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## Using Relevant Experience Data to Increase Credibility and Reduce Margins

By Mark Birdsall and Marianne Purushotham

Page 4



### 3 Chairperson's Corner

By Jim Hawke

### 4 Using Relevant Experience Data to Increase Credibility and Reduce Margins

By Mark Birdsall and Marianne  
Purushotham

### 10 Industry Preparedness And Impact of FASB Targeted Improvements

By Craig Reynolds and Karthik  
Yadatore

### 14 GAAP Targeted Improvements—Retrospective Noise

By Steve Malerich

### 18 Challenges to Consider Upon IFRS 17 Adoption

By Michael Beck, Laura Gray and  
Gavin Stewart

### 22 Asset Dependency Discounting—A Flaw in IFRS 17?

By Erik Jen Houg Lie

### 24 PBR, How Shall I Examine Thee? Let Me Count the Ways

By Tricia Matson, Leslie Jones and  
Andy Rarus

### 31 Reporting and Disclosure Requirements Under VM-31

By Gaurav Rastogi

### 35 Financial Reporting Research Update

By Jim Hawke and Ronora Stryker

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To join the section, SOA members and non-members can locate a membership form on the Financial Reporting Section Web page at <http://www.soa.org/sections/financial-reporting/financial-reporting-landing/>.

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# Chairperson's Corner

By Jim Hawke

During the second quarter the section council continued to work on programs for the Valuation Actuary Symposium, the Annual Meeting, and webcasts to help you with your continuing education needs.

By the time this issue of *The Financial Reporter* is published, the 2017 Valuation Actuary Symposium will have been completed. Our leads for the symposium were Bob Leach, David Ruiz, and Katie Cantor as well as our SOA staff partner Jim Miles. I hope those of you who attended enjoyed the sessions and breakfast which we hosted, addressing such issues as PBR, FASB targeted improvements, GAAP hot topics, VM-20 mortality, VM-20 simplified methods and many more. The symposium committee members put in a great deal of work on this content and I expect it to be a great success.

Annual meeting sessions being developed are IFRS 17 update, U.S. statutory update, FASB targeted improvements, assumption setting across valuation bases, PBR reporting and disclosures, VM-20 for senior management, proposed NAIC VA reserve and capital reform case study, life insurance M&A update, and emerging trends in model risk management. These may be modified for the final program and additional topics may be added. It should be a great meeting!

Two key webcasts were scheduled to be held in July and August, FASB targeted improvements on July 18 and Understanding VM-20 earnings results for August 18. The second of these will be a presentation by the research team that developed a study for us concerning the attribution of reserve changes under PBR. The research report should be published later in the year. A third webcast on reinsurance under PBR is in the planning stages as well.

The council approved combining two of our new research ideas, using an expanded study of emergence of earnings under multiple accounting bases to also illustrate the targeted improve-



ments to US GAAP. We also approved co-sponsoring a study with the Product Development Section Council on waiver of premium/monthly deduction rider assumptions under a principle-based framework.

Don't forget to continue to check the new SOA volunteer opportunities site<sup>1</sup> to see if there is a need you could fill. One recent entry to the site is the council looking for authors who have contributed articles to this newsletter to also record podcasts of their material.

As always I hope you find this edition of *The Financial Reporter* helpful, and welcome any suggestions you might have for the section council. My tour of duty as chair of the section council is ending soon and this will be my final chairperson's corner article. It has been a great privilege to serve, and I wish you the best in the future wherever your career may lead. ■



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## ENDNOTE

<sup>1</sup> <https://engage.soa.org/volunteeroportunities/opportunities-list-public>

# Using Relevant Experience Data to Increase Credibility and Reduce Margins

By Mark Birdsall and Marianne Purushotham

Principle-based reserves (PBR) and other risk analyses have raised the bar for setting assumptions and establishing margins for material assumptions. Under PBR, documentation requirements are more detailed and include describing the sources of assumptions and the process for setting margins. The size of margins must be related to the level of uncertainty in the assumptions, including the degree of credibility in the historical experience underlying each material assumption. A company with relevant historical experience for material assumptions that is less than 100 percent credible must either find relevant industry experience to increase the credibility of its own historical experience or set wider margins due to the greater uncertainty in setting the assumptions using company experience alone.

The following is an excerpt from Section 9C of VM-20 permitting the use of similar experience from other sources in setting a company's mortality experience assumption:

- b. Company experience data shall be based on experience from the following sources:
  - i. Actual company experience for books of business within the mortality segment.
  - ii. Experience from other books of business within the company with similar underwriting.
  - iii. Experience data from other sources, if available and appropriate, such as actual experience data of one or more mortality pools in which the policies participate under the term of a reinsurance agreement. Data from other sources is appropriate if the source has underwriting and expected mortality experience characteristics that are like policies in the mortality segment.

- c. The company experience mortality rates shall not be lower than the mortality rates the company expects to emerge which the company can justify and which are disclosed in the PBR Actuarial Report.

Other terms used in regulations and actuarial literature that describe the appropriateness of the “other experience” to the company experience are *relevant* and *directly applicable*.

Current industry experience studies, such as the study underlying the 2015 Valuation Basic Table (2015 VBT) tend to be highly aggregated, meaning that while the impact of underwriting rules and other factors such as gender, smoking status, policy size, issue age and duration are analyzed, other important factors are not. These other important factors might include product type and design elements, distribution channel characteristics and target markets and the interdependence of material risk factors (such as lapse and mortality experience, especially for term products).

Therefore, companies need to be cautious about applying the results of a highly aggregated study as “relevant experience” in the process of assumption setting under PBR or any risk analysis process.

## CENTRAL ESTIMATE ASSUMPTIONS

For the purposes of this discussion, the term *central estimate assumptions* refers to assumptions that combine relevant company experience (that is less than 100 percent credible) and industry experience for the material or key risks underlying a product to develop baseline assumptions for modeling those material risks in cash flow projection models. Where relevant company experience for a material risk is 100 percent credible, that experience (with consideration of possible trends) for the key risk would be the central estimate assumption. When there is less than 100 percent credibility, the relevant company experience can be credibility-blended with relevant industry experience (with consideration of possible trends) to establish the central estimate assumptions for a material risk.

## RELEVANT EXPERIENCE

In this context, *relevant* means the experience is directly applicable to the expected experience of the material risk(s) under consideration. Depending on the risk factor, traditional experience studies may not have identified all significant predictors, which may include the following:

1. Product design elements, including the configuration of riders on a policy;
2. Distribution characteristics, including producer characteristics and compensation patterns;

3. Target markets, including customer characteristics and how the products will be used, such as qualifying for tax-related advantages; and
4. Dynamic policyholder behavior functions reflecting scenario-dependent factors, such as the in-the-moneyness of a benefit.

Where appropriate, both company and industry experience studies should be designed to identify the significant predictors beyond the traditional predictors used in the past.

LIMRA, MIB and other data aggregators have been working with the Society of Actuaries (SOA) on the development of enhanced experience studies that identify significant predictors of experience. These enhanced studies could serve as the basis for identifying industry experience that is relevant to company experience.

Company experience that is used to establish expected experience should also be evaluated for relevance. Enhanced industry studies can provide a road map for enhanced company experience studies. However, a company usually has more detailed information about its business than data aggregators do. In some cases, industry studies show the “company code” as one of the key predictors of experience. In this context, the company code serves as a proxy for additional information about the business to which the data aggregator does not have access. With more detailed information, the company can identify additional predictors for which company code is a proxy in industry studies and provide feedback to data aggregators to improve those industry studies.

Aligning the key predictors between industry and company experience can serve as the basis for identifying relevant industry experience to supplement company experience in establishing the central estimate assumptions for use in pricing, PBR and other risk analysis. With the combined experience producing higher credibility measures, smaller margins for uncertainty would be needed.

If relevant industry experience is not available to or not considered by the actuary, company experience alone can be used for a key risk, but the lower credibility of using only company experience would result in greater uncertainty in the assumptions and larger margins. In this case, the company experience would become the central estimate assumption for that key risk.

In the case of an emerging key risk (like one associated with a new benefit) for which neither company nor industry experience is available, the actuary would use professional judgment in setting the central estimate assumption. However, this lack of historical experience would result in a correspondingly wide probability distribution and margin for that risk, appropriate to

the high level of uncertainty. Following these principles would minimize the risk of underpricing and under-reserving products with new benefits.

See the Appendix for references to the term *relevant* in the Exposure Draft of the Actuarial Standard of Practice (ASOP) on setting assumptions and in Section 20 of the Valuation Manual (VM-20). The concept of relevance is also included in many other ASOPs and sections of the Valuation Manual.

## CALCULATING THE CREDIBILITY OF COMPANY EXPERIENCE FOR MATERIAL RISKS

Per VM-20, there are two basic methods for calculating credibility: the limited fluctuation method and the Bühlmann method. The latter requires a company to have access to industry-level information. Data aggregators might help provide the industry perspective needed for the Bühlmann method, which in many instances appears to produce higher credibility values. The credibility of the relevant industry experience could likewise be calculated.

## CREDIBILITY-BLENDING COMPANY EXPERIENCE AND RELEVANT INDUSTRY EXPERIENCE FOR KEY RISKS

With respect to formally including relevant industry experience in the assumption-setting process, VM-20 provides a road map for a credibility-blending process specific to the mortality assumption for the deterministic reserve and the stochastic reserve. Please note that this process can be applied to other key assumptions as well. While VM-20 applies to setting modeling assumptions for the PBR deterministic and stochastic reserve calculations, the credibility-blending process is a sound methodology for developing central estimate assumptions for other risk analysis purposes, including pricing.

## DEVELOPING REDUCED MARGINS DUE TO HIGHER CREDIBILITY

Margins can be developed either for individual material assumptions or as an aggregate margin for the material assumptions taken together. Despite different details in the calculations, these two approaches should produce results of the same magnitude and may serve as a cross-check for each other, including calibrating the covariance adjustment on individual margins.

To develop prudent estimate assumptions from the anticipated experience assumptions, VM-20 Section 9B.2 provides guidance in setting margins:

The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger modeled reserve than would otherwise result. For example, the company shall use a larger margin when:

A new tool is being developed that can assist the actuary in establishing margins based on levels of uncertainty.

- a. The experience data have less relevance or lower credibility.
- b. The experience data are of lower quality, such as incomplete, internally inconsistent, or not current.
- c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to, recent changes in circumstances or changes in company policies.
- d. There are constraints in the modeling that limit an effective reflection of the risk factor.

A new tool is being developed that can assist the actuary in establishing margins based on levels of uncertainty. The SOA has funded a project that explores simplified PBR methods. One of the deliverables of this project is a multi-risk scenario generator that produces both economic scenarios (consistent with the SOA/American Academy of Actuaries economic scenario generator) and scenarios for the other material risks identified by the company. With the user supplying the company's actual to expected ratio for each material assumption, the number of observed events, the exposure and the probability distribution type, the generator can produce scenarios for each material assumption at specified probability levels.

For example, if moderately adverse experience is about the 84<sup>th</sup> percentile of the probability distribution, then sensitivity tests could be run for each of the material risks using 84<sup>th</sup> percentile scenarios produced by the multi-risk scenario generator. Taking the differences between the present value of future cash flows for each sensitivity test and the baseline run using central estimate assumptions and then applying a covariance adjustment, an aggregate margin could be derived. One option for the covariance adjustment would be a square root formula analogous to the covariance adjustment for the life risk-based capital process, with consideration of the independence or dependence of the material risks.

The multi-risk scenario generator scenarios will produce narrower distributions for the material risks when more relevant historical experience underlies the central estimate assumptions. As a simple example, assuming mortality rates have a Poisson distribution, adding four times more data to a company's experience from relevant industry experience would reduce the extra

mortality in the 84<sup>th</sup> percentile sensitivity testing factors by 55 percent to 60 percent.

#### CASE STUDY—USING REINSURER DATA

In addition to industry studies by data aggregators such as LIMRA and MIB, reinsurers may partner with companies in providing relevant historical experience to supplement company experience in setting assumptions and margins. This approach may be needed when other data aggregators have not yet produced enhanced experience studies identifying the significant predictors for a material risk.

For example, consider the case of a reinsurer providing experience to a direct writer to use in setting the mortality assumption for a term life insurance product. The key issues are twofold: (1) the relevance of the company and reinsurer experience to the expected future experience of the new product; and (2) the combination of relevant company and industry experience to develop the central estimate mortality assumptions for pricing as well as the anticipated experience assumption for mortality in the VM-20 reserve calculations. Issue 2 becomes important only if issue 1 is satisfied.

With respect to issue 1, the reinsurer may select a block of reinsured term life insurance business for which it has recent first-dollar historical experience with underwriting rules and risk class structures like those that will be used for the new product. In addition, it may consider other factors such as level premium periods, pattern of post-level term premiums (including size of premium jumps), presence of a return of premium (ROP) benefit and type, method of distribution and pattern of compensation, level of competitiveness and distribution of face amounts and gender.



Based on the limited fluctuation method, the company's relevant fully underwritten experience will be calculated based on face amount and/or policy count. If there is an extremely wide distribution of face amounts, credibility based on policy count may be preferable. The same calculations will be done for the reinsured business.

Ratios of relevant reinsurer mortality experience to relevant company mortality experience will be calculated. These ratios will be evaluated with respect to the direction and magnitude of the differences from 100 percent. Confidence intervals may be established based on credibility levels but should be used with care. The width of the distribution of reinsurer experience should also be considered.

A wide distribution of reinsurer experience may indicate either of the following: (1) outliers that might be better excluded impacting the distribution; and/or (2) the impact of other important factors that have not yet been analyzed in selecting the reinsurer experience.

To refine the reinsurer experience with respect to its relevance to the company experience, the following steps may be followed:

1. Consider the distribution in experience by company within the reinsurer experience and group the companies by the level of their relative experience, particularly for the most important risk classes. Select the grouping that appears to align best with the company's experience overall and for the most important risk classes.
2. Confirm that the face amount and underwriting class distribution are reasonable.
3. Calculate the credibility of this refined reinsurer experience.
4. Calculate the reinsurer to company experience ratios overall and by gender and risk class.
5. Perform statistical tests to confirm that the company's experience is within reasonable parameters.
6. If the ratios in step 4 are reasonably close to 100 percent, develop the mortality assumption as the credibility-weighted blending of the relevant company experience and the relevant peer group experience.

## CONCLUSION

When company historical experience for a material risk is less than 100 percent credible, relevant industry experience can be used to supplement that company experience to develop central estimate assumptions for setting pricing assumptions, anticipated experience assumptions for PBR and cash flow projection assumptions for other purposes. Enhanced experience studies

at the industry and company levels may identify additional significant predictors of experience that can be used to identify relevant industry experience and, in turn, to increase the credibility of the experience underlying the company's material assumptions and reduce the margin for uncertainty. Data aggregators such as LIMRA, MIB and others (including reinsurers) should be encouraged to develop enhanced experience studies to identify the significant predictors of experience and dynamic policyholder behavior functions that will serve as a road map for further individual company analysis using additional detailed information available at the company level. Enhanced company experience studies can then feed these additional predictors back to data aggregators to help improve industry studies and enable data aggregators to do a better job of providing relevant industry experience for the use and benefit of companies.

## EXCERPTS FROM VM-20 AND THE DRAFT ASOP ON SETTING ASSUMPTIONS

These excerpts illustrate the uses of the term *relevant* in the Exposure Draft ASOP on setting assumptions and in VM-20. Note also the frequency with which the words *available* and *credible* accompany the references to *relevant*. This illustrates the importance of using relevant experience data to increase credibility.

### ASSUMPTION SETTING EXPOSURE DRAFT

3.1.1 General Considerations—The actuary should set assumptions that are reasonable for the intended purpose, or, if other parties have the responsibility for setting assumptions, assess whether the assumptions set by others are reasonable for the intended purpose. The actuary should consider the following:

- a. available and **relevant** data, including, where appropriate, the credibility of any such data as discussed in ASOP No. 25, Credibility Procedures;
- b. other available and **relevant** information; and
- c. whether there are reasons to expect that future experience will differ significantly from past experience.

3.4 Reliance on Others—Data and analyses **relevant** to the assumptions may be available from a variety of sources, including the principal, representatives of the entity, investment advisers, demographers, economists, scientists, statisticians, health care providers and other professionals. When the actuary is responsible for setting assumptions or assessing the reasonableness of assumptions set by others within the scope of this standard, the actuary may consider and incorporate the views of such experts, but the setting or assessment of assumptions should reflect the actuary's professional judgment. If the actuary states reliance on other sources and disclaims responsibility for any material assumption selected by a party other than the

actuary, the actuary should disclose such reliance in accordance with section 4.2(b).

## VM-20

Section 9.A.6. The company shall use its own experience, if **relevant** and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.

- a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining **relevant** company experience with industry experience data, tables or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.
- b. For risk factors (such as premium patterns on flexible premium contracts) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as the current situation with some lapse assumptions) to which statistical credibility theory can be appropriately applied but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available **relevant** company experience, any available **relevant** industry experience or any other experience data that are available and **relevant**. Such techniques include:
  - i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available **relevant** company experience or reasonable expectations;
  - ii. Applying factors to **relevant** industry experience tables or other **relevant** data to reflect any available **relevant** company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data;
  - iii. Blending any available **relevant** company experience with any available **relevant** industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying policies and/or company practices.

- c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most **relevant** data available, if such data exist.

The qualified actuary to whom responsibility for this group of policies is assigned shall annually review **relevant** emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the qualified actuary shall set a new, adequate, anticipated experience assumption for the factor.

Section 9.2.B.2. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger modeled reserve than would otherwise result. For example, the company shall use a larger margin when:

- a. The experience data have less **relevance** or lower credibility.

Section 9.2.D.1. The company shall determine prudent estimate policyholder behavior assumptions such that the assumptions:

- d. Reflect the outcomes and events exhibited by historical experience only to the extent such experience are **relevant** to the risk being modeled.

Section 9.2.D.3. Margins for Prudent Estimate Policyholder Behavior Assumptions

The company shall establish margins for policyholder behavior assumptions in compliance with subsection 9.B subject to the following:

- a. To the extent that there is an absence of **relevant** and fully credible data, the company shall determine the margin such that the policyholder behavior assumption is shifted toward the conservative end of the plausible range of behavior, which is the end of the range that serves to increase the modeled reserve.
- b. The company must assume that policyholders' efficiency will increase over time unless the company has **relevant** and credible experience or clear evidence to the contrary.

Section 9.2.D.4. Additional Sensitivity Testing for Policyholder Behavior Assumptions

The company shall examine the sensitivity of assumptions on the modeled reserve as required under Subsection A.3 of this section and shall at a minimum sensitivity test:

- a. Premium payment patterns, premium persistency, surrenders, partial withdrawals, allocations between available investment and crediting options, benefit utilization and other option elections if **relevant** to the risks in the product;

Section 9.2.D.6. For a term life policy that guarantees level or near level premiums until a specified duration followed by a material premium increase, or for a policy for which level or near level premiums are expected for a period followed by a material premium increase, for the period following that premium increase the lapse and mortality assumptions shall be adjusted, or margins added, such that the present value of cash inflows in excess of cash outflows assumed shall be limited to reflect the **relevance** and credibility of the experience, approaching zero for periods where the underlying data have low or no credibility or **relevance**. ■



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## Call For Volunteers

Are you interested in getting involved with the Financial Reporting Section but don't know where to start? Continue to check the new SOA volunteer opportunities list (<https://engage.soa.org/volunteeropportunities>) to find a job that suits your skills and availability!



## Editorial Correction

In the June 2017 issue of *The Financial Reporter*, the author bio and photo for Shaowei Yang were omitted from the article “Setting Ascribed Premiums for Market Risk Benefits under FASB Targeted Improvements.” The editorial staff of the SOA apologizes for the error and regrets any confusion the error created. The correct author bio and photo are as follows.



Shaowei Yang, FSA, MAAA is a director at Pacific Life Insurance Company. He can be contacted at [Shaowei.Yang@pacificlife.com](mailto:Shaowei.Yang@pacificlife.com).

# Industry Preparedness And Impact of FASB Targeted Improvements

By Craig Reynolds and Karthik Yadatore

**T**he Financial Accounting Standards Board (FASB) released an exposure draft on Sept. 29, 2016, in which it proposed significant changes to U.S. GAAP accounting for long-duration insurance contracts to address stakeholders' key concerns. We have summarized the proposed changes below:

1. Unlock and periodically update benefit and expense reserves for fixed premium/ fixed benefit products.
2. Amortize deferred acquisition cost (DAC) in proportion to insurance or benefits in force, without interest, and eliminate loss recognition testing.
3. Use fair value methods to calculate reserves for all guarantees associated with separate account products.
4. Provide detailed disclosures on liability balance roll-forwards.

We recently performed a detailed study<sup>1</sup> to understand:

- The impact of the proposed changes to GAAP earnings and equity for several illustrative product types and
- Industry's key concerns, preparedness to adopt, and expectations of impact of the proposed changes via a survey of 14 leading life insurance and annuity producers.

In the remainder of this article, we highlight the results of our study. While the terms such as FAS 60, FAS 97, FAS 120, and SOP 03-1 are technically no longer in use, we use them in this article because they are a part of the common vernacular.

## UNLOCK AND PERIODICALLY UPDATE BENEFIT AND EXPENSE RESERVES FOR FIXED PREMIUM/ FIXED BENEFIT PRODUCTS

One of the key stakeholder concerns is the need to improve the timeliness of reflecting emerging experience and its deviation from expected when calculating the liability value.

To address this concern, FASB has proposed that the net premium reserve method will continue to apply. However, the net premium ratio will be updated at each valuation date for actual historical experience and any updates to the projected best estimate cash flows. The assumptions used to project the best estimate cash flows must be updated at least annually and will not contain any provision for adverse deviation (PADs). The discount rates used to calculate the reserves will be based on the yields of high-quality fixed investment income assets that reflect the duration characteristics of future policy benefits. The discount rate must be updated at least quarterly.

The proposed changes are in contrast to current GAAP where, in the absence of loss recognition, the assumptions, including the discount rate, are locked-in at issue. Hence, the reserve factors too are locked-in at issue.

The proposed changes will impact products that fall under the purview of FAS 60, FAS 120, and FAS 97 Limited Pay. Our survey results show that the industry largely agrees with this change in principle. However, 12 of the 14 survey participants are concerned about the unlocking of liability cash flows when reserving for fixed premium/ fixed benefit products, primarily for two reasons: 1) difficulty in implementation due to resource constraints, and 2) possible material impact to GAAP equity and income. In particular, nine participants expressed concern about possible material impact to GAAP financials due to a nonalignment of discount rates and the earned rates. We believe that resource constraints arise due to possible lack of historical information for these products along with possible valuation/financial system changes required to implement the proposed changes.

To illustrate and analyze potential impacts of the proposal, we modeled a 20-year term product on a new business basis and a seasoned participating whole life (par WL) block and performed various sensitivities to simulate change in model assumptions or deviation of actual from expected. The par WL's dividend scale is dynamically adjusted based on the projected earned rates, mortality rates and expenses. The results of our modeling lend validity to the industry concerns.

Due to the elimination of PADs, the term product's reserves are lower when calculated under the proposed changes compared with reserves under current GAAP. An increase in the mortality and expense assumption or a decrease to the projected earned rates have a more muted impact on GAAP reserves under current GAAP where the reserve factors are locked-in. However, under the proposed changes, the reserves significantly increase when adverse experience leads to changes in future assumptions, since reserve factors are updated for increase in prospective mortality and expenses or a decrease to current or assumed future earned rates. Under current GAAP, when deviation of ac-

tual experience from expected occurs during the current period, almost the entire amount of the variance affects GAAP income immediately, whereas under the proposed changes, some of the variance would be offset by a corresponding update in the liability calculation.

For the par WL product, since the reserve factors under current GAAP are locked-in at issue, the reserves are relatively unchanged when mortality or expense assumptions are increased. Interestingly, under the proposed changes too, the reserves remained largely unchanged because the dividend scales reflected in the best estimate cash flows were assumed to adjust to reflect changes in anticipated experience.

Under the proposed changes, we believe that the standard would require the discount rate to be based on an AA-quality yield curve, since the wording in the exposure draft is the same as is used for pension obligations, and for those the Securities and Exchange Commission (SEC) has deemed “high-quality” to be AA. Due to this proposed change to discount rate assumption, a disconnect will likely exist between the earned rates that feed into the dividend scale and discount rates. Hence, liability measurement could be understated or overstated relative to what would be needed to fund the benefits and anticipated dividends.

### AMORTIZE DEFERRED ACQUISITION COST (DAC) IN PROPORTION TO INSURANCE OR BENEFITS IN FORCE

FASB has proposed that DAC now be amortized in proportion to insurance in force as opposed to premiums, estimated gross profits (EGPs), or estimated gross margins (EGMs) to address the stakeholder concern of simplifying DAC amortization. The DAC asset will not accrue interest and loss recognition will be eliminated. The net premium ratio and the SOP 03-1 benefit ratio will be capped at 100 percent.

Ten of the 14 survey participants believe that simplification of the DAC amortization is one of the main improvements resulting from the proposed changes. We asked the survey participants what they intended to use as a basis for amortizing the DAC for various products. For whole life and term products, the preferred choice is death benefit in force, followed by policy count. For both variable and general account universal life, the preferred choice is death benefit in force, followed by policy count and account value. For deferred annuities, the popular choice is account value, followed by policy count, and for immediate annuities and structured settlements, the preferred choice is annuity benefits in force, followed by policy count.

We also modeled a universal life (UL) and a fixed deferred annuity (FDA) to understand the impact of the proposed changes to DAC amortization.



For the term and the par WL products, we used the face amount in force to amortize the DAC under the proposed changes. For both these products, DAC is amortized at a faster rate compared with current GAAP due to the absence of interest rate accrual. For term, the impact of the removal of interest accrual on DAC is much more significant than the removal of PADs. For UL products we used face amount in force, and for the FDA we used account value as the basis of amortization under the proposed changes. Our modeling results show that, under the proposed GAAP, for par WL, UL and FDA, the amortization basis, and hence DAC, tends to be less sensitive to change in assumptions or deviations of actual from expected compared with the amortization basis and DAC calculated under current GAAP. Unlike the term and par WL product, the DAC balance calculated under the proposed changes for UL and FDA would not always be lower than DAC calculated under current GAAP. This is because the projected EGPs can increase or decrease from one projection period to the next, while the amortization basis under new GAAP, e.g., death benefit in force and account value, generally would tend to decrease after the contract was past the premium paying period.

### USE FAIR VALUE METHODS TO CALCULATE RESERVES FOR ALL GUARANTEES ASSOCIATED WITH SEPARATE ACCOUNT PRODUCTS

FASB has proposed this change to simplify the accounting associated with options and guarantees embedded in variable



products. The impact of this proposed change will mostly impact variable annuity products. Under current GAAP, guaranteed minimum death benefits, income benefits, and sometimes withdrawal benefits are accounted for under SOP 03-1, as they involve longevity or mortality risk. Fair valuing these benefits will add significant volatility to the GAAP liability.

Half of the survey participants expressed concern about fair value reserving for all GMxBs due to the possible materiality of impact to GAAP financials. Our understanding is that this proposal may:

- Create incentives for companies that don't hedge their guaranteed minimum benefits to reevaluate their hedging strategy and philosophy;
- Better align the hedge target and the liability value for companies that hedge the economic value of these guarantees; and
- Continue to produce a mismatch between the hedge gains/losses and the change in GAAP liability value for companies that hedge their statutory reserving and solvency requirements, though the mismatches may now be different in direction and magnitude due to the proposed changes.

### IMPROVED DISCLOSURES

FASB will propose significantly more involved disclosure requirements than currently required to improve the effectiveness of required disclosures and provide more decision-useful information to financial statement users.

Disaggregated roll-forwards of the liability balances will be required along with information about estimates and judgments, including how they have changed and their effect on the measurement of the liability. For account value-based products, balances will need to be presented based on ranges of combinations of minimum guaranteed rates and current credited rates.

All 14 participants responded that they do not have an existing process or a clear plan in mind to produce the required attribution, disclosures and documentation. A combination of a need for additional resources and perceived ambiguity about the proposed changes is causing almost all of the survey participants to be concerned about required attribution, disclosures, and documentation and the transition guidance.

### CONCLUSION

Based on the results of our modeling, we conclude that the changes proposed by FASB may have significant impact and require material implementation effort. However, our survey results show that the industry has completed almost no work beyond discussing the proposed changes with senior management. We hope that this article and the white paper we published will shed more light on understanding the impact of the proposed changes and prompt further discussion. ■



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### ENDNOTE

1 <http://www.milliman.com/insight/2017/Proposed-Changes-to-US-GAAP-An-impact-analysis-of-proposed-targeted-improvements/>

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# GAAP Targeted Improvements—Retrospective Noise

By Steve Malerich

In its proposed updates to accounting for long-duration contracts, FASB specifies a retrospective method of accounting for assumption changes when calculating liabilities—the same method we use now to value universal life DAC and additional liabilities.

Financial statement users have generally endorsed the retrospective method because, when we change an assumption, they want to see a change in our liability. Considering, however, all of the challenges that companies have faced in explaining DAC unlocking, industry comments were nearly unanimous in recommending a prospective method.

Following the April 19 roundtable, it appears likely that FASB will retain the retrospective method for unlocking liabilities. (DAC unlocking will use a prospective method.)

In this article, I illustrate some likely drivers of unlocking volatility for traditional contracts. In the next issue (if the retrospective method is still alive) I will look at how we might reduce volatility by modifying our approach.

## A KEY DRIVER OF UNLOCKING VOLATILITY

One feature of the retrospective method has only an indirect relationship to assumption changes. In what is often referred to as a “retrospective true-up,” actual experience is combined with a current projection to recalculate the net premium ratio.

When we update the calculation for actual experience without changing assumptions, the retrospective method distributes the cost or benefit of any variance between past and future periods in proportion to expected revenue (premium income for traditional contracts). If, among random variations, there happens to be a bias, the deferred costs or benefits will accumulate.

Such bias, if it persists, will eventually lead us to change an assumption. At that time, our revised calculation will similarly distribute the change in projected values between past and future.

Some of the resulting reserve change will essentially be a reversal of past deferrals.

## ILLUSTRATIONS

The following illustrations are built from a current estimate cash flow projection of a hypothetical nonparticipating whole life insurance product.

Three different “actual” cash flow patterns highlight the effects of the traditional approach to applying the retrospective method. Though crudely representative of real-world conditions, these are not representative of actual or expected experience for any particular product. To help clarify the effects, random variances are ignored and net income excludes overhead expense and equity income.

Each illustration compares net income under retrospective and prospective assumption update methods to two benchmarks—expected and ideal. For expected, all experience follows original assumptions. For ideal, valuation assumptions are set at inception to equal the actual cash flows. For simplicity, the assumption changes in all illustrations align perfectly with actual experience. In reality, future experience cannot be perfectly divined from the past.

Optimally, actual net income would be close to ideal before and after an assumption change.

### Adverse Early Mortality Experience

In Chart 1, adverse experience begins immediately but gradually tapers off. Ultimate experience matches the original assumption. The select mortality assumption is changed in year five.

Prior to the assumption change, prospective net income is clearly closer to ideal than is retrospective. By including actual cash flows in the liability calculation, retrospective effectively spreads the cost of the excess claims over the life of the business.

By the end of year four, accumulated claims are 2,700 greater than expected. Of this, 1,700 (66 percent) has been deferred to be charged against premiums in years five and later. The unlocking adjustment is 2,000. So 1,700 (87 percent) of the 2,000 unlocking adjustment is just to reverse the prior deferral of excess claim costs. The remaining 300 is the portion of increased expected claims that must now be matched with past premiums and immediately added to the reserve.

The prospective method would pass the claim variances directly to net income as they occur. At the time of change, prospective has no unlocking adjustment.

Chart 1  
Adverse Early Mortality Experience

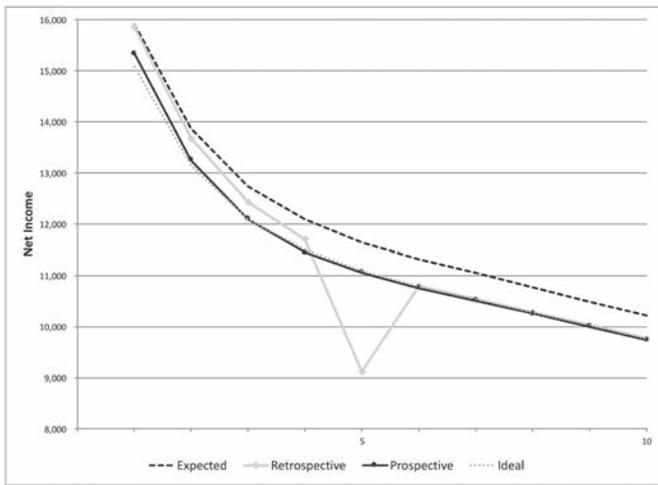
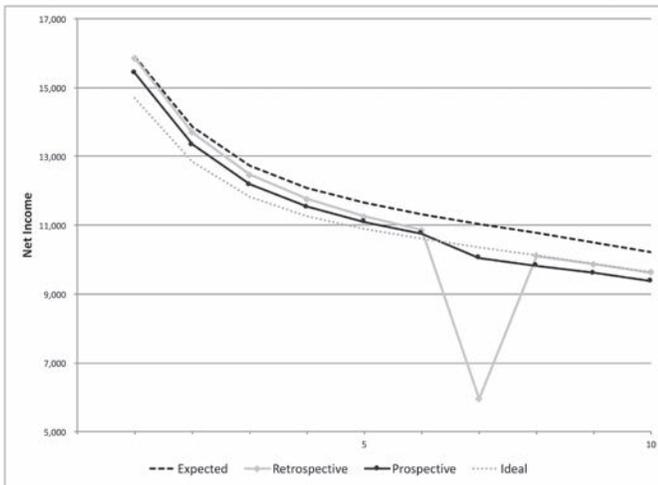


Chart 2  
Perpetually Adverse Experience



After the assumption change, net income under both methods is equal or close to ideal.

### Perpetually Adverse Experience

In Chart 2, adverse experience begins immediately and is forever worse than originally expected, though by proportionally declining amounts. Here, we change the assumption in year seven.

Under both methods, net income is between expected and ideal prior to the assumption change. Retrospective again spreads the excess costs in proportion to premium, slowing its approach to ideal. Prospective still looks better than retrospective, though not as dramatically as in the first illustration.

By the end of year six, accumulated claims are 3,600 greater than expected. Of this, 1,900 (53 percent) has been deferred to

In real life, we would not know that experience will forever be worse than originally assumed.

be charged against premiums in years seven and later. The unlocking adjustment is 4,400. So 1,900 (43 percent) of the 4,400 unlocking adjustment is just to reverse the prior deferral of excess claim costs. The remaining 2,500 is the portion of increased expected claims that must now be matched with past premiums and immediately added to the reserve.

After the assumption change, retrospective aligns perfectly with ideal. Prospective must also fund the 2,500 that retrospective matches to past premium. Unlike retrospective, however, prospective charges this cost against future premium with a higher net premium ratio, such that subsequent net income would be lower under this method than either retrospective or ideal.

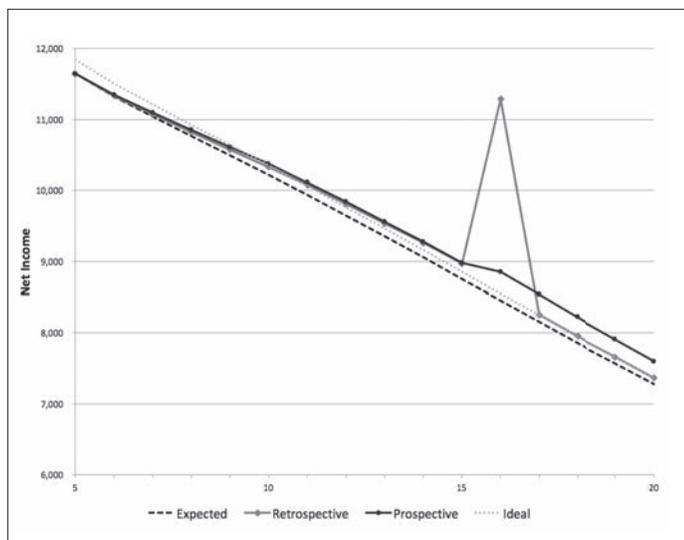
In this illustration, we can see a conceptual tradeoff between the two methods: magnify unlocking by the amount of past claims that had previously been deferred or increase future reserve accruals to gradually make up for the inadequate charges against past premium. In practice, the tradeoff is more muddled.

In real life, we would not know that experience will forever be worse than originally assumed. We might think the adverse experience is a select mortality issue. As a result, our new assumption would be more optimistic than ideal.

Under the retrospective method, we might have unlocking of 2,000 or smaller, depending on how optimistic we are about how soon claims will align with the original assumption. Thus, the adjustment will merely reverse all or part of the 1,900 in accumulated prior deferrals. In fact, since the valuation system accumulates only actual experience, we won't even know the amount of past deferrals. We might conclude that 1,000 or less is a reasonable unlocking amount, thus carrying forward much of the past deferral which, in this illustration, we know must eventually reverse. Subsequent income will be closer to ideal, but still too high.

Since we've changed expected claims for all or part of the remaining select period, it will likely be a while before claims exceed the new assumption by noticeable amounts. On the plus side, that at least means further deferrals will be insignificant for a while. They will, however, continue to accumulate and will eventually have to reverse.

Chart 3  
Increasingly Favorable Experience



Under the prospective method, we wouldn't have any deferrals to reverse. We'd be carrying a larger reserve balance than retrospective, possibly even larger than we would have after a retrospective unlocking, and we would increase the reserve accrual rate for future years. Additionally, without any immediate or significant near-term effect of unlocking, we might be more aggressive in changing assumptions than we would under the retrospective method.

### Increasingly Favorable Experience

In Chart 3, slightly favorable experience begins to emerge five years after issue. After 15 years, we recognize an acceleration of mortality improvement from about five to 10 years after the business was issued, followed by a return to previously assumed improvement rates. In year 16, we change our assumption accordingly.

Under both methods, the difference from expected net income is almost imperceptible until about 10 years after issue. The difference between retrospective and prospective methods is even smaller.

Before the assumption change, net income continues to improve relative to expected. Retrospective spreads the favorable experience in proportion to premium but, since several years pass from issue until the variances become significant, relatively little is deferred.

By the end of year 15, accumulated claims are 1,900 lower than expected. Of this, only 400 (21 percent) has been deferred, to be matched with premiums in years 16 and later. The unlocking adjustment is 2,700. So this time, only 15 percent (400) of the 2,700 unlocking adjustment is needed to reverse the prior deferral of reduced claim costs. The remaining 2,300 is the portion of decreased future claims that must now be matched with past premiums and released from the reserve. After the assumption change, retrospective aligns perfectly with ideal.

Prospective unlocking would leave the reserve unchanged but reduce future accrual with a lower net premium ratio, such that subsequent net income would be higher than either retrospective or ideal.

This chart highlights another conceptual difference between the two methods—whether the cost or benefit of developments occurring several years after issue should be matched retrospectively to income over the entire life of the business or prospectively to income after the developments are recognized. Many actuaries believe prospective matching to be the better principle. FASB, however, has consistently endorsed retrospective matching in this and other projects.

### CONCLUSIONS

Chart 3 makes clear that significant reserve unlocking will be a challenge under some circumstances. Charts 1 and 2, however, suggest that we might reduce the frequency and severity of the challenge if we can find a way to minimize or avoid the deferral and subsequent reversal of persistent, biased variances.

Assuming retrospective unlocking remains the standard for assumption updates, I will present in the next issue some ideas on how we might overcome the problem of deferring and then reversing the effects of actual experience variances. For now, consider something that is implicit in current practice:

*With respect to expected future experience, actual experience is given zero credibility until the valuation actuary decides otherwise when updating assumptions. ■*



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# Challenges to Consider Upon IFRS 17 Adoption

By Michael Beck, Laura Gray and Gavin Stewart

In the 1990s the International Accounting Standards Board (IASB) put in place International Financial Reporting Standards 4 (IFRS 4) to provide guidance for the accounting of insurance contracts. This measure was implemented as a stop gap while awaiting the development of a permanent standard. Twenty years later IFRS 17 (the Standard) was issued by the IASB on May 18, 2017 and provides the principles that will govern insurance contracts in many countries around the world, effective Jan. 1, 2021. This article provides an overview of IFRS 17 followed by a discussion of some of the intricacies related to IFRS 17 and how companies can consider addressing these in their upcoming implementations.

## IFRS 17 OVERVIEW

IFRS 17 is a principle-based approach to accounting for insurance contracts. The standard brings with it some new concepts, as well as incorporating concepts that exist under other measures but were not previously included in IFRS 4. This standard introduces the general measurement model (GMM) which is constructed by four separate building blocks: (1) cash flows, (2) risk adjustment, (3) discount rates and (4) contractual service margin.

Under IFRS 17, cash inflows and outflows are explicitly projected as a part of the valuation. The cash flows should include all cash flows that relate to the fulfillment of a “group” of contracts on a best estimate basis without an allowance for adverse deviation. Certain expenses, such as product development, are therefore not included as these cannot be tied to a specific contract.

The cash flows are discounted back to the valuation date using the current rates. In addition to the basic cash flows, a risk adjustment (RA) for non-financial risks is included in the liability. This RA represents an amount that makes the entity indifferent between providing a known set of cash flows and one with uncertainties in terms of amount and timing.

At the inception (or point-of-sale) of the contracts, a contractual service margin (CSM) is established to eliminate any initial profit recognition. Over the duration of the contract life, the CSM

is released as the risk to which the company is exposed runs off. The release of the CSM represents profit from the product which can be recognized in the profit and loss statement. The pattern of the release of the CSM is based on the principle of “coverage units” which represents the amount of service provided during the period. Although the production of the financial statements is not covered in this article, it is worth noting that disclosures will require considerable effort and should be proactively developed early in the adoption process.

## CSM AND LOSS COMPONENT

Paragraph 38 of IFRS 17 defines the CSM as “the unearned profit the entity will recognize as it provides services in the future.” There are a number of adjustments to the CSM that must occur each reporting period including accretion of interest, changes in the cash flows due to certain assumption updates, and calculation of the run-off. If the CSM is eliminated prior to the end of the life of the contracts, a separate “loss component” must be tracked and monitored in case the CSM needs to be re-established at a future point in time. As the inclusion of the CSM and/or loss component is one of the biggest methodology changes from IFRS 4 to IFRS 17, it represents one of the most crucial and challenging implementation aspects for companies adopting the new standard. To be able to calculate and understand the CSM and loss component, companies will need to focus attention on data, analysis of change and coverage units, as discussed below.

## CSM Data Challenges

The ongoing data needs associated with the CSM are substantial, and will require a holistic approach to capturing data so that it can be appropriately allocated to a “group” of insurance contracts. Appendix A of IFRS 17 defines a group of insurance contracts as a set of contracts which, at initial recognition, are:

- Subject to similar risks and managed together (i.e., are part of a portfolio)
- Written within a period of no more than one year (see transition section for treatment of business written prior to transition)
- All categorized as being either (a) onerous at inception, (b) not onerous at inception with no significant risk of subsequently becoming onerous, or (c) not onerous at inception with risk of subsequently becoming onerous

For many insurers, this grouping is more granular than current levels at which products are managed. While most insurers are already managing products with similar risk profiles together, current portfolios may not be limited to a 12-month period. Additionally, as the sub-division of onerous and non-onerous

contracts is new to IFRS 17, it is doubtful that many insurers currently manage to this level of granularity.

The increased granularity required by IFRS 17 has two implications for data needs relative to the CSM:

1. Since IFRS 17 requires best-estimate cash flows to be recast at each valuation date, projection models must be run for each group of insurance contracts, with changes in certain estimates relating to future service flowing through the CSM. Changes related to financial assumptions do not flow through the CSM, nor do changes related to incurred claim liabilities, so tracking the nature of the changes is also critical. Depending on the methods in place for making and reviewing assumption updates across product groupings, this may put strain on both the assumption review process as well as any controls that are in place to ensure assumption updates are made as expected.
2. As the current period CSM is calculated using the prior period CSM as a starting point, the retention of historical CSM information is critical. Ultimately, this requirement forces companies to maintain a greater amount of data than current requirements. For those contracts that are either considered onerous at inception or become onerous in subsequent valuation periods, companies will need to track a loss component rather than a CSM. While the loss component is recognized immediately in profit and loss, the accumulated balance must be disclosed in a company's financial statements and tracked on a recurring basis to monitor if the product becomes profitable.

To begin preparing for these increased data needs, companies would be well-advised to begin conducting gap assessments on current valuation systems and data management capabilities sooner rather than later. In addition, companies will want to begin conversations with assumption committees and with their auditor over the increased population of product groupings requiring assumption updates and controls. For those companies that have a simplified or siloed approach to assumption updates, now may be a good time to invest in enhancing these processes and positioning them to be successful under IFRS 17. Finally, actuarial departments will benefit from close coordination with IT and data groups to manage the flow of information necessary to track the period-over-period CSM and/or loss component for each group of insurance contracts.

### Analysis of Change

The disclosure requirements defined within paragraphs 101 and 104 of IFRS 17 require that companies reconcile the opening and closing balances of the CSM, separating out:

- Changes related to future service (such as assumption updates or contracts initially recognized in the period)
- Changes related to current service (such as experience adjustments and the amount of CSM recognized in current profit and loss)
- Changes related to past service (such as changes related to incurred claims)

The practical implication of these disclosure requirements is that companies will need a stepwise set of cash flow projections that show the impact of experience updates, assumption changes, and the subsequent release of the CSM (as paragraph 44(e) of IFRS 17 prescribes that the release of CSM should be based on the end-of-period balance, accounting for experience updates and assumption changes). These stepwise projections can then be used to construct an analysis of change that fulfills the disclosure requirements.

Many companies already produce waterfall-type analyses showing such breakdowns under current IFRS 4 reporting. However, the updated contract grouping requirements and increased complexity of the CSM under IFRS 17 introduce additional challenges to these analyses, and companies should consider including the disclosure requirements of IFRS 17 in their initial gap assessments.

### Coverage Units

In each reporting period, a portion of the CSM for a group of insurance contracts is released to reflect the transfer of services for that period, as described by paragraph B119. This release of CSM represents a company's expected profit for the period. The amount to be released is determined by reference to "coverage units" within the group, such as face amount, policy count, or annualized premium, which are not specifically defined in the standard. The choice of different coverage units may lead to varying patterns of profit emergence, depending on the nature of the product. For some products, such as term life insurance, the choice of coverage units may be less influential, as the coverage units maintain fairly stable proportions over the product life irrespective of how the company defines them. For other products, such as universal life insurance, the choice of coverage units is much more consequential.

As the choice of coverage units has a direct impact on a company's income statements under IFRS 17, companies should begin thinking through what coverage units best reflect the nature of each grouping of insurance contracts. Analysis of the impact of different choices for coverage units can also be included in financial impact assessments as companies seek to understand the impact of IFRS 17 on their business. Additionally, as the standard does not specify a level at which coverage units should

be consistent between product groupings, companies will likely want to discuss the consistency of chosen coverage units with their auditors.

## TRANSITION

Unlike some valuation bases, such as U.S. principle-based reserving (PBR), IFRS 17 is a fully retrospective standard which means that all policies must be reported on this new basis. Once a company has developed their methodologies and tools, it then has a very large exercise to go back and determine what all of its old business would have looked like on an IFRS 17 basis. This section discusses some of the apparent challenges and possible solutions to transition.

### Transition Approaches

To address the complexities of transition, an entire appendix within the standard (Appendix C) is included to discuss the effective date and transition. The details provided in this appendix cover the whole process of transition, and the decision that companies have to make boils down to choosing what methods should be used for old business.

The standard prescribes that the full retrospective approach (FRA) should be used (paragraph C3) unless it is “impracticable” to do so. Under the FRA a company would be required to calculate the IFRS 17 balances from inception to the transition date in order to determine the CSM at the date of the opening balance sheet. For most companies this may be exceedingly difficult if not impossible for much of their business, especially the older contracts. In recognition of this, the IASB included provisions for simplified methods in the standard. Where the full retrospective approach is impracticable, companies can choose either the modified retrospective approach (MRA) or the fair value approach (FVA).

A large determinant of the choice between FRA, MRA and FVA will be the availability of data, and the approach which is adopted may vary by block of business and age. A possible approach when performing initial impact assessments might be to assume a FRA for business back “x” years where data is more readily available, and then the FVA or MRA approach is used for older business as appropriate. Such an approach would be subject to refinement as a company determines what level of data is truly attainable. Engaging early with auditors and, where applicable, regulators will smooth the process a company experiences.

### Data Needs

As mentioned above, availability and granularity of data are key factors in deciding which approach a company can adopt. To be able to perform the FRA all of the following data would be required for the whole history of the product:

The exercise of transitioning from IFRS 4 to IFRS 17 for in-force business is a very significant undertaking. ...

- Assumptions (economic and insurance)
- In force policy data
- Experience cash flows
- Reinsurance treaties

Given that some policies were issued many decades ago, the likelihood that companies have these data elements readily available is slim. Where this information is not “available without due cost or effort” (paragraph C6), then either the MRA or the FVA will be used. In deciding between the MRA and the FVA, companies will need to consider that the MRA still requires “reasonable and supportable” data as well as considerable estimation effort, while the FVA is still subject to uncertainty regarding application as the IASB has not provided significant additional guidance. It is worth noting that paragraph B37 states that “Information available from an entity’s own information systems is considered to be available without undue cost or effort.”

To assess the availability of data, companies need to undertake significant data mapping exercises. This allows companies to understand what data is available and where there are gaps, providing evidence to demonstrate impracticability where the FRA is not adopted. As the transition process will come only after a company’s methodologies and tools have been developed, this allows time to consider the various approaches. Where companies perform the data analysis earlier they will have more time to discuss with their management and auditors.

### Practicalities

The exercise of transitioning from IFRS 4 to IFRS 17 for in-force business is a very significant undertaking even when all of the technical issues have been reasonably considered. That said, companies can consider a few things to help them speed up their transition initiatives.

The grouping of new policies for the CSM calculation is at an annual level for new business. However, this requirement doesn’t exist for existing business (paragraph C10 and C23). Grouping policies into larger groups may have a number of benefits: potential mitigation of volatility in the CSM, more policies in a group when considering if a block is onerous, fewer groups to run through models, and fewer groups for which to determine

the CSM. These benefits have to be weighed against computing requirements from having very large in force policy data files. Depending on the products, companies may consider splitting the business into 5-year blocks as a suitable compromise. When determining such groupings, an important consideration is that the discount rate curve for each block needs to be determined. Companies are able to use a weighted average approach, but may also want to consider changes in interest rate environments when determining the grouping.

The introduction of new regulations and financial reporting requirements provides an opportunity for companies to reassess their actuarial, data infrastructure, and processes. The introduction of PBR for life products in the United States led to a number of companies shifting modeling platforms. Depending on the priorities and structure of the company, technology solutions will range in effort and cost.

## CONCLUSION

IFRS 17 brings with it many new challenges which companies need to start considering. Many of these revolve around data either for calculation of the CSM or for the transition, but challenges also exist for other building blocks. In the next is-

sue, we will continue to investigate these challenges and how companies may begin to think about the solutions specific to their business. ■



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# Asset Dependency Discounting—A Flaw in IFRS 17?

By Erik Jen Hong Lie

In this article, I will discuss the issue of asset dependency discounting as addressed by IFRS 17.

According to paragraph B74:

Estimates of discount rates shall be consistent with other estimates used to measure insurance contracts to avoid double counting or omissions; for example:

- a. Cash flows that do not vary based on the returns on any underlying items shall be discounted at rates that do not reflect any such variability;
- b. Cash flows that vary based on the returns on any financial underlying items shall be:
  - i. Discounted using rates that reflect that variability; or
  - ii. Adjusted for the effect of that variability and discounted at a rate that reflects the adjustment made.

At first glance, the application of the standard seems to be clear: discount asset-dependent cash flows (ADCF) by a risk discount rate, and discount non-asset-dependent cash flows (NADCF) by the risk-free rate. In the example of a traditional life (TL) participating (PAR) product, dividend-related cash flows will be asset-dependent, while other guaranteed cash flows, including premium and expenses, will be non-asset-dependent. The intention for this is good in that cash flows will be discounted at the discount rate that reflect their risk characteristics. If a company is using fixed cash flows to fund risky investments, those cash flows will be discounted at a lower rate (i.e., risk-free rate) and the interest spread will be earned in a separated line called “finance result” (i.e., investment margin) instead of “insurance service result” (i.e., underwriting margin).

However, the above statement is faulty since it ignores the cash flows’ ability to affect the returns on the underlying item. To

illustrate this, consider the following hypothetical product: a 3-pay-5 universal life contract where the policyholder gets 100 percent of the investment return (assumed 5 percent). A benefit is only payable upon maturity, regardless of whether the policyholder died or not. For illustrative purpose, assume no policyholder will lapse and no expenses, charges or deductions. Assume the risk-free rate to be 3 percent. Table 1 shows the account value roll-forward and the cash flows.

Table 1

AV Roll Forward			Cashflows	
Premium	Return	AV	Premium	Mat Ben
100	5%	105.00	100	
100	5%	215.25	100	
100	5%	331.01	100	
	5%	347.56		
	5%	364.94		364.94

And the split cash flow discounting is as shown in Table 2.

Table 2

Split CF Discount		
ADCF	NADCF	BEL
285.94	-291.35	-5.41
300.24	-197.09	103.15
315.25	-100.00	215.25
331.01	0.00	331.01
347.56	0.00	347.56
0.00	0.00	0.00

One can see that if we use the risk-free rate to discount the premium (which does not vary based on the returns on any underlying items), but use a risk-discount rate to discount the maturity benefit, this will result in day-one negative best estimated liability (BEL). This negative BEL will become the contractual service margin (CSM) at initial recognition, and amortized in future years.

However, there is no gain or loss from the insurer side for this contract. Since the insurer is crediting exactly what it earns to the policyholder, even if we considered there is an interest spread (5 percent investment return vs 3 percent interest expense), this gain is solely attributed to the policyholder, not the insurer. The day-one CSM built up from the insurer side is double counting the economic value of this contract.

Therefore, I believe the correct statement for B74 should be “two-way” instead of “one-way.” I believe that (a) should read “cash flows that do not vary based on, and do not affect the returns on, any underlying items ...” and that (b) should read “cash

flows that vary based on, or may affect the returns on, any financial underlying items. ...”

In the amended statement, there are two ways of splitting the cash flow:

1. Consider all cash flows as ADCFs. Say, for a unit-linked contract, even the “guaranteed” part of cash flows like guaranteed minimum death benefit (GMDB) will not be paid since the contract is lapsed if the account value drops to 0. By nature it is like a deep out-of-the-money (OTM) call contract, and hence is an embedded derivative, thereby all cash flows are asset dependent.
2. Split the cash flows with the premiums backing it. Say, for a TL PAR contract, we can consider the guaranteed cash flows to be non-asset-dependent but the non-guaranteed cash flows to be asset-dependent. It is theoretically possible to separate the portions of premium backing each part. For example, calculate the NADCF BEL and ADCF BEL, determine their ratios and use the same ratio to split the premium. This is shown in Table 3. (However, this method should only be used if the NADCFs will not affect the underlying item and its subsequent sharing mechanism, like bonuses for TL PAR, or fees and charges for UL)

Table 3

Split CF Discount		
NADCF BEL (Excl Prem)	ADCF BEL (Excl Prem)	BEL (Excl Prem)
138.02	142.97	280.99
142.16	150.12	292.28
146.42	157.63	304.05
150.82	165.51	316.32
155.34	173.78	329.12
0.00	0.00	0.00

Portion	
NADCF %	ADCF %
49%	51%

One may argue that, according to Paragraph B77, the splitting of cash flows is not required:

IFRS 17 does not require an entity to divide estimated cash flows into those that vary based on the returns on underlying items and those that do not. If an entity does not divide the estimated cash flows in this way, the entity shall apply discount rates appropriate for the estimated cash flows as a whole, for example, using stochastic modelling technique or risk-neutral measurement techniques.

This statement appears to be referencing B74(b)(ii), such that using risk-neutral measurement techniques may avoid the split of cash flow problem. Firstly, I believe that the risk-neutral measurement technique should not be allowed in IFRS 17 except for calculating the time value of options and guarantees (TVOG). Secondly, even if a risk-neutral measurement technique is adopted, the above logic still does not stand. In the variable fee approach (VFA) model, the subsequent measurement needs to be unlocked by a change in the NAD BEL and a change in variable fees from the underlying item. The splitting of premium is still required to calculate the underlying item (i.e., asset share) backing ADCFs but not NADCFs assuming the NADCFs will not affect the underlying item.

To conclude, I believe the IASB should change the wording in B74 as noted above. And even after this change, the classification of asset dependent cash flows and splitting of premium will still be another debatable topic, regardless of whether the company uses risk-neutral measurement techniques. ■



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# PBR, How Shall I Examine Thee? Let Me Count the Ways

By Tricia Matson, Leslie Jones and Andy Rarus

Principle-based reserves (PBR) standards for individual life insurance business became effective in the vast majority of states on Jan. 1, 2017 (with a 3-year transition period that enables companies, at their option, to adopt anytime up to Dec. 31, 2019). As a result, life insurance companies (excluding those that qualify for and take certain exemptions or exclusions and/or those that exclusively offer pre-need, credit life and industrial life products, which are currently exempt) will be significantly changing the methods, assumptions, processes, and systems used to determine reserves for life insurance products. The available exemptions include the company-wide exemption (which may be renamed the “Life PBR exemption”) and stochastic and deterministic exclusion tests that, if both were passed, would allow companies to essentially continue to follow an approach similar to today’s. This article provides a brief overview of some of the changes that will be driven by the PBR requirements and a discussion of how reviewers of those reserves (auditors and examiners) may approach their review under the new methodology.

## PBR REQUIREMENTS

Reserves under PBR still involve an evaluation of future benefits and future premiums; however, that may be where the similarities to the current formulaic reserving process ends. While there are some historical reserving processes that are more “principle based” in nature, such as asset adequacy analysis and reserving for variable annuities with guarantees, the reserving approach for the individual life formula reserves that currently must be held are static in nature. Under PBR, the projections of future benefits, expenses and revenue consider all cash flows material to the business, including premiums and other revenue collected from the insured, investment income, policyholder benefit payments (including surrender benefits net of surrender charges) and expenses. The calculation involves using some prescribed assumptions and some assumptions that are based on company experience and actuarial judgment. The calculation also provides for margins for uncertainty. In order to include investment income in the projections, both assets and liabilities are project-



ed. Rather than using a single economic scenario, a range of economic scenarios must be considered (if the stochastic calculation is required).

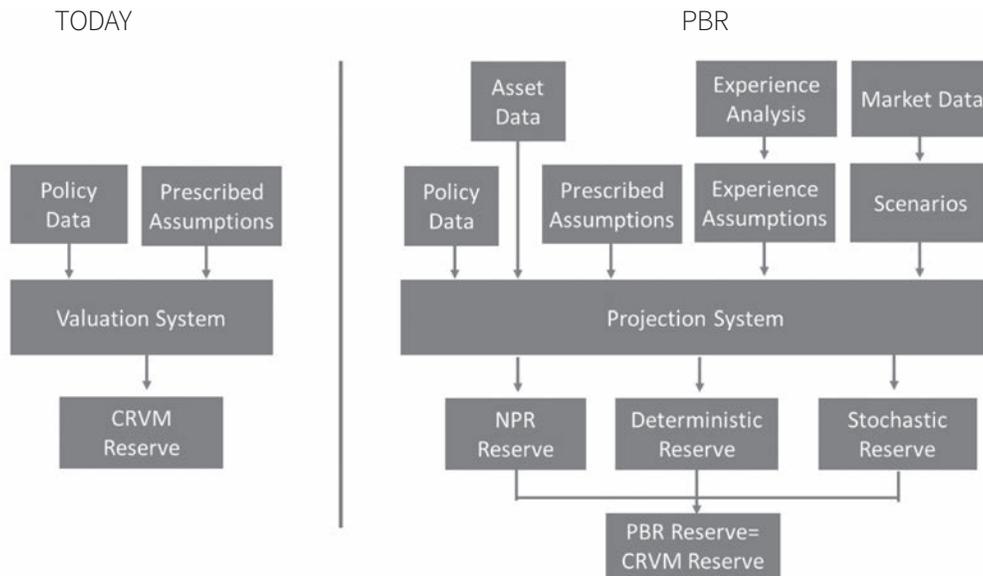
The requirements for the calculation are described in the NAIC’s Standard Valuation Manual (VM). Unlike the valuation law, this document will be updated regularly and does not require legislative approval in most jurisdictions. Chapter 20 (VM-20) describes requirements for life products. For in-scope life insurance products that have not met the exclusion tests, the reserve is the greatest of the following three calculated reserves:

1. The net premium reserve (NPR), which is a calculation similar to (and in some cases identical to) today’s reserve but with some potential differences in the underlying assumptions;
2. The deterministic reserve, which is a more risk-based, current-assumption reserve including all material cash flows, some prescribed assumptions and a single economic scenario; and
3. The stochastic reserve, which is similar in many ways to the deterministic reserve but is calculated using a set of stochastic interest rate and equity scenarios.

## CHANGES IN THE RESERVING PROCESS

PBR will add significant complexity to the reserving process, requiring new data, systems, methods, assumptions and controls. Figure 1 is a representation of the data flow and elements involved in the current statutory reserving process as compared to what is required under PBR.

Figure 1



In order to focus our commentary on the most significant area of change, we have centered our discussion on the “formulaic” statutory reserves rather than the approach used to evaluate the adequacy of those reserves. Note that PBR will not impact asset adequacy testing requirements—a company will still be required to test their entire block of business. Figure 1 and our comments below regarding auditing reserves apply to the formulaic reserves and the PBR reserve that will replace the formulaic reserve, not the examination or audit process that is used for evaluating the reserve adequacy testing process performed by the appointed actuary.

Under the current reserving process shown on the left side of Figure 1, the input data needed to perform the calculation involves only policyholder data and specific, prescribed assumptions for mortality and interest based on the policy type and issue year. A valuation system is then typically used to perform the calculations using those two static assumptions, and the reserve for each policy is output from the system. The primary tasks involved in auditing or examining such a reserve are as follows:

- Verifying the accuracy of the policy data;
- Reconciling information flows (data and assumption feeds into the valuation system, and reserve feeds out of the system and into the ledger); and
- Verifying the accuracy of the valuation systems calculations (including whether the proper assumptions were used in the calculations).

Depending on the level of risk associated with the reserving process and the quality of the company’s internal controls to mit-

igate that risk, one or more of these tasks may occur as part of the audit or examination. Data verification and reconciliations are frequently handled by the financial/accounting auditors/examiners, and the verification of the reserve calculations is frequently handled by the actuarial auditors/examiners. Such verification may involve aggregate level review of reserve amounts (performing trend analysis on reserves or other analytical tests) as well as recalculations of reserves for a sample of policies.

Turning to the PBR reserve process, we have several similar tasks that would be performed in order to audit or examine the reserve, as well as some new tasks we must consider. Since the net premium reserve (NPR) calculation is quite similar to the CRVM reserve in the current framework, this article will not focus on that particular part of the calculation. Audit of the NPR calculation is expected to be very similar to what is performed under the current framework.

For the remainder, a key consideration in planning the audit or examination approach is consideration of risk. If, for example, the stochastic reserve drives the final booked reserve for the bulk of the business, it may make sense to focus audit efforts on that part of the calculation. If certain data inputs are brand new that were not previously used in reserving processes, they may be viewed as higher risk than inputs that are consistent with the prior reserving process. So this risk-based approach to identifying where to focus the audit or examination effort will be even more important in a PBR framework.

Based on what is typical for a life insurance company implementing PBR, we have identified the components of the calculation that we believe are likely to be relatively higher or lower risk

(after consideration of controls). Of course the actual assessment of the risk will depend on the specific facts and circumstances for each company.

Figure 2

Relatively lower risk	Policy data accuracy, asset data, market data, PBR reserve (booked amount)
Relatively higher risk	Policy data completeness, experience analysis, prescribed assumptions, experience assumptions, scenarios, projection system/model

In addition, the NAIC’s PBR Review (EX) Working Group is currently developing additional procedures for inclusion in the risk-focused financial examination process, and has identified the following risks<sup>1</sup> for inclusion in the Financial Examiners Handbook risk repository that are specific to PBR:

- **The insurer has not taken appropriate steps to prepare for the implementation of PBR.** We have not addressed this risk in our article, since it is focused on how to audit or examine PBR reserves subsequent to adoption.
- **In-force data is not complete or accurate nor consistent with accounting records.** Ensuring the completeness and accuracy of the in-force data has always been a focus of examinations. However, the importance of ensuring consistency with accounting records is heightened for PBR.
- **The data utilized in the company’s PBR model is not representative and consistent with the company’s in-force data.** This would be addressed in the evaluation of policy data accuracy that is included in Figure 2.
- **Policies subject to PBR are not properly identified or exclusion testing is not properly performed.** This would be primarily addressed in the evaluation of policy data completeness that is included in Figure 2. The projection system used as part of the exclusion testing (as applicable) would be covered in our projection system item.
- **The assumptions used by the insurer to calculate reserves for policies subject to PBR are not accurate or appropriate.** This would be addressed in the evaluation of experience analysis, prescribed assumptions, and experience assumptions that are included in Figure 2.
- **The methodologies utilized in PBR are not appropriate or the reserve computations are not performed correctly.** This risk would be primarily addressed in our projection system item. Certain methodologies may also be evaluated in conjunction with the review of assumptions (for example, application of credibility methods).

We expect that in both a financial examination and a financial statement audit, the review would first involve an evaluation of company controls related to each risk, and then substantive testing would follow only if the residual risk is still deemed to be high. The focus of this article is on these higher risk areas, and specifically the substantive testing that would help an auditor or examiner evaluate these risks further. While we understand that control testing is a critical component of the review, we have focused on substantive testing primarily for brevity, and also due to the likelihood that in the early years of PBR, residual risk assessments for many components of the process are likely to be moderate or high.

Policy data, asset data, and some portion of the market data required as inputs into the PBR process are likely to have already been used for other reserving processes, such as determining formula reserves or performing asset adequacy analysis. In the event that the company is leveraging existing processes and data that were already used as part of the cash flow testing process, and already have associated controls, the risk associated with errors in the data or inappropriate transfer of data may be relatively low. In addition, the process of using the results from the projection system calculation, determining the maximum reserve among the three components (NPR, deterministic and stochastic reserves), and booking the reserve amount to the ledger is a relatively low complexity component and is likely to involve specific controls. So, while there is certainly risk associated with these areas, the risk profile is lower than the remaining components of the PBR calculation.

The remainder of this article will focus on approaches to evaluate the higher risk areas. For each of these areas, there is a range of approaches to audit or examine the company’s analysis to assess accuracy and reasonableness.

### Policy Data Completeness

The completeness of policy data is likely to be a relatively higher risk area due to the new and somewhat complicated process by which companies will be determining which policies are subject to which requirements within the valuation manual. There are several considerations in determining whether a given policy type uses a PBR approach, and then which components of the PBR calculation (NPR, deterministic reserve, stochastic reserve) apply, including:

1. The size of the company (some companies will be eligible for a company-wide exemption but only if they do not write certain types of universal life (UL) products and meet other criteria related to premium volume and risk-based capital levels);
2. The type of policy (certain life insurance business such as pre-need is excluded);

3. Treatment of policy riders, which must be valued in accordance with requirements set forth in the VM;
4. The issue year of the policy and the transition election made by the company (PBR application is prospective only, so only policies issued after the effective date are included, and the effective date is dependent on the transition election); and
5. Whether the business qualifies for the deterministic and stochastic exclusion tests.

In light of these considerations, there is risk that the company has misclassified its business, and potentially left out policies that should be included in the PBR calculation. There is also risk that the exclusion tests were not performed correctly.

The actuarial examiner or auditor could evaluate these risks through procedures such as the following:

- Advising the financial exam or audit team in their policy data completeness testing, to help in understanding which business should or should not be included in the PBR analysis;
- Selecting samples of policies from various lines of business to evaluate the company's decision tree in determining whether PBR applies;
- Evaluating the methods and assumptions used in performing the deterministic and stochastic exclusion tests for reasonableness and consistency with the guidance; and
- Evaluating the results of the deterministic and stochastic exclusion tests.

The last two procedures above are similar in nature to those that will be performed in evaluating the PBR reserve calculation itself, which is discussed further below.

### Experience Analysis

This is likely to be a high-risk area because it has not historically been a direct component of financial reporting, at least for statutory analysis. Experience analysis does, of course, feed into the company's assumption setting process in general. However, the primary statutory financial reporting application that uses experience analysis has been cash flow testing. In the event that cash flow testing did not result in the booking of additional reserves, an insurer may not have placed a heavy focus on having appropriate controls and governance in their experience analysis process. This may be less true for companies that also report on a GAAP basis, since GAAP reserving does rely more heavily on experience-based assumptions.

In addition, PBR has specific requirements regarding the setting of "anticipated experience" and "prudent estimate" assumptions.

An anticipated experience assumption is an expectation of future experience for a risk factor given available, relevant information pertaining to the assumption being estimated and a prudent estimate assumption is a risk factor assumption developed by applying a margin to the anticipated experience assumption for that risk factor.

Key areas of focus for purposes of auditing or examining the experience analysis process would include:

- Testing of the data underlying the experience studies,
- Evaluation of the appropriateness of the data based on its intended use and
- Sample recalculations of specific experience study results.

Note that we will discuss the application of the experience data to the actual assumption setting process below. The first bullet above would typically be handled by the accounting specialists. However, actuaries would assist in identifying the data to be tested based on its significance to the ultimate reserves booked.

The most important actuarial review item is the second bullet above. It will be very important for the auditing or examining actuary to evaluate whether the experience data being used is suitable for the ultimate use of the experience study. For example, if the experience study is used to set assumptions on business written in 2017 on a six-class underwriting structure, but the data underlying the study is based on only three underwriting classes, how is that being addressed in the process? If the experience data is analyzed at a very granular level, are the results at that level credible, or do they need to be blended with industry data or grouped differently to achieve appropriate credibility? For experience that is dependent on the external environment (for example, lapses that tend to vary based on interest rates), how is that accounted for? As part of the audit or examination, these are areas that the reviewing actuary should understand, and raise as issues or concerns if the process does not appropriately take them into account.

It may also be worthwhile to do some testing of the experience study calculations on a sample basis. While the calculations of metrics such as actual to expected ratios is typically not very complex, the process may be prone to error if it has not historically been well controlled.

### Assumptions

Due to the increased number and complexity of both prescribed assumptions and experience-based assumptions in PBR as compared to current formulaic reserve approaches, auditing or examining the proper application of these assumptions will be more challenging. However, the general approach to doing this review

will be similar to what is done today for the prescribed assumptions used in the formulaic reserves and the experience-based assumptions used in asset adequacy analysis. Currently, as part of examinations or audits, where reserving assumptions are deemed areas of high risk (which is typical), the auditing or examining actuary will evaluate (sometimes on a sample basis) whether the company has applied the correct mortality table(s) and interest rates as part of the reserving process for formulaic reserves, and whether the company has appropriately considered experience data, credibility, and other sources of information in setting assumptions for asset adequacy analysis. Similarly, audits or examinations of PBR reserves will involve evaluating whether the PBR reserves follow the prescribed approaches and assumptions as documented in VM-20, as well as whether the assumptions can be supported by credible company data or industry studies. However, the items to be evaluated are much more extensive and include items such as:

- Default costs
- Interest rates, spreads and equity levels
- Mortality
- Premium persistency
- Lapses
- Expenses
- Other policyholder behavior
- Application of credibility
- Treatment of reinsurance
- Treatment of hedging programs

Not all of these are explicitly prescribed, but even where company experience is used in the assumption setting process, there are prescribed approaches that must be used, limits that must be considered and margins that must be established.

One suggested approach to audit this long list in an efficient manner is to apply risk-based sampling techniques, similar to what is already done on audits and examinations. For example, the reviewing actuary could review the company's sensitivity testing to understand which assumptions are most impactful, and focus the review on only those assumptions. Another approach would be to select a representative sample of policies (considering the relative risk profile of policy types), and test the assumptions used for the sample for compliance with the regulation. This could be done in conjunction with the testing of the PBR projection system, which will typically be done on a sample basis (this is covered in more detail below).

One component of PBR will be experience data reporting. This data provides a comparison basis that allows the regulator to perform reasonableness checks on the appropriateness of assumptions as documented in actuarial reports and may serve as a source of information for regulators to potentially use to iden-

tify assumptions that appear inconsistent with typical industry practice and therefore warrant additional review.

The NAIC performed a pilot project to assess company readiness and approach for PBR. One of the findings was that the approach companies used for setting the mortality assumption varied significantly, in particular as it related to credibility of experience data. So this, for example, may be an assumption that is viewed as a relatively higher risk item.

Although this article is focused on substantive testing, and less so on controls, an important consideration in designing the nature and depth of testing is the extent to which the company has formal, documented processes for assumptions setting and governance. We expect that companies will have in place formal processes and procedures for setting assumptions, including information to be evaluated, frequency and thresholds for determining whether updates are needed. We also expect a formal and centralized assumption review process. To the extent the assumption governance process is weak, more substantive testing may be warranted.

### Scenarios

Unlike today's reserving for life insurance products, the PBR calculations will often include a stochastic component, in which future cash flows are projected over a range of stochastic interest rate (and depending on the product, equity) scenarios. In fact, PBR also contemplates stochastic scenarios for other risk factors (such as mortality and policyholder behavior), but it is not anticipated that many companies will use such scenarios at implementation. Since the stochastic reserve component of the PBR reserve is based on the results from the "tail" of these scenarios, it is important that the scenarios used are generated and applied properly. There is a prescribed scenario generator that companies must use, and while some companies will already be familiar with the generator, many may be using it for the first time. Areas for review related to the scenarios include:

- Evaluation of the generation of the stochastic scenarios using the prescribed generator and
- Evaluation of use of the scenarios in the cash flow projection model.

Since the scenario generator is available to the public, testing the scenarios used is relatively straightforward. Techniques to do so could involve an independent run of the economic scenario generator and comparison of the results or performing analytical tests on the scenarios such as deriving the means, volatilities and specific calibration points at future projection years to confirm accuracy.

Evaluating the use of the scenarios in the cash flow projection model could be accomplished through independent recalculations of results for sample policies and sample scenarios, which is discussed further below. Another potential approach is to perform analytical tests on cash flow output, such as calculating the projected investment return in several of the tail scenarios to confirm that the relative returns move in tandem with the input scenarios.

### Projection System

Potentially the area of greatest risk in the near term is the accuracy of the projection system used to determine the PBR reserves. Many companies will be implementing, or significantly enhancing, their actuarial projection systems to handle PBR. The vendors offering these systems have been working on expanding the functionality to accommodate PBR for some time. However, there has been limited industry testing of the functionality to date, and some of the guidance was continuing to evolve right up until mid-2016 for a 2017 adoption date. The guidance will continue to change. All of this presents risk in the projection system, including:

- Vendor coding is not fully reflective of the PBR requirements, or does not appropriately handle the specifics of an individual company's products.
- Company-implemented modifications were not done correctly.
- The approach used by the company to group individual policies into "model cells" for projection purposes materially misstates the reserve.
- Use of modeling simplifications or scenario reduction techniques that materially misstate the reserve.
- The detailed specifications of the products are not properly reflected in the projection system.
- There are insufficient controls on the projection system, resulting in errors with data feeds or manual entries, or a poor change control process.
- Users of the system are not fully trained or proficient and use the models or model output incorrectly.
- The company does not have a robust (or even reasonable) model validation policy or process, or appropriate model governance in place.

Therefore, it will be important for auditors and examiners to perform testing to assess the accuracy of the PBR calculations. This is not a new concept, since we have existing examples in

which auditors and examiners are testing complex (including stochastic) actuarial projection models, such as:

- Testing of variable annuity reserves, which already follow a principle-based approach for reserving.
- Testing of asset-liability management, cash flow testing, and hedging models as part of a risk-focused examination where these areas present high residual risk.
- Testing of actuarial projection models used for certain GAAP applications such as DAC amortization and products for which there are profits followed by losses and a projection-based reserve must be established.

The steps involved in substantively testing a projection model for PBR are:

1. Performing static and/or dynamic validations of the model: A static validation confirms that the modeled policies are consistent with the in-force business subject to PBR, through comparisons of items such as actual and modeled policy counts, reserves, face amounts and account values. A dynamic validation is a comparison of recent actual cash flows to those projected in the early years of the model.
2. Testing, or reviewing the company's testing, of whether the approach to grouping policies into model cells results in a significant understatement of reserves: This may involve running the calculations before and after grouping on a sample basis, or asking the company to do so and reviewing the results.
3. Selecting a sample of policies for testing: This involves obtaining a listing of the policies and/or model "cells" (policy groupings used for modeling) and selecting a subset of the policies or cells based on risk characteristics. For example, the examiner or auditor may wish to cover the top products being sold, males and females, the most prominent underwriting classes, and a range of issue ages in the selection process.
4. Coordinating with the financial examination team: It is the financial team that is likely to be testing policy data (if

It will be important for auditors and examiners to perform testing to assess the accuracy of the PBR calculations.

appropriate) and they will need guidance from the actuary as to which policy characteristics are important ones to the calculation.

5. Selecting a sample of scenarios for testing: This would typically focus on the deterministic scenario since it supports the deterministic reserve and then one or more “tail” scenarios that drive the stochastic reserve. Since the stochastic scenarios themselves are evaluated as described above and the process by which the projection model develops projected cash flows is the same regardless of scenario, it is generally not necessary to test a large number of scenarios to gain comfort with the model.
6. Obtaining from the company the detailed model input (data and assumptions) and output (projected cash flows and associated in-force statistics), and performing analytical tests on that model output to assess reasonableness.
7. Performing independent projections of cash flows for the sample in a different system than the one the company uses: Using a different projection system eliminates the potential for a vendor error to be present in both calculations and therefore missed.
8. Comparing the projection amounts for consistency, and working through differences with the company.

Another approach that is referenced in the draft financial examination guidance and has been suggested by the NAIC, is the use of a “model portfolio approach.” This approach involves the use of a defined, standard set of policies and specifications and the calculation of the PBR reserve for that policy set using both the company’s projection system and the reviewing actuary’s projection system. The NAIC has a team of actuarial resources in place to assist state regulators in this process and most large audit firms have an actuarial projection model that could be used for such an approach. Two potential drawbacks of this approach are that it may not address the risk if the reviewing actuary has the same projection system as the company (since certain errors could be vendor-built), and that it will not necessarily identify risks associated with unique product features offered by the company. However, in many instances it would capture the bulk of the potential drivers of error.

In performing independent recalculations, it is very common to have small projection differences due to differences in treatment of cash flow timing (e.g., order of decrements), different time steps, etc. However, these should not have a material impact on the final reserve amount for the sample. Significant differences from the company’s calculations would be evaluated and resolved.

As a final point on modeling, the PBR Model Governance Practice Note Work Group of the American Academy of Actuaries (Academy) released a new practice note<sup>2</sup> to provide additional

information for practicing life actuaries seeking to better understand models, model risks, model governance, and related issues, as these actuaries implement PBR. There is also a model governance checklist on the Academy website that touches on many of the items discussed above.<sup>3</sup>

## CONCLUSION

Due to the magnitude of the change in data, assumptions, application of judgment, processes and technology, significant effort is required to examine or audit PBR reserves. However, it is not an insurmountable task. Using many of the tools already in existence for similar processes and applying a risk-focused approach to the testing, the examination or audit can be broken down into key areas of risk to be focused on. In addition, because the business subject to PBR will be relatively small to start and grow over time, the examination or audit of the reserves can follow suit. It will be beneficial for auditors and examiners to review and plan their procedures in advance of having to actually perform substantive testing. Because of the complexity of PBR and the need therefore to focus on areas of highest risk in performing substantive testing, it is even more important to plan carefully in advance of diving in!

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## ENDNOTES

- 1 PBR Review (EX) Working Group June 13, 2017 meeting materials; see [http://www.naic.org/documents/cmte\\_e\\_fehtg\\_170629\\_materials.pdf](http://www.naic.org/documents/cmte_e_fehtg_170629_materials.pdf)
- 2 [http://www.actuary.org/files/publications/Model\\_Governance\\_PN\\_042017.pdf](http://www.actuary.org/files/publications/Model_Governance_PN_042017.pdf)
- 3 [http://actuary.org/files/publications/PBRChecklist\\_Final.pdf](http://actuary.org/files/publications/PBRChecklist_Final.pdf)

# Reporting and Disclosure Requirements Under VM-31: Reporting Requirements for Business Subject to PBR

By Gaurav Rastogi

With principle-based reserves (PBR) for life insurance under VM-20, *Requirements for Principle-Based Reserves for Life Products* (VM-20), becoming operative in most states effective Jan. 1, 2017, companies have been working diligently to understand the technical guidance and to build the actuarial models and processes needed to comply with its requirements. Companies have spent numerous hours investigating and discussing such issues as levels of aggregation for mortality experience, the various requirements related to asset returns and the numerous uncertainties related to tax implications. Yet, in focusing so much attention on the front-end preparation and technical issues, companies may be missing one of the key elements of successful implementation: compliance with the reporting and disclosure requirements of VM-31, *PBR Actuarial Report Requirements for Business Subject to a Principle-Based Reserve Valuation*. Actuaries reviewing these requirements will find them to be comprehensive in both breadth of coverage and depth of detail. Companies that fail to pay adequate attention to the requirements early in the adoption process may well find themselves struggling to comply when filing requirements come due.

PBR adds many rigorous disclosure requirements that must be addressed by the appointed actuary and complying will take substantial effort. However, companies should not yet press the panic button, as there is still time to adequately prepare. The first recommendation for a successful completion of the reporting requirements is probably the simplest: read the guidance ... and read it early. As companies devise the plan for tackling the reporting requirements under PBR, it is essential to read through the guidance in advance. This will ensure that the company is establishing the calculations and analyses needed to ensure that the information is available to meet the reporting requirements,

and to have a proper structure to the report. The last thing a company wants to find as it is preparing its PBR report is that the report requires additional information that involves redoing steps early in the calculation process. For example, the *PBR Actuarial Report* requires companies to document the rationale behind the chosen assumptions. It is critical to document the steps along the way in order to avoid creating additional documentation much later in the process. It is prudent for companies to consider establishing governance and/or risk committees to document decisions and rationales as they work towards getting themselves ready for reserving under the principle-based regime.

VM-20 allows companies to use their own experience, if relevant and credible, to establish their best estimate assumptions for various assumptions. Documenting and supporting assumptions is not new; companies have been doing so since at least the 1980s, when asset adequacy analysis and associated reporting requirements were first introduced. Additionally, cross-border and other companies located in Canada reporting under the Canadian regime have had the added experience of reporting under a principle-based framework for many years now as well, under the Canadian Asset Liability Method and its predecessors. In fact, more recently, such requirements have been introduced in the United States for variable annuities reporting under Actuarial Guideline 43, *CARVM for Variable Annuities* (AG 43). So there are plenty of places to look for examples and guidance for reporting under existing principle-based approaches. However, even an actuary experienced in reporting under these existing frameworks needs to be aware of the specific requirements of VM-31. For example, VM-31 reporting requirements are more stringent than those for AG 43 and require an in-depth discussion of material decisions made and information used by the company in complying with the minimum reserve requirements. As companies try to draw parallels, it is essential that they understand the differences and additional requirements imposed under VM-31.

One fact to consider when implementing reporting approaches is that the success of PBR reporting depends heavily on clarity of communication and transparency between the company and the regulators, as well as other key constituencies such as the management, its board and auditors. Clear documentation that seeks to meet all the requirements under VM-31 is the primary conduit for opening the lines of communication. The PBR Actuarial Report requires that companies explain model results and why they think the results are appropriate. Insight into the results and attribution analyses can demonstrate an understanding and lead to the transparency that regulators seek under the PBR reporting regime. Every year, the appointed actuary must also explain any significant changes from prior years in the methods used to determine the anticipated experience assumptions and

margins and rationale for such changes. A comprehensive, clear report establishes an environment of trust and may result in less time answering regulator's questions. The actuary should also consider the applicable Actuarial Standards of Practice (ASOPs) that apply to the reserving process and the VM-31 report, including, but not limited to, ASOP 41, *Actuarial Communications*, and ASOP 23, *Data Quality*.

In deciding how much detail is required, there is no clear answer, but anything that aids in the understanding of results should probably be included. Early feedback received recently from the pilot study for PBR reporting conducted by the NAIC in 2016 revealed that no reports were complete. Various reports contained a wide range of detail, and the regulators felt that many reports needed to be supplemented with additional information. The reports with less details generated a lot more follow up questions from the regulators. The PBR Actuarial Report requires rigorous sensitivity testing around premium patterns, premium persistency, timing and margins, which have again been designed to promote transparency and clarity around these assumptions, and necessarily involve a detailed discussion of all assumptions.

## STRUCTURE OF THE REPORT

The NAIC pilot study conducted by the PBR review working group also discussed the structure of the report. The study indicated that most companies displayed results in the same format as the requirements of the guidance, and the regulators felt that the format should be followed as it provides a level of standardization to the reports, and that it may eventually become a requirement in the future. The PBR Actuarial Report starts with an overview section followed by a deeper discussion of the various assumptions and other items. In the overview section, companies must define risks identified for each group of policies, summary of valuation assumption and changes, assumption setting methodology, asset modeling assumptions, and any other material risks which have been identified. The remainder of the report is intended to describe those areas in more detail as they apply to each group's segments.

VM-31 identifies the main topics of disclosure. They are summarized as follows:

1. Assumptions and margins summary: The report requires a summary of the valuation assumptions and margins used.
2. Cash flow model: This section must include a description of the modeling system, choice of segmentation, a description of how model calculations were validated as well as how the results compare to actual historical experience.
3. Mortality assumptions: The report requires a detailed explanation of how the anticipated mortality assumption was developed, including a description of mortality segments used to determine company experience mortality rates, the starting and ending period of time used to grade company experience rates to the industry table, and a description of the industry basic table that was used for each segment.
4. Policyholder behavior: This section includes a description of the source of the data used to develop the policyholder behavior assumptions as well as how these assumptions interact with the non-guaranteed elements (NGE) in the policy.
5. Expenses: The report must include a description of the expense allocation methodology and how the margins are determined.
6. Assets: In addition to disclosing the details regarding the asset modeling assumptions and various margins, if the starting assets do not fall within 2 percent of the final aggregate minimum reserve, this section must include documentation to describe why the company believes that there is not a material understatement of reserves.
7. Revenue sharing: This section must include a description of the revenue sharing agreements and the guarantees underlying the income that is used in the projections.
8. Reinsurance modeling: This section should include a description of the reinsurance agreements as well as the assumptions used to determine the cash flows included in the model.
9. Non-guaranteed elements: This section requires a description of the modeling approach, the margins, and a description of how the projected levels of NGEs in the model are consistent with the experience assumption used in each scenario.
10. Deterministic/stochastic exclusion tests: This section must include documentation of the rationale used for grouping of products for exclusion testing, a summarized view of results of various exclusion tests as well as any relevant documentation regarding the rationale for using the stochastic reserve demonstration method, which is used to demonstrate why a group of policies meet the exclusion criteria.
11. Others: This section focuses on margins. This section must include the impact of individual margins for each risk factor (assumptions such as mortality, policyholder behavior,

Anything that aids in the understanding of results should probably be included.

expenses, etc.), including the aggregate impact of all margins on deterministic reserves for each segment. Also required is any documentation around approximations and simplifications used in the reserve calculations.

12. **Certifications:** This section includes certifications for compliance with the Valuation Manual guidance.

While all elements of the report are important and required under VM-31, certain sections appear to present additional challenges in preparation and presentation. These include the sections on mortality, policyholder behavior, assets, non-guaranteed elements, and margins. Each of these five areas is discussed in more detail below.

## MORTALITY

Under VM-31, companies must describe the mortality segments used to determine company experience mortality rates, the starting and ending period of time used to grade company experience rates to the industry table, and the description of the industry basic table used for each segment.

### Mortality Segments

Description of mortality segments is key and the rationale for including policies into these segments must also be documented. When a company divides its experience into segments or sub-classes, it must provide evidence that the sum of expected claims from these sub-classes is not lower than experience for the aggregated class. Companies should think about this particular requirement at the time of defining the segments, and not after the mortality assumption has been fully developed.

### Adjustments To Company Experience Mortality Rates

If any changes in risk selections or underwriting classes are reflected through adjustments to company experience mortality rates, companies must provide justification of those adjustments by citing “published medical and clinical studies” (VM-31 Section 3.D.3.e) to support such adjustments. Also, any other relevant information concerning such adjustments must be reflected.

### Source Of Data

Companies can choose to set the mortality assumptions for a segment based on mortality rates which are not based on experience from that segment. However, in such cases, the companies must provide extensive explanation on the source of data and its appropriateness and why they believe that policies from the segment will be similar to those from the selected data source.

The documentation is additionally rigorous when it comes to assumptions developed using company specific experience. Companies must provide “justification to support and demonstrate that the resultant anticipated experience assumption is at

least as great as those expected to actually emerge” (VM-31 Section 3.D.3.k). Another challenge is that when the company experience mortality rates for any mortality segment are not based on the experience from that segment, VM-31 imposes strict additional documentation requirements for the source of data, supporting studies and other items to justify these assumptions. Therefore, it is imperative that as companies develop these assumptions, they are diligent at documenting their thought process and supporting studies along the way.

## POLICYHOLDER BEHAVIOR ASSUMPTIONS

A major concern regarding policyholder behavior assumptions is the lack of available industry data. The PBR Actuarial Report requires a clear description regarding the sources and credibility of data along with a description of how assumptions were determined and what are the margins used in developing these assumptions.

### Anti-selection

If adjustments to lapses and mortality assumptions are made to account for anti-selection, the company must document the rationale for such anti-selection assumptions.

### Premium Payment Pattern Sensitivity Testing

A key policyholder assumption is the pattern of premium payments. Companies will be required to document sensitivity testing completed for choosing flexible premium payments. Sensitivity testing is required for policies that give policyholders flexibility in premium payment, as well as for different premium patterns including minimum premium payment, no further premium payment, pre-payments assuming single or level premiums. Thus, companies should incorporate sensitivity testing in their implementation plans.

Every three years, the result of an actual to expected analysis must also be included in the PBR Actuarial Report. Companies should start thinking about the template and items to be incorporated for this analysis as part of the implementation process. Competitor rate definition and usage must also be included in the report so companies should monitor competition in light of the disclosures required in the documentation.

## ASSETS

Companies must document in detail the method used to allocate the total asset portfolio into segments, and a description of the asset portfolio which discusses types of assets, their durations, credit ratings and other features. Also, companies are required to document rationale for allocating assets to policies which are subject to PBR and those that are not.

The guidance requires a description of the investment strategy as well as reinvestment and divestment assumptions, and how well those strategies compare to the actual investment policy of the company. VM-20 has a prescribed asset investment strategy, and companies need to demonstrate that their modeled investment strategy does not produce a reserve that is less than what would be produced by this prescribed investment strategy.

It is important to think of a company's own investment policy in light of these disclosure requirements. Any investment strategy used to model these reserves, must be comparable to the company's actual investment policy, and must produce reserves higher than the prescribed alternative. It is both a challenge and an opportunity for companies to take a step back, and revisit their investment policy in light of the principle-based reporting regime.

### NON-GUARANTEED ELEMENTS

NGEs are defined as either dividends under participating policies or other elements affecting life insurance costs that are established by the company and can be subject to change (VM-20, Section 1), such as cost of insurance charges for universal life products. VM-31 asks for detailed descriptions on how the projected levels of NGEs are consistent with experience assumptions in each modeled scenario.

#### Reference To Prior Year Practice

The company must describe its prior year NGE practices and previously established NGE policies as well as how they are being reflected in the projected NGE amounts.

#### Dividend Schedule And Changes To Projected NGE Amounts

The documentation requires a detailed description of the approaches to modeling NGE assumptions such as policyholder dividends, as well as how the margins of conservatism were established. In addition, any changes to projected NGE amounts to account for changes in experience, and a lag in timing of any changes to NGE relative to date of recognition of that change must also be reported and discussed (VM-31, Section 3.D.9.a).

As companies document their NGE assumptions, the challenge for companies is to demonstrate the relationship between policyholder behavior assumptions and the NGEs assumed in the model as well as to be able to explain the consistency between the two sets of assumptions. This is another example of how the documentation promotes transparency and understandability of results for the regulators.

### MARGINS

Companies are required to document the impact of individual margins and an impact of all margins in aggregate on the deterministic reserves for each model segment. Also, they are required to summarize "the impact of aggregation on stochastic reserves" (VM-31, Section 3.D.11.f).

#### Margin Impacts

In order to comply with the requirements of reporting the estimated aggregate impacts of all margins on deterministic reserves, there is a specific approach for the prescribed assumptions such as interest rates, equity assumptions, etc. These prescribed assumptions must be considered as the prudent estimates. For the purposes of reporting isolated impacts of margins, companies can elect to establish their own best estimates for these assumptions; however, they must provide the rationale and methodology for establishing such assumptions.

Companies should be mindful of how model segments are established and make sure to note impacts of margins for each segment. When completing the attribution analysis to understand the impact of margins, order of operations is key, and companies may find that a change in order of attribution may have markedly different effect on the magnitude of these margins. Also, companies should pay special attention to sensitivity testing performed as they are now also required to demonstrate what actions were taken and how the assumptions and their margins were developed from the results of this sensitivity testing.

VM-31 introduces multiple requirements that companies must adhere to in writing the PBR report. Due to the high number of requirements, companies must plan ahead in order to have all the necessary support, rationale and documentation to become PBR-ready. Effective, clear disclosure is key to operating successfully in a PBR world, as it enhances the transparency between company and regulator on which PBR depends. ■

*This material has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax or other professional advice. Please refer to your advisor for specific advice.*



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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 2017, on projects in process and those recently completed.

## CURRENTLY IN PROCESS...

The 2015 research report on Earnings Emergence Under Multiple Financial Reporting Bases is being expanded to examine an additional product and upcoming accounting changes. The original report looked at deferred annuities and term life insurance under US SAP, US GAAP, IFRS, CALM, and market-consistent balance sheet approaches. The expanded report will add universal life and make updates for principle-based U.S. statutory reserves, targeted US GAAP changes, and the new IFRS for insurance products. Work has just begun on this project.

Waiver of Premium in a principle-based environment—the Financial Reporting Section is co-sponsoring this review of pricing, reserving and experience with the Product Development Section. The Project Oversight Group has been formed and a researcher has been selected. This project is in the very early stages.

PBA Change Attribution Analysis—this project will study the drivers of change in principle-based reserves. This project is in the later stages, with a planned SOA webcast and presentation at the Valuation Actuary Symposium in August.

Simplified methods for principle-based reserve calculations—the project oversight group has selected the researcher and work is in the middle project stage.

Modern Deterministic Scenarios—a review of possible deterministic scenario sets which could be useful to company management, regulators and rating agencies under PBA. This project is in the final stage and we anticipate publication very soon.

## COMPLETED IN 2017...

Actuarial Model Governance: A Survey of Actuarial Modeling Governance and the Industry Evolution Report—this is an

update to the original 2012 report co-sponsored by the Financial Reporting and Modeling Sections. <https://www.soa.org/Research-Reports/2017/2017-01-actuarial-model-governance>

## COMPLETED IN 2016...

Nested Modeling—A company survey on the use of nested stochastic modeling and an analysis of ways to reduce run time and improve the efficiency of nested simulations: <https://www.soa.org/Research-Reports/2016/nested-stochastic-modeling>

PBA Implementation Guide Update and PBA Beginning Tales: <https://www.soa.org/Research/Research-Projects/Life-Insurance/research-2013-pba-implementation-guide.aspx>

Retention Management: <https://www.soa.org/Research/Research-Projects/Life-Insurance/research-quantitative-retention.aspx>

Predictive Analytics Call for Papers: <https://www.soa.org/News-and-Publications/Publications/Essays/2016-predictive-analytics.aspx>

## 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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