangini

**A**t the recent Life and Annuity Symposium in Nashville, I was a panelist for Session 21—also broadcast and available as a live SOA webinar—and discussed the impact that PBR will have on the Product Development Process. The main theme of my part of the presentation was that pricing, valuation/financial reporting and risk management actuaries will need to work much more closely together due to the impact that the Valuation Manual will have on assumption setting, reinsurance, and governance. This article touches on the high level themes and I invite you to explore the session slides or the full SOA webinar to see how your role as a qualified or appointed actuary might play out.

My first assertion was that pricing actuaries are typically closest to the underlying experience data and risk classification used to set prudent estimate assumptions. Qualified Actuaries (as defined under VM-G) who review and certify that PBR assumptions, methods and models are appropriate and Appointed Actuaries who opine on the adequacy of PBR reserves are likely to BOTH be relying on product actuaries for appropriate documentation of company experience. They will no longer be operating in silos setting their own assumptions, but will be working together and with risk management to have “one view of the truth.”

The next assertion was that the role of reinsurance in the product development process would necessarily impact both product and financial reporting actuaries. Consider that the ceding company and each of its reinsurance pool members will have their own set of credible experience for a particular product potentially leading to different underlying assumptions and especially different credibility-based margins despite the same product design and underwriting. “Mirror-reserving” is gone in a PBR world. The ceding company may have early adopted PBR and the reinsurer might not have (or vice-versa). Both might have adopted, but one party might be holding a Deterministic Reserve (DR) and the other an NPR reserve for the same risk. The PBR reserve “credit” taken on the cedant’s financial statements

for reinsurance will be the difference between the reserve calculated by the cedant with and without reinsurance and NOT involve the reinsurer. If one of these is a DR and the other an NPR the impact of reinsurance won’t be linear! If the reserve “credit” taken by the cedant and the reserve held by the reinsurer don’t match (and they don’t have to) this might not be economically reflected in the reinsurance rates! This suggests that reinsurers will and should be involved much earlier in the product development process and that both the pricing and valuation actuaries at these multiple counter-parties must be actively involved in discussions with each other from the start in determining the impact on reserves and emergence of profits for all parties.

Another assertion was that if the company does have “one version of the truth” as to the anticipated experience that is communicated to stakeholders, there will likely be different margins for pricing uncertainty, valuation conservatism, and solvency-level capital. In an ERM/ORSA world this impacts implementation of controls. Will assumptions and margins be “set on high”? Will pricing, valuation and ERM all have a seat at the table? Will these be set at the business unit level with governance and controls in corporate?

How will modeling be performed and therefore governed and controlled? Centralized teams with pricing and valuation and ERM as “internal clients”? Multiple independent business unit subject-matter expert modeling teams with separate corporate modeling teams for valuation and ERM to validate the results? Will financial reporting actuaries be the natural candidates for these modeling teams or ERM or “company quants” be doing this work?

Can corporate strategy be just within the purview of senior management? If block of business A is in the same “PBR segment” as block of business B which benefits from “internal hedging” and block A is sold in an M&A transaction it can change the PBR reserves and profitability for block B! Can you really have “secret corporate development teams” pursuing M&A that don’t include a broader team of both product and valuation PBR technical experts to analyze these knock-on impacts?

... pricing, valuation/financial reporting and risk management actuaries will need to work much more closely together. ...

All of this will involve new processes and controls that must be integrated with the company's existing ERM program, internal audit, external audit and regulators. So valuation actuaries will need to be relying on pricing documentation, complying with VM-31 documentation and preparing PBR Actuarial reports, and interfacing even more with ERM and compliance functions of the insurer.

The common theme is that your role within the company is about to change and you'll be involved in much more than setting reserves. Please be on the lookout for a series of five PBR-related webinars that started in July and are being jointly sponsored by the Financial Reporting and Smaller Insurance

Company Section Councils that address some of these issues. We also have sessions at the Valuation Actuary Symposium and Annual Meeting that might be helpful as you adjust to these changes. ■



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# GAAP Targeted Improvements— Illustrated Term Insurance Earnings

By Steve Malerich

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

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

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

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

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

## EXPECTED EXPERIENCE

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

Table 1

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

## Early Years

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

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

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

Table 2

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

## Later Years

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

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

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

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

#### Lifetime

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

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

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

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

#### Random Variances

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

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

Chart A

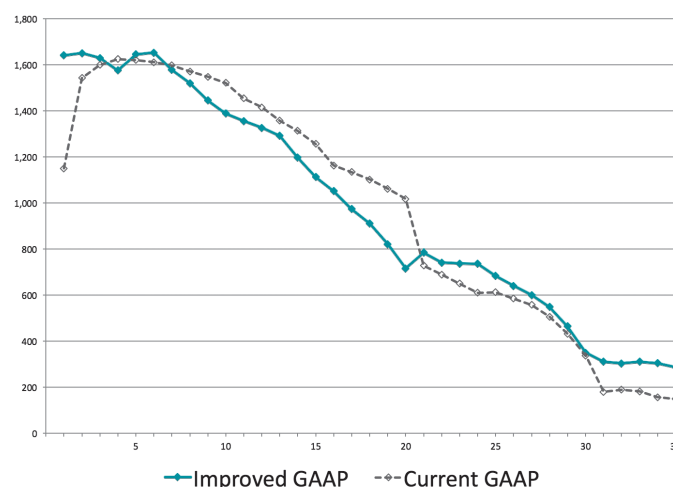


Table 3

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

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

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

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

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

Table 4

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

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



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

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



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

#### Analyzing the Reserve Change

For both early and late variances, we noted three principal components of the reserve true up—unlocking, additional accrual, and direct offset. Table 5 illustrates those components, with all numbers signed as positive or negative to earnings. The early and late years are as we saw before, and we have a middle year variance for comparison. (Differences between the true up and the sum of the three pieces result from small effects<sup>1</sup> not captured in this attribution.)

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

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

#### Explaining the Unlocking

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

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

Table 5

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

Table 6

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

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

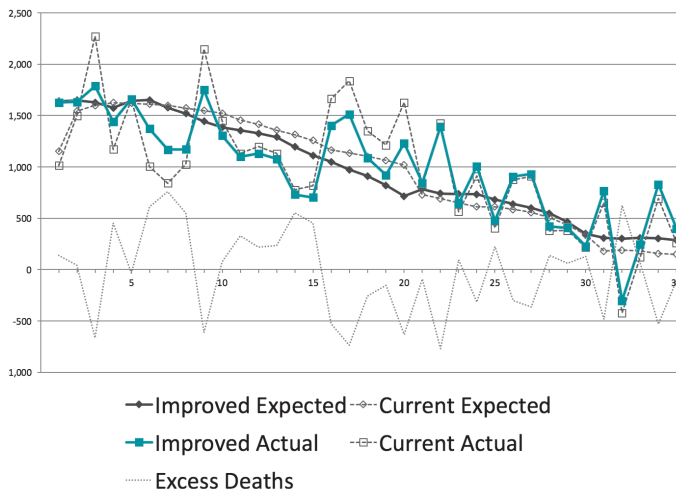
Estimated unlocking is simply the product of the variance, the offset rate, and the historical ratio.

#### Lifetime

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

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

Chart B



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

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

### RECURRING VARIANCES

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

#### Without Changing Assumptions

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

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

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

#### Unlocking of Assumptions

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

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

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

In practice, earnings will look like the boxes until the assumption change and approximately<sup>2</sup> like the balls after the change. When the assumption is changed, earnings will take the unlocking charge as represented by the diamonds. For the same assumption change, the amount of unlocking depends heavily on the timing of the change.

Chart C

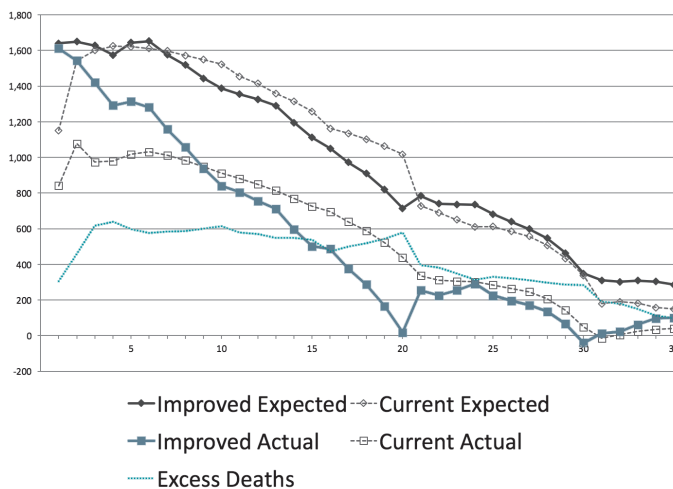
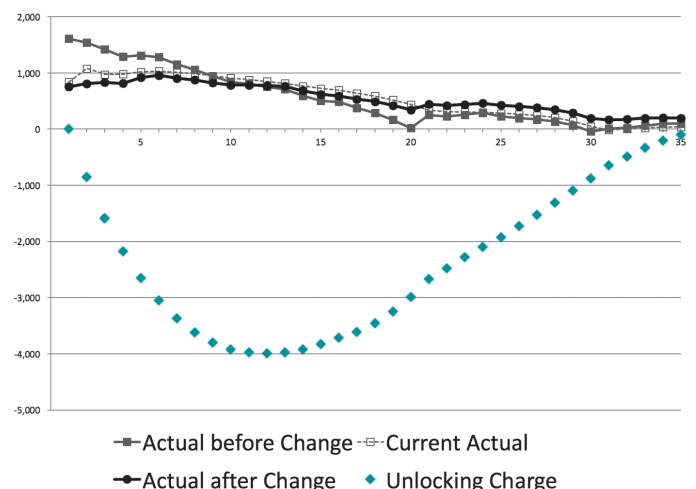


Chart D



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

## OTHER ISSUES

### Constraints

Nowhere in these illustrations did we bump into constraints.

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

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

### Discount Rates

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

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

## ENDNOTES

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



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# Brexit—What Does it Mean for U.S. Insurers?

By Michael Beck and Aisling Metcalfe

**T**he story starts with a referendum one day. Before 9 a.m. the following morning, global stock markets have crashed, the currency has collapsed and the Prime Minister has stepped down. While this sounds like the beginning of a Hollywood blockbuster movie, it is in fact not too far from what happened overnight in the United Kingdom on June 23rd/24th when 52 percent of the electorate voted in a referendum to leave the European Union (EU).

In this article we discuss the background to Britain's membership in the EU and some of the implications of the vote to leave, focusing on the potential impacts to financial reporting for U.S. insurance companies.

## BACKGROUND

The EU grew out of the European Economic Community (EEC) founded by France, West Germany, Italy, Belgium, Netherlands and Luxembourg in 1957. (The EEC was itself a successor to the European Coal and Steel Community founded in 1951). From the start the U.K. had a somewhat strained relationship with the EU; the U.K.'s initial membership application was vetoed by France under Charles de Gaulle and the U.K. did not join until 1973. In 1975 the U.K. held a referendum similar to the one held this year; however, unlike this referendum the outcome was to remain in the EEC. The EU grew rapidly after the fall of the Iron Curtain, with 13 of the current 28 member countries joining after 2002.

A handful of European countries are not members of the EU; the two largest are Switzerland and Norway. Switzerland and Norway are part of the European single market, which includes allowing the free movement of people, as well as contributing to the EU budget. Since reducing immigration was a key part of the U.K. referendum campaign, it is not clear how this, or a similar, type of arrangement would work for the U.K.

Switzerland, which has a substantial financial services sector, is a particularly interesting parallel for the U.K. Switzerland's relationship with the EU is governed by a series of bilateral agreements. One important difference is that Switzerland's banks do not have "passporting" rights (see below for definition of pass-

porting); it is expected that U.K. banks would lobby hard to retain these.

## WHAT HAPPENS NEXT?

The referendum is not technically binding on the U.K. government. There are recent examples of governments ignoring referendums; for example, in 2015 the Greek government ignored a referendum rejecting the terms of the EU bailout. However, it seems unlikely that the U.K. government would be able to completely ignore the referendum result.

Unlike the United States, there is a mechanism for member states to leave the EU. The process is governed by Article 50 of the Lisbon treaty. The country informs the EU that it intends to leave and begins exit negotiations, with a maximum period for negotiations of two years. The only country to leave previously was Greenland in 1985 so there is little precedent. As we write this in late June there seems to be no hurry on the part of the U.K. government to trigger Article 50, though it is expected that it will be triggered sometime between September and December 2016. Other EU countries are currently declining to enter into informal discussions prior to Article 50 being formally triggered, so it seems likely that the two year maximum negotiation period will be strictly adhered to.

In short, there will probably be an initial six months of uncertainty until Article 50 is triggered, followed by at least another two years of uncertainty while negotiations take place.

## IMMEDIATE IMPACT

The initial market response to the referendum result was highly negative. Sterling fell to the lowest level against the dollar in 30 years and the FTSE 100 index fell 3.15 percent on June 24, 2016. This market reaction was mirrored by the Dow Jones (-3.04 percent) and Nikkei 225 (-8.46 percent). The markets recovered somewhat over the following days, with the FTSE 100 recovering all lost value as of close of business June 29, 2016.

There was also considerable political upheaval and uncertainty in the U.K. The major political parties had all campaigned to remain in the EU. The referendum result triggered leadership contests in the ruling Conservative party, the main opposition Labour party passed a vote of no confidence in its leader, and the leader of UKIP (United Kingdom Independence Party and a strong proponent of Brexit) has stepped down to the ire of European Parliamentary members.

## LONG TERM ECONOMIC IMPACT

Over the next two years the U.K. government will be negotiating with the EU how the relationship will operate in the future: what rules will still apply to the U.K., how much funding they will be required to contribute and what voice they will continue to have. Until these discussions are concluded and the market has settled post separation, it is hard to tell what the ultimate im-

pacts will be. The following issues are certain to be those which influence future choices and decisions of U.S. insurers with U.K. and European exposure.

#### Passporting

Under current rules, U.K. companies can sell business across the EU. This is referred to as passporting and means that a financial institution with a base in one EU country can do business in all of them. Passporting has contributed to London being a world financial center. If this is revoked then U.S. companies that operate across Europe with a main base in the U.K. will need to consider where they are geographically located. There may be a major departure of financial firms from the U.K. if the terms are substantially better to remain located within the EU. Also, companies may feel that it is easier to sell off blocks of business, which will in turn provide an opportunity for well capitalized insurers.

#### Investment Markets

The outcome of the referendum caused large shock to global stock markets, driving investors to the security of Gilts and Treasuries which in turn pushed down their yields. While markets may well rebound, global uncertainty will lead to more complexity in assumption setting for asset returns and also in margin setting for principle-based reserves (PBR) and Economic Capital. With investors moving to more secure investments, U.S. Treasury yields will be forced down and the low interest rate environment which has been experienced for the past several years will likely persist.

### IMPACT ON INSURANCE FINANCIAL REPORTING

The majority of the rules in Britain's financial sector have been written by the EU and the country will now have to negotiate new trading terms with the remainder of the bloc. In principal these could be canceled as the U.K. leaves the EU and Britain could adopt completely different practices to the rest of Europe. However, the global trend in recent years has been towards harmonization of standards, so it seems likely that the U.K. would retain many of the current standards. The Financial Conduct Authority recently stated, "Much financial regulation currently applicable in the U.K. derives from EU legislation. This regulation will remain applicable until any changes are made, which will be a matter for government and parliament."<sup>1</sup> This should give comfort that there will be no immediate changes in financial or insurance regulations following separation from the EU.

#### Solvency II

Solvency II (SII) was introduced by the European Insurance and Occupational Pensions Authority (EIOPA) and implemented in 2016 after many years of delays. It requires all companies<sup>2</sup> operating within the EU to calculate their technical provisions on a best estimate basis and add to this a risk capital amount based

on a 1-in-200 year stress. Along with the technical calculations there are onerous reporting requirements.

Looking forward there are a number of possible options for the U.K. regulatory body, the Prudential Regulation Authority (PRA):

- Continue with the SII standard without any modifications and without any future input over changes to the standard,
- Revert to Solvency I, and
- Create a new standard.

Given the level of effort that has gone into SII over the past seven years, it seems very unlikely that companies would have the appetite for a change in regulations. Broadly, the approach to SII is considered to be a sensible one and for this reason it is unlikely that the PRA would want to implement a major change to reserving and reporting requirements. Gold plating (i.e., layering in additional regulations) of SII is explicitly prohibited by EIO-PA; however the PRA might look to do this as previous U.K. regulators did with the Individual Capital Assessment under Solvency I. The creation of a "SII plus" would likely not diverge greatly from the SII standards to ensure that equivalency was maintained to ease consolidation of reporting across Europe.

If SII persists, then for U.S. insurance companies with U.K. operations, from a liability reporting point of view, there would be little change required. The continued use of SII should not cause any issues in itself as it will be a well embedded process by the time separation occurs.

#### IFRS/IASB Guidance

The IASB is currently drafting a new Insurance Contracts Standard (i.e., IFRS 4 Phase 2), and under the current regime the U.K. would comply with this. It seems likely that the U.K. will apply the new standard when issued, given that this is not explicitly related to EU membership. Britain is unlikely to want to differ markedly from standards applied by the rest of the world, and the industry has already invested a good deal of work on preparing for the new standard.

In 2014, the U.S. FASB decided to move away from the IASB convergence project and pursue its own "targeted changes" to U.S. GAAP for insurance contracts. It is possible that once outside of the EU, the U.K. would also choose to move away from the IASB standard. However, the U.K. is starting in a different place from the U.S. in terms of current standards, and in terms of the size of its internal market, subsequently it seems less likely that the U.K. would choose to go its own way.

#### CFO Forum

The CFO Forum is a non-EU entity which aims to "influence the development of financial reporting, value-based reporting,

and related regulatory developments for insurance enterprises on behalf of its members, who represent a significant part of the European insurance industry.”<sup>3</sup> The CFO Forum is made up of the CFOs of major European insurance companies and as such the Brexit will have no direct impact on its membership, although Brexit will of course be a major topic that they discuss. One of the significant outputs from the CFO Forum has been the guidelines for European Embedded Value (EEV) and Market Consistent Embedded Value (MCEV). There is likely to be no impact on these guidelines as they are principles based and not specific to countries being within the EU. Only a few U.S. insurers calculate an EV for internal or public reporting purposes and there will be little or no impact on how these are determined as a result of Brexit.

#### Auditor Rotation

On June 17 this year, EU regulation came into effect which mandated the rotation of auditors for public interest entities<sup>4</sup> (PIE) whereby firms are required to replace their auditors every 10 years (with the potential to extend under certain circumstances). As with SII, this European law has been adopted into U.K. law, making it more difficult to repeal. Added to this, prior to the EU law, the Competition and Markets Authority (a U.K. government department whose role is to make markets work well for consumers) had already introduced proposals for the mandatory tender and rotation of audits. These two facts make it highly likely that the U.K. will retain the audit rotation requirements.

#### Further Possibilities

At this stage there is much speculation about the possible ramifications of Brexit. There is talk of the break-up of the U.K.; the Scottish First Minister has already indicated that a second referendum on Scottish independence is “highly likely” based on the fact that Scotland overwhelmingly voted to stay in the EU. There is also speculation about the possibility of further break-up of the EU, with nationalist parties in France and Italy, among others, seeing the British vote to leave as encouragement

for their own anti-EU policies. The impact of further political upheaval is unclear; however, it would almost certainly produce greater uncertainty in the market place, which could infect U.S. markets.

Discussion of possible doomsday scenarios is fun for the media (and for the quintessentially British activity of discussing over a pint in the pub). However, given the increase in global connectedness it seems unlikely at this point that the U.K. will impose different regulations on insurers compared to the rest of the world. ■

#### ENDNOTES

- 1 <https://www.fca.org.uk/news/european-union-referendum-result-statement>
- 2 Small company exemptions do exist for the smallest insurance companies where the gross premium income is less than €5 million or gross technical provisions is below €25 million.
- 3 <http://www.cfoforum.nl/index.html>
- 4 <https://www.kpmg.com/BE/en/IssuesAndInsights/ArticlesPublications/Documents/EU-Audit-Reform-Fact-Sheet-MFR.pdf>



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**SOCIETY OF  
ACTUARIES**

# FASB Update

By Leonard Reback

As of June 2016, the Financial Accounting Standards Board (FASB) has completed its deliberations on its proposed targeted improvements to long-duration insurance contracts accounting, and is in the process of writing an exposure draft of its tentative decisions. So with a brief lull on the GAAP insurance accounting front, it may be worth exploring some of the other recent FASB activities that may impact actuaries.

## FINANCIAL INSTRUMENTS— RECOGNITION AND MEASUREMENT

As with insurance contracts, FASB had been working with the International Accounting Standards Board (IASB) to develop a converged accounting standard for financial instruments. And as with insurance contracts, the effort fell apart. IASB issued a comprehensive financial instrument accounting standard, IFRS 9, in 2014. IFRS 9 covered three areas of financial instrument accounting—classification and measurement, impairment, and hedging.

FASB has been working to issue new standards on each of these subjects separately. The first of these standards, ASU 2016-01, covers recognition and measurement and was issued in January 2016. The new standard takes effect for most companies in 2018. The new standard does not significantly change recognition or measurement for many of the financial instruments held by insurers.

On the asset side, debt securities will still be classified in one of three categories: trading, available-for-sale (AFS), and held-to-maturity (HTM). Trading securities will continue to be measured at fair value with all changes in fair value reported in net income (FV-NI). AFS securities will continue to be measured at fair value, but with certain changes in fair value reported in other comprehensive income (FV-OCI). And HTM securities, as well as originated loans, will continue to be measured at amortized cost.

Financial instrument liabilities will continue to be reported at amortized cost. Embedded derivatives will continue to be bifurcated from both asset and liability financial instruments and reported at FV-NI. And the fair value option will continue to

be available for both financial instrument assets and financial instrument liabilities.

However, there are a few changes. For example, there are some new disclosures that will be required and some changes to deferred tax assets related to financial instruments. But probably the most interesting changes for actuaries relate to equity securities and to the fair value option.

Equity securities held as assets will no longer be eligible for FV-OCI or amortized cost measurement. Nearly all equity securities will be required to be accounted for at FV-NI. The only exceptions are for those measured using the equity method of accounting or that result in consolidation, but those situations would not likely apply to assets backing insurance contracts. There is also a practical expedient available for equities whose fair value is not readily determinable.

For financial liabilities that elect the fair value option, the impact of changes in own credit will no longer be reported in net income. Rather, the change in fair value resulting from changes in own credit will be reported in other comprehensive income. This alleviates situations where net income increases because the fair value of the liability decreased as a result of the insurer's creditworthiness becoming impaired, and vice-versa. Note that this treatment only applies to financial liabilities that elect the fair value option; for derivatives reported at fair value the impact of changes in fair value resulting from own credit changes will continue to be reported in net income.

## FINANCIAL INSTRUMENTS—CREDIT LOSSES

In June 2016 FASB issued a new standard, ASU 2016-13, on credit losses or impairment. The new standard takes effect for SEC filers in 2020. This standard may impact actuaries who work with investments. There is also a bit of a stealth impact on some reinsurance valuations.

Under current US GAAP, values of financial assets are written down if there is an "other than temporary impairment." This write down is permanent and can never be reversed.

The new standard adjusts this approach for financial assets reported at FV-OCI. Since the fair value reported on the balance sheet already incorporates the market price of any impairment, an overhaul to credit loss recognition was not deemed necessary for FV-OCI assets. But there are some changes for determining the value to use for calculating net income. Rather than writing down the asset value, an allowance will be taken for any impairment against the asset value. This allowance can be reversed if circumstances change. Because the allowance can be reversed, the new standard requires recognizing a credit loss even for impairments judged to be temporary. The allowance is capped such



that the asset amortized cost value used for net income net of the allowance cannot be less than the fair value of the asset.

This cap may produce some asymmetry in reported results depending on interest rates. If interest rates have decreased since the asset was acquired, the asset fair value may have increased above amortized cost value, meaning the cap may limit the amount of any impairment recognized in income. This would not be the case if interest rates have declined. This also means that changes in interest rates could impact the amount of allowance recognized in net income, even if the expected credit loss has not changed.

For assets reported at amortized cost, the new standard introduces a completely new model for measuring credit losses, the “current expected credit loss” or CECL model. Under this model, an allowance is established against the asset value for the present value of all currently estimated expected credit losses over the contractual term of the asset. This means that some loss will be recognized on newly acquired amortized cost assets, except for assets whose expected credit losses are truly zero (such as, perhaps, U.S. Treasuries). For assets with a high credit standing this initial loss may be small, but the loss could be larger for lower credit-quality assets. There are special rules to avoid large losses for assets whose credit quality deteriorated prior to the asset being acquired.

The stealth issue for reinsurance actuaries is that the CECL model applies to reinsurance receivables. The new standard modifies paragraph 944-310-35-4 of Accounting Standards Codification (formerly paragraph 73 of FAS 113) so that a ceding company will be required to measure expected credit losses on reinsurance receivables under the CECL model. Expected losses related to disputed amounts will continue to be reported under existing GAAP. Although the impact of calculating a credit loss allowance for a reinsurance treaty with a highly rated reinsurer may be small, some work would still need to be performed. By a similar amendment, credit losses on premium receivables related to financial guarantee reinsurance will also be measured under the CECL model.

As with many recent FASB standards, the new credit loss standard also expands required disclosures.

## FINANCIAL INSTRUMENTS—HEDGING

FASB is also working on revisions to the hedge accounting model, but these are not as far along as the recognition and measurement or credit loss portions of its financial instruments project. The intent is to simplify hedge accounting, and an exposure draft of the new proposals is expected later in 2016. However, at this point FASB does not seem inclined to address portfolio hedging, which will likely limit any benefits of the new model to

hedged insurance risks, which are often hedged on a portfolio basis.

## FAIR VALUE DISCLOSURES

In December 2015, FASB issued an exposure draft of a proposed standard to revise the disclosures associated with fair value calculations. As actuaries who value embedded derivatives are aware, these disclosures can be extensive and complex. The proposals in the exposure draft would clarify some language, remove certain disclosures and add others.

The American Academy of Actuaries Financial Reporting Committee submitted a comment to the exposure draft addressing a few aspects of the exposure draft. The comment letter viewed some of the clarifications positively, but expressed concerns about one aspect of the proposal to add disclosures. In particular, for “level 3” fair value estimates for which disclosures about assumptions are currently provided, the proposal would add a requirement to disclose the range and weighted average of each assumption. For lapse or mortality assumptions on a variable annuity guarantee, the range could be meaninglessly wide. Additionally, the weighted average can be extremely difficult to calculate, if the calculation has to be done over many scenarios, projected over many years, for each of many contracts. And the resulting weighted average may still not be very meaningful, and perhaps even misleading. After all, if one company’s lapse assumption is lower than another company’s assumption that could mean that one company is being more conservative. Or it could mean that the companies have different contract features that impact expected lapsation, or that they sell to different populations of customers. The weighted average itself would not reveal why one company’s assumption differs from the other.

## GOODWILL IMPAIRMENT

Under current US GAAP, goodwill is tested for impairment indirectly using a two-step test. The fair value of the reporting segment containing the goodwill is compared to the reported book value of the segment. If the fair value is higher, there is no impairment. If not, the second step must be performed. In the second step, the fair value of each asset and liability except for the goodwill must be calculated. If the net of these fair values of the individual assets and liabilities exceeds the fair value of the reporting segment, there is no impairment. Otherwise, the goodwill is impaired and written down such that the net fair value of the assets and liabilities plus the goodwill equals the fair value of the segment.

In May 2016, FASB issued an exposure draft of a proposal to simplify the goodwill impairment test. The proposal would eliminate the second step. This step can be time consuming and complex because a fair value calculation is needed for each asset and liability within the reporting segment.

However, there could be some negative consequences to eliminating the second step, especially for insurers. For example, in a rising interest rate environment the fair value of many assets reported on insurers' balance sheets may decrease, but the value of the insurance liabilities may not decrease accordingly. This mismatch may cause the reported book value of a reporting segment to drop below the fair value of the segment, so that the first step of the goodwill impairment test would fail. But the second step would calculate the fair value of the liabilities, so that if the liabilities were well matched to the assets, the liability fair value would be below the book value and the impairment may be avoided. If the second step is not performed, the goodwill may need to be written down even though there is no impairment in the segment from an economic standpoint.

A similar situation may occur because of hedging if the hedged risk is not measured at fair value, such as variable annuity guarantees measured under SOP 03-1, or a minimum interest guarantee on a universal life contract, which may not be explicitly measured at all. If the hedging instruments are reported at fair value and there is favorable experience, the reported value of the hedging instrument may decline more than that of the hedged item. This too could cause the book value of a segment to be less than the fair value, but the second step of the current goodwill impairment test would adjust for this.

So eliminating the second step of the goodwill impairment test could save a lot of effort, but it could result in situations where goodwill is written down just because of an accounting mismatch elsewhere on the balance sheet. Circling back to FASB's proposed targeted improvements for long-duration insurance contracts, some of the proposals could mitigate these situations. For example, some insurance liabilities would be discounted using a current discount rate, which would reduce the accounting mismatch with assets at fair value. And all variable annuity guarantees would be reported at fair value, reducing the mismatch with hedging instruments at fair value. However, not all insurance liabilities would use a current discount rate (for example, universal life contracts). And not all guarantees that may be hedged would be at fair value (for example, minimum interest guarantees and guarantees on many equity indexed contracts). So some of these accounting mismatches would persist, resulting in potential goodwill impairments if the second step of the goodwill impairment test is eliminated. ■



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# 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.*

**O**n June 10, 2016, the NAIC issued a news release on its website announcing the adoption of a recommendation to activate principle-based reserving (PBR) starting on Jan. 1, 2017. At the time of this news release, the revised Standard Valuation Law permitting recognition of a PBR approach had been passed by 45 states, representing nearly 80 percent of the U.S. life insurance market. The quote from John M. Huff, NAIC president and Missouri insurance director appears below.

“This is an historic accomplishment for the state-based system of insurance regulation that marks the beginning of a new policy valuation system that can adapt to new and innovative life insurance products benefiting consumers and life insurers. For many years, life insurers and insurance regulators contended with an outdated formulaic based system that was challenged to keep pace with consumer demands for new life insurance products, while providing life insurers with reasonable valuation guidance for ensuring financial soundness.”

With this milestone achieved, and as the 2016 calendar year progresses, the NAIC’s Life Actuarial Task Force (LATF) is scrambling to smooth out any snags or rough edges they view as critical to a company’s implementation of VM-20’s minimum reserve requirements. This article will cover late-developing amendment proposal forms (APF) submitted to the LATF for its consideration. At the time of drafting of this article, several of these APFs were either adopted or under consideration by the LATF group. The reader should be advised to follow up with relevant developments regarding final action.

## NET PREMIUM RESERVE DEFINITION

Several clarifications and adjustments have been made to the net premium reserve (NPR) language in VM-20. The discussion below assumes the reader is familiar with the NPR formula for term and universal life with secondary guarantee (ULSG) products.

During the LATF call on June 22, the group discussed the APF submitted by the American Council of Life Insurers (ACLI) re-



garding the definition of secondary guarantee. The language in VM-20 did not include a formal definition of “secondary guarantee” in terms of a ULSG product. The language that has been added is consistent with the definition found in Model Regulation 830. Specifically, a secondary guarantee is:

A conditional guarantee that a policy will remain in force for either:

- More than five years (the secondary guarantee period); or
- Five years or less (the secondary guarantee period) if the specified premium for the secondary guarantee period is less than the net level reserve premium for the secondary guarantee period based on the CSO valuation tables defined in VM-20 Section 3.C and the valuation interest rates defined in this Section, or if the initial surrender charge is less than 100 percent of the first year annualized specified premium for the secondary guarantee period; even if its fund value is exhausted.

This language is equivalent to the carve-out in Model Regulation 830 Section 3A(2), except that Model Regulation 830 defines what is **not** a secondary guarantee and VM-20 defines what **is** a secondary guarantee.

The VM-20 Section 3 definition of NPR for ULSG includes the comparison of two reserve components. One of these components is determined by ignoring the fact that the policy has a secondary guarantee (See Section 3B(5) in VM-20). The method used for this component is much like the reserve determined under the Universal Life Insurance Model Regulation. The clarification necessary in the 3B(5) reserve component was to define “future benefits” as being based on the greater of  $e_{x+t}$  which is the actual policy fund value on the valuation date and  $f_{x+t}$  which is a proxy fund value at the valuation date developed

... the new requirement is specific to a term plan with more than five years of level premiums and specific to the deterministic reserve calculation.

by assuming payment of the level gross premiums necessary to keep the policy in force for the entire coverage period, based on the policy's (primary) guarantees of mortality, interest and expenses.

The second of the two reserve components is defined in Section 3B(6). In this component the secondary guarantee is recognized. As such, the reserve calculation can make use of lapse rates through a specified formula for lapse. The APF clarifies that the  $R_{x+t}$  variable of the lapse formula below cannot be greater than one or less than zero.

$$L_{x+t} = R_{x+t} \cdot 0.01 + (1 - R_{x+t}) \cdot 0.005 \cdot r_{x+t}$$

Where

$$R_{x+t} = \frac{[FFSG_{x+t} - ASG_{x+t}]}{[FFSG_{x+t} - LSG_{x+t}]}, \text{ but } \geq 1 \text{ and } \leq 0$$

For term policies subject to Actuarial Guideline 45 (Return of Premium Term, or ROP Term), the lapse rates to be used in the NPR have been clarified as “6 percent for the first half of the initial level premium period, and 0 percent for the remainder of the initial level premium period.” Prior to this clarification, the reader would have found 0 percent at all durations to be the requirement for lapse rates for this product type.

Also for term policies, the language and the table specifying lapse rates to use in the NPR calculation have been clarified. The rates remain unchanged from earlier versions, but the language regarding when to apply these rates has been made clear.

## POST LEVEL TERM PROFITS

An amendment proposed by the Minnesota Department of Commerce was adopted by LATF on May 19. This APF prohibits the recognition in the Deterministic Reserve of any positive net cash flows following the level premium period for a term product (losses may be recognized). This stipulation appears in Section 9 on assumptions, under paragraph D.6 for policyholder behavior. The new language is provided below.

“For the calculation of the deterministic reserve, for a term life policy issued 1/1/2017 and later that guarantees level or near level premiums for more than five years until a specified dura-

tion followed by a material premium increase, or for a policy for which level or near level premiums are expected for more than five years, followed by a material premium increase, for the period following that premium increase the cash inflows or outflows shall be adjusted such that the present value of cash inflows does not exceed the present value of cash outflows.”

Notice that the new requirement is specific to a term plan with more than five years of level premiums and specific to the deterministic reserve calculation. Prior to adding this additional paragraph, for the type of term products defined, the company would have based the inclusion or exclusion of any post level term cash flows on whether the company's experience was relevant and credible. If the company has no relevant or credible experience, then a 100 percent shock lapse at the end of the level-term period would be the reasonable assumption for this situation. The reason regulators felt this provision was necessary has to do with the availability of the 2017 CSO and the fact that the term NPR was developed in a 2001 CSO valuation environment. As such, calibration of the NPR was based on 2001 CSO, and the NPR parameters (in particular the 135 percent allowance on post-level term profits) was a counter-weight to the conservatism in the 2001 CSO mortality rates. However, with 2017 issues, companies will have the ability to value NPR using 2017 CSO. It was felt that not enough relevant testing was available to determine if 135 percent continues to be the appropriate parameter for term NPR. Until the NPR formula can be re-calibrated to the new 2017 valuation table, the regulators felt this provision was necessary.

## MINIMUM RESERVE CHANGES

An amendment titled, “Keep Term and ULSG Separate,” affected Sections 2, 3, 4, 5 and 7 of VM-20. The change put in place by this amendment was an effort to appropriately assign the PBR excess to the policies which contributed the excess. In other words, the new language clearly defines how the deterministic reserve and stochastic reserve are apportioned among product groups. The revised Section 2 language makes three product groups clear. The product groups are: all term policies, all ULSG policies and all life insurance policies subject to 3.A.2. As originally submitted, the amendment included two options for apportioning the stochastic reserve.

On July 7, 2016, LATF adopted Option 2 of this amendment which is described further below. LATF also voiced a commitment to further study Option 1. Both options are explained and demonstrated below in order to profile the differences. Option 2 will be the only option appearing in VM-20 Section 5.G in the version of the Valuation Manual appropriate for Jan. 1, 2017.

Let's first start with the calculation of the modeled stochastic reserve (SR) and see how, under each of options 1 and 2, the SR would be apportioned among the product groups included in the

SR model segment. For this illustration, product 1 is traditional whole life (WL) and product 2 is a lifetime ULSG product. The company manages its risks across these products similarly because they are both permanent products, and therefore product 1 and 2 are combined in the same model segment. The company does not qualify for the company-wide exemption; chooses not to perform the stochastic exclusion test for either product; and will implement PBR for both products for 2017 year end.

For purposes of this illustration, the following definitions are made and linked to the amounts in Table 1 below.

$SR^{Aggregate}$  = Stochastic Reserve when both product groups are considered in one model segment (11,000 in Table 1)

$SROpt1^{Product1}$  = Stochastic Reserve when Product Group 1 is considered separately, using the 30 percent worst scenarios resulting from the calculation of  $SR^{Aggregate}$  (2,000 in Table 1)

$SROpt1^{Product2}$  = Stochastic Reserve when Product Group 2 is considered separately, using the 30 percent worst scenarios resulting from the calculation of  $SR^{Aggregate}$  (11,500 in Table 1)

$SROpt2^{Product1}$  = Stochastic Reserve when Product Group 1 is considered separately, using a set of 30 percent worst scenarios unique to Product Group 1 (2,250 in Table 1)

$SROpt2^{Product2}$  = Stochastic Reserve when Product Group 2 is considered separately, using a set of 30 percent worst scenarios unique to Product Group 2 (11,700 in Table 1)

For purposes of discussion, assume  $SR^{Aggregate}$  is determined for the aggregate model segment (i.e., both product groups combined). The revised language of Section 5 describes the calculation of  $SR^{Aggregate}$  and indicates that “if a company is managing the risks of two or more different product types as part of an integrated risk management process, then the products may be combined into the same aggregation subgroup. If policies from more than one product group are included in an aggregation subgroup, the reserve for each product group shall also be determined, as described in Section 5.G.” Once  $SR^{Aggregate}$  is calculated and known, the revised language of 5.G. comes into play. This is a step that needs to be performed in order to facilitate the determination of the Minimum Reserve of Section 2. The company has calculated  $SR^{Aggregate}$ . Both options that LATF had considered are detailed below. As noted, option 2 was ultimately adopted and will appear in the version of VM-20 applicable for Jan. 1, 2017.

**Option 1:** Under Option 1, the allocated portions sum to the total  $SR^{Aggregate}$ . A key characteristic of Option 1 is that  $SROpt1^{Product1}$  and  $SROpt1^{Product2}$  are separately determined but using the same 30 percent worst scenarios that comprise the CTE70 for the entire group of policies. If the sum of the stochastic reserve for each product group does not equal the total

for the entire group of policies, the total is allocated to each product group proportionately, as demonstrated by the formula.

$$SR1\% = \frac{SROpt1^{Product1}}{(SROpt1^{Product1} + SROpt1^{Product2})}$$

$$SR2\% = \frac{SROpt1^{Product2}}{(SROpt1^{Product1} + SROpt1^{Product2})}$$

The portion of  $SR^{Aggregate}$  allocated to Product 1 is ( $SR^{Aggregate} \cdot SR1\%$ ); the portion of the SR allocated to Product 2 is ( $SR^{Aggregate} \cdot SR2\%$ ). In the Table 1 example,  $SR1\% = 14.8\%$  and  $SR2\% = 85.2\%$

**Option 2:** Under Option 2,  $SROpt2^{Product1}$  and  $SROpt2^{Product2}$  are each determined independently using the set of 30 percent worst scenarios specific to the risks of each separate product group. In this option, the sum of  $SROpt2^{Product1}$  and  $SROpt2^{Product2}$  is most surely something different than  $SR^{Aggregate}$ , since it is highly likely that the scenarios contributing to the CTE70 will differ.

Once the allocation of the SR to the two contributing product groups is known, then the Section 2 minimum reserve for each product group can be determined. In order to apply the language of Section 2, the company needs the product-level NPR for product 1 (WL) and separately for product 2 (ULSG). This product-level NPR is the sum of the seriatim NPR amounts for the policies in the product group, is adjusted for due and deferred premium amounts and is net of reinsurance ceded. Under both allocation options, the minimum reserve for each product subgroup is the product-level NPR plus the excess PBR reserve allocated to that subgroup. For simplicity, the illustration assumes that the deterministic reserve falls below the stochastic reserve, and so the deterministic reserve amount is ignored in the illustration. Specifics for allocating the deterministic reserve among subgroups are discussed later.

... the new language clearly defines how the deterministic reserve and stochastic reserve are apportioned among product groups.

Table 1 below provides an example of the two stochastic reserve allocation options. All figures in Table 1 are only for illustrating the allocation options and do not represent actual calculations of PBR reserves. In this example, the cash flow offset benefit for the model segment (i.e., both product groups combined) is 2,500 (13,500 – 11,000). We can know this offset amount only by first finding the 30 percent worst scenarios for the aggregate segment and then running product-specific stochastic reserves using that same set of scenarios. There are two key elements of the allocation structure:

- i. The PBR Excess is only defined by product subgroup. The provision for this construct is found in the revised Section 2 language whereby each of the three product groups (term, USLG, all other policies subject to Section 3.A.2) have minimum reserves defined separate to the others. For example, in Table 1 the PBR excess is 2,000 when viewed as a model segment (11,000 – 9,000). However, when viewed as product groups under Option 1, the PBR excess is zero for WL and 5,370 for ULSG. When viewed as product groups under Option 2, the PBR excess is zero for WL and 7,700 for ULSG.
- ii. Under Option 2, there are no cash flow offset benefits across product groups due to the nature of calculating each product-level stochastic reserve independently. This is because each product-level stochastic reserve is

determined using a separate calculation and potentially unique 30 percent worst scenarios. Under Option 1, the cash flow offset available at the aggregate level (the 2,500 in row (d) of Table 1) is recognized, but limited when allocated to the product-level subgroups by the Option 1 proportions, or  $SR1\%$  and  $SR2\%$ . In Table 1, after calculating the stochastic reserve for each product group using the same 30 percent worst scenarios, Product 1 has no PBR excess ( $NPR > SR$ ) and Product 2 has a PBR excess of 7,500 (11,500 – 4,000). In the Option 1 allocation approach, the product level excess is essentially scaled back by 85.2 percent of the 2,500 offset ( $5,370 = 7,500 - 85.2\%(2,500)$ ). The 85.2 percent is the Option 1 allocation percentage ( $85.2\% = 11,500/13,500$ ).

The discussion above focuses on the revised requirements addressing allocation of the stochastic reserve. For the allocation of the deterministic reserve, the revised language simply includes this new paragraph in VM-20 Section 4.D:

*“If the group of policies for which a deterministic reserve is calculated includes policies from more than one product group, where product group is defined as in Section 2 to be term insurance policies, ULSG policies, and all other types of policies, a deterministic reserve shall be determined for each product group by following the process of A – C above by treating each product group as a subgroup. The Net Asset Earned rate used for discounting each product group can be the NAER*

Table 1

		Product 1 (WL)	Product 2 (ULSG)	Model Segment
a	NPR net of Reins	5,000	4,000	9,000
b	Model Segment Stochastic Reserve			11,000
c(1)	SROpt1	2,000	11,500	13,500
c(2)	SROpt2	2,250	11,700	
d	“Offsets” benefits (c(1)-b)			2,500
e				
f		<u>Product 1 (WL)</u>	<u>Product 2 (ULSG)</u>	<u>Total</u>
g	Allocate SR: Option 1	1,630	9,370	11,000
h	PBR Excess: Option 1	0	5,370	
i	Minimum Reserve Option 1	5,000	9,370	14,370
j				
k	Allocate SR: Option 2	2,250	11,700	
l	PBR Excess: Option 2	0	7,700	
m	Minimum Reserve Option 2	5,000	11,700	16,700

*for the group of policies. If the sum of the deterministic reserve for each product group does not equal the total deterministic reserve, the total shall be allocated to each product group proportionally.”*

Based on the language provided, the company can choose to use the NAER from the model segment in determining the product-level deterministic reserves. The other choice would be to calculate NAERs unique to each product-level deterministic reserve for use in discounting cash flows. Whichever method is chosen, it will only influence how the aggregate deterministic reserve is allocated back to the product group for purposes of Section 2 minimum reserve determination.

### OTHER APFs

The following amendments are important to know and understand as well, and are largely in the spirit of clarification, removing redundancies and improving geography of the document.

**VM-G:** The key change in VM-G for actuaries is an effort to convey the concept that the company will assign to one or more qualified actuaries the responsibilities outlined in Section 4 of

VM-G. The qualified actuary’s responsibilities are made distinct from those of the appointed actuary which are covered in VM-30.

**Companywide Exemption:** The provisions for this exemption are moved from VM-20 Section 6 (Exclusion Tests) to Valuation Manual Section II Reserve Requirements.

**VM-20:** The terms “reinsurance discrete cash flows” and “reinsurance aggregate cash flows” are no longer necessary and are removed. At one time, the deterministic reserve was a seriatim construct, and it was necessary to allocate reinsurance aggregate cash flows to individual policies. Following the introduction of the seriatim NPR amount, the deterministic reserve became an aggregate reserve, and therefore the reinsurance aggregate cash flows can be considered part of the deterministic reserve. ■



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# Bermuda Regulatory Changes—Life Insurance Implications

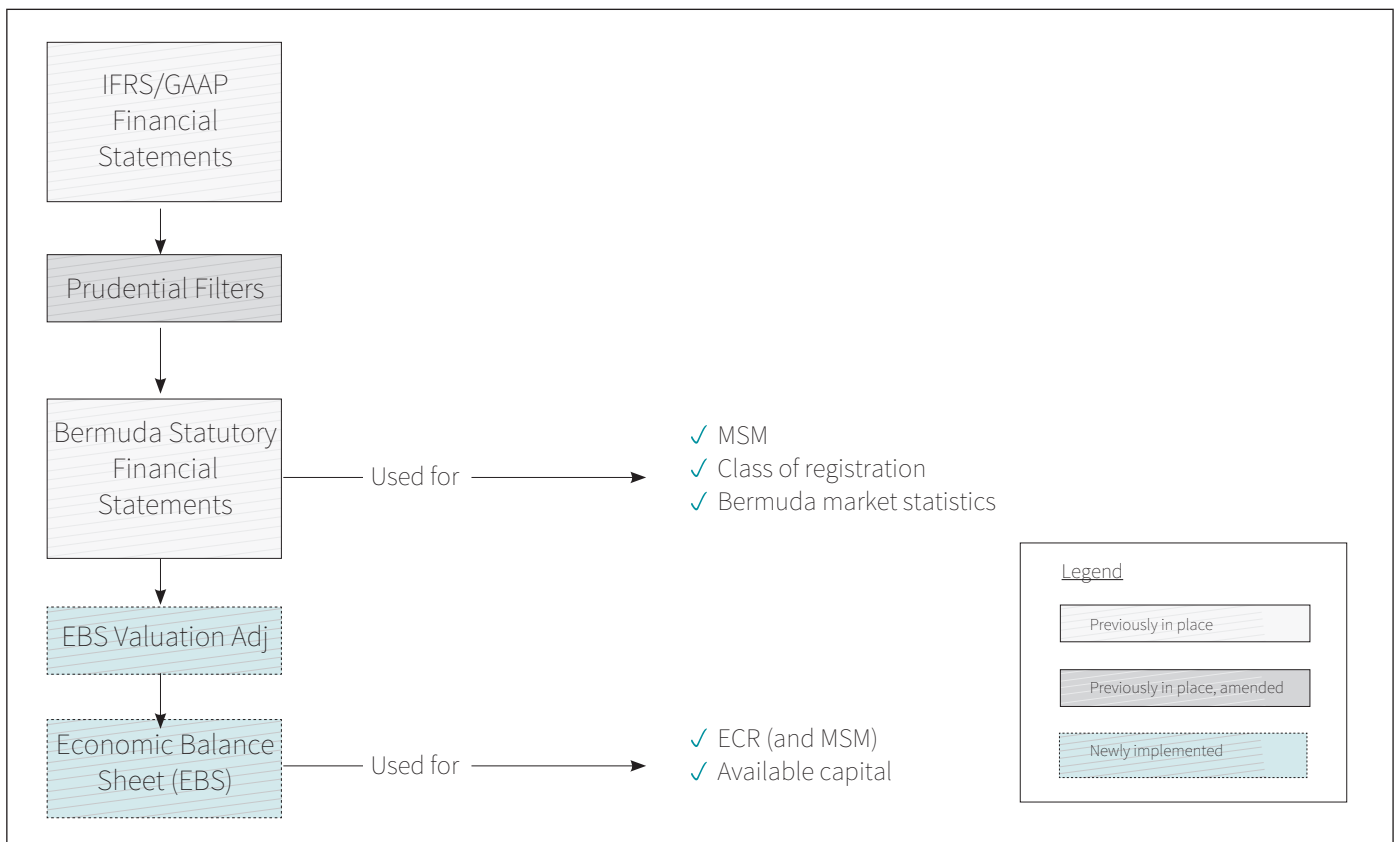
By Alpesh Sanghani, Asad Khalid and Anji Li

*Note: The views expressed herein are those of the authors and do not necessarily reflect the views of Ernst & Young LLP or the global EY organization.*

In 2015, the Bermuda Monetary Authority (BMA) released guidance for the implementation of the Economic Balance Sheet (EBS) framework. The underlying principle of the EBS framework is that both assets and liabilities are valued on an economic basis (i.e., market or fair value basis). The EBS framework will now be used as the basis to determine a (re)insurer’s solvency ratios (available capital and required capital) and will also be the basis for the Approved Actuary’s opinion.

The EBS framework impacts all Bermuda based commercial (re) insurance entities, and was effective as of Jan. 1, 2016 with an

Illustration 1



option for transitional arrangements for certain long-term liabilities. The regulatory changes have a broad effect on Bermuda companies, including but not limited to financial reporting and capital requirements. This article summarizes key aspects of the EBS framework with respect to valuation of long-term liabilities. Further, we highlight key implications of the EBS framework for life insurers and actuaries.

## SOLVENCY II EQUIVALENCE

Since the placement of the Solvency II Directive in 2009, the EU has been working towards the implementation of Solvency II regulations which aim to unify the EU insurance market and promote consumer protection. Solvency II has had strong influences on the recent Bermuda insurance regulatory changes. For the last few years, Bermuda has been working towards attaining Solvency II equivalence, a designation which means that Bermuda’s commercial (re)insurers and insurance groups would not be disadvantaged when competing for, and writing, business in the EU.

Full Solvency II equivalence was achieved by Bermuda in November of 2015, after numerous amendments to Bermuda regulations. Both EU Solvency II requirements and new Bermuda regulations came into effect on Jan. 1, 2016.



## BERMUDA REGULATORY CHANGES<sup>1</sup>

Prior to the recent amendments, companies in Bermuda were required to file Statutory Financial Statements (SFS), which were directly derived from the IFRS/GAAP financial statements by applying a series of adjustments, referred to as “prudential filters” by the BMA. The SFS were used as the basis to calculate the insurer’s Enhanced Capital Requirement (ECR), as well as used to determine Minimum Solvency Margin (MSM), class of registration under the BMA, and Bermuda market statistics.

As part of the BMA’s efforts to attain Solvency II equivalence, the EBS requirement was introduced. The EBS is now used as the basis to calculate the ECR and available capital, and it also indirectly impacts the MSM calculation as MSM is floored at 25 percent of the ECR. Illustration 1 summarizes the Bermuda reporting regime and its uses.

As part of the introduction of EBS, the prudential filters applied to IFRS/GAAP financial statements to derive SFS were modified, shown in the illustration. Examples of amendments to the prudential filters applied to actuarial line items include:

- Deferred Acquisition Costs (DAC) is to be carried onto the SFS and valued consistent with IFRS/GAAP standards, whereas previously DAC was not an admitted asset on the SFS.
- Goodwill is not carried onto the SFS.

## ECONOMIC BALANCE SHEET (EBS)

The general principle is that both assets and liabilities should be included on the EBS on an economic basis. As shown in Illustration 1, the IFRS/GAAP financial statements are the starting point for the EBS, to which valuation adjustments are applied for cases where IFRS/GAAP does not require an economic valuation.

Two key valuation adjustments with respect to actuarial long-term liabilities are as follows:

- IFRS/GAAP reserves are replaced by insurance technical provisions, and
- DAC is eliminated as an asset.

## TECHNICAL PROVISIONS

The technical provisions are the sum of two components:

1. Best Estimate (BE)—calculated as the present value of projected liability cash flows (based on best estimate assumptions), including the value of policyholder options and guarantees, and

2. Risk Margin—reflects the uncertainty associated with the best estimate cash flows.

### *Best Estimate*

The underlying calculation of the BE is defined as the present value of the probability-weighted average of future cash flows. Hence for products with embedded option and guarantees, a stochastic approach needs to be considered. The BE must reflect all future cash inflows and outflows related to the insurance contract, throughout the lifetime of the policy, based on unbiased assumptions as of the valuation date. The projected cash flows include premiums, benefits, expenses (including acquisition costs, maintenance expenses, commissions, premium taxes, investment expenses and overhead expenses), and other cash flow items required to settle future obligations.

The BE is calculated gross of reinsurance, with the reinsurance recoverable amount on a best estimate basis shown separately.

The general principle used to calculate the BE is that the discount rate reflect the currency’s risk free-rates with an illiquidity adjustment. The BMA provides two methods for the calculation of the BE:

1. Standard approach, and
2. Scenario based approach.

The choice of method for the calculation of the BE is left to the discretion of both the BMA and the (re)insurer. The BMA plans to further refine the standards to reflect the results of the 2015 trial run.

### *BE—Standard Approach*

Under the standard approach, the discount rate is equal to a risk-free rate plus an illiquidity adjustment. The BMA recognizes that the insurance liabilities are not fully liquid and, as such, allows for the inclusion of an adjustment in the discount rate to reflect the illiquidity premium.

The discount rate under the standard approach is provided quarterly by the BMA for the major currencies. As a result, all businesses valued under the standard approach use the same discount rate curve as of a particular valuation date.

### *BE—Scenario-Based Approach*

Recognizing that the standard approach may not capture the market sensitivity of certain businesses, the BMA developed an alternative scenario-based approach. The scenario-based approach uses the actual portfolio of assets assigned to the (re) insurer’s block of business and captures the extent to which assets and liabilities are cash flow matched. Different blocks of business are to be evaluated separately.



The BMA has developed a set of eight stress interest rate scenarios in order to target reasonable market events that are within one standard deviation from the mean. The eight stress scenarios along with the baseline scenario are run individually to determine the amount of assets required at the beginning of the projection to cover the projected liability cash flows. Reinvestment assumptions used in the projection should reflect the (re)insurer's investment strategy. This process results in nine different asset requirement amounts, of which the highest one is set as the BE.

In preparation for the Bermuda EBS trial runs, companies have leveraged existing U.S. statutory cash flow testing or Canadian CALM reserve models to calculate results under the scenario-based approach.

#### Risk Margin

The technical provisions are the sum of BE and a risk margin. The risk margin intends to reflect the uncertainty associated with the cash flows, that is, the instances in which actual cash flows exceed the expected cash flows. The method prescribed by the BMA to determine the risk margin is the cost-of-capital approach. Key aspects of the risk margin calculation prescribed by the BMA are as follows:

- Cost-of-capital rate of 6 percent;
- Calculation should reflect Bermuda regulatory capital requirements, defined as the ECR;

- Risks to be accounted for are insurance risk, counterparty credit risk and operational risk; and
- Calculation should use a risk-free discount curve.

The cost-of-capital approach closely resembles one of the risk margin calculation methods under Solvency II,<sup>2</sup> and is one of the approaches proposed by IASB for IFRS risk adjustment reporting.

#### Transitional Arrangements

(Re)insurers may apply for transitional arrangements for certain long-term technical provisions, which would apply only to business written on or before Dec. 31, 2015, where the standard approach has been used. Transitional arrangements allow the (re)insurer to grade to the EBS reserves over a period of 16 years. During the transitional period, the (re)insurer is to calculate technical provisions both under the current approach and the full EBS approach, and interpolate between the two values.

#### IMPLICATIONS FOR INSURERS IN BERMUDA

Changes in the Bermuda reporting landscape for commercial (re)insurers have significant implications on the life actuary's role, particularly the BMA's implementation of the EBS. Some key implications are as follows:

**Actuarial opinion**—The BMA will require a formal actuarial opinion regarding the technical provisions in the EBS.

**Modeling capabilities**—There will be an increased need for modeling capabilities, especially when the scenario-based approach is used.

**Assumption and model governance**—Given that the EBS requires using best estimate assumptions at each point in time (as opposed to account value and locked-in assumptions for some products under US GAAP), there will be increased need to analyze experience on a more regular basis. This will increase the need for assumption and model governance as the assumptions will directly impact the financial statements, capital requirements and available capital levels.

**Reserve and capital ratio volatility**—Given that the EBS best estimate assumptions are updated at each valuation date (as opposed to being locked-in for some products), EBS financials will reflect an increased volatility of surplus, compared to US GAAP. Furthermore, an increased volatility of surplus will result in greater volatility of capital ratios.

**Methodology**—There will be a need to establish methodologies for the EBS calculation where clear guidance is not provided and/or where simplifications are required. Some examples in-

clude the treatment of separate accounts and appropriate drivers for purposes of risk margin estimation.

**Product pricing**—Certain products may look more attractive to (re)insurers. Additionally, changes to the (re)insurer’s current pricing may be required if capital requirements are materially impacted. ■

#### ENDNOTES

- 1 Bermuda Monetary Authority Guidance Notes for Commercial Insurers and Insurance Groups Statutory Reporting Regime, February 2016
- 2 EIOPA, Guidelines on the valuation of technical provisions



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# Details, Details

By Henry Siegel

At its June meeting the International Accounting Standards Board (IASB, the board) made important clarifications to several aspects of the upcoming Insurance Contracts Standard. Regrettably, those clarifications did not always go as far as they should have.

## AGGREGATION OF CONTRACTS

The most significant issue the board discussed was probably what level of aggregation should be used for amortizing the contractual service margin (CSM) and to determine losses that need to be recognized at issue. Originally, the board had tentatively concluded that the objective for amortization of CSM into net income should be at the individual contract level, but that it could be aggregated if contracts in the group met certain conditions:

- a. they have “cash flows that the entity expects will respond in similar ways to key drivers of risk in terms of amount and timing;” and
- b. at inception they “had similar expected profitability (i.e., similar contractual service margin as a percentage of the premium).”<sup>1</sup>

The idea was to be sure that the CSM ran out as the exposures did. So if a contract expired due to lapse or death, any CSM associated with it should also have expired. In the same way, the allocation should recognize the exposure on contracts as they expire so that if larger contracts lapse more quickly, for example, the CSM amortization should recognize this.

This made some sense from the board’s perspective, but missed a few key considerations. First, insurance is based on the concept of the law of large numbers so measuring anything at the individual policy level is conceptually flawed. It’s so flawed that there is a well-known actuarial joke about the type of actuary who can do this.

There’s also a major problem interpreting what “similar expected profitability” meant. Is a 10 percent margin similar to 20 percent? Or 11 percent? Is 4 percent similar to 2 percent? Companies did rough calculations that showed results with great variety due to competitive issues and pricing simplifications (e.g., a single rate for five issue ages).

There is a real chance that requirement b) above could necessitate thousands of groupings for a single year of issues.

It was not even clear whether a year of issues could be grouped together for some contracts such as annuities where the “price” would vary depending on interest rates at the time of issue. A separate grouping every time the interest crediting rate changed is a real possibility.

Apparently the board and staff received a lot of feedback on this, and the staff reacted by proposing a clarification to the basic objective for amortizing the CSM.

The staff proposed and the board tentatively decided:

- a. “the objective for the adjustment and allocation of the contractual service margin should be that the contractual service margin at the end of a reporting period represents the profit for the future services to be provided for a group of contracts.
- b. an entity should measure the contractual service margin using the group used for deciding when contracts are onerous. Consequently, an entity should measure the contractual service margin by grouping insurance contracts that at inception have:
  - i. expected cash flows the entity expects will respond similarly in terms of amount and timing to changes in key assumptions.
  - ii. similar expected profitability, i.e., the contractual service margin as a percentage of the total expected revenue. An entity can use as a practical expedient the expected return on premiums, i.e., the contractual service margin as a percentage of expected premiums.
- c. an entity should reflect the expected duration and size of the contracts remaining in the group at the end of the period when allocating the contractual service margin of the group of contracts to the profit or loss statement.”<sup>2</sup>

These changes eliminated the idea of measuring things at a single contract level, but otherwise kept the requirements for grouping almost the same. One important change is that the suggested measurement is now a percentage of revenue rather than premium. The board thereby eliminated the investment component of premium from the measurement.

The discussion on these changes was quite extended with several board members raising important points.

One member pointed out that the requirement in ii. above is very rule-like and not in accord with the board’s desire to be principle based. Another correctly pointed out that the CSM is not, in reali-

ty, only profit and that calling it such was improper. Others correctly worried that this requirement could produce a huge number of groupings that would be difficult to manage.

In the end, 11 board members voted in favor of the change while three opposed it. The staff agreed, however, that they would request feedback on this issue from a limited number of interested parties before issuing a final standard.

## EXPERIENCE ADJUSTMENTS AND CHANGES IN ASSUMPTIONS

The board next discussed language to clarify when the effect of experience adjustments and changes in assumptions about future experience would be recorded in profit and loss and when they would adjust the CSM.

The board agreed with staff recommendations that changes to estimates of incurred claims (e.g., the runoff of the IBNR) should always go to profit or loss even though some of the change may be in estimates of the future. After discussion, the board decided that while this principle is what they had in mind, the proposed wording needed to be improved, so staff will try to devise better wording for their final draft.

The staff also proposed additional wording changes in the guidance for when changes in other types of assumptions are reflected in the CSM and when in profit and loss. This new wording was included as an Appendix in Agenda Paper 2B for the June meeting.

## PRESENTATION AND DISCLOSURE OF INSURANCE FINANCE INCOME OR EXPENSES

A number of presentation issues were discussed next. The major issue was the requirement to split changes in the risk adjustment between an underwriting and finance component. The board agreed that this was an unnecessary complication to the reporting and eliminated that requirement. The entire change in the risk adjustment could therefore be shown as part of the underwriting result if the company's accounting policy called for it.

The board also agreed that the objective for disaggregating finance income and expenses between P&L and OCI was not to present the income or expenses on a cost measurement basis. Rather, the objective of disaggregating insurance finance income or expenses between P&L and OCI "should be to present in profit or loss a systematic allocation of the total expected insurance finance income or expenses over the life of the contract."

Therefore, "the forthcoming insurance contracts Standard should provide guidance that, in this context, a systematic allocation:

- a. is based on characteristics of the contract without reference to factors that do not affect the cash flows of the contract. For example, the allocation of the total expected finance income or expenses should not be based on expected rec-

ognized returns from assets if those expected recognized returns do not affect those cash flows.

- b. results in the amounts recognized in OCI over the life of the contract totaling zero."<sup>3</sup>

The board also decided that

- a. "for insurance contracts for which changes in financial assumptions do not have a substantial effect on the amounts paid to the policyholder, the systematic allocation is determined using the discount rate(s) applicable at the inception of the contract; and
- b. for insurance contracts for which changes in financial assumptions have a substantial effect on the amounts paid to the policyholder, a systematic allocation can be determined in one of the following ways:
  - i. using a rate that allocates the remaining revised expected finance expenses over the remaining life of the contract at a constant rate; or
  - ii. if the contracts use a crediting rate to determine amounts due to the policyholder, using an allocation based on the amounts credited to the policyholder in the period and expected to be credited in future periods."<sup>4</sup>

The board also tentatively decided:

- a. "it would not require an entity to disclose an analysis of the total insurance finance income or expenses recognized in the statement(s) of financial performance disaggregated at a minimum into:
  - i. the interest accretion calculated using current discount rates;
  - ii. the effect of changes in discount rates in the period on the measurement of insurance contracts; and
  - iii. the difference between the present value of changes in expected cash flows that adjust the contractual service margin in a reporting period, measured using discount rates that applied on initial recognition of those insurance contracts, and measured at current rates; and
- b. it would include an objective in the forthcoming Standard that an entity should explain the total amount of insurance finance income or expenses in a reporting period, and to fulfil that objective an entity should:
  - i. explain the relationship between insurance finance income or expenses and the investment return on the related assets the entity holds to provide investors with sufficient information to understand the sources of net

finance income or expenses recognized in profit or loss and other comprehensive income; and

- ii. disclose an explanation of the methods the entity uses to calculate the insurance finance income or expenses presented in profit or loss.”<sup>5</sup>

### REINSURANCE CONTRACTS AND THE SCOPE OF THE VARIABLE FEE APPROACH

The board tentatively decided an entity should not apply the variable fee approach to reinsurance contracts issued or reinsurance contracts held. The board was concerned that reinsurers might be able to justify using the variable fee approach on all their contracts, a result that it did not intend. This change simply clarifies that intent.

### NEXT STEPS

As mentioned above, the staff will continue to develop a revised working draft for further discussion. They will use that draft to seek input from selected external parties on some aspects of the revised draft including those discussed above.

The board expects to discuss further any sweep issues that arise from testing and from the continued drafting process in the third quarter of 2016. At that time, the board aims to set a mandatory effective date for the Standard.

The issue of aggregation of policies has been the subject of considerable discussion among actuarial and industry groups this month. Another reason why

**Insurance Accounting is too important to be left to Accountants! ■**

### ENDNOTES

- 1 January 2016 IASB Update ([http://media.ifrs.org/2016/IASB/January/IASB-January-Update\\_Monthly.pdf](http://media.ifrs.org/2016/IASB/January/IASB-January-Update_Monthly.pdf))
- 2 June 2016 IASB ([https://s3.amazonaws.com/ifrswebcontent/2016/IASB/June/IASB\\_June\\_Update.pdf](https://s3.amazonaws.com/ifrswebcontent/2016/IASB/June/IASB_June_Update.pdf))
- 3 Ibid.
- 4 Ibid.
- 5 Ibid.



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# Financial Reporting Research Update

By Jim Hawke and Ronora Stryker

**R**esearch is a primary mission of the Financial Reporting Section and a significant use of our section dues revenue. Here is an update, as of June 24, 2016, on projects in process, on the horizon, and recently completed.

## ON THE HORIZON ...

**Impact of Targeted Changes to US GAAP**—the council has received a proposal for a project to look at how companies will address the various new requirements. We will likely move forward when FASB's new guidance comes out.

**Expansion of the 2015 report on Earnings Emergence Under Multiple Financial Reporting Bases** to examine additional products is being considered. The original report looked at deferred annuities and term life insurance.

The council has approved co-sponsoring a project on simplified methods for principle-based reserve calculations with the Smaller Insurance Company Section.

## CURRENTLY IN PROCESS ...

**PBA Change Attribution Analysis**—this project will study the drivers of change in principle-based reserves. A project oversight group has been formed and the RFP will come out soon.

**Nested Modeling**—A company survey on the use of nested stochastic modelling and an analysis of techniques to reduce run time and improve the efficiency of nested simulations is nearing completion with a likely release by the end of the summer.

**PBA Implementation Guide Update**—An update to the earlier version including all current developments. The report was discussed at the 2016 Life and Annuity Symposium and should be released by the end of July.

**Modern Deterministic Scenarios**—A review of possible deterministic scenario sets which could be useful to company management, regulators, and rating agencies under PBA. The POG has selected the researcher and work is underway.

**Predictive Analytics Call for Papers**—The SOA issued a call for articles on the increasing use of predictive analytics by actuaries. POG has reviewed submissions. Prizes and publication will follow shortly.

**Retention Management**—Research that examines retention management strategies under a principle-based framework for reserves and capital is essentially completed. It was presented at the 2016 Life and Annuity Symposium and will be released by the end of the summer.

## COMPLETED IN 2015 ...

**Transition from Low to High Interest Rates:** <http://www.soa.org/Research/Research-Projects/Life-Insurance/research-2015-rising-interest-rate.aspx>

**Multiple Measurement Bases:** <http://www.soa.org/Research/Research-Projects/Life-Insurance/2015-earnings-emergence.aspx>

**VBT/CSO Impact Study:** <http://www.soa.org/Research/Research-Projects/Life-Insurance/research-cso-impact-study.aspx>

**Tail risk/correlation of risk primer:** <http://www.soa.org/Research/Research-Projects/Life-Insurance/2015-extreme-events-for-insurers.aspx>

Many of these projects were co-sponsored with other sections and organizations. Please visit the SOA research website for more information, or contact Jim Hawke or Ronora Stryker. ■



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