

MEETING MATERIALS PACKET

LIFE ACTUARIAL (A) TASK FORCE

December 11-12, 2022

NAIC FALL NATIONAL MEETING

December 11-12, 2022

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NATIONAL MEETING FALL 2022

Draft date: 12/2/22

*2022 Fall National Meeting
Tampa, Florida*

LIFE ACTUARIAL (A) TASK FORCE

Sunday, December 11, 2022

8:00 a.m. – 4:30 p.m. ET

JW Marriott—HB Plant Ballroom E & F—Level 2

Monday, December 12, 2022

8:00 a.m. – 11:00 a.m. ET

JW Marriott—HB Plant Ballroom E & F—Level 2

ROLL CALL

Member

Cassie Brown, Chair
Scott A. White, Vice Chair
Mark Fowler
Ricardo Lara
Michael Conway
Andrew N. Mais
Dana Popish Severinghaus
Amy L. Beard
Doug Ommen
Vicki Schmidt
Grace Arnold
Chlora Lindley-Myers
Eric Dunning
Marlene Caride
Adrienne A. Harris
Judith L. French
Glen Mulready
Michael Humphreys
Jon Pike
Allan L. McVey

Representative

Rachel Hemphill
Craig Chupp
Sheila Travis
Ahmad Kamil
Eric Unger
Wanchin Chou
Vincent Tsang
Scott Shover
Mike Yanacheak
Nicole Boyd
Fred Andersen
William Leung
Michael Muldoon
Seong-min Eom
Bill Carmello
Peter Weber
Andrew Schallhorn
Steve Boston
Tomasz Serbinowski
Tim Sigman/Joylynn Fix

State

Texas
Virginia
Alabama
California
Colorado
Connecticut
Illinois
Indiana
Iowa
Kansas
Minnesota
Missouri
Nebraska
New Jersey
New York
Ohio
Oklahoma
Pennsylvania
Utah
West Virginia

NAIC Support Staff: Scott O'Neal/Jennifer Frasier

AGENDA

Sunday, December 11, 2022

8:00 – 8:20 a.m.	1. Call to Order/Roll Call/Consider Adoption of its Minutes and Written Subgroup Reports— <i>Rachel Hemphill (TX)</i>
8:20 – 8:30 a.m.	2. Consider Adoption of the Report of the Index-Linked Variable Annuity (A) Subgroup— <i>Peter Weber (OH)</i>
8:30 – 9:20 a.m.	3. Consider Adoption of Actuarial Guideline ILVA— <i>Peter Weber (OH)</i>
9:20 – 9:45 a.m.	4. Consider Adoption of the Report of the Valuation Manual (VM)-22 (A) Subgroup— <i>Ben Slutsker (MN)</i>
9:45– 10:05 a.m.	5. Consider Adoption of Revisions to <i>Actuarial Guideline XLIX-A—The Application of the Life Illustrations Model Regulation to Policies With Index-Based Interest to Policies Sold on or After December 14, 2020 (AG 49-A)</i> — <i>Fred Andersen (MN)</i>
10:05– 10:45 a.m.	6. Consider Adoption of the Report of the Indexed Universal Life (IUL) Illustration (A) Subgroup, Including Discussion of Comments Received on the Exposure for <i>Life Insurance Illustrations Model Regulation (#582) Ideas</i> — <i>Fred Andersen (MN)</i>
10:45 – 11:00 a.m.	Break
11:00 – 12:00 p.m.	7. Discuss the American Academy of Actuaries (Academy) Economic Scenario Generator (ESG) Working Group ESG Simplified Corporate Model— <i>Jason Kehrberg (Academy) and Iouri Karpov (Academy)</i>
12:00 – 1:30 p.m.	Lunch
1:30 – 3:00 p.m.	8. Hear from the Academy on ESG Interest Rate Stylized Facts and Acceptance Criteria— <i>Jason Kehrberg (Academy) and Link Richardson (Academy)</i>
3:00 – 3:15 p.m.	Break
3:15 – 3:35 p.m.	9. Consider Adoption of the NAIC Staff Recommendation on a Replacement for the London Interbank Offered Rate (LIBOR) Memorandum— <i>Pat Allison (NAIC)</i>
3:35 – 3:50 p.m.	10. Receive an Update on VM-50, Experience Reporting Requirements, and VM-51, Experience Reporting Formats, of the <i>Valuation Manual</i> — <i>Pat Allison (NAIC)</i>
3:50 – 4:10 p.m.	11. Consider Adoption of an NAIC Negative Interest Maintenance Reserve (IMR) Staff Memorandum— <i>Scott O’Neal (NAIC)</i>
4:10 – 4:30 p.m.	12. Consider Exposure of APF 2022-08— <i>Brian Bayerle (ACLI)</i>

Monday, December 12, 2022

8:00 – 8:25 a.m.	13. Hear an Update from the Academy Life Practice Council — <i>Ben Slutsker (Academy) and Donna Claire (Academy)</i>
8:25 – 8:40 a.m.	14. Hear an Update on Society of Actuaries (SOA) Research and Education— <i>Dale Hall (SOA)</i>
8:40 – 8:55 a.m.	15. Consider Re-exposure of Amendment Proposal Form (APF) 2022-07— <i>Brian Bayerle (American Council of Life Insurers—ACLI) and Dave Neve (Actuarial Resources Corporation of Georgia)</i>
8:55 – 9:15 a.m.	Break
9:15 – 10:45 a.m.	16. Discuss the ESG Field Test Qualitative Survey Results— <i>Pat Allison (NAIC) and Scott O’Neal (NAIC)</i>
10:45 – 11:00 a.m.	17. Discuss Any Other Matters Brought Before the Task Force
11:00 a.m.	18. Adjournment

Agenda Item 1

Consider Adoption of its Minutes

Draft: 11/28/22

Life Actuarial (A) Task Force
Virtual Meeting
November 17, 2022

The Life Actuarial (A) Task Force met Nov. 17, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Ricardo Lara represented by Ahmad Kamil and Elaine Lam (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Amy L. Beard represented by Scott Shover (IN); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); Jon Pike represented by Tomasz Serbinowski (UT); and Allan L. McVey represented by Tim Sigman (WV).

1. Exposed a Referral from the Financial Regulation Standards and Accreditation (F) Committee on Model #822

Becky Meyer (NAIC) noted that the NAIC's accreditation standards require states to adopt certain laws and regulations. She said that with the revisions to the *Standard Valuation Law* (#820) for principle-based reserving (PBR), the Financial Regulation Standards and Accreditation (F) Committee is questioning whether an accreditation standard is still needed for the *Actuarial Opinion and Memorandum Regulation* (#822). Meyer noted that after an initial review, it appears that the requirements related to Model #822 significantly overlap with the requirements laid out in the *Valuation Manual*. Meyer noted that the Committee is asking whether the Task Force could review the requirements of the *Valuation Manual* and provide a recommendation regarding whether the requirements in Model #822 are redundant and, therefore, are no longer needed as an accreditation standard in their referral letter (Attachment A).

Hemphill noted that on an initial read of the requirements, it does seem like #822 is duplicative. Hemphill elected to expose the referral from the Committee for 21-day public comment period ending Dec. 7.

2. Exposed an NAIC Staff Memorandum on Negative IMR Guidance in VM-20, VM-21, and VM-30

Scott O'Neal (NAIC) said that in the rapidly rising interest rate environment, some life insurance and annuity companies are seeing their interest maintenance reserve (IMR) balances decrease or even become negative. He noted under current statutory accounting guidance, a negative IMR is a non-admitted asset. He said that the Statutory Accounting Principles (E) Working Group had received a letter from the American Council of Life Insurers (ACLI) regarding this issue with negative IMR and the potential for the double counting of losses through the disallowance of negative IMR on the balance sheet and a related reserve deficiency caused by allocating negative IMR in VM-20, Requirements for Principle-Based Reserves for Life Products; VM-21, Requirements for Principle-Based Reserves for Variable Annuities; and VM-30, Actuarial Opinion and Memorandum Requirements. He said that NAIC staff had prepared a memorandum (Attachment B) with temporary 2022 year-end guidance for companies to handle negative IMR in a reasonable and principle-based fashion and, therefore, not allocate any non-admitted portion of IMR for purposes of VM-20, VM-21, and VM-30. However, he noted that if a company was granted a permitted practice to admit the formerly non-admitted negative IMR, the company then should allocate the formerly non-admitted portion of negative IMR again as a reasonable and principle-based approach.

Tsang asked if the Task Force was considering admitting the negative IMR as an asset and changing the annual statement instructions. Hemphill noted that any change to admitting negative IMR as an asset would need to be considered by the Working Group and that it was unlikely that the Working Group could make such a sweeping change to accounting standards this late in the year. The Task Force then discussed the technical details of the guidance in the NAIC staff memorandum. Carmello noted that the *Valuation Manual* reserving requirements are not perfectly clear regarding the handling of negative IMR, and the NAIC staff memorandum seeks to clarify the handling for year-end 2022 before potential further action can be taken by the Working Group. Paul Graham (ACLI) noted that he would like a change to the guidance to not just refer to any potential permitted practices that are granted, but also any potential guidance from the Working Group that could allow negative IMR to be admitted. Carmello noted that he expects the Working Group to coordinate with the Task Force on any action related to IMR and that the guidance could be updated at that time.

Graham then asked how companies would be notified of the guidance in the NAIC staff memorandum. Hemphill noted that once adopted by the Task Force, the NAIC would send the memorandum to the chief financial examiners of each NAIC jurisdiction along with the Working Group. She noted that the Task Force would take comments on how the memorandum should be distributed during a potential exposure of the memorandum.

Andersen made a motion, seconded by Carmello, to expose the NAIC staff memorandum (Attachment B) for a two-week public comment period ending Nov. 30. The motion passed unanimously.

3. Exposed an NAIC Staff Recommendation Memorandum for LIBOR Replacement

Pat Allison (NAIC) noted that the purpose of the NAIC staff memorandum (Attachment C) was to recommend a replacement for the London Interbank Offered Rate (LIBOR) for use in 2022 year-end reporting and going forward. Allison said that language in the *Valuation Manual* specified that the replacement for LIBOR, the Secured Overnight Financing Rate (SOFR), would become effective once the Task Force adopts the NAIC staff memorandum. Allison went on to discuss the technical details of the NAIC Staff memorandum on the replacement for LIBOR. Alan Routhenstein (American Academy of Actuaries—Academy) then discussed the Academy's comment letter (Attachment D) that supported the NAIC's memorandum, including the justification for the effective date of Dec. 30, 2022.

Weber made a motion, seconded by Yanacheak, to expose both the NAIC staff memorandum (Attachment C) and the Academy comment letter (Attachment D) for a two week public comment period ending Nov. 30. The motion passed unanimously.

4. Discussed a Plan for IUL Illustration (A) Subgroup Discussion at the Fall National Meeting

Andersen noted that the Task Force had provided direction for a project to consider improvements to indexed universal life (IUL) illustrations in two phases: 1) a quick fix to address the immediate concern with companies illustrating non-benchmark indices higher than benchmark indices; and 2) develop a potential recommendation to partially open up the *Life Insurance Illustrations Model Regulation* (#582) to more comprehensively address the IUL illustration issues. Andersen recommended that in addition to discussions of the two phases, the Task Force consider the potential for a third phase of the project, which would consider recommendations to the Life Insurance and Annuities (A) Committee to more broadly address issues with life illustrations.

5. Exposed the AG ILVA Draft

Weber noted that the Index-linked Variable Annuity Actuarial Guideline Draft (AG ILVA Draft) (Attachment E) had been updated to reflect more of a middle-ground regarding the question of whether to require a market value

adjustment (MVA). He said that the new AG ILVA Draft allows states more discretion to consider the value of supporting assets and whether a market value adjustment is appropriate to define the interim nonforfeiture values. Leung said that he would like the drafting note to be reworded to note that a state may want to consider whether excluding an MVA is appropriate. Slutsker and Eom noted support for Leung's suggested edit for the AG ILVA Draft.

Kirk Evans (Sammons Financial) said that he viewed the index strategies offered in ILVA products as similar to investments known as structured notes that are available on the capital markets. He said that the language in the AG ILVA Draft should make it clear that given this similarity, the interim values could be valued consistently with how they are valued on the capital markets through a fair value approach. Eom agreed that the language could be added to the AG ILVA Draft to make it clearer that a fair value approach was appropriate.

Birny Birnbaum (Center for Economic Justice—CEJ) asked whether different policy forms would be required across different states, as under the AG ILVA Draft one state could require an MVA whereas another could allow for an MVA to be excluded. Weber noted that he anticipates the Interstate Insurance Product Regulation Commission (Compact) would likely work on setting standards for these products so that their issue could be more uniform across states.

Weber made a motion, seconded by Yanacheak, to expose the AG ILVA Draft with modifications to incorporate the edits suggested by Leung and Evans. The motion passed unanimously.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 11/28/22

Life Actuarial (A) Task Force
Virtual Meeting
November 10, 2022

The Life Actuarial (A) Task Force met Nov. 10, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Ricardo Lara represented by Ahmad Kamil and Elaine Lam (CA); Michael Conway represented by Eric Unger (CO); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Amy L. Beard represented by Scott Shover (IN); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Michael Muldoon (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Adopted its Summer National Meeting Minutes

Chupp noted a minor correction to the Task Force's Summer National Meeting minutes on page 2, stating that the reference to "American Comment Letter" for Attachment 9 should be "Academy Comment Letter."

Weber made a motion, seconded by Chupp, to adopt the Task Force's Aug. 8 minutes with the correction suggested by Chupp (Attachment A). The motion passed unanimously.

2. Discussed Comments Received on the Oct. 13 ILVA Exposure

Weber noted that the Task Force had received comments on the Oct. 13 exposure of the Actuarial Guideline Index-Linked Variable Annuities Draft (AG ILVA Draft) (Attachment B) and the associated exposure questions (Attachment C) and that the Task Force would discuss those comments today.

Brian Bayerle (American Council of Life Insurers—ACLI) said, regarding the ACLI's comments (Attachments D and E) on the first exposure question on the term of the market value adjustment (MVA), that the AG ILVA Draft should allow companies to use a term length other than the maturity of the fixed income asset proxy. He said that this would allow policyholders to connect any MVA to their term length selection and facilitate company asset-liability management. He said that investment strategies for these products could change over time, particularly for flexible premium products. Beth Keith (American Academy of Actuaries—Academy) noted that the Academy agrees with the ACLI position in its comments (Attachments G and H) that companies should be able to have flexibility on the length of the MVA.

Leung noted that he thinks the company should be given more flexibility to set the length of the MVA after the maturity of the initial index strategy. Yanacheak noted that the language in the AG ILVA Draft requiring the MVA term length to be equal to the maturity of the fixed-income asset proxy may eliminate certain products that are currently marketed. Hemphill agreed that different term lengths could be appropriate and did not necessarily conflict with the principles of the AG ILVA Draft. Tsang asked the ACLI whether the concern of the industry was that the maturity of the fixed-income asset proxy did not line up with how companies are investing to support the indexed-linked variable annuity (ILVA) products. Jonathan Clymer (ACLI) noted that some of these products can have flexible premiums, which can make the company's asset-liability management strategy more complex. Yolanda Chow (ACLI) then walked through an example (Attachment F) of a flexible premium ILVA product, noting

the challenges of setting the MVA term equal to the maturity of the fixed income asset proxy for these products. Tsang noted that he understands the concerns that had been raised with the MVA term length and stated that a possible solution would be to allow the length of the MVA term to vary with the maturity of the underlying assets.

Bayerle then began the discussion of the ACLI's comments on the second question of whether companies should be allowed to include or exclude an MVA in their products, noting that the ACLI believes that companies should be allowed the flexibility to include or exclude an MVA. Bayerle stated that while the ACLI agrees that the contract value should be materially consistent with the market value of the equity exposure, interest rate exposure may not be a primary motivator for policyholders to purchase the product. Thus, an MVA may not be appropriate for some products. Several state insurance regulators then voiced their opinion, with some noting support for allowing flexibility in including or excluding an MVA and others stating that an MVA should always be included. As the meeting time ran out before a resolution could be reached, it was determined that the Task Force's scheduled meeting the following week would be extended to continue the ILVA discussions.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 11/22/22

Life Actuarial (A) Task Force
Virtual Meeting
October 27, 2022

The Life Actuarial (A) Task Force met Oct. 27, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Sheila Travis (AL); Ricardo Lara represented by Ahmad Kamil and Elaine Lam (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Amy L. Beard represented by Scott Shover (IN); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Heard Update on the ESG Field Test

Hemphill discussed the history of the NAIC's economic scenario generator (ESG) project, noting limitations with the ESG developed by the American Academy of Actuaries (Academy) and that the Academy would no longer maintain its ESG beyond making it available in its current form. She said that as the Academy considered its ESG proprietary, it was not an option for the NAIC to take over the Academy's ESG and make modifications to address the limitations. To select a replacement for the Academy's ESG, Hemphill said that the NAIC worked with state insurance regulators, industry representatives, and Academy representatives to develop a request for proposal (RFP) along with criteria for vendor selection. She said that Conning was then selected through a competitive RFP process.

Hemphill noted that state insurance regulators, subject matter experts (SMEs) from the industry and the Academy, NAIC staff, and Conning have worked collaboratively to refine the calibration of Conning's ESG to meet the objectives of regulators. She said that this was an iterative process as acceptance criteria were defined, feedback was received from SMEs, and Conning made changes to its ESG. Hemphill said that state insurance regulators eventually desired a field test to gain a better understanding of the materiality of some of the technical items relating to the ESG calibration and model form. She noted that going into the field test, state insurance regulators did not feel that their work with the ESG was done and instead expected to use the information to continue to refine the technical requirements of the ESG.

Hemphill said that the NAIC is happy with the support that Conning has provided throughout the process. She also noted the challenging nature of the ESG project and the appreciation that state insurance regulators and the NAIC have for the effort that industry and Academy SMEs and field test participants have put into the project. She thanked these groups and noted that state insurance regulators look forward to continuing to work collaboratively to implement a new ESG for U.S. statutory reserve and capital purposes.

Scott O'Neal (NAIC) then provided an update on the NAIC's ESG field test, noting that the actual amount of participation in terms of the number of insurance groups, legal entities, and field test runs was slightly lower than what ESG field test participants had indicated in a previous survey. O'Neal noted, however, that there was still a large amount of participation that would be more than sufficient to capture the impacts of the field test. Finally, he said that the NAIC planned on bringing a subset of the results of the field test to the discussion at the Task Force's session at the Fall National Meeting.

2. Heard a Presentation from the Academy ESGWG on a Simplified Corporate Model and Associated Stylized Facts and Acceptance Criteria

Jason Kehrberg (Academy) delivered the background portion of the Academy Economic Scenario Generator Working Group's (ESGWG) presentation (Attachment A) on an independent set of corporate model stylized facts and acceptance criteria along with a proposed simplified corporate model. He noted that this presentation fit into a series of presentations that the Academy has been delivering on the overall ESG project.

Hal Pedersen (Academy) then discussed the Academy's recommended corporate stylized facts that could be fit into two broad categories: 1) those that relate to corporate credit spreads; and 2) those that relate to bond index fund returns. Pedersen then went into the details of Academy's six stylized facts. Kehrberg noted that the stylized facts recommended by the Academy for the corporate model are generally consistent with what the NAIC's ESG vendor, Conning, has presented in the past. Yanacheak asked if stylized fact 1c and 3a from the presentation implied that the equity model should be regime-switching. Pedersen noted that the Academy's intent was not to suggest that a regime-switching equity model should be used and that there could be systemic risks in the credit market that are not necessarily experienced in the equity market, and vice versa.

Iouri Karpov (Academy) noted that the Academy is recommending a set of acceptance criteria that are consistent with the defaults and spreads that are prescribed in VM-20, Requirements for Principle-Based Reserves for Life Products, along with a simplified model that meets these acceptance criteria. The simplified model is fully documented, specified, and calibrated and has gone through a peer review process. One key difference between the Conning GEMS Corporate model and the simplified model is that the simplified model implicitly captures the impact of credit migrations, defaults, and recoveries whereas these components are explicitly modeled in GEMS. Kehrberg noted that the simplified corporate model produces excess spreads (over treasuries) and would need to be implemented on top of a Treasury model.

Hemphill asked if the presentation could be posted to the NAIC's web page. O'Neal noted that he would post the presentation to the NAIC's principle-based reserving (PBR) web page under the Stylized Facts and Acceptance Criteria header and notify the Task Force's distribution when this is done.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 11/3/22

Life Actuarial (A) Task Force
E-Vote
October 24, 2022

The Life Actuarial (A) Task Force conducted an e-vote that concluded Oct. 24, 2022. The following Task Force members participated: Scott A. White, Vice Chair, represented by Craig Chupp (VA); Ricardo Lara represented by Ahmad Khalil (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Amy L. Beard represented by Scott Shover (IN); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen (MN); Chlora Lindley-Myers represented by William Leung (MO); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); Jon Pike represented by Tomasz Serbinowski (UT); and Allan L. McVey (WV).

1. Adopted its 2023 Proposed Charges

The Task Force conducted an e-vote to consider adoption of its 2023 proposed charges (Attachment A). The motion passed unanimously.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 11/22/22

Life Actuarial (A) Task Force
Virtual Meeting
October 13, 2022

The Life Actuarial (A) Task Force met Oct. 13, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Ricardo Lara represented by Ahmad Kamil (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Amy L. Beard represented by Scott Shover (IN); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Exposed the Actuarial Guideline ILVA Draft

Weber said that the charge of the Index-Linked Variable Annuity (A) Subgroup was to provide recommendations or changes as appropriate to nonforfeiture requirements related to index-linked variable annuities (ILVAs). He said the Subgroup's proposed Actuarial Guideline ILVA Draft (AG ILVA Draft) (Attachment A) created a framework for determining the conditions that an ILVA product could be considered a variable annuity and, therefore, exempt from the nonforfeiture requirements of the Standard Nonforfeiture Law for Individual Deferred Annuities (#805) and consistent with the nonforfeiture requirements of the Variable Annuity Model Regulation (#250).

Leung asked if the surrender value on anniversary date would also be market-value adjusted under the AG ILVA Draft. Weber noted that the market-value adjustment would only apply to interim values as currently written.

Yanacheak inquired as to whether companies would be expected to refile their products ahead of the effective date of the AG ILVA Draft or if state insurance regulators would need to reach out to companies with products they expected would not be compliant. Weber noted that it would be up to companies first to determine whether their products are compliant but that he also expects that states would do some reaching out to companies that have products that may not be compliant.

Brian Bayerle (American Council of Life Insurers—ACLI) noted that the AG ILVA Draft was an important step in the regulation of a growing product segment. He said that the ACLI had questions (Attachment B) for state insurance regulators and interested parties to consider during the next exposure of the AG ILVA Draft.

Weber made a motion, seconded by Tsang to expose the AG ILVA Draft and questions for a period of 21 days. During discussion of the motion, Chupp asked whether a wording change should be made to clarify that the strategy value should be before any market-value adjustment. After much discussion, it was decided that this should be an area for feedback during the comment period.

Boston asked whether the AG ILVA Draft defined the required nonforfeiture amounts or the minimum nonforfeiture amounts. Weber noted that some states may choose to view the nonforfeiture amounts as a minimum and allow amounts in excess of the values defined in the AG ILVA Draft. Katie Campbell (NAIC) noted that the language in the AG ILVA Draft stated that the nonforfeiture values companies provide should be materially consistent with how they are defined within the AG ILVA Draft. She said that once nonforfeiture values are

determined according to the AG ILVA Draft, Model #250 should be referred to determine whether they are minimums.

Birny Birnbaum (Center for Economic Justice—CEJ) stated that the questions that were envisioned to be exposed alongside the AG ILVA Draft should be withdrawn, as they may emphasize certain issues over others that may be as or more important. He also questioned how a potentially similar product issued before the effective date of the AG ILVA would have different interim value requirements than a product issued after the effective date and noted that is an issue that Task Force may want comments on. Weber noted that despite the exposure of the questions alongside the AG ILVA Draft, the entirety of the AG ILVA Draft was on the table for commenters to opine on and that it was common practice of the Task Force to expose questions alongside drafts. Hemphill noted that the exposure could specify that feedback on the questions was in addition to general feedback on the AG ILVA Draft.

After discussion, the motion passed unanimously for a 21-day public comment period ending Nov. 2 (Attachment A).

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 11/15/22

Life Actuarial (A) Task Force
Virtual Meeting
October 6, 2022

The Life Actuarial (A) Task Force met Oct. 6, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Ricardo Lara represented by Ahmad Kamil and Elaine Lam (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Amy L. Beard represented by Scott Shover (IN); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Discussed Comments Received on the IUL Illustration (A) Subgroup Exposure

Andersen noted that a concept for indexed universal life (IUL) illustrations has been exposed since July and that related comments were discussed during the Summer National Meeting. He also noted that additional comments were received after the discussion at the Summer National Meeting. He said that after the discussion of the first set of comments, it appeared that there was an informal regulator consensus on a two-step solution: 1) a quick fix to address illustrations for uncapped volatility-controlled indices; and 2) request that the Life Insurance and Annuities (A) Committee pursue a targeted opening of the *Life Insurance Illustrations Model Regulation* (#582) to provide a long-term solution that would work for a wide variety of potential future product designs.

Andersen then provided a short explanation for each of the additional comment letters (Attachments A – G). Birny Birnbaum (Center for Economic Justice—CEJ) noted that he supports the two-step approach, with the caveat that he does not want any arbitrary limitations on opening the model given his view that material changes would need to be made to improve illustrations. Andersen noted his intention to include a lengthy public comment period alongside the recommendation to the Life Insurance and Annuities (A) Committee. Yanacheak noted that he had supported a limited opening of Model #582 as too broad of a request to the Life Insurance and Annuities (A) Committee may get rejected. Serbinowski said that without opening the entirety of Model #582, he does not see how there would not be incentives for companies to design products that simply illustrated well rather than performed well. Andersen replied that it would be helpful to the Life Insurance and Annuities (A) Committee for the Task Force to provide some idea of the fixes that would be needed. Birnbaum noted that he would draft up a rationale for opening Model #582 to provide a starting point for the Life Insurance and Annuities (A) Committee.

Hemphill noted that the next steps could be for the Indexed Universal Life (IUL) Illustration (A) Subgroup to work on both the quick fix and the recommendation for the Life Insurance and Annuities (A) Committee to Model #582 and asked if there were any objections from Task Force members to that plan. There were no objections, and the discussion concluded with that direction.

2. Adopted APF 2022-06

Lam summarized amendment proposal form (APF) 2022-06 by stating that it adds a requirement to disclose information regarding the company's inflation assumption in principle-based reserving (PBR) actuarial reports. Lam noted that a similar requirement was in VM-31, PBR Actuarial Report Requirements for Business Subject to a

Principle-Based Valuation, but that it was mistakenly taken out. Brian Bayerle (American Council of Life Insurers—ACLI) noted he supports the adoption of APF 2022-06, especially considering the high level of inflation currently present.

Lam made a motion, seconded by Leung, to adopt APF 2022-06 (Attachment H). The motion passed unanimously.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 11/1/22

Life Actuarial (A) Task Force
Virtual Meeting
September 29, 2022

The Life Actuarial (A) Task Force met Sept. 29, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Ricardo Lara represented by Ahmad Kamil (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Chlora Lindley-Myers represented by William Leung (MO); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Heard Guidance on the Implementation of Future Mortality Improvement in VM-20

Hemphill noted that the implementation of the future mortality improvement (FMI) rates adopted during the Sept. 22 meeting of the Life Actuarial (A) Task Force could increase or decrease a company's reserve results depending on company or block of business-specific factors. She said that companies that are not ready to apply the FMI rates in their year-end 2022 valuations could use a simplification according to the standards of Section 2.G of VM-20, Requirements for Principle-Based Reserves for Life Products, if the company is able to demonstrate that this simplification does not materially understate reserves or bias the reserves lower.

2. Heard an Update on the NAIC's ESG Field Test

Scott O'Neal (NAIC) said that while the NAIC Economic Scenario Generator (ESG) Field Test company data submissions were originally due at the end of August, several companies have requested extensions and have not yet turned in data. He said that some companies have dropped out of the field test since an update was last provided at the Summer National Meeting and that 26 different insurance groups comprising 39 legal entities are currently still participants. O'Neal noted that of those 39 legal entities, 35 have turned in at least some of their field test results, and 27 have notified the NAIC that their submission is complete. He said that the NAIC continues to work with the field test participants to ensure that nothing is missing from their submissions and to verify results.

Eom asked when state insurance regulators and interested parties could expect to see a summary of the results of the field test. O'Neal noted that the timing is unclear given that some companies have yet to turn in results and that there was expected to be a good amount of dialogue between the NAIC and companies needed to confirm field test results.

3. Heard an Update from the Academy on Equity Model Stylized Facts

Jason Kehrberg (American Academy of Actuaries—Academy) walked through changes that had been made to the Academy's equity model stylized facts (Attachment A) following state insurance regulator feedback. He said that changes were made to stylized facts #2 and #5 and that a new stylized fact #9 was added to the set.

Hemphill asked whether the stylized facts were prioritized by number. Kehrberg noted that a rough prioritization was performed based on the intended use for statutory reserves and capital, but he said the group would revisit this question as it develops acceptance criteria.

4. Requested Volunteers for New ESG Drafting Groups

Hemphill said the new drafting groups would be formed to support the NAIC's implementation of a new ESG for statutory reserves and capital. She went over the directives of each new drafting group (Attachment B), including: 1) recommending updates or replacements for the VM-20 stochastic exclusion ratio test (SERT) scenario methodology; deterministic reserve scenario; scenario picker tool; VM-21, Requirements for Principle-Based Reserves for Variable Annuities, Alternative Methodology; and the VM-21 Company Specific Market Paths (CSMP) methodology; and 2) determining an appropriate model governance framework. She requested that state insurance regulators and interested parties interested in volunteering for these drafting groups email O'Neal.

5. Heard an Update on APF 2022-04 and the NAIC's Transition to SOFR for Swap Spread Assumptions

Alan Routhenstein (Academy) walked through a comment letter (Attachment C) on amendment proposal form (APF) 2022-04 related to the VM-20 and VM-21 prescribed swap spread assumptions. He noted that the Academy had received an informal request from NAIC staff for transition guidance with regards to moving from the London Interbank Offered Rate (LIBOR) to the Secured Overnight Financing Rate (SOFR) as the basis for the swap spread assumption. The letter addressed three recommendations: 1) the timing of the transition from using LIBOR to SOFR in the determination of prescribed swap spread assumptions is expected to be for year-end 2022; 2) companies should assess whether the prescribed current and long-term swap spreads are materially appropriate for their valuations before SOFR is implemented by the NAIC and make adjustments if necessary; and 3) if SOFR is not implemented for use in prescribed swap spread assumptions by year-end 2022, then companies should continue assessing the reasonableness of the prescribed assumptions for their year-end 2022 valuations.

Tsang asked how companies should determine the definition of "materially appropriate." Routhenstein responded that the recommendation is for the actuary to make a judgment to determine what is materially appropriate. Tsang noted that he hopes the Academy could provide a more definitive threshold for determining materiality and that he would like to see demonstrations of materiality from the company actuaries and not just rely on judgment without support. Connie Tang (Prudential) noted that current language in VM-31, PBR Actuarial Report Requirements for Business Subject to a Principle-Based Valuation, regarding modeling simplifications could apply in this situation and require disclosures for any simplifications. Hemphill added that current guidance in VM-20 included a materiality standard that could be used by companies to determine if the swap spread assumption was material to their block of business. Hemphill and Tsang noted a desire to see more clarity related to disclosures and materiality in the next version of the Academy's transition guidance.

Pat Allison (NAIC) gave an update on the status of the data contracts that the NAIC is working to put into place to transition to SOFR. Allison noted that the NAIC is not currently in a position to be able to provide SOFR-based prescribed swap spreads. She said that the challenge is that although the swap spread data received from the two sources is similar, the Treasury rates for some tenors between the two sources are different. She noted that the NAIC has asked the Academy for a recommendation on an appropriate methodology to determine the full Treasury yield curve for purposes of developing the swap spread assumptions.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 10/19/22

Life Actuarial (A) Task Force
Virtual Meeting
September 22, 2022

The Life Actuarial (A) Task Force met Sept. 22, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ahmad Kamil, Thomas Reedy, and Ted Chang (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Adopted the SOA HMI and FMI Factors

Marianne Purushotham (Society of Actuaries—SOA) presented the SOA Historical Mortality Improvement (HMI) and Future Mortality Improvement (FMI) recommendation (Attachment A) along with the HMI and FMI Rates (Attachment B). The SOA recommended: 1) an HMI approach that is based on data from 2010–2020 but sets the 2020 mortality equal to the 2019 level to remove the impact of COVID-19; and 2) an FMI approach that includes mortality deterioration in the initial years of the scale to account for the impact of COVID-19 on mortality and then grades to long-term mortality improvement (MI) levels at projection year 10. Mr. Slutsker asked about how the margins were applied to the FMI. Ms. Purushotham explained that the margin is applied before the application of smoothing between the attained age rates. Brian Bayerle (American Council of Life Insurers – ACLI) noted the ACLI’s support of the recommendation and that a large insurance carrier had noted that their results were consistent with those produced by the NAIC model office.

Mr. Yanacheak made a motion, seconded by Mr. Leung, to adopt the SOA’s HMI recommendation. The motion passed unanimously.

Mr. Carmello noted that a rate of zero was appropriate for FMI given the impacts of COVID-19 and other factors, including individuals forgoing medical care during the COVID-19 pandemic. Mr. Reedy supported the suggestion for zero FMI and noted that in a principle-based reserving (PBR) framework, greater uncertainty calls for greater margin. Mr. Yanacheak said that the SOA’s recommendation was reasonable given the reflection of COVID-19 in the FMI and noted that this assumption is revisited on an annual basis. Mr. Chupp supported the SOA’s recommendation given the inclusion of deterioration in FMI to reflect COVID-19. Ms. Eom said that the margins included in the FMI are sufficient to reflect some uncertainty regarding the assumption.

Mr. Chupp made a motion, seconded by Ms. Eom, to adopt the SOA’s FMI recommendation. New York opposed, but the motion passed.

Ms. Hemphill noted that in reports for VM-31, PBR Actuarial Report Requirements for Business Subject to a Principle-Based Valuation, there are areas where companies can disclose the impact of implicit margins. She said that the more information that companies can include in their VM-31 reports on the impacts of the HMI and FMI

rates, the better-informed state insurance regulators can be going into the discussions for next year's HMI and FMI assumption discussions.

2. Heard an Update on the Health Actuarial (B) Task Force's Meeting to Consider Adoption of the GLWPVT Valuation Tables

Scott O'Neal (NAIC) noted that the Health Actuarial (B) Task Force is considering the adoption of a replacement for the 2005 Group Term Life Waiver Mortality and Recovery Table (GLWPVT) used in *Actuarial Guideline XLIV—Group Term Life Waiver of Premium Disabled Life Reserves* (AG 44) during its Sept. 28 meeting. He said that given the replacement table's mortality component, Life Actuarial (A) Task Force members may wish to participate in the meeting.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 10/6/22

Life Actuarial (A) Task Force
Virtual Meeting
September 15, 2022

The Life Actuarial (A) Task Force met Sept. 15, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Glen Mulready represented by Andrew Schallhorn (OK); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Discussed its Charge Related to the VM-21 SPA and Requested Volunteers for a Drafting Group to Address This Charge

Ms. Hemphill noted that the Life Actuarial (A) Task Force would like to form a drafting group to address its charge to: “Evaluate and provide recommendations regarding the VM-21/AG 43 Standard Projection Amount, which may include continuing as a required floor or providing as disclosure.” She said that the scope of the drafting group’s work would include VM-21, Requirements for Principle-Based Reserves for Variable Annuities, and asked Mr. Slutsker, Valuation Manual (VM)-22 Subgroup chair, if it would also be appropriate to include VM-22 as well. Mr. Slutsker responded that it made sense to consider whether both the VM-21 and VM-22 standard projection amount (SPA) should be binding or a disclosure item as part of the work of the drafting group to be formed. Mr. Weber noted that the new drafting group may want to consider whether the charge can be addressed ahead of the implementation of a new economic scenario generator (ESG). Brian Bayerle (American Council of Life Insurers—ACLI) noted that an existing ACLI Annuity Experience Group may be able to help with this charge or that an ACLI SPA specific group could be formed. Mr. Slutsker, speaking in his capacity as vice president of the American Academy of Actuaries (Academy) Life Practice Council, noted three Academy groups that could assist with the work. Ms. Hemphill concluded that individuals interested in participating in the new drafting group could contact Scott O’Neal (NAIC).

2. Exposed APF 2022-06

Mr. Reedy said that the intention of amendment proposal form (APF) 2022-06 (Attachment A) was to require that companies provide information on their inflation assumption used in VM-20, Requirements for Principle-Based Reserves for Life Products, along with a rationale in their principle-based reserving (PBR) actuarial reports. Mr. Reedy noted that he believes that disclosure of the inflation assumption in the PBR actuarial report had existed in a previous version of the *Valuation Manual* and that he thinks it had been inadvertently removed.

Mr. Reedy made a motion, seconded by Mr. Chupp, to expose APF 2022-06 for a 21-day public comment period ending Oct. 5. The motion passed unanimously.

Having no further business, the Life Actuarial (A) Task Force adjourned.

Draft: 9/21/22

Life Actuarial (A) Task Force
Virtual Meeting
September 8, 2022

The Life Actuarial (A) Task Force met Sept. 8, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Marlene Caride represented by Seong-min Eom (NJ); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Adopted the 2023 GRET Table

Mr. Weber made a motion, seconded by Mr. Chupp, to adopt the Society of Actuaries' (SOA's) 2023 Generally Recognized Expense Table (GRET) (Attachment A). The motion passed unanimously.

2. Adopted the AG 53 Template

Mr. Slutsker noted two editorial changes that were made to the *Actuarial Guideline LIII—Application of the Valuation Manual for Testing the Adequacy of Life Insurer Reserves* (AG 53) Template (Attachment B) after exposure: 1) more consistent labeling in the Asset Yield tabs was added; and 2) a duplicate row was deleted in the Sensitivity Test. After Ms. Hemphill inquired regarding confirmation of whether the changes could be deemed editorial, Scott O'Neal (NAIC) confirmed that the updates could be deemed as such.

Mr. Andersen then discussed a comment letter (Attachment C) that was provided by Risk & Regulatory Consulting LLC (RRC). He noted that while there are many helpful recommendations included in the comment letter, it does not make sense to change the template given the timing required for adoption and use for year-end 2022. He noted that state insurance regulators could utilize the guidance present in the comment letter in certain instances where additional information is needed from companies. He also noted that the AG 53 Template is only required to be adopted by the Task Force as described in AG 53, rather than the typical NAIC process where task force adoptions are adopted by parent committees before finally being adopted by the Executive (EX) Committee and Plenary.

Mr. Andersen made a motion, seconded by Mr. Leung, to adopt the AG 53 Template. The motion passed unanimously.

3. Heard an Update from the Index-Linked Variable Annuity (A) Subgroup

Mr. Weber noted that the Index-Linked Variable Annuity (A) Subgroup is close to having a recommendation for the consideration of the Task Force, and a draft version of the index-linked variable annuity (ILVA) actuarial guideline was exposed on Sept. 6 for a public comment period ending Sept. 16.

Mr. Serbinowski then proceeded to walk through the ILVA outline to the Task Force (Attachment D). He described the purpose of the ILVA actuarial guideline as creating a framework for determining the conditions that an ILVA product could be considered a variable annuity and therefore exempt from the nonforfeiture requirements of the *Standard Nonforfeiture Law for Individual Deferred Annuities* (#805) and consistent with the nonforfeiture requirements of the *Variable Annuity Model Regulation* (#250). He said the ILVA actuarial guideline is based on two principles: 1) the interim values defined in the contract should provide equity between the contract holder and the insurance company; and 2) the interim values should be consistent with the market value of a hypothetical portfolio over the term of the index strategy.

Mr. Leung, while noting that the Subgroup's work is focused on interim values, asked for clarification on whether the contract values on the anniversary date of the index strategy meet the definition of a variable annuity according to Model #805. Mr. Serbinowski noted that Model #805 exempts variable annuities from the nonforfeiture requirements but does not actually define what a variable annuity is.

Mr. Yanacheak noted the challenges in fitting the ILVA product into the definition of a variable annuity. Mr. Weber acknowledged that while the ILVA product is not a traditional separate account-based variable annuity, the ILVA actuarial guideline would provide a framework where states could consider these products to be variable annuities for nonforfeiture purposes. Mr. Serbinowski added that the Subgroup is trying to stay away from where the product is supported, whether it is from the separate account or general account. Instead, he said the focus is on how the products are funded and determining the interim values based on the market values of the supporting assets. Mr. Weber then noted that the Subgroup is working to define the interim values to be reflective of both downside risks and upside potential, like how a variable annuity would function.

4. Exposed APF 2022-07

Brian Bayerle (American Council of Life Insurers—ACLI) delivered some high-level comments regarding the intent of amendment proposal form (APF) 2022-07. He noted that APF 2022-07 originated after APF 2018-57 was passed, and companies believed there was some ambiguity around some of the requirements in APF 2018-57. He noted that APF 2022-07 was intended to clarify that the net premium reserve (NPR) mortality adjustments were to be applied at the block of business level and not a more granular level.

David Neve (Actuarial Resources Corporation of Georgia) then gave a walk-through of the details of APF 2022-07. Mr. Chupp asked whether it would make sense for APF 2022-07 to not reference language from VM-20, Requirements for Principle-Based Reserves for Life Products, Section 6.B.5.d and instead pull the language directly into APF 2022-07. Mr. Neve welcomed the suggestion, but he asked that Mr. Chupp include his thoughts in a comment letter to allow more time for consideration. Ms. Hemphill inquired as to whether APF 2022-07, Section 6.B.5.d should also include reference to VM-20, Section 3.C.1.g. Mr. Neve asked that instead of altering APF 2022-07 for exposure, any reference changes be included in a comment letter to allow for more time for consideration.

Mr. Chupp made a motion, seconded by Mr. Andersen, to expose APF 2022-07 (Attachment E) for a 21-day public comment period ending Sept. 28. The motion passed unanimously.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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Draft: 9/7/22

Life Actuarial (A) Task Force
Virtual Meeting
August 25, 2022

The Life Actuarial (A) Task Force met Aug. 25, 2022. The following Task Force members participated: Cassie Brown, Chair, represented by Mike Boerner and Rachel Hemphill (TX); Scott A. White, Vice Chair, represented by Craig Chupp (VA); Mark Fowler represented by Jennifer Li (AL); Ricardo Lara represented by Ted Chang, Ahmad Kamil, and Thomas Reedy (CA); Michael Conway represented by Eric Unger (CO); Andrew N. Mais represented by Wanchin Chou (CT); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Vicki Schmidt represented by Nicole Boyd (KS); Grace Arnold represented by Fred Andersen and Ben Slutsker (MN); Chlora Lindley-Myers represented by William Leung (MO); Eric Dunning represented by Derek Wallman (NE); Adrienne A. Harris represented by Bill Carmello and Michael Cebula (NY); Judith L. French represented by Peter Weber (OH); Michael Humphreys represented by Steve Boston (PA); and Jon Pike represented by Tomasz Serbinowski (UT).

1. Exposed the Mortality Improvement Rates HMI and FMI Scenarios

Marianne Purushotham (Joint American Academy of Actuaries [Academy] Mortality Improvements Life Work Group [MILWG] and Society of Actuaries [SOA] Mortality and Longevity Oversight Advisory Council [MLOAC]) presented the revisions to the 2022 Historical Mortality Improvement (HMI)/Future Mortality Improvement (FMI) Scale Development Recommendations (Attachment A). She reminded the Task Force that one of the MILWG/MLOAC principles is that the valuation mortality assumption should not include the excess mortality or mortality deterioration from the initial mortality shock. She said the joint MILWG/MLOAC group reasoned that in the year the shock occurred and additional claims were incurred, capital had been set aside to cover those unexpected shock events. The principle holds that only if the effects of the shock on mortality are expected to be ongoing should the shock be reflected in the future mortality.

Ms. Purushotham said the first two approaches for HMI remove the COVID-19 mortality shock. Approach 3 includes the full extent of the COVID-19 shock. Ms. Purushotham said the joint MILWG/MLOAC group is recommending approach 2 because better data that would inform how to remove the shock is not available, and approach 2 resulted in less mortality improvement than approach 1.

Ms. Purushotham said approach 1 for FMI uses the calculation method the Task Force approved last year. She said approach 2 includes COVID-19 mortality deterioration in the early years of the FMI scale. Approach 3 is like approach 2 except for using 50% more COVID-19 mortality deterioration in 2023 and 2024. Ms. Purushotham said the joint MILWG/MLOAC group is recommending FMI approach 2. She said the universal life with secondary guarantees (ULSG) model office results, using the joint MILWG/MLOAC group's recommendation of HMI approach 2 and FMI approach 2, show a 5.95% decrease in the baseline deterministic reserve (DR). She said alternate run 1 uses HMI approach 3 and FMI approach 1. The ULSG model office results for alternate run 1 show a 0.68% decrease in the baseline DR. Ms. Purushotham said alternate run 2 uses HMI approach 2 with no FMI. The ULSG model office results for alternate run 2 show a 1.5% increase in the baseline DR.

Scott O'Neal (NAIC) presented the results of the term product model office. He said percent changes are not shown because the term model office reserves are computed six months after issue, so the baseline reserve amount is negative. He said the model office for the recommended approach results in a \$10,878 increase over the baseline amount. The model office alternate runs 1 and 2 show a \$38,194 increase and a \$29,561 increase over the baseline, respectively.

Ms. Hemphill suggested that an exposure could include approach 2 for HMI and approaches 2 and 3 for FMI. She said the rates for each approach will be exposed separately. Brian Bayerle (American Council of Life Insurers—ACLI) agreed to ask ACLI member companies to use the rates to run sample reserves based on their company data.

Mr. Slutsker asked if there are any reasons why the joint MILWG/MLOAC group recommendation and both alternate runs 1 and 2 could not be exposed. Ms. Hemphill said alternate 1, which combines HMI approach 3 and FMI approach 1 becomes problematic if companies use their own experience for HMI and apply FMI approach 1. She said Mr. Chupp previously voiced a concern that the combination would allow companies to gain an advantage if they do not account for COVID-19 in their company experience. Mr. Boston asked if the exposure could include HMI approach 1 and no FMI. Ms. Hemphill said she agrees with Mr. Boston's suggestion.

Mr. Slutsker suggested that in the future, the Task Force should consider the impacts of each HMI and FMI approach separately.

Mr. Chupp made a motion, seconded by Mr. Leung, to expose the model office reserve impacts of combining HMI approach 2 with FMI approach 2, HMI approach 2 with FMI approach 3, and HMI approach 1 with no FMI, as well as the rates for each of the approaches used in the model office runs for a 21-day public comment period ending Sept. 21. The motion passed unanimously.

Having no further business, the Life Actuarial (A) Task Force adjourned.

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December 11, 2022

From: Fred Andersen, Chair
The Experience Reporting (A) Subgroup

To: Rachel Hemphill, Chair
The Life Actuarial (A) Task Force

Subject: The Report of the Experience Reporting (A) Subgroup to the Life Actuarial (A) Task Force

The Experience Reporting (A) Subgroup has not met since the Summer National Meeting. Upcoming projects include monitoring the plans for collecting life insurance mortality and policyholder behavior data using the NAIC as the statistical agent, starting to develop mandatory reporting of variable annuity data, and continuing to work on evaluating actuarial aspects of accelerated underwriting.

Note that the Valuation Analysis Working Group (VAWG), through its company-specific reviews of asset adequacy analysis will monitor emerging trends, particularly with respect to dynamic policyholder behavior resulting from the rise in interest rates. Findings from VAWG may inform the need for upcoming data collection.

December 11, 2022

From: Seong-min Eom, Chair
The Longevity Risk (E/A) Subgroup

To: Rachel Hemphill, Chair
The Life Actuarial (A) Task Force

Subject: The Report of the Longevity Risk (E/A) Subgroup to the Life Actuarial (A) Task Force

The Longevity Risk (E/A) Subgroup has not met since the Summer National Meeting. The subgroup will resume the meetings once the currently exposed VM-22 PBR methodology is finalized and adopted to develop and recommend longevity risk factor(s) for the product(s) that were excluded from the application of the current longevity risk factors.

December 11, 2022

From: Pete Weber, Chair
The Variable Annuities Capital and Reserve (E/A) Subgroup

To: Rachel Hemphill, Chair
The Life Actuarial (A) Task Force

Subject: The Report of the Variable Annuities Capital and Reserve (E/A) Subgroup (VACR SG) to the Life Actuarial (A) Task Force

The VACR SG has not met since the Summer National Meeting. At the request of LATF, the Chair has made a request to the Society of Actuaries to expand the work they are currently carrying out for the VM-22 Standard Projection Amount Mortality DG to include variable annuities. More specifically, to develop mortality rates to be used as prescribed assumptions within the VM-21 Standard Projection Amount.

Agenda Item 2

Consider Adoption of the Report of the
Index-Linked Variable Annuity (A) Subgroup

Draft: 12/1/22

Index-Linked Variable Annuity (A) Subgroup
Virtual Meeting
September 27, 2022

The Index-Linked Variable Annuity (A) Subgroup of the Life Actuarial (A) Task Force met Sept. 27, 2022. The following Subgroup members participated: Peter Weber, Chair (OH); Tomasz Serbinowski, Vice Chair (UT); Sarvjit Samra (CA); Vincent Tsang (IL); Derek Wallman (NE); Kevin Clarkson (NJ); Bill Carmello (NY); Rachel Hemphill (TX); and David Hippen (WA).

1. Discussed the Comments on the Proposed ILVA Actuarial Guideline

Steve Wolfrath (Ameriprise Financial), representing the American Council of Life Insurers (ACLI) said the industry does not view this as a philosophical disconnect from the current draft of the guideline but rather a technical issue to be addressed and truly illustrate that issue. The text section of the guideline that reads the index strategy base must equal the strategy value at the index strategy term start date seems like an innocent enough sentence, but it becomes problematic because it is not clear that a market value adjustment could be applied at that point in time. Our request to resolve this is to make it clearer that a market value adjustment (MVA) could be applied on the segment end date. It would create a more consistent client experience by not having this cliff issue, and that is why that change is being requested.

Serbinowski stated that no further changes should be made to the guideline outside of the fourth point in the joint ACLI and Community of Annuity Insurers (CAI) comment letter, and the discussion could now be moved to the Life Actuarial (A) Task Force highlighting the MVA issue.

Serbinowski made a motion, seconded by Hippen, to submit the Subgroup's fifth exposure of its Actuarial Guideline ILVA: Nonforfeiture Requirements for Index-Linked Variable Annuity Products, with the change from item four of the joint ACLI and CAI comment letter, to the Life Actuarial (A) Task Force. The motion passed unanimously.

Having no further business, the Index-Linked Variable Annuity (A) Subgroup adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/A CMTE/LATF/2022 Fall/ILVA Calls/09 27

Draft: 12/1/22

Index-Linked Variable Annuity (A) Subgroup
Virtual Meeting
September 20, 2022

The Index-Linked Variable Annuity (A) Subgroup of the Life Actuarial (A) Task Force met Sept. 20, 2022. The following Subgroup members participated: Peter Weber, Chair (OH); Tomasz Serbinowski, Vice Chair (UT); Sarvjit Samra (CA); Vincent Tsang (IL); Derek Wallman (NE); Kevin Clarkson (NJ); Bill Carmello (NY); Rachel Hemphill (TX); Craig Chupp (VA); and David Hippen (WA).

1. Discussed the Comments on the Proposed ILVA Actuarial Guideline

Weber discussed comments on the fifth draft of the proposed actuarial guideline (Attachment 1), which was exposed on Sept. 5 for a public comment period ending Sept. 16. He said the comments received from industry revolve around the application of market value adjustments (MVAs).

Serbinowski commented on the complexity of the MVAs, and he stated that the issue is the market value of the hypothetical portfolio to serve as a proxy for these products that are exempt as a variable annuity (VA) product and substituting for a daily value that would be in a true unit linked VA. Clarkson stated that the MVAs in other types of annuity products deal with real numbers, and he suggested that companies could opt out of the MVA if they show that an MVA is not needed. However, that would be difficult when using a hypothetical portfolio. Beth Keith (American Academy of Actuaries—Academy) asked how one manages hypothetical portfolios when contracts extend beyond the term of the hypothetical portfolio. Serbinowski stated that the hypothetical portfolio is created for the interim values for a particular segment or term. Keith asked if the hypothetical portfolio would be created for each term. Serbinowski stated that the hypothetical portfolio would be created at the beginning of each term. Hippen stated that MVAs would be positive or negative in the interim. Weber stated that the principle is to capture the market value during the interim period. Carmello asked if MVAs are required for hypothetical bonds in this exposure, and he said the New York State Department of Financial Services (NYDFS) would be in favor of not having MVAs in the fixed portion. Chupp stated that the first few exposures did not require MVAs and still should not require MVAs. Weber acknowledged that there have been changes since the project started based on comments received, and there was seemingly a consensus of the group to use market values in the hypothetical portfolio, and to allow non-market values would deviate from the principles. Clarkson stated that the feedback from companies shed light on the importance of MVAs.

Adam Brown (Alliance), representing the American Council of Life Insurers (ACLI) said there is value in having flexibility for companies to offer a choice of MVAs, and he said consumers who purchase index-linked variable annuities (ILVAs) do so primarily to participate in equity performance while maintaining a level of protection. He asked for guidance on how the MVA is applied at the end of a term if the assets are longer than the term was envisioned. Serbinowski said industry has stated that they are not investing in assets that mature at the end of the term, and the formula recognizes what the companies are doing in supporting their products. Brown stated that the products come to a very similar conclusion over the life of the product whether a book value approach or a market value approach is used, and MVAs should not be required. Serbinowski said the interim values apply to the values outside the beginning and end of a term, and MVAs would not be applied on those dates since the contract language will cover the values outside of the interim values. Brown stated that the MVAs applied in that manner would create a cliff in the values on the day before the end of a term and could be difficult to explain to consumers; he said he would like to see continuity for the customer. Clarkson said the New Jersey Department of Banking and Insurance requires that daily values be available on request, and he asked why the companies would not design the product to diminish the cliff effect as it approaches the end of the term. Brown said the ACLI is

asking for flexibility as noted in the first and third points in the joint ACLI and Community of Annuity Insurers (CAI) comment letter (Attachment 2). Steve Wolfrath (Ameriprise Financial) said Ameriprise Financial provides daily values to consumers. Carmello stated that the NYSDFS treats the ILVA products as a fixed indexed annuity with the buffer as an add-on. Weber said this guideline is attempting to produce unit-linked type values for these products. Brian Bayerle (ACLI) said the change was very significant, and state insurance regulators should consider the impact on the marketplace.

Serbinowski said the companies present these products as VAs with relief from non-forfeiture law, and the Subgroup has tried to propose a guideline that might not accommodate everything but remains true to the statement that the values vary with the investment performance of the separate accounts. Weber noted that the guideline has accomplished the goal of making these types of products variable. Chupp said the interim values will use an MVA, but that on the term start date and end date will not use the MVA. Steve Roth (CAI) stated that he thought the Subgroup had moved away from the *Variable Annuity Model Regulation* (#250) and moved more broadly into the Standard Nonforfeiture Law for Individual Deferred Annuities (#805). If the Subgroup is moving more towards Model #805, then the guideline need not be as proscriptive regarding MVAs. Serbinowski stated that VA products are exempt from Model #805, and he asked if a company can design a product that does not meet Model #805 requirements; therefore, just call that product variable. Roth stated that Model #805 does not define a VA, but Model #250 and the *Modified Guaranteed Annuity Model Regulation* (#255) have defined a VA in two ways, and the Subgroup is defining a VA in a third way. Hippen said the guideline needs to align with a model regulation to have regulatory authority. Weber said the Subgroup has been trying to make the guideline unit-linked and align with Model #250.

John M. Clymer (Prudential), representing the ACLI, said the joint ACLI and CAI comment letter (Attachment 2) points out that ILVA products allow an MVA term length equal to the index strategy term in addition to the maturity of the fixed income asset proxy. He stated that this option was included in the fourth exposure and should continue to be incorporated.

Weber said the guideline may not accommodate all products in the marketplace, and the Subgroup is trying to introduce consistency across the states for products that currently have no regulation.

The Subgroup agreed to hold an additional meeting to discuss items in the joint ACLI and CAI comment letter that had not been considered.

Having no further business, the Index-Linked Variable Annuity (A) Subgroup adjourned.

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Draft: 9/29/22

Index-Linked Variable Annuity (A) Subgroup
Virtual Meeting
August 29, 2022

The Index-Linked Variable Annuity (A) Subgroup of the Life Actuarial (A) Task Force met Aug. 29, 2022. The following Subgroup members participated: Peter Weber, Chair (OH); Tomasz Serbinowski, Vice Chair (UT); Sarjit Samra (CA); Vincent Tsang (IL); Derek Wallman (NE); David Wolf (NJ); Bill Carmello (NY); Rachel Hemphill (TX); and Craig Chupp (VA).

1. Discussed the Comments on the Proposed ILVA Actuarial Guideline

Mr. Weber discussed comments on the fourth draft of the proposed actuarial guideline (Attachment 1), which was exposed on July 25 for a public comment period ending Aug. 23. He said the comments received from industry were primarily on two items. The first item was the application of market value adjustments (MVAs) to partial withdrawals and surrenders.

Ryan Berends (Athene, representing the American Council of Life Insurers—ACLI) said the joint ACLI and Community of Annuity Insurers (CAI) comment letter (Attachment 2) points out that the proposed guideline is based on a market value framework. He said restricting the MVA to partial withdrawals and surrenders is inconsistent with that backdrop. He said the goal of the MVA is to mark fixed income assets to market in connection with policy transactions. He said in addition to that happening with partial withdrawals and surrenders, it also happens with deaths, annuitizations, and transfers. Mr. Berends said that rather than delineating each type of transaction that would trigger an MVA, the ACLI recommends focusing on the underlying principles of equity between the contract holder and the insurance company, and the equity language in the actuarial certification. Mr. Serbinowski asked if it makes more sense to use market values for these products instead of book values. Mr. Berends responded that the decision of whether to use market value should be based on the manufacturing and risk management considerations for the product. Mr. Serbinowski said he agrees that the MVA should be applicable to all decrements but disagrees that companies should have the freedom to decide that MVAs should not be applicable based on manufacturing and risk management considerations.

Katie Campbell (Interstate Insurance Product Regulation Commission—Compact) noted that a true variable product would require an MVA to be included when determining the value of the fixed income asset proxy. Mr. Berends suggested that one perspective is to allow situations where MVAs may not apply at all, but if the MVA does apply, it should be applied to all decrements. Mr. Serbinowski asked that if it is equitable to include an MVA, then should they always be included. Mr. Berends said that is a point well-taken. Mr. Carmello said that the New York Department of Financial Services (NYDFS) does not allow negative MVAs on death benefits because death benefits are non-elective benefits.

Beth Keith (American Academy of Actuaries—Academy) said the Academy comment letter (Attachment 3e) supports applying negative MVAs only in the case of withdrawals and surrenders. Jonathan Clymer (Prudential, representing the ACLI) asked if Mr. Carmello would allow an MVA upon death if the contract provided a return of premium benefit. Mr. Carmello said he would be comfortable with that structure. Yolanda Chow (Equitable) said that in treating the index-linked variable annuity (ILVA) like a variable annuity (VA), only a return of account value is offered, not a return of premium. She said negative MVAs are not allowed. Mr. Serbinowski said the decision whether an MVA on a death benefit is allowed should be left to the states. Mr. Carmello concurred, saying that if there is a death benefit floor, such as a return of premium, it should not be adjusted by an MVA.

Ms. Keith said that instead of using the term “fixed income asset proxy,” the guideline should reference fixed income invested assets. Mr. Serbinowski disagreed with the Academy’s proposed change. Mr. Weber said the issue will be returned to the drafting group.

Mr. Weber said the second item the comments focused on was the effective date. He expressed uncertainty about whether an effective date is necessary. Steve Roth (CAI) said that the ACLI/CAI comment letter suggested that if an effective date is needed, it should be bifurcated for new and existing contracts, with the dates being April 2023 and July 2024, respectively. Mr. Bayerle said he believes that having an effective date will be helpful. Mr. Carmello suggested using July 2024 as the effective date for both new and existing contracts. Mr. Serbinowski said that it is not clear why companies need so much lead time to comply with the guideline.

Having no further business, the Index-Linked Variable Annuity (A) Subgroup adjourned.

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Agenda Item 3

Consider Adoption of Actuarial Guideline ILVA

**Actuarial Guideline ILVA
Nonforfeiture Requirements for Index Linked
Variable Annuity Products**

Background

The purpose of this guideline is to specify the conditions under which an Index-Linked Variable Annuity (ILVA) is consistent with the definition of a variable annuity and exempt from Model 805 and specify nonforfeiture requirements consistent with variable annuities.

A number of insurers have developed and are issuing annuity products with credits based on the performance of an index with caps on returns, participation rates, spreads or margins, or other crediting elements, that include a risk of negative index returns subject to limitations on the loss, such as a floor or a buffer. These products are not unitized and do not invest directly in the assets whose performance forms the basis for the credits.

There is no established terminology for these annuity products. These products go by several names, including structured annuities, registered index-linked annuities (RILA), or index-linked variable annuities, among others. This guideline refers to these products as index-linked variable annuities (ILVA).

Variable annuities are exempted from the scope of NAIC Model 805, *Standard Nonforfeiture Law for Individual Deferred Annuities*; however, NAIC Model 805 does not define the term "variable annuity".

NAIC Model 250, *Variable Annuity Model Regulation*, defines variable annuities as "contracts that provide for annuity benefits that vary according to the investment experience of a separate account" Section 7B of NAIC Model 250 provides that "to the extent that a variable annuity contract provides benefits that do not vary in accordance with the investment performance of a separate account" the contract shall satisfy the requirements of the NAIC Model 805.

The application of the NAIC Model 250 to a traditional variable annuity with unitized values is straightforward. The unitized feature provides an automatic linkage between annuity values and the investment experience of a separate account. Daily values (market values of the separate account assets) are the basis of all the benefits, including surrender values.

The fact that ILVA accounts are not unitized means they do not have values determined directly by the market prices of the underlying assets. Therefore, this guideline sets forth principles and requirements for determining values, including death benefit, withdrawal amount, annuitization amount or surrender values, such that an ILVA is considered a variable annuity and thereby exempt from Model 805. An ILVA that does not comply

with the principles and requirements of this guideline is not considered a variable annuity and therefore is subject to Model 805.

Drafting Note: This guideline interprets the term “variable annuity” for purposes of exemption from Model 805. It is not intended to modify the definition of a variable annuity under Model 250 or other Model Regulations.

Scope

This guideline applies to any index-linked annuity exempt from the NAIC Model 805 on the basis that it is a variable annuity and includes index-linked crediting features that are built into policies or contracts (with or without unitized subaccounts) or added to such by rider, endorsement, or amendment.

Principles

This guideline is based on the following principles:

1. Interim Values defined in the contract provide equity between the contract holder and the insurance company
2. Interim Values are consistent with the ~~market~~ value of the Hypothetical Portfolio over the Index Strategy Term.

Definitions

“Derivative Asset Proxy” means a package of hypothetical derivative assets established at the beginning of an Index Strategy Term that is designed to replicate credits provided by an Index Strategy at the end of an Index Strategy Term.

“Fixed Income Asset Proxy” is a hypothetical fixed income asset.

“Hypothetical Portfolio” means a hypothetical portfolio composed of a Fixed Income Asset Proxy and a Derivative Asset Proxy.

“Index” means a benchmark designed to track the performance of a defined portfolio of securities.

“Index Strategy” means a method used to determine index credits with specified index or indices and cap, buffer, participation rate, spread, margin or other index crediting elements.

“Index Strategy Base” means the notional amount used to determine index credits that does not change throughout the Index Strategy Term except for withdrawals, transfers, deposits, loans, and any explicit charges.

“Index Strategy Term” means the period of time from the term start date to the term end date over which an index changes and the index credit is determined.

“Interim Value” means the Strategy Value at any time other than the start date and end date of an Index Strategy Term.

“Strategy Value” means the value, attributable to an Index Strategy, used in determining values including death benefit, withdrawal amount, annuitization amount or surrender values.

“Trading Cost” means the additional cost of liquidating the derivative assets in the Derivative Asset Proxy or actual derivative assets supporting the Index Strategy that is not accounted for in the Derivative Asset Proxy calculation.

Text

The Index Strategy Base must equal the Strategy Value at the Index Strategy Term start date.

The Fixed Income Asset Proxy is assumed to be a hypothetical fixed income asset ~~with a maturity based on the maturity of the fixed income assets supporting the ILVA, and~~ with a yield that results in

- i. at the beginning of the Index Strategy Term, the book value of the Fixed Income Asset Proxy equal to the Index Strategy Base less the Derivative Asset Proxy value; and
- ii. at the end of the Index Strategy Term, the book value of the Fixed Income Asset Proxy, assuming no change in yield, projected to equal the Index Strategy Base.

~~The market value of the Hypothetical Portfolio is the market value of the Fixed Income Asset Proxy and the market value of the Derivative Asset Proxy.~~

~~The market value of the Fixed Income Asset Proxy is its book value, using the yield above, adjusted using a market value adjustment formula (MVA) appropriate for the maturity of the Fixed Income Asset Proxy.~~

Drafting Note:

The guideline defines the conditions under which an index linked variable annuity is exempt from Model 805 on the basis that it is a variable annuity. A variable annuity provides daily values (analogous to Interim Values in this guideline) based on the market value of separate account assets. In order to more closely align an ILVA to a variable annuity, ~~as stated in the Principles of the guideline,~~ Interim Values are to should be consistent with market value of hypothetical assets supporting the ILVA (i.e. Hypothetical Portfolio). The market value of the assets may be determined by a fair value

~~methodology or by applying an MVA to the book value. The market value of the Hypothetical Portfolio is equal to the market value of a Fixed Income Asset Proxy plus the market value of a Derivative Asset Proxy. In determining the market value of the Fixed Income Asset Proxy, a state may want to consider whether excluding an MVA is applied to the book value of the fixed assets to approximate the market value of the fixed income assets supporting the ILVA appropriate. In making a determination regarding whether an MVA should be applied and, if applicable, what an acceptable MVA formula is, the state should consider whether the Interim Values provide reasonable equity between the contract holder and the insurance company. No additional MVA is applicable to Strategy Values or Interim Values.~~

The value of the package of derivative assets is determinable daily. Assumptions used to determine the market value of the Derivative Asset Proxy including implied volatilities, risk-free rates, and dividend yields must be consistent with the observable market prices of derivative assets, whenever possible.

Interim Values must be materially consistent with the ~~market~~ value of the Hypothetical Portfolio over the Index Strategy Term less a provision for the cost attributable to reasonably expected or actual Trading Costs at the time the Interim Value is calculated.

If a contract provides Interim Values determined using a methodology other than a Hypothetical Portfolio methodology as described in this guideline, the company must demonstrate that the contractually defined Interim Values will be materially consistent over the Index Strategy Term with the Interim Values that would be produced using the Hypothetical Portfolio methodology for each combination of Index Strategy and Index Strategy Term under a reasonable number of realistic economic scenarios that include index changes that test crediting constraints and recognize initial option pricing parameters.

The company must provide an actuarial memorandum with each ILVA product filing that includes the following:

1. Actuarial certifications must be included with each ILVA product filing and must include the following:
 - a. Interim Values defined in the contract provide equity between the contract holder and the insurance company;
 - b. The assumptions used to determine the market value of the Derivative Asset Proxy including implied volatilities, risk-free rates, dividend yields, and other parameters required to value the derivatives are consistent with the observable market prices of derivative assets over the Index Strategy Term, whenever possible. Valuation techniques include the standard Black-Scholes method, Monte-Carlo Simulation techniques, and other market consistent option valuation techniques for more complex options;
 - c. The contractually defined Interim Values are materially consistent with the Interim Values that would be produced using the Hypothetical Portfolio

methodology for each combination of Index Strategy and Index Strategy Term over the Index Strategy Term less a provision for the Trading Costs at the time the Interim Value is calculated; and

- d. Any Trading Costs represent reasonably expected or actual costs at the time the Interim Value is calculated; and

~~The market value adjustment applicable to the Fixed Income Asset Proxy, is expected to produce results reasonably similar to changes in the market value of the fixed income assets supporting the ILVA and the formula provides for reasonable equity between the contract holder and the insurance company.~~

2. If the Interim Values are determined using a methodology other than the Hypothetical Portfolio methodology described in this guideline, the actuary shall describe the testing performed to verify that the values are materially consistent with the Hypothetical Portfolio methodology. The actuary should define any parameters or assumptions used in determining material consistency and provide a summary of the results of the testing.

3. Descriptions of

a. The ~~market~~ value of the Fixed Income Asset Proxy; ~~including the~~

~~a.b.~~ The market value adjustment formula, if any;

~~b.c.~~ The market value of the Derivative Asset Proxy including any Trading Costs; and

~~c.d.~~ All formulas, methodologies and assumptions used to calculate these values for each Index Strategy and Index Strategy Term as well as the sources for all assumptions.

ILVA nonforfeiture benefits for Index Strategies subject to this guideline must comply with Section 7 of Model 250 not including Section 7.B with net investment return consistent with the requirements for determining Interim Values in this guideline.

Effective Date

The Guideline applies to all contracts issued on or after July 1, 2024.



November 30, 2022

Rachel Hemphill, Chair
Craig Chupp, Vice Chair
Life Actuarial (A) Task Force
National Association of Insurance Commissioners

**RE: LATF Exposure of Actuarial Guideline ILVA: Nonforfeiture Requirements for
Index Linked Variable Annuity Products**

Dear Madam Chair and Mr. Vice Chair:

The American Council of Life Insurers (ACLI)¹ and the Committee of Annuity Insurers (CAI)² appreciate the opportunity to submit the following comments to LATF on their 2nd exposure of *Actuarial Guideline ILVA: Nonforfeiture Requirements for Index Linked Variable Annuity Products*.

We would first like to thank the Task Force for addressing our concerns relating to Market Value Adjustment (MVA) term length, MVA optionality and Index Strategy Base. We are, however, concerned that the revised Drafting Note appears to contain a preference for the inclusion of MVAs. In order to make the Drafting Note more neutral with regard to MVAs, we suggest the following modifications (additions in green font; deletions in red font):

Drafting Note (with modifications shown):

The guideline defines the conditions under which an index linked variable annuity is exempt from Model 805 on the basis that it is a variable annuity. A variable annuity provides daily values (analogous to Interim Values in this guideline) based on the market value of separate account assets. In order to more closely align an ILVA to a variable annuity, Interim Values should be consistent with the market value of hypothetical assets supporting the ILVA (i.e., Hypothetical Portfolio). The market value of the assets may be determined by a fair value methodology or by applying an MVA to the book value. A state may want to consider whether ~~excluding an MVA is appropriate~~ necessary, ~~In making a determination regarding~~

¹ The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI's member companies are dedicated to protecting consumers' financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI's 280 member companies represent 94 percent of industry assets in the United States.

² The Committee of Annuity Insurers is a coalition of life insurance companies that issue annuities. It was formed in 1981 to address legislative and regulatory issues relevant to the annuity industry and to participate in the development of public policy with respect to securities, state regulatory and tax issues affecting annuities. The CAI's current 30 member companies represent approximately 80% of the annuity business in the United States.

~~whether an MVA should be applied and, if applicable, what an acceptable MVA formula is.~~ ^{12/11, 12/22} The state should consider whether the Interim Values provide reasonable equity between the contract holder and the insurance company.

Drafting Note (clean version):

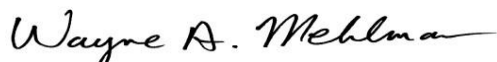
The guideline defines the conditions under which an index linked variable annuity is exempt from Model 805 on the basis that it is a variable annuity. A variable annuity provides daily values (analogous to Interim Values in this guideline) based on the market value of separate account assets. In order to more closely align an ILVA to a variable annuity, Interim Values should be consistent with the market value of hypothetical assets supporting the ILVA (i.e., Hypothetical Portfolio). The market value of the assets may be determined by a fair value methodology or by applying an MVA to the book value. A state may want to consider whether an MVA is necessary, and if applicable, what an acceptable MVA formula is. The state should consider whether the Interim Values provide reasonable equity between the contract holder and the insurance company.

In addition, to make it clear that the Drafting Note consists of just one paragraph, we suggest that it be indented within the Text section.

The ACLI and the CAI appreciate the opportunity to comment on this exposure as you continue to finalize the AG.

Respectfully submitted,

AMERICAN COUNCIL OF LIFE INSURERS (ACLI)



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November 30, 2022

Mr. Weber and Mr. Serbinowski

As a retired regulatory actuary familiar with much of the ILVA product history, I appreciate the opportunity to comment on the exposure draft. Please accept my apologies if these issues have been fully discussed in the past.

1. Regarding the **Scope**, consider a drafting note clarifying whether a design with a 0% floor is within scope or, similar to the approach noted in the absence of an MVA, include a recommendation advising states to consider whether a 0% floor (or equivalent feature) is appropriate.
2. In the paragraph where a **methodology other than a Hypothetical Portfolio methodology** is first discussed, it isn't entirely clear how the company is to "**recognize initial option pricing parameters**." Taking volatility as an example, a simplistic interpretation might be to keep volatility inputs static over the Index Strategy Term. Perhaps a less simplistic interpretation would be to assume that the initial volatility surface does not change over the Index Strategy Term. Please consider whether language such as "**recognize initial option pricing market conditions**" would be less subject to misinterpretation.
3. Please consider expanding the **Effective Date** language. In addition to addressing **contracts**, it seems prudent to reference **Index Strategy Riders** explicitly. Also, consider whether there should be a final date by which all **Index Strategies** available for election must be compliant.

Thank you again for the opportunity to offer comments.

Tom Kilcoyne, FSA, Retired
tjmkilcoyne@verizon.net

Agenda Item 4

Consider Adoption of the Report of the
Valuation Manual (VM)-22 (A) Subgroup

December 11, 2022

From: Ben Slutsker, Chair
The VM-22 (A) Subgroup

To: Rachel Hemphill, Chair
The Life Actuarial (A) Task Force

Subject: The Report of the VM-22 (A) Subgroup to the Life Actuarial (A) Task Force

The VM-22 (A) Subgroup has been meeting roughly every other week since the beginning of April. The focus of calls thus far has been to address edits received on a July 2021-exposed draft of VM-22 principles-based requirements. There were nearly 400 comments in total, which were divided into four tiers based on priority. On October 4, the NAIC VM-22 Subgroup completed discussion on these comments and re-exposed another draft of the VM-22 principles-based requirements, with an exposure period ending on January 2, 2023. Several items were reflected in the newest exposure, some of which were developed subsequent to the NAIC National Summer Meeting. Some of the notable items are as follows:

- **Small Company Exemption** – Proposal to base the small company exemption off a threshold linked to prior-year fixed annuity reserves in the annual statement. The exemption would not apply to products with guaranteed living benefits.
- **Scope** – Principles describing which business is in scope of VM-22 requirements, including elements related to the applicability of nonforfeiture limits and a guarantee on the return of principal. The principles also clarify that index-linked variable annuities products are applicable to VM-21 requirements.
- **Allocation** – Modified approach to allocate statutory reserves in excess of the cash surrender value to all non-variable annuity products, including life contingent payouts, non-life contingent payouts, and accumulation annuities.
- **Longevity Reinsurance** – The Subgroup provided an update to the longevity reinsurance proposal, which now incorporates expenses in determining a k-factor to set premiums for the reserve calculation. In addition, longevity reinsurance would be treated as a separate “Reserving Category” for aggregation purposes.
- **VM-V** – A new section called “VM-V” would contain the current VM-22 requirements related to the maximum valuation rate for formulaic reserves on payout annuities. This may be applicable to payout annuity contracts issued prior to the PBR effective date, approved under the PBR exemption, or that pass the exclusion test.

After the re-exposure of the VM-22 principles-based requirements, the Subgroup has continued to meet to discuss the assumptions and methodology of a standard projection amount calculation. This has consisted of presentations made by Vincent Tsang on policyholder behavior assumptions and Seong-min

and the Society of Actuaries on mortality assumptions, following work completed by the respective NAIC drafting groups. These discussions have largely focused on the mechanics of the standard project amount, whereas the decision on whether to serve as minimum reserve floor or disclosure-only item will be determined by the associated LATF drafting group effort on this topic (which applies to both VM-21 and VM-22).

The Subgroup is also targeting a VM-22 field test for next year, which will be dependent on the progress of the Economic Scenario Generator project and accompanying field tests. This field test will be jointly led by the Academy, ACLI, and NAIC. If completed in 2023, this timing may lead to an effective date of 1/1/2025 (with a three year transition period for implementation), but the timeline will be revisited as progress in the Subgroup continues to develop.

The following pages contain a draft timeline for the NAIC VM-22 project and a summary key framework items discussed during the Subgroup calls during 2022.

PBR VM-22 Project Draft Timeline

Attachment Four
Life Actuarial (A) Task Force
12/11-12/22

EFFECTIVE DATE GOALS

1/1/2025	PBR VM-22 effective with three year transition period												1/1/2028								PBR VM-22 mandatory prospectively												
DRAFT TIMELINE	12 21	1 22	2 22	3 22	4 22	5 22	6 22	7 22	8 22	9 22	10 22	11 22	12 22	1 23	2 23	3 23	4 23	5 23	6 23	7 23	8 23	9 23	10 23	11 23	12 23	1 24	2 24	3 24	4 24	5 24	6 24	7 24	8 24
SPA DG - develop assumptions/methodology																																	
VM22 SG calls - Address comment letters and edits																																	
ESG Field Test #1																																	
VM-22 exposure (90 days preferable)																																	
SPA Discussions at VM-22 Subgroup																																	
NAIC National Meeting December 12 - 15, Tampa FL																																	
VM-31 SG meetings to prepare recommendation																																	
VM-22 Field Test Final exposure & preparations																																	
Discuss comments from Fall VM-22 draft exposure																																	
ESG Field Test #2 (timeline estimate)																																	
VM-22 and C3P1 Field Test																																	
Compile/analyze Field Test results																																	
Discuss field test results on public calls																																	
Resolve outstanding items and changes from field test																																	
LATF exposure and discussion of comments																																	
LATF Adoption																																	
A Committee Adoption																																	
NAIC Exec & Plenary Adoption																																	

NAIC VM-22 Drafting Discussion Log

#	Topic	Description	Date	Tier	Outcome
1	VM-22 Scope and Definitions	Keep current definitions for what is in-scope or focus only on non-variable annuities out of scope	4/13/2022, 10/4/2022	1	Exposed principles in Section II of the Valuation Manual, moved definitions to VM-01, and removed references to product names in VM-22 section 2
2	Reserving categories and aggregation	Determine Option 1 or Option 2 from exposed reserve category definitions	4/13/2022	1	Preliminary vote to pursue Option 1
3	Small Company Exemption	Fixed Annuity PBR exemption, similar to life PBR exemption for smaller carriers?	4/13/2022, 10/4/2022	1	Voted to pursue a "Fixed Annuity PBR Exemption"; Exposed ACLI proposed threshold based on prior year reserves, with some modifications
4	Reinvestment Guardrail	Keep VM-20/VM-21 mix, Academy mix, TX mix, or other? Wait until field test for final decision?	4/27/2022	1	Wait until observing impact in field testing results before voting on a reinvestment mix guardrail
5	Principles & Risks Across VM Chapters	Build one section in the Valuation Manual for principles that apply to VM-20, VM-21, and VM-22	4/27/2022	2	Openness to interested party proposals for a common "principles" section, but will focus on working through other VM-22 decisions before exploring
6	General Assumptions Section	Add a section to the VM-22 draft on general considerations and requirements for assumption	4/27/2022	2	Will include a proposed general assumptions section ("Section 13") from Texas, to be consistent with a recent APF adoption on VM-21
7	Transition Period	Permit 1) early adoption and 2) retrospective adoption to the start of the 3-year transition period?	4/27/2022	2	Decided to not pursue early adoption; VM-22 will say silent on retrospective adoption to start of transition period, similar to VM-20
8	Minimum Error for Index Credit Hedges	What should be the minimum breakage expense (i.e., error) for modeling hedges supporting index credits?	5/11/2022	2	Will wait until seeing field testing results before minimum threshold
9	Longevity Reinsurance	How should longevity reinsurance be defined and treat negative reserves/recurring premiums?	5/11/2022	2	Academy presented on longevity reinsurance and will provide a refined definition; New Jersey proposal is exposed for reserving requirements
10	Categories for VM-31 Disclosures	What level of granularity should be required for disclosing PBR reserves for product groups in VM-31?	5/11/2022	2	Will wait until seeing field testing results before determining granularity of disclosures
11	Exclusion Test: SPIA contracts	Allow SPIAs to have the option of PBR vs. pre-PBR valuation without an exclusion test?	6/1/2022	2	Voted to allow SPIAs automatically pass exclusion testing, subject to criteria around optionality and a liability duration threshold (TBD)
12	Exclusion Test: PRT Certification Method	Allow PRT contracts to use the Certification Method for exclusion testing?	6/1/2022	2	Do not allow PRT to undergo the Certification Method
13	Exclusion Test: Grouping	Group between products with significantly different risk profiles?	6/1/2022	2	Do not allow grouping between products with significantly different risk profiles, consistent with VM-20 and TDI's proposal
14	Exclusion Test: Future Premiums	For the stochastic exclusion ratio test, determine whether to include future premiums	6/1/2022	2	Include future premiums in the numerator, but only benefits and expenses in the denominator, consistent with VM-20.
15	Exclusion Test: Deterministic Reserve	To pass the deterministic test, does the company need to pass or disclose 16 scenarios with baseline mortality?	6/1/2022	2	Require passing the ratio test for 16 economic scenarios under 100% of the anticipated experience mortality assumption
17	Import Reinsurance Wording from VM-20	Import VM-20 wording on incorporating contractual or additional characteristics for modeling reinsurance?	6/14/2022	2	Include proposed wording from VM-20
18	Fair Value Certification	Include fair value certification, similar to existing VM-21 requirement?	6/14/2022	2	Include fair value certification disclosure for non-index credit hedging programs
16	PRT Mortality	Permit PRT mortality with limited credibility to follow a third-party provider instead of an industry table?	6/14/2022	2	Voted in favor of using a prescribed table; do not permit a third party table upon limited credibility
19	Allocation Method	Determine Option 1 or Option 2? Wait until observing field test results before deciding?	9/21/2022	2	Using an ACLI proposal based on Option 2 for the VM-22 exposure, which addresses a tax issue for non-life contingent annuities

NAIC VM-22 Drafting Discussion Log

#	Topic	Description	Date	Tier	Outcome
20	Working Reserve	Use a working reserve concept to serve as a floor for contracts without cash surrender value?	6/29/2022	2	Academy will work on a working reserve concept for contracts without cash surrender value, though may be little impact due to reserving categories
21	Grouping for Fund Value Depletion	Appropriate reserving category for deferred annuities with GMWBs/GMIBs that have depleted fund value	6/29/2022	2	Decided to leave these contracts in the "Payout Reserving Category" for now, but will add a drafting note to solicit feedback an optional approach
22	RBC Guidance Note	Retain the guidance note in VM-21 that discusses the relationship between reserves and RBC?	8/17/2022	3	ACLI will provide the full text for the Subgroup to consider
23	Principle 1	Should the edits to Principle 1 for VM-22 be incorporated into VM-21 as well?	8/17/2022	3	For now, will plan to focus only on VM-22, as LATF can explore the other VM chapters upon the Subgroup's recommendation of the VM-22 draft to LATF
24	Principle 2	Does setting an SR to be reasonably conservative over a span of economic cycles contradict other principles?	7/13/2022	3	ACLI will provide the full text for the Subgroup to consider
25	Aggregation Limits	Guidance note stating aggregation may not be possible for experience rated group and reinsurance treaties	7/13/2022	3	Will include this text in the VM-22 draft
26	Principle 3	Delete "Generally, assumptions are to be based on the conservative end of the confidence interval"?	7/13/2022	3	Retain this language
27	Principle 5	Delete sentence about the principle to not reduce the reserve unless reducing the risk?	7/13/2022	3	Retain this language
28	Risks not reflected	Retain or remove the list of "Risks not reflected" in VM-22?	7/13/2022	3	Remove subsection 3, but keep section 4 and update title to include "risks not reflected"
29	Separate Account References	Recommendation to delete all references to "separate accounts" in VM-22	7/13/2022	3	For now, will keep references to "separate accounts" and will add a drafting note to solicit feedback
30	Combination Risks	Proposal to delete "Risks modeled in the company's risk assessment processes that are related to the contracts"	7/13/2022	3	Retain this language
31	Immaterial Risks	Recommendation to delete sentence about not reflecting risks that do not materially affect the reserves	7/13/2022	3	Remove this language
32	Liquidity Risk	Refer to liquidity risks for "run on bank" or "sudden and significant levels of withdrawals and surrenders"	7/13/2022	3	Use the "run on bank" description
33	Significant Future Reserve Increases	Strike this item from the list of risks not reflected?	7/13/2022	3	Retain this language
34	Fixed Annuity Definition	Need to define a "fixed annuity"?	7/13/2022	3	Will replace all references to "fixed annuity" with "non-variable annuity"
35	Longevity Swaps	Are these contracts included in the definition of PRT?	7/13/2022	3	As a follow-up, Academy will include reviewing the definition of PRT when revisiting the definition of longevity risk
36	CSV and GMDB definitions	Retain VM-21 definitions for "cash surrender value" and "guaranteed minimum death benefits"?	7/13/2022	3	Will not retain the definition for "cash surrender value" and will move the "guaranteed minimum death benefits" to VM-01
37	Assumed reserve level for RBC	Question whether CTE70 was the assumed level for reserves upon determining RBC	7/19/2022	3	Question relates to RBC, and therefore did not discuss as part of the VM-22 Subgroup
38	VM-23	Consider reinstating "VM-23" to avoid confusion around the where exemptions/exclusions point to vs. PBR?	7/19/2022, 10/4/2022	3	Exposed moving the current VM-22 requirements (previously Section 14 in the VM-22 draft) to a separate "VM-V" section in the Valuation Manual.

NAIC VM-22 Drafting Discussion Log

#	Topic	Description	Date	Tier	Outcome
39	Pre-Reinsurance	Request to develop further guidance around pre-reinsurance	7/19/2022	3	ACLI will consider whether to provide suggested language to clarify pre-reinsurance cash flow requirements in response to the next exposure
40	Deterministic Reserve	Use this term for the single scenario reserve calculated upon passing the deterministic exclusion test?	7/19/2022	3	Will replace "scenario reserve" with "deterministic reserve". Also added "aggregate minimum reserve" as the term for the final reserve
41	Deterministic Certification Option	Keep this terminology or change?	7/19/2022	3	Given that the term "deterministic reserve" will not be used, decided to keep this terminology
42	Stochastic Exclusion Test	Change Section 3.E to "Stochastic Exclusion Test" header?	7/19/2022	3	Accepted comment and made change to update header
43	Guidance Note for Exclusion Test	Remove the guidance note that clarifies that AG33/AG35 may be used upon passing the exclusion test	7/19/2022	3	Decided to remove this guidance note
44	Prudent Estimate Assumptions	Move Section 3.G to Section 4 of the document?	7/19/2022	3	Subgroup decided to hold off for now
45	Simplifications	Port over VM-21 Section 3.H on simplifications, approximations, and modeling efficiency techniques?	7/19/2022	3	Subgroup agreed to add this wording for simplifications, to be consistency with VM-21
46	Review experience every three years?	Make this a requirement for the qualified actuary?	7/19/2022	3	Subgroup agreed to include a requirement to review experience every three years
47	Simplification example for the SPA	Add an example of a simplification for the SPA upon development	7/19/2022	3	Delete for now and revisit upon development of the SPA
48	Stochastic Mortality	Consider including stochastic mortality in the stochastic reserve for longevity reinsurance?	7/19/2022	3	Subgroup agreed to port over VM-20 language on stochastic modeling when static prudent estimates are not appropriate for liability assumptions
49	MVA Guidance Note	Is the market value adjustment guidance note from VM-21 still appropriate for VM-22?	8/17/2022	3	Subgroup decided to remove guidance note
50	Hedging Reorganization	Move parts of Section 4.A.4 to Section 9, which covers hedging	8/17/2022	3	Open to comments on restructuring this section during the next exposure
51	Future Hedging Programs	Align VM-22 draft to be consistent with APF 2020-12 adopted edits for VM-21?	8/17/2022	3	Subgroup decided to be consistent with APF 2020-12 language
52	Index Credit Hedge Margin	Does this reflect both model risk and real-world error? How does stress testing justify the error?	8/17/2022	3	Wording is added to state that both sources of error are reflected in the margin; in addition the reference to stress testing will be removed
53	Margin on Hedging Paragraph	Remove this paragraph if included in another section, even upon edits from TDI/OPBR?	8/17/2022	3	Open to comments on restructuring this section during the next exposure
54	Revenue Sharing	Is the section of revenue sharing applicable to non-variable products?	8/17/2022	3	Decided to retain this section
55	Projection Period	Use consistent language with VM-20?	8/17/2022	3	Kept the first sentence to be consistent with VM-20, but removed the second proposed sentence, since now the approximation section has been added
56	PIMR	Include pre-tax IMR in VM-22?	8/17/2022	3	Refer to LATF
57	MVA on CSV Floor	Apply the market value adjustment factor to the cash surrender value reserve floor for applicable products?	9/7/2022	3	Will not add language applying the MVA to the CSV floor; instead new language states the MVA shall only apply when assets are held at market value

NAIC VM-22 Drafting Discussion Log

#	Topic	Description	Date	Tier	Outcome
58	Consistency with Managed Business	Modify NAER requirement to have assets modeled in a manner consistent with how business is managed?	8/24/2022	3	ACLI will consider whether to recommend specific edits related to this comments
59	Limits on NAER	Define a specific cap or floor for the NAER instead of saying it should not be "unreasonably high"?	8/24/2022	3	Subgroup decided to modify language to change "unreasonably high" to "extremely positive or negative", which covers both directions
60	Reserve Floor	NY comment on using CARVM as a reserve floor	8/24/2022	3	Will hold off on discussing the standard projection amount until after the other sections of VM-22 are re-exposed, in Fall of 2022
61	Longevity Reinsurance & SPA	Require the k-factor approach to address negative reserve issue for longevity reinsurance in SPA?	8/24/2022	3	Will hold off on discussing the standard projection amount until after the other sections of VM-22 are re-exposed, in Fall of 2022
62	Standard Projection Amount	Equitable comment on supporting SPA with company assumptions insignificant risk factors	8/24/2022	3	Will hold off on discussing the standard projection amount until after the other sections of VM-22 are re-exposed, in Fall of 2022
63	Exclusion Testing & SPA	Modify exclusion test to address the standard projection amount?	8/24/2022	3	Will hold off on discussing the standard projection amount until after the other sections of VM-22 are re-exposed, in Fall of 2022
64	Hedging eligibility for exclusion testing	Refine wording around the restriction for not allowing blocks with hedging programs to use exclusion testing?	8/24/2022	3	Academy will suggest possible disclosures to better identify "hedging programs solely supporting index credits"
65	Mortality Stress Tests	If using the NY7 for the Certification Method, add mortality stress scenarios?	8/24/2022	3	Added language for mortality stress scenarios if using the NY7 Certification Method
66	Mortality Shock	Include the mortality shock for the ratio test based on the company materiality standard if more restrictive?	8/24/2022	3	No objections to modifying the stochastic exclusion ratio test to use the company materiality standard if more restrictive
67	Baseline Mortality Test	Include the baseline mortality test in determining the exclusion test?	6/1/2022	3	Subgroup agreed to include the baseline mortality scenario for the stochastic exclusion ratio test
68	Permutations	Include note on number of exclusion test permutations for clarity?	6/1/2022	3	Updated guidance note to include the number of permutations, inclusive of testing economic scenarios under the mortality baseline
69	Non-Proportional Reinsurance	Add definition for non-proportional reinsurance	8/24/2022	3	Decided to add a guidance note that references the APPM for clarification on the non-proportional reinsurance
70	SERT if Other Tests Fail	Prohibit passing the SERT if the demonstration test fails?	8/24/2022	3	Added language to prohibit passing the stochastic exclusion ratio test if the demonstration test fails
71	Demonstration Test	Remove options in 1.a and 2.a?	8/24/2022	3	ACLI will take back and decide whether to recommend removing the demonstration test altogether, or only certain components/language
72	Deterministic Exclusion for SPA	Consider SPA for the deterministic exclusion test	8/24/2022	3	Will hold off on discussing the standard projection amount until after the other sections of VM-22 are re-exposed, in Fall of 2022
73	Deterministic Exclusion Scenario	Is the deterministic certification intended not be applicable for blocks with index credit hedging?	9/7/2022	3	Intent is for the deterministic certification option to not apply to also not apply to hedging programs supporting index credits; no changes made
74	SPIA Guidance Note	Remove guidance note specifying that the deterministic exclusion test applies to SPIAs?	9/7/2022	3	No objections to removing guidance note
75	Delta Hedging	Replace or remove example about delta hedging for VM-22?	9/7/2022	3	Remove example referring to delta hedging
76	Non-Elective Benefits	Remove guidance note to limit modeling non-elective benefits after CSV is depleted if reducing reserves?	9/7/2022	3	No objections to language, but removed guidance note because the similar wording already existed in the paragraph above

NAIC VM-22 Drafting Discussion Log

#	Topic	Description	Date	Tier	Outcome
77	100% Policyholder Efficiency	Assuming 100% policyholder inefficiency contradicts VM Section II 6.H.2, so revise VM Section II?	9/21/2022	3	Replace VM Section II language with the principle that efficiency increases over time
78	NGE Board of Directors	Comment that only allowing NGE exclusion if approved by the Board does not necessarily seem reasonable	9/21/2022	3	Removed this language from the draft, but added a drafting note to inquire on why potential language may be appropriate
79	Unsupported Judgement	Comment to remove the reference to using "unsupported actuarial judgement" from Section 11	9/21/2022	3	No objections to removing this language
80	Mortality and Reinsurance	Does Section 11.A require evaluation of a plus vs. minus segment differently for pre- vs. post reinsurance?	9/21/2022	3	This language is not included in VM-21 and was removed from the VM-22 draft
81	Mortality Improvement	Is the mortality improvement requirement intended to apply to all mortality assumptions in VM-22?	9/21/2022	3	Addressed by clarifying that this section only applies to industry mortality assumptions
82	Option 1 DR vs SR	Require separate allocation for DR vs. SR for allocation Option 1 (Section 13)?	9/21/2022	3	Agreed to add wording to clarify the allocation between the DR and SR should be separate
83	Option 2 for Direct Iteration Method	Option 2 is not designed to work for the Direct Iteration Method	9/21/2022	3	ACLI will consider adding language to address the direct iteration method
84	Option 2 Single Scenario	Could produce unstable allocation when products with different risk profiles are aggregated for PBR	9/21/2022	3	Reserving categories will require separate allocation for payouts and accumulation-based annuities
85	Index-linked annuity	This term is used in the proposed Section II, Subsection 2 draft, but is not defined	10/4/2022	3	Implicitly addressed through the proposed set of principles for scope of VM-21 vs. VM-22 in Section II of the Valuation Manual
86	Modified Guaranteed Annuities (MGAs)	VM-21 has language that exempts contracts falling under scope of MDL-255; does this contradict Section II edits?	10/4/2022	3	Implicitly addressed through the proposed set of principles for scope of VM-21 vs. VM-22 in Section II of the Valuation Manual

Draft: 11/30/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
November 30, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met Oct. 12, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Elaine Lam and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA).

1. Exposed Academy Proposal for SPIA Exclusion Testing

Chris Conrad (American Academy of Actuaries – Academy) walked through proposed language (Attachment 1) for VM-22, Requirements for Principle-Based Reserves for Non-Variable Annuities that would allow for single premium immediate annuities (SPIAs) and certain other products to be allowed to use pre-Principle-Based Reserves (PBR) valuation requirements without applying for the Annuity PBR Exemption or performing stochastic exclusion testing. Slutsker asked what the rationale was for the Academy going with a volume of business threshold versus a durational threshold for the proposed exclusion language. Conrad noted a desire for consistency and explained that the average duration of a business line could shift around over time and therefore it would be possible to be eligible for exclusion one year and ineligible the next.

Leung noted that the proposed language covered more than just SPIAs and asked whether it would make sense to rename it to reflect the broader scope of payout annuities. Conrad agreed that it made sense to rename. Slutsker noted that the title could be changed to payout annuity benchmark as part of the exposure. Hemphill asked why the proposed language would allow for automatic exclusion to be granted rather than requiring approval by a domiciliary commissioner. Conrad noted that his group was charged with determining an automatic exclusion process for payout products and that they were trying to avoid optionality. Hemphill responded that because the proposed language required judgement due to the reference to the materiality of policyholder options that she was uncomfortable with allowing companies to exclude business without approval of the domiciliary commissioner. Slutsker suggested including an additional condition in exposure of the proposed exclusion language to require approval from the domiciliary commissioner.

Leung made a motion, seconded by Yanacheak to expose the Academy's proposed payout annuity language for 60 days with two edits; 1) changing the wording to note that the language applies to the broader payout annuity class of products rather than just SPIAs, and 2) including an additional condition to require approval from the domiciliary commissioner. The motion passed without objection.

2. Heard Recommendation on SPA Expense Assumptions

Ken Lombardo (Willis Towers Watson – WTW) presented a recommendation (Attachment 2) for standard projection amount (SPA) expense assumptions. Dan Kim (American Equity) asked how much overhead was allocated in the expense assumptions. Lombardo noted that a bottom-up analysis was not performed, and that the expense assumptions would not cover much overhead at a typical company. Tsang asked if the recommended expense assumptions could be considered a lower bound. Lombardo said that the recommended expense assumptions were more consistent with a guardrail approach, rather than a fully allocated approach that a company would use in their stochastic calculations. Chupp asked about the rationale for the inflation assumption. Lombardo noted that it made sense to build an expense assumption that appropriately accounted for inflation, however, administrative expenses were not a very material part of the valuation.

Hemphill noted that she would prefer expense assumptions that reflect average industry fully allocated expenses for a better comparison to the assumptions used in the stochastic reserve calculations. Slutsker noted that this is something that could be revisited later, as these expense assumptions would not be exposed today. Connie Tang (Prudential) asked whether the percent of account value administrative expense assumption from VM-21, Requirements for Principle-Based Reserves for Variable Annuities would apply in the recommendation. Lombardo said that they would go back and look at that assumption, but the percent of account value feature could help with keeping the assumption current.

Having no further business, the VM-22 (A) Subgroup adjourned.

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Draft: 11/30/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
October 27, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met Oct. 27, 2022. The following Subgroup members participated: Ben Slutsker, Chair, and Lei Rao-Knight (CT); Mike Yanacheak (IA); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA)

1. Heard a Presentation on VM-22 SPA Mortality Assumptions

Eom said that the VM-22 Standard Projection Amount (SPA) Mortality Assumption Drafting Group had two objectives: 1) to develop an initial set of mortality adjustment factors to be used in the VM-22, Requirements for Principle-Based Reserves for Non-Variable Annuities, field test; and 2) to determine if a new set of best estimate mortality tables need to be developed based on recent experience. Joel Sklar (Society of Actuaries—SOA) then delivered a presentation (Attachment 1) on the SOA's recommended mortality adjustment factors. Carmello asked if the same deferred annuity mortality would be used to value death benefits and annuitizations. Sklar noted that for death benefits, mortality is not a very critical assumption. However, he said the mortality used for living benefits and annuities would be consistent with payout annuities.

Tsang referred to the payout annuity mortality adjustment factors under age 60 and asked whether the factor of 150% would reduce the margins by too much for the affected ages. Sklar noted that the factors over age 60 were much more material. Alice Fontaine (Fontaine Consulting LLC) asked whether the factors would be applied to the mortality table and then the final mortality rates would be graduated to achieve a smooth progression from year to year. Sklar said that graduation would not be employed before age 50 due to a lack of materiality and credibility, but some smoothing would be done for age 50 and above. Slutsker noted that for guaranteed living benefit mortality, the SOA was recommending a ratio based on variable annuity experience and asked if the group had thought about alternative approaches given potential concerns with the appropriateness of the variable annuity experience to fixed annuities. Sklar said that there was active discussion on this topic, but the group did not find any better methodology to their recommendation. Sklar noted that more data would be needed on fixed annuities to be able to develop an assumption based on fixed annuity experience.

Having no further business, the VM-22 (A) Subgroup adjourned.

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Draft: 11/30/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
October 12, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met Oct. 12, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Elaine Lam and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA).

1. Heard a Presentation on VM-22 SPA PB Assumptions

Tsang walked through a presentation (Attachment 1) of the activities of the VM-22 Standard Projection Amount (SPA) Policyholder Behavior (PHB) Assumptions Drafting Group. Carmello asked whether experience from the 1980s and 1990s was considered when determining the dynamic lapse assumptions. Tsang noted that the Drafting Group considered that data but felt that it was too outdated to be used in the development of the current dynamic lapse assumption. John R. Miller (American Equity Investment Life Insurance Company) said sensitivity analysis could be provided on the dynamic lapse formula to illustrate how the results could change with different lapse parameters.

Brian Bayerle (American Council of Life Insurers—ACLI) asked for a rationale behind the approach to developing PHB assumptions using the VM-21, Requirements for Principle-Based Reserves for Variable Annuities, SPA as a starting point and blending in new experience data. Tsang noted that the Drafting Group was looking for consistency with VM-21. Carmello noted that the withdrawal assumptions are based on fixed-indexed annuities, and he asked if there is any plan to get data for vanilla fixed annuities. Tsang noted that data for vanilla fixed annuities should be available by the end of 2022, and separate withdrawal assumptions may be developed between fixed-indexed annuities and vanilla fixed annuities.

Carmello noted that for multi-year guaranteed annuities (MYGAs), if the market value adjustment (MVA) is based on treasury rates, then it may not be effective to mitigate disintermediation risk during a time when corporate spreads are increasing; therefore, should be subject to the dynamic lapse formula. Miller noted that he agrees that to the extent the MVA is not effective, MYGAs should be subject to the dynamic lapse formula.

Having no further business, the VM-22 (A) Subgroup adjourned

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Draft: 11/22/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
October 4, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met Oct. 4, 2022. The following Subgroup members participated: Ben Slutsker, Chair, and Lei Rao-Knight (CT); Mike Yanacheak (IA); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA)

1. Discussed Including the Fixed Annuity PBR Exemption in the VM-22 Exposure

Brian Bayerle (American Council of Life Insurers—ACLI) provided a summary of the *Fixed Annuity PBR Exemption Draft* (Attachment 2) being considered for inclusion in *VM-22 PBR: Requirements for Principle-Based Reserves for Non-Variable Annuities* draft (VM-22 Draft) (Attachment 1). Slutsker noted that some of the larger considerations included the basis for defining the threshold for exemption, the level of the threshold, and certain types of guarantees that would be ineligible for exclusion. Chupp noted his concern with the threshold being based off of reserves net of reinsurance, stating that a company could avoid the requirements by entering into reinsurance agreements. In addition, some Subgroup members commented that the proposed threshold of \$3 billion of prior year reserves on non-variable annuities seemed fairly high and that an open question for the exposure should be whether a lower figure, such as \$500 million, is more appropriate. After much discussion, the Subgroup decided to include the fixed annuity principle-based reserving (PBR) exemption language in the next exposure of the VM-22 Draft, along with guidance notes to ask for feedback on some of the key considerations for the next exposure of the VM-22 Draft.

2. Discussed Revised Scope and Definitions Sections and the Inclusion of a VM-V Section in VM-22 Exposure

Slutsker discussed revisions to the VM-22 Draft (Attachment 1), including: 1) the addition of principles to the scope; 2) additional definitions in VM-01, Definitions for Terms in Requirements; and 3) moving the Statutory Maximum Valuation Interest Rates for Income Annuities to a new VM-V section. Hearing no objections from the Subgroup to the revisions, they will be included in the next exposure of the VM-22 Draft.

3. Discussed Longevity Reinsurance

Slutsker noted that the Subgroup had received comments on a June exposure of a proposal for longevity reinsurance (Attachment 3). Brent Dooley (American Academy of Actuaries—Academy) summarized the three major points of the Academy's comment letter (Attachment 4): 1) the Academy does not support the establishment of a longevity reinsurance reserve category, and instead favors more of a principle-based approach; 2) the Academy would favor a gross premium approach and flooring reserves at zero at the category level rather than contract-level flooring of reserves; and 3) if the k-factor approach is used, it should be based off of current prudent estimate assumptions as opposed to locked in assumptions. Bayerle said that the ACLI largely agrees with the Academy's comments (Attachment 5). Tricia Matson (Risk & Regulatory Consulting—RRC) summarized her comment letter (Attachment 6) by noting support for the k-factor approach.

Eom thanked the commenters for their letters and noted that the k-factor approach could be consistent with the principle-based statutory framework that includes conservatism. She said that she is open to approaches that would allow for the assumptions behind the k-factor to be unlocked. However, she said this could present resource issues for some companies. John Robinson (Society of Actuaries—SOA) noted that some commenters seemed to

indicate that the text of the VM-22 Draft did not align with the principles that were laid out and asked if state insurance regulators would consider removing principles where there was a lack of alignment. Bayerle agreed with Robinson's comments but did not think it would be necessary to change the principles for the next exposure of the VM-22 Draft. Eom said that additional changes in this direction could be considered in the next exposure.

4. Exposed the VM-22 Draft

Yanacheak made a motion, seconded by Leung, to expose the VM-22 Draft for a 90-day public comment period ending Jan. 2, 2023. The motion passed unanimously.

Having no further business, the VM-22 (A) Subgroup adjourned

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Draft: 11/15/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
September 21, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met Sept. 21, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Elaine Lam and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); and Craig Chupp (VA)

1. Reviewed “Tier 3” Comments in the VM-22 Draft

Slutsker continued the discussion from the Subgroup’s prior meeting of the remaining “Tier Three” comments on the draft of VM-22, Requirements for Principle-Based Reserves for Non-Variable Annuities (VM-22 Draft) (Attachment 1). He noted a comment from the American Council of Life Insurers (ACLI) that discussed an apparent inconsistency between the policyholder efficiency assumption that allowed for less than 100% efficiency in Section 10.D.8 and the language in Section 6.H.2. that implied 100% efficiency. He said that additional language on policyholder efficiency existed in VM-21, Requirements for Principle-Based Reserves for Variable Annuities, that specified that increasing levels of policyholder efficiency should be assumed over time. Hemphill said that she supports eliminating the contradiction on policyholder efficiency in the VM-22 Draft, being consistent with the efficiency language in other sections of the *Valuation Manual*, and including an example of efficient policyholder behavior. The VM-22 Draft was updated with that direction.

Slutsker introduced a comment from the Texas Department of Insurance (TDI) in Section 10.I.5.b of the VM-22 Draft that questioned why non-guaranteed elements can be excluded if authorized by the board. Hemphill asked the Subgroup if anyone had background on the intention of the language. Hearing none, the Subgroup decided to remove the language but add a drafting note to inquire about the purpose of the language in the VM-22 Draft.

Slutsker said that the TDI had made a comment in Section 11.A.1 of the VM-22 Draft that language should be deleted that referred to unsupported actuarial judgment. Hemphill noted that actuarial judgment is not arbitrary and should always be supportable. Hearing no objections to striking the language, it was removed from the VM-22 Draft.

Slutsker introduced a comment in Section 11.A.4 of the VM-22 Draft from the TDI that questioned how to interpret language that would require risk reclassification for a segment depending on whether it was gross or net of reinsurance. After discussion, the Subgroup decided to remove the language as it was not consistent with VM-21.

Slutsker said that the American Council of Life Insurers (ACLI) commented on Section 11.C.2 of the VM-22 Draft that mortality improvement should be consistent with the underlying tables used based on available experience and subject to appropriate guardrails. He also noted that the TDI made a comment that Section 11.C.2 should only refer to industry mortality. He asked if the ACLI had any objection to the section only referring to industry mortality. Brian Bayerle (ACLI) agreed that it made sense that this section would only refer to industry mortality but would see if the ACLI had any additional comments after reviewing the exposure.

2. Discussed Allocation for Non-Life Contingent Contracts

Barbara Gold (Prudential Financial) walked through the technical specifics of the allocation methodology. Slutsker noted that there were originally two options for the allocation in a prior exposure: 1) use the same language as VM-21 where allocation was based on a risk measure for a given contract; and 2) an allocation based on an

actuarial present value (APV). Gold confirmed that the latest language was consistent with option 2 above using APVs. Hemphill noted a concern with different APV definitions in the language between contracts that take the deterministic certification option versus contracts where a stochastic reserve (SR) is calculated. Gold committed to adding language to make it clear that the allocation is intended to be done separately for the deterministic reserve and stochastic reserve.

Slutsker noted a comment that the TDI brought up about how to address contract reserves that are calculated using the direct iteration method. Gold noted that companies using the direct iteration method would need to calculate a net asset earned rate for the scenario with the reserve value closest to, but not greater than, the SR. Hemphill asked that specific instructions be added to the language to specify the allocation methodology for contracts using the direct iteration method.

Slutsker inquired whether any Subgroup members had concerns with moving forward with the allocation language. Hearing no objections, the language is planned to be added to the VM-22 Draft.

3. Discussed Fixed Annuity PBR Exemption

Bayerle noted that the Fixed Annuity Principle-Based Reserving (PBR) Exemption (Attachment 3) is designed to mirror the Life PBR Exemption, with most of the language corresponding line for line. However, Bayerle said that there was some language that was added as requested by state insurance regulators during the Subgroup's April 13 meeting. He said that instead of premiums, the Fixed Annuity PBR Exemption is based off of reserves, with a threshold of \$3 billion and \$6 billion of prior year reserves for individual entities and groups, respectively. Chupp noted that a large difference between the Life PBR Exemption and the current Fixed Annuity PBR Exemption is that the Life PBR Exemption was gross of reinsurance, where the Fixed Annuity PBR Exemption is on a net basis. The Subgroup agreed to start with that discussion during its next meeting.

Having no further business, the VM-22 (A) Subgroup adjourned

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Draft: 10/6/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
September 7, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met Sept. 7, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); Nicole Boyd (KS); William Leung (MO); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA)

1. Reviewed “Tier 3” Comments in VM-22 Draft – Sections 7–11

Mr. Slutsker noted that the purpose of the meeting was to continue to get through the remaining “Tier Three” comments (Attachment 2). He said that the “Tier Four” comments would not require discussion of the Subgroup given that these comments are largely editorial in nature. He noted that the goal of the Subgroup is to re-expose a draft of VM-22 with the bulk of the comments addressed by Oct. 25.

Mr. Slutsker addressed a comment in Section 4.B.1.b relating to the treatment of a market value adjustment (MVA) when applying a cash surrender value (CSV) floor to the scenario reserve. Ms. Hemphill noted an existing guidance note in VM-21, Requirements for Principle-Based Reserves for Variable Annuities, that specified that the application of an MVA when determining the CSV floor must be consistent with how the annual statement value of assets are treated. Mr. Carmello noted that in New York, companies can hold assets that support MVA annuities at market value or book value and that the inclusion of an MVA in the CSV floor should be consistent with how the assets are held on the annual statement. Mr. Leung noted that sometimes the MVA formula does not perfectly track with the market value of the assets. Mr. Carmello replied that it would add too much volatility in the reserves to not apply the MVA to the CSV floor in a consistent manner with how the assets are held. Mr. Slutsker then called for a voice vote to determine whether to: 1) remove the language that specified that the MVA should always be applied to the CSV floor and add a sentence specifying that the MVA should be applied consistently with how the assets are valued; or 2) keep the existing language. The Subgroup unanimously decided to go with the first option. Mr. Serbinowski asked for a disclosure item for companies to report real CSV compared to the market value of their assets.

Mr. Slutsker then discussed a comment in Section 7.E.1.b on whether the deterministic certification option (DCO) was meant to exclude contracts that are supported by index hedging, such as fixed-indexed annuities. Chris Conrad (American Academy of Actuaries—Academy) noted that the intention of the drafters was to exclude these contracts from being able to use the DCO.

Mr. Slutsker said that the Texas Department of Insurance (TDI) had made a comment to delete the guidance note at the end of Section 7.E.2 that indicated the DCO was intended for single premium immediate annuities (SPIAs) or similar products. Ms. Hemphill noted the potential that the DCO would not be appropriate for some SPIAs and that it could be appropriate for other products. Mr. Slutsker said the guidance note would be deleted from the draft.

Mr. Slutsker said that the TDI comment on Section 9.B.4 was to understand if a better hedging strategy example could be added to the guidance note for greater relevance to VM-22. He said that the hedging example will be removed from the guidance note in the next exposure.

Mr. Slutsker said that the TDI had asked about the source of a guidance note under Section 10.D.2.c relating to the incidence rates to use for certain non-elective benefits. Mr. Conrad noted that this language came from *Actuarial Guideline XXXIII—Determining CARVM Reserves for Annuity Contracts with Elective Benefits* (AG 33). This language was later edited and brought into Section 10.D.2.c, and the guidance note was deleted. The draft language remained unchanged after the Subgroup’s discussion.

Mr. Slutsker said that the American Council of Life Insurers (ACLI) commented that the language in Section 10.D.8 contradicted Section 6.H.2, which prescribes 100% efficient policyholder behavior, and that the language in Section 6.H.2 should be aligned with the language in Section 10.D.8. Mr. Conrad noted that the Academy agreed with the ACLI’s comment and suggested either striking the contradictory language in Section 6.H.2. or replacing with: “Benefit usage may be assumed even if the policyholder has not previously taken any action to use the benefit.” The Subgroup did not decide on a direction for the language before the meeting ended, and it agreed to resume the discussion during its next meeting.

Having no further business, the VM-22 (A) Subgroup adjourned

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Draft: 9/7/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
August 24, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met Aug. 24, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Lei Rao-Knight (CT); Mike Yanacheak (IA); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); and Tomasz Serbinowski (UT).

1. Reviewed the VM-22 Project Timeline

Mr. Slutsker reviewed the VM-22 project timeline and comment log (Attachment 1). He said the Subgroup will continue to work through the remaining comments over the next few meetings. He said the longevity risk reinsurance exposure will be addressed after completion of the comment log.

2. Discussed Tier Three Comments in the VM-22 Draft

The Subgroup continued to review tier three comments on the proposed VM-22 framework (Attachment 2). Mr. Slutsker said the Texas Department of Insurance (TDI) comment on the final paragraph of Section 4.B.1 will be edited to clarify that the scenario reserve floor should be no lower than the sum of the cash surrender value and the market value adjustment (MVA).

Mr. Slutsker asked the American Council of Life Insurers (ACLI) whether its comment on Section 4.B.3.a is asking for a change in the wording of the paragraph. Brian Bayerle (ACLI) agreed to discuss the issue with ACLI members.

Mr. Slutsker said that changes were made to Section 4.B.3.b.iv in response to comments from the TDI and the California Department of Insurance (CDI) suggesting that the phrase “unreasonably high” be replaced, which defined guardrails.

Mr. Slutsker said discussion of the comments on Section 6 related to the standard projection amount (SPA) will be deferred until there is a Subgroup meeting committed solely to discussion of the SPA.

Mr. Slutsker said the TDI comment on Section 7.A.1.c suggests defining the phrases “associated with the contracts” and “supporting the contracts.” The comment noted that if the phrases are equivalent, the Subgroup should be consistent in using one phrase or the other. He said the TDI comment also suggests that the term “solely supporting” be defined. Chris Conrad (American Academy of Actuaries—Academy) said the Academy will review the wording of the section.

Mr. Slutsker said new language was added to Section 7.A.1.d that lists criteria for passing the stochastic exclusion test. Mr. Conrad said the Academy is considering what duration might be a suitable cutoff to use in the test.

Mr. Slutsker reviewed the TDI comment suggesting that for the stochastic exclusion test (SET) certification method demonstration in Section 7.B.3.a, the alternative use of the New York seven economic scenarios (ESGs) should be conducted under each of the three mortality adjustment factors in Section 7.C.1. He said the TDI also commented on the need to reference a company’s materiality standard in the stochastic exclusion ratio test (SERT) demonstration in Section 7.C.1. He said the language proposed by the TDI will be included in the next exposure.

Mr. Bayerle said the ACLI comment in Section 7.C.3 asks for clarification of the term “non-proportional reinsurance” in either the Definition section or in a guidance note. Mr. Slutsker asked if examples could be provided in lieu of a definition. Sheldon Summers (Claire Thinking) said that years ago during discussions related to revising the *Life and Health Reinsurance Agreements Model Regulation* (#791) to address the application of yearly renewable term insurance to group life contracts, it was decided that experience refunds would not cause proportional reinsurance agreements to become nonproportional. Mr. Summers suggested that any examples should include a reference to that decision. Reggie Mazyck (NAIC) suggested that a guidance note pointing to the question and answer (Q&A) document supporting Model #791 reference could satisfy Mr. Summers’ request. Robin Marcotte (NAIC) agreed to search for the proper reference.

Mr. Bayerle said the ACLI will review its comment on Section 7.D.1.a and Section 7.D.2.a to determine whether its intent is to suggest the deletion of the two paragraphs or the entire Section 7.D. Mr. Slutsker suggested the ACLI consider whether a guidance note explaining the two paragraphs would be a sufficient alternative.

Having no further business, the VM-22 (A) Subgroup adjourned.

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Draft: 9/7/22

Valuation Manual (VM)-22 (A) Subgroup
Virtual Meeting
August 17, 2022

The VM-22 (A) Subgroup of the Life Actuarial (A) Task Force met Aug. 17, 2022. The following Subgroup members participated: Ben Slutsker, Chair (MN); Ahmad Kamil, Elaine Lam, and Thomas Reedy (CA); Mike Yanacheak (IA); Vincent Tsang (IL); Nicole Boyd (KS); William Leung (MO); Seong-min Eom (NJ); Bill Carmello and Amanda Fenwick (NY); Rachel Hemphill and Yujie Huang (TX); Tomasz Serbinowski (UT); and Craig Chupp (VA).

1. Reviewed the VM-22 Project Timeline

Mr. Slutsker reviewed the VM-22 project timeline and comment log (Attachment 1). He said the target effective date is January 2025. He noted that the timing of the VM-22 field test is dependent upon the timing of the economic scenario generator (ESG) field test completion.

2. Discussed Tier Three Comments in the VM-22 Draft

The Subgroup continued to review tier three comments on the proposed VM-22 framework (Attachment 2). Mr. Slutsker said the American Council of Life Insurers (ACLI) recommended adding the guidance note on the “Relationship to RBC Requirements” from VM-21, Requirements for Principle-Based Reserves for Variable Annuities. Brian Bayerle (ACLI) suggested keeping the guidance note and reevaluating it after completion of the VM-22 field test. Mr. Slutsker said the American Academy of Actuaries (Academy) did not include the guidance note in its initial draft of the VM-22 framework. Mr. Carmello said he prefers to remove the guidance note. Mr. Slutsker said the guidance note will be replaced with a drafting note indicating that the references to risk-based capital (RBC) have been removed.

Mr. Bayerle recommended broadening the language defining Principle 2 by changing the words “reserving category” to “prescribed guardrails.” The Subgroup agreed to the wording change and separately agreed to keep the guidance note on market value adjustments on liability cash flows.

Ms. Hemphill said the guidance note following Section 4.A.1 should be retained for consistency with VM-21. Mr. Chupp pointed out that the guidance note requires editing to align with VM-21. Mr. Slutsker said the guidance note will be removed now and reconsidered when the Life Actuarial (A) Task Force reviews and reconciles VM-20, Requirements for Principle-Based Reserves for Life Products, VM-21, and VM-22.

The ACLI recommended moving portions of Section 4.A.4 to Section 9, which houses most of the hedging requirements. Mr. Slutsker said specific hedging requirements will be moved to Section 9.

Mr. Slutsker responded to the comment on Section 4.A.4.b by saying that the language in amendment proposal form (APF) 2020-12, which was recently adopted for inclusion in the 2023 *Valuation Manual*, should be used to revise the VM-22 language. Ms. Hemphill said that APF 2020-1 provided updates to the language of VM-20 and VM-21. She agreed that the VM-22 language should be consistent with the language in the APF. Mr. Bayerle noted that the ACLI will be proposing changes that were intended for inclusion in APF 2020-12 but were deferred due to time constraints. Mr. Slutsker said any new hedging amendment proposals that are submitted will be applied to VM-20, VM-21, and VM-22.

Ms. Hemphill said the Texas Department of Insurance (TDI) comments on Section 4.A.4.b.i.c questions whether stress testing alone is sufficient to support the index credit hedge margin, and whether the real-world hedging error and the modeling error in reflecting the future hedging should be separated when considering the hedge breakage expense assumptions. Mr. Slutsker asked if the paragraph should be modified to indicate that both the index credit margin and the real-word margin should be captured in the hedge margin and reported separately in VM-31, PBR Actuarial Report Requirements for Business Subject to a Principle-Based Valuation. Ms. Hemphill answered affirmatively. Mr. Slutsker said that in addition to adding wording requiring the separate reporting for the error terms, the reference to stress testing will be removed from the paragraph.

The Subgroup discussed the ACLI comment on whether the revenue sharing section should be retained. Mr. Bayerle suggested keeping the section because of the possibility of having to combine VM-21 and VM-22 in the future. Based on Mr. Bayerle's input the Subgroup agreed to retain the revenue sharing section.

Mr. Slutsker discussed the TDI comment recommending that the projection period for VM-22 be aligned with the projection period defined in VM-20. The Subgroup agreed to delete the second sentence of the paragraph.

Bill Wilton (Unaffiliated) discussed his comment recommending the deletion of the reference to pre-tax interest maintenance reserve (IMR). Mr. Slutsker said the Subgroup will refer the issue to the Task Force.

Having no further business, the VM-22 (A) Subgroup adjourned.

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Agenda Item 5

Consider Adoption of Revisions to Actuarial Guideline XLIX-A

Nov. 18, 2022

Exposure for AG49-A Quick Fix Proposal

On October 13, 2022, the IUL Illustration Subgroup exposed “quick fix” proposals to address the issue of some companies illustrating non-benchmark indices in a more favorable manner than benchmark indices. These proposals are found in the “Exposure Drafts” tab of the [IUL Illustration Subgroup webpage](#).

Following up on the straw poll conducted during the November 9 Subgroup call, as explained on the November 17, 2022 Life Actuarial Task Force (LATF) call, it is possible a vote for adoption of the Securian proposal will occur at the NAIC National Meeting LATF session in December.

A potential final version of the Securian proposal is provided below.

Of note, the changes from the version of the proposal exposed at the Subgroup are:

- Elimination of the second background paragraph of AG 49-A, due to the lack of significance and relevance combined with the redundancy with the Effective Date section of the Guideline.
- Establishment of March 25, 2023 as the effective date of the revisions. That date is the potential NAIC executive / plenary adoption date. If the date of adoption is later than March 25, 2023, the effective date could be changed at the committee or executive level.

Please send comments to Scott O’Neal (soneal@naic.org) by close of business Nov. 30.

Actuarial Guideline XLIX-A

THE APPLICATION OF THE LIFE ILLUSTRATIONS MODEL REGULATION TO POLICIES WITH INDEX-BASED INTEREST SOLD (On or After December 14, 2020)

Background

The *Life Insurance Illustrations Model Regulation* (#582) was adopted by the NAIC in 1995. Since that time there has been continued evolution in product design, including the introduction of benefits that are tied to an index or indices. Although these policies are subject to Model #582, not all of their features are explicitly referenced in the model, resulting in a lack of uniform practice in its implementation. In the absence of uniform guidance, two illustrations that use the same index and crediting method often illustrated different credited rates. The lack of uniformity can be confusing to potential buyers and can cause uncertainty among illustration actuaries when certifying compliance with Model #582.

~~In 2019, the NAIC decided that illustrations of products with multipliers, cap buy-ups, and other enhancements that are linked to an index or indices should not illustrate better than products without such features. This new requirement is intended to apply to illustrations on policies sold on or after the effective date of this guideline while the existing requirements continue to apply for inforce illustrations on policies sold before the effective date of this guideline.~~

This guideline provides uniform guidance for policies with index-based interest. In particular, this guideline:

- (1) Provides guidance in determining the maximum crediting rate for the illustrated scale and the earned interest rate for the disciplined current scale.

- (2) Limits the policy loan leverage shown in an illustration.
- (3) Requires additional consumer information (side-by-side illustration and additional disclosures) that will aid in consumer understanding.

Text

1. Effective Date

This Actuarial Guideline shall be effective for all new business and in force illustrations on policies sold on or after December 14, 2020.

2. Scope

This Actuarial Guideline shall apply to any life insurance illustration that meets both (i) and (ii), below:

- i. The policy is subject to Model #582.
- ii. The policy offers Indexed Credits.

3. Definitions

A. Alternate Scale: A scale of non-guaranteed elements currently being illustrated such that:

- i. The Annual Rate of Indexed Credits for each Index Account does not exceed the lesser of the maximum Annual Rate of Indexed Credits for the illustrated scale less 100 basis points and the credited rate for the Fixed Account. If the insurer does not offer a Fixed Account with the illustrated policy, the Annual Rate of Indexed Credits for each Index Account shall not exceed the average of the maximum Annual Rate of Indexed Credits for the illustrated scale and the guaranteed Annual Rate of Indexed Credits for that account. However, the Annual Rate of Indexed Credits for each Index Account shall never be less than the guaranteed Annual Rate of Indexed Credits for that account.
- ii. If the illustration includes a loan, the illustrated Policy Loan Interest Credited Rate shall not exceed the illustrated Policy Loan Interest Rate. For example, if the illustrated Policy Loan Interest Rate is 4%, the Policy Loan Interest Credited Rate shall not exceed 4%.
- iii. All other non-guaranteed elements are equal to the non-guaranteed elements for the illustrated scale.

B. Annual Net Investment Earnings Rate: Gross portfolio annual earnings rate of the general account assets (excluding hedge assets for Indexed Credits), less provisions for investment expenses and default cost, allocated to support the policy. Charges of any kind cannot be used to increase the Annual Net Investment Earnings Rate.

C. Annual Rate of Indexed Credits: The total annualized Indexed Credits expressed as a percentage of the account value used to determine the Indexed Credits.

D. Benchmark Index Account: An Index Account with the following features:

- i. The interest calculation is based on the percent change in S&P 500® Index value only, over a one-year period using only the beginning and ending index values.

Appendix C

(S&P 500® Index ticker: SPX)

- ii. An annual cap is used in the interest calculation.
 - iii. The annual floor used in the interest calculation shall be 0%.
 - iv. The participation rate used in the interest calculation shall be 100%.
 - v. Interest is credited once per year.
 - vi. The Hedge Budget used to determine the cap in 3 (D) (ii) does not exceed the Annual Net Investment Earnings Rate. Charges of any kind cannot be used to increase the annual cap.
 - vii. There are no enhancements or similar features that provide additional Indexed Credits in excess of the interest provided by 3 (D) (i) through 3 (D) (v), including but not limited to experience refunds, multipliers, or bonuses.
 - viii. There are no limitations on the portion of account value allocated to the account.
 - ix. A single Benchmark Index Account will be determined for each policy. This can be either an Index Account offered with the illustrated policy or determined according to Section 4 (A) (ii) for purposes of complying with this guideline. A policy shall have no more than one Benchmark Index Account.
- E. Fixed Account: An account where there are no Indexed Credits.
- F. Hedge Budget: For each Index Account, the total annualized amount assumed to be used to generate the Indexed Credits of the account, expressed as a percent of the account value in the Index Account. This total annualized amount should be consistent with the hedging program of the company.
- G. Index Account: An account where some or all of the amounts credited are Indexed Credits.
- H. Indexed Credits: Any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to policy values that is linked to an index or indices. Amounts credited to the policy resulting from a floor greater than zero on an account with any interest credit, multiplier, factor, bonus, charge reduction, or other enhancement to policy values that is linked to an index or indices are included.
- I. Loan Balance: Any outstanding policy loan and loan interest, as defined in the policy.
- J. Policy Loan Interest Rate: The current annual interest rate as defined in the policy that is charged on any Loan Balance. This does not include any other policy charges.
- K. Policy Loan Interest Credited Rate: The annualized interest rate credited that applies to the portion of the account value backing the Loan Balance:
- i. For the portion of the account value in the Fixed Account that is backing the Loan Balance, the Policy Loan Interest Credited Rate is the applicable annual interest crediting rate.
 - ii. For the portion of the account value in an Index Account that is backing the Loan Balance, the Policy Loan Interest Credited Rate is the Annual Rate of Indexed

Credits, net of any applicable Supplemental Hedge Budget, for that account.

- L. Supplemental Hedge Budget: For each Index Account, the Hedge Budget minus the minimum of the Annual Net Investment Earnings Rate and the Hedge Budget that is used in the determination of the Benchmark Index Account. The Supplemental Hedge Budget will never be less than zero. This amount should be consistent with the hedging program of the company.

4. Illustrated Scale

The total Annual Rate of Indexed Credits for the illustrated scale for each Index Account shall be limited as follows:

- A. Calculate the geometric average annual credited rate for the Benchmark Index Account for the 25-year period starting on 12/31 of the calendar year that is 66 years prior to the current calendar year (e.g., 12/31/1949 for 2015 illustrations) and for each 25-year period starting on each subsequent trading day thereafter, ending with the 25- year period that ends on 12/31 of the prior calendar year.
 - i. If the insurer offers a Benchmark Index Account with the illustrated policy, the illustration actuary shall use the current annual cap for the Benchmark Index Account in 4 (A).
 - ii. If the insurer does not offer a Benchmark Index Account with the illustrated policy, the illustration actuary shall use actuarial judgment to determine a hypothetical, supportable current annual cap for a hypothetical, supportable Index Account that meets the definition of the Benchmark Index Account, and shall use that cap in 4 (A).
- B. For the Benchmark Index Account the Annual Rate of Indexed Credits shall not exceed the minimum of (i) and (ii):
 - i. The arithmetic mean of the geometric average annual credited rates calculated in 4 (A).
 - ii. 145% of the Annual Net Investment Earnings Rate.
- C. For any other Index Account that is not the Benchmark Index Account in 3 (D), the Annual Rate of Indexed Credits illustrated as a percentage of the account value in the Index Account prior to the deduction of any charges used to fund a Supplemental Hedge Budget shall not exceed the minimum of (i) and (ii) for policies issued prior to March 25, 2023 and shall not exceed the minimum of (i), (ii), and (iii) for policies sold on or after March 25, 2023:
 - i. The Annual Rate of Indexed Credits for the Benchmark Index Account calculated in 4 (B) plus the Supplemental Hedge Budget for the Index Account.
 - ii. The Annual Rate of Indexed Credits reflecting the fundamental characteristics of the Index Account and the appropriate relationship to the expected risk and return of the Benchmark Index Account. The illustration actuary shall use actuarial judgment to determine this value using lookback methodology consistent with 4 (A) and 4 (B) (i) where appropriate.
 - iii. The lesser of (1) and (2) multiplied by the Annual Rate of Index Credits for the Benchmark Index Account, calculated in 4 (B), divided by (2); plus, the

Supplemental Hedge Budget:1. The Hedge Budget of the Indexed Account2. Hedge Budget of the Benchmark Indexed Account.

- D. For the purposes of compliance with Section 6 (C) of Model #582, the Supplemental Hedge Budget is subtracted from the Annual Rate of Indexed Credits before comparing to the earned interest rate underlying the disciplined current scale.

At the beginning of each calendar year, the insurer shall be allowed up to three (3) months to update the credited rate for each Index Account in accordance with 4 (B) and 4 (C).

5. Disciplined Current Scale

The earned interest rate for the disciplined current scale shall be limited as follows:

- A. If an insurer engages in a hedging program for Indexed Credits in an account, the assumed earned interest rate underlying the disciplined current scale for that account, inclusive of all general account assets, both hedge and non-hedge assets, that support the policy, net of default costs and investment expenses (including the amount spent to generate the Indexed Credits of the policy) shall not exceed the lesser of (i) and (ii):
- i. The Annual Net Investment Earnings Rate, plus 45% of the lesser of (1) and (2):
 - 1. Hedge Budget minus any annual floor, to the extent that the floor is supported by the Hedge Budget.
 - 2. The minimum of the Annual Net Investment Earnings Rate and the Hedge Budget that is used in the determination of the Benchmark Index Account.
 - ii. The Annual Rate of Indexed Credits plus the Annual Net Investment Earnings Rate minus the Hedge Budget.

These rates should be adjusted for timing differences in the hedge cash flows to ensure that fixed interest is not earned on the Hedge Budget minus any annual floor, to the extent that the floor is supported by the Hedge Budget.

Guidance Note: The above approach does not stipulate any required methodology as long as it produces a consistent limit on the assumed earned interest rate underlying the disciplined current scale.

For a policy with multiple Index Accounts, a maximum rate in 5 (A) should be calculated for each account. All accounts, fixed and indexed, within a policy can be tested in aggregate.

- B. If an insurer does not engage in a hedging program for Indexed Credits, the assumed earned interest rate underlying the disciplined current scale shall not exceed the Annual Net Investment Earnings Rate.
- C. These experience limitations shall be included when testing for self-support and lapse-support under Model #582, accounting for all illustrated benefits including any illustrated benefits and bonuses that impact the policy's account value.

6. Policy Loans

If the illustration includes a loan, the illustrated Policy Loan Interest Credited Rate shall not exceed the illustrated

Policy Loan Interest Rate by more than 50 basis points. For example, if the illustrated Policy Loan Interest Rate is 4.00%, the Policy Loan Interest Credited Rate shall not exceed 4.50%.

7. Additional Standards

The basic illustration shall also include the following:

- A. A ledger using the Alternate Scale shall be shown alongside the ledger using the illustrated scale with equal prominence.
- B. A table showing the minimum and maximum of the geometric average annual credited rates calculated in 4 (A).
- C. For each Index Account illustrated, a table showing actual historical index changes and corresponding hypothetical Indexed Credits using current index parameters for the most recent 20-year period.

Brian Bayerle
Senior Actuary

Colin Masterson
Policy Analyst

November 30, 2022

Rachel Hemphill
Acting Chair, NAIC Life Actuarial Task Force (LATF)

Mr. Fred Andersen
Chair, Index Universal Life (IUL) Illustration (A) Subgroup

Re: Securian AG49-A Quick Fix Proposal

Dear Ms. Hemphill and Mr. Andersen:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit feedback on the exposed Securian AG49-A Quick Fix proposal to address the issue of some companies illustrating non-benchmark indices in a more favorable manner than benchmark indices under the current regulatory framework.

As noted in our previous letter, ACLI would be supportive of either the Securian approach or Group of 7 Companies approach to amending AG49-A. After reviewing the LATF-exposure of the Securian approach, we have two comments to be considered by regulators before adoption.

First, in Section 4.C, the language around the effective date should be consistent with prior prospective-only AG49 changes. The language should be consistently “policies sold.”

Second, our members have expressed concern around the feasibility of the March 25th effective date. Companies will require adequate time to adjust and update their illustration systems, marketing materials, administration systems that produce in force illustrations, and agent training. Having additional implementation time after final approval would be appreciated so an effective date of May 1st would be preferred by ACLI.

With these edits combined, we would suggest the following changes to Section 4.C:

C. For any other Index Account that is not the Benchmark Index Account in 3 (D), the Annual Rate of Indexed Credits illustrated as a percentage of the account value in the Index Account prior to the deduction of any charges used to fund a Supplemental Hedge Budget shall not exceed the minimum of (i) and (ii) for policies ~~issued~~ **sold** prior to ~~March 25, 2023~~ **May 1, 2023**

American Council of Life Insurers | 101 Constitution Ave, NW, Suite 700 | Washington, DC 20001-2133

The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI's member companies are dedicated to protecting consumers' financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI's 280 member companies represent 94 percent of industry assets in the United States.

and shall not exceed the minimum of (i), (ii), and (iii) for policies sold on or after May 1, 2023
~~March 25, 2023:~~

12/11-12/22

Thank you once again for allowing us to submit feedback on this proposal. We are grateful for the work done by regulators on this issue thus far and we are looking forward to the discussion at the NAIC Fall National Meeting.

Best,

 *Colin Masterson*

cc: Scott O'Neal, NAIC

Agenda Item 6

Consider Adoption of the Report of the
Indexed Universal Life (IUL) Illustration (A) Subgroup

11/20/22

Indexed Universal Life (IUL) Illustration (A) Subgroup
Virtual Meeting
November 9, 2022

The Indexed Universal Life (IUL) Illustration (A) Subgroup met Nov. 9, 2022. The following Subgroup members participated: Fred Andersen, Chair (MN); Ted Chang (CA); Manny Hidalgo (CT); Mike Yanacheak (IA); Vincent Tsang (IL); Derek Wallman (NE); Bill Carmello (NY); Peter Weber (OH); Maribel Castillo, Darlene Plyler, and Heike Ulrich (TX); and Tomasz Serbinowski (UT).

1. Heard Comments Regarding a Quick Fix to AG 49-A

Andersen reminded the Subgroup that on Oct. 6, the Life Actuarial (A) Task Force provided the Subgroup with two charges. The first charge is to attempt a quick fix to *Actuarial Guideline XLIX-A—The Application of the Life Illustrations Model Regulation to Policies with Index-Based Interest to Policies Sold on or After December 14, 2020* (AG 49-A) regarding the issue of uncapped volatility-controlled indices being illustrated, in some cases, more favorably than capped Standard & Poor's 500 (S&P 500) benchmark indices. The second charge is to explore a potential request to the Life Insurance and Annuities (A) Committee to look into a limited, targeted opening of the *Life Insurance Illustrations Model Regulation* (#582) to reduce the probability of the Task Force and the Subgroup needing to do further guideline updates to address anticipated future product designs.

Andersen reminded the Subgroup that during its Oct. 12 meeting, it exposed two documents to address the two charges. For the exposure relating to the charge regarding Model #582, the comment period ends Nov. 22.

Andersen said that this meeting will address the charge for a quick fix to get illustrations of uncapped volatility-controlled indices in line with illustrations of capped S&P 500 benchmark indices.

Andersen noted that the public was invited to make comments on three proposals: 1) a proposal from Securian Financial; 2) a proposal from a group of multiple companies; and 3) a proposal from a coalition of insurance professionals. The proposers were also invited to further explain their proposals, including providing comparisons of metrics for benchmark and non-benchmark indices under the various proposals. The Subgroup received five comment letters.

The Subgroup heard summaries of comment letters from the American Academy of Actuaries' (Academy's) Life Illustrations Work Group; Securian Financial and Penn Mutual; Allianz, John Hancock, Lincoln National, National Life, Nationwide, Pacific Life, and Sammons (group of 7); a coalition of 12 concerned insurance professionals (coalition); and the American Council of Life Insurers (ACLI). Follow-up questions and comments were also heard.

Subgroup members discussed the proposals, comment letters, and views for a direction going forward. Some were in favor of changing the current practice of using past performance in the look back period to determine the long-term projection rate for an IUL illustration. Others were in favor of pursuing a small change now and considering a broader change later. Andersen noted that in the Subgroup's exposure regarding ideas for Model #582, there is flexibility to address broad IUL illustration issues without revising the model regulation, and some ideas presented in the quick-fix proposals could be pursued later for a long-term solution. Other concepts discussed included a disclosure of the company's hedge budget and potential maximum limits used in the illustration calculation.

Andersen reiterated the Subgroup's charge of developing a quick fix to address the illustration discrepancy between uncapped volatility-controlled indices and capped S&P 500 benchmark indices. He noted his opinion that for this phase of the project, the Task Force did not contemplate receiving Subgroup recommendations for changing the limits on the benchmark index aspects in IUL illustrations. He characterized the two charges as first applying the brakes on a specific current practice and then considering approaches to address a broader view. Andersen also explained the timing and steps for final adoption of a quick-fix proposal and potential impacts for progressing to a long-term proposal if a quick fix was not recommended soon.

The Subgroup heard from interested parties who expressed concerns about a quick fix and suggested that the Subgroup address the broader concerns sooner rather than later. As part of his comments, Birny Birnbaum (Center for Economic Justice—CEJ) expressed support for the coalition proposal.

Subgroup members discussed the pros and cons of pursuing a quick fix and the potential breadth of a quick fix.

The Subgroup held a straw poll for whether to pursue a quick fix and a potential direction for a quick fix. Six Subgroup members (plus the Subgroup chair) favored pursuing the Securian approach as the quick fix. Four Subgroup members favored a more conservative approach resembling the coalition proposal. No members favored the group of 7 approach. Andersen said that he plans to continue this discussion, including presenting the straw poll results, as part of the Subgroup's update to the Task Force at the Fall National Meeting.

Having no further business, the Subgroup adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/A CMTE/LATF/2022 Fall/IULI Calls/11 09/Nov 9 Minutes.docx

11/13/22

Indexed Universal Life (IUL) Illustration (A) Subgroup
Virtual Meeting
October 12, 2022

The Indexed Universal Life (IUL) Illustration (A) Subgroup met Oct. 12, 2022. The following Subgroup members participated: Fred Andersen, Chair (MN); Ted Chang (CA); Manny Hidalgo (CT); Mike Yanacheak (IA); Derek Wallman (NE); Bill Carmello (NY); Peter Weber (OH); Maribel Castillo, Darlene Plyler, and Heike Ulrich (TX); and Tomasz Serbinowski (UT).

1. Exposed a Request to Collect Comments Regarding Model Regulation #582

Mr. Andersen noted that on Oct. 6, the Life Actuarial (A) Task Force provided the Subgroup with two charges. The first charge is to attempt a quick fix to *Actuarial Guideline XLIX-A—The Application of the Life Illustrations Model Regulation to Policies with Index-Based Interest to Policies Sold on or After December 14, 2020* (AG 49-A) regarding the issue of uncapped volatility controlled indices being illustrated, in some cases, more favorably than capped Standard & Poor's 500 (S&P 500) benchmark indices. The second charge is to explore a potential request to the Life Insurance and Annuities (A) Committee to look into a limited, targeted opening of the *Life Insurance Illustrations Model Regulation* (#582) to reduce the probability of the Task Force and the Subgroup needing to do further guideline updates to address anticipated future product designs.

Mr. Andersen started discussion with the second charge, which could involve opening a public comment period to collect initial ideas on what subsections of Model #582 to potentially open and to collect concepts of the types of changes that would be needed to prevent additions or updates to the actuarial guidelines relating to IUL illustrations.

Mr. Andersen noted potential considerations for comments. He mentioned that one consideration is that the broader the scope of opening Model #582, the longer it will likely take to get through the process of adopting revisions. Another consideration is that there are likely aspects of Model #582 that lead to oversimplification of IUL illustrations, but potential remedies may lead to overcomplication of the illustrations. Brainstorming will be needed to lead to the right balance.

Mr. Andersen said that if comments are collected, it would be helpful if revision suggestions for Model #582 could perhaps identify concepts that could likely be addressed in a shorter time frame, along with concepts that may take longer to address. He asked commenters to keep in mind other parties that might have an interest in aspects of potential changes to Model #582. He also mentioned that ideas to address the broader issues without opening Model #582 would be welcome. He said that it would be helpful to receive comments on aspects that are actuarial in nature, as well as aspects that may be non-actuarial, as this may help the Committee potentially delegate work assignments.

Mr. Andersen anticipated that the next conversation on what a recommendation to the Committee will look like will occur at the Task Force's session at the Fall National Meeting.

Mr. Weber made a motion, seconded by Mr. Hidalgo, to open a public comment period through Nov. 22 to collect comments regarding potential direction of activity (Attachment 1). After discussion, the motion passed.

2. Exposed a Request to Collect Comments Regarding a Quick Fix to AG 49-A

Mr. Andersen repeated that the charge from the Life Actuarial (A) Task Force is to address the issue of uncapped volatility controlled indices being illustrated more favorably by some companies than capped S&P 500 benchmark indices. The quick fix would be to address the issue of uncapped volatility controlled indices so they illustrate no more favorably than currently required for capped S&P 500 benchmark indices. Proposals beyond that may be addressed in work associated with the charge discussed earlier in the meeting.

Mr. Andersen noted that from a previous exposure and comment period, multiple proposals and comment letters regarding a quick fix are temporarily available on the Subgroup's web page.

The Subgroup heard a proposal from Securian Financial, presented by Brian Rock (Securian Financial).

The Subgroup heard a proposal from a group of six companies (Allianz, John Hancock, Lincoln National, National Life, Pacific Life, and Sammons), presented by Austin Bichler (Allianz).

The Subgroup heard a proposal from Bobby Samuelson (The Life Product Review) and Sheryl Moore (Moore Market Intelligence). Mr. Samuelson noted that other comment letters provided comments in the same direction.

Mr. Andersen said that the other comment letters received from the previous exposure were not specific in terms of wording proposals. He asked for commenters to present any other specific proposals. No response was given.

The Subgroup heard discussion on the proposals presented.

Mr. Andersen invited those who presented proposals to submit a letter using more plain language to explain the methodology and results. This would help the Subgroup and others to understand how each proposal works, and to help them assess the pros and cons of each proposal. Mr. Serbinowski added that numerical examples and calculations would also be helpful.

Mr. Yanacheak said that he would like to hear feedback on the idea that different indices could be limited to illustrate the same. Mr. Serbinowski clarified this request by asking whether products and strategies associated with the same hedge budget should illustrate the same.

Mr. Yanacheak made a motion, seconded by Mr. Serbinowski, to expose the proposals contained in the comment letters from Securian Financial and the group of six companies, a proposal that clarifies the Samuelson-Moore comment letter, and the discussion topic of whether products and strategies associated with the same hedge budget should illustrate the same (Attachment 2) for a 21-day public comment period ending Nov. 3. The motion passed.

Having no further business, the Indexed Universal Life (IUL) Illustration (A) Subgroup adjourned.

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October 13, 2022

Indexed Universal Life (IUL) Illustration (A) Subgroup

Exposure for Model Reg 582 Ideas

To address concerns relating to IUL illustrations, the IUL Illustration (A) Subgroup has been charged to provide recommendations for consideration of changes to the *Life Insurance Illustrations Model Regulation (#582)*.

By Tuesday, November 22, 2022, please provide comments for the following:

- Which Model Reg 582 subsections to consider opening
 - Provide an opinion on aspects of proposed Model Regulation revision concepts that are actuarial in nature and aspects that may be non-actuarial.
- Concepts for draft revisions to address broad IUL illustration issues
- Whether such addressing of broad issues could occur without revising the Model Regulation

Please send comments to Jennifer Frasier (jfrasier@naic.org) by close of business Nov. 22.

Brian Bayerle
Senior Actuary

Colin Masterson
Policy Analyst

November 18, 2022

Ms. Rachel Hemphill
Acting Chair, NAIC Life Actuarial Task Force (LATF)

Mr. Fred Andersen
Chair, Index Universal Life (IUL) Illustration (A) Subgroup

Re: Model Reg 582 Ideas

Dear Ms. Hemphill and Mr. Andersen:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit the following comments on the exposure soliciting feedback on the IUL Illustration (A) Subgroup's (Subgroup) consideration of changes to *Life Insurance Illustrations Model Regulation #582* (Model).

ACLI wishes to work with LATF and the Subgroup to develop solutions to appropriately address the regulatory concerns around IUL illustrations and to foster appropriate consumer understanding of these products. However, it is not a simple task to determine which subsections of the Model to consider opening without a clear understanding on what concern(s) the changes are trying to solve.

To help develop solutions, ACLI believes the Subgroup should more clearly outline the concern(s) they are trying to address and let that drive the development of potential revisions to the Model. As part of that process, ACLI suggests laying out a set of guiding regulatory principles to help drive more targeted feedback. Below, we suggest some possibilities:

Ensure illustrations:

- demonstrate both the benefits and risks of product features to promote consumer understanding;
- are product-neutral, so that any changes to the Model create a level playing field between products;
- are adaptable to new product development to ensure that consumers are provided innovative products that adapt to current market environments.

American Council of Life Insurers | 101 Constitution Ave, NW, Suite 700 | Washington, DC 20001-2133

The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI's member companies are dedicated to protecting consumers' financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI's 280 member companies represent 94 percent of industry assets in the United States.

ACLI hopes that with a greater understanding of regulator concerns, we would be better situated to provide feedback towards solutions to those concerns.

Thank you for your consideration and we look forward to future discussions.

Handwritten signature of B. Banfield in cursive script.

Colin Masterson

Attachment Six

Life Actuarial (A) Task Force

12/11-12/22

cc: Scott O'Neal, NAIC

November 22, 2022

Mr. Fred Andersen
Chair, Index Universal Life (IUL) Illustration (A) Subgroup (Subgroup)

Via Email: jfrasier@naic.org

Indexed Universal Life (IUL) Illustration (A) Subgroup
Exposure for Model Reg 582 Ideas

Dear Mr. Andersen:

The Coalition of Concerned Insurance Professionals appreciates the opportunity to comment on this Exposure Draft for Model Reg 582 revisions.

The Subgroup is seeking comments to the following:

- Which Model Reg 582 subsections to consider opening
 - Provide an opinion on aspects of proposed Model Regulation revision concepts that are actuarial in nature and aspects that may be non-actuarial.
- Concepts for draft revisions to address broad IUL illustration issues
- Whether such addressing of broad issues could occur without revising the Model Regulation

We will first address the specific comments requested by the Subgroup addressing Index UL and then provide a broader and historical perspective on Model Reg 582.

Index UL and Targeted Revisions to Model Reg 582

We believe that any attempt to open Model reg 582 to include Index UL must first address AG49-A concerns. Accordingly, we recommend the combination of Phase 1 – The Securian Proposal (with an effective date of March 2023) and Phase 2 – The Coalition Proposal (with an effective date of January 2024) AG49-A amendments in the plan to reopen Model 582. These two phases are transitional prerequisites that are assumed to have been implemented by 1/1/2024 and will facilitate a more orderly addition of indexed methodologies into Model Reg 582 and allow any Reg 582 working group to commence following this year's NAIC winter meeting.

Prior to addressing targeted revisions to Model Reg 582, the AG49-A as amended, will have established for index UL illustrations the following:

- i. Removal of the lookback methodology described in Section 4(A) of AG 49-A that uses historical index return data combined with declared elements to produce a maximum illustrated rate
- ii. Installation of the Hedge Budget in Section 4(C) as the maximum illustrated rate for any indexed account.
- iii. Disclosure of the Hedge Budget in Section 7 for each Indexed Account as the basis for the illustrated rate
- iv. Reduction of the 45% factor in Section 5(A)(i) to 0% and clarification of actuarial supportability testing to align with changes made to Section 4.
This will bring non-BIA accounts into alignment with the BIA account, and also create consistency in illustrations between Indexed UL and other fixed life insurance products.

In no way does the elimination of the lookback from Section 4(A) reduce the ability for the consumer to understand the mechanics of indexed crediting or the product. The ability to demonstrate the variability and hypothetical historical returns of indexed crediting is already available in the illustration through the tables described in AG 49-A Section 7(C). We believe these tables should remain and could be enhanced by Model Reg 582 amendments adopting a standardized stochastic analysis of volatility for life insurance products and require illustrations to show consumers the probability of the illustrated assumptions to sustain to policy maturity.

Appropriate sales of Index UL can continue while modifications to #582 are explored to holistically incorporate indexed crediting.

The examination of targeted sections of #582 to address Index UL are as follows:

- Section 4(D) of 582 states that “‘Disciplined current scale’ means a scale of non-guaranteed elements constituting a limit on illustrations currently being illustrated by an insurer that is reasonably based on actual recent historical experience.”
- ASOP 24 clarifies that the investment return factor of the disciplined current scale “should be reasonably based on recent actual investment experience, net of default costs, of the assets supporting the policy block.” In the case of Indexed UL, the assets supporting the policy block are a diversified portfolio of fixed income assets with demonstrable recent experience as would be found in any other fixed life insurance product.
- However, ASOP 24 goes further, stating that “if interest credits are linked to an external index or indices, then the investment return factor is sensitive to business or economic cycles...When

determining the investment return factor for policies within the scope of AG 49, actuaries should comply with limitations imposed on the assumed earned interest rate underlying the disciplined current scale.”

- In our view, this standard of practice goes beyond the scope of #582 by addressing the return on assets – specifically options – that are used to hedge a particular product feature rather than assets that are used to support the policy block. Furthermore, it delegates the limitation on the disciplined current scale to AG 49/AG 49-A, which determines the earned interest rate for the disciplined current scale in Section 5, essentially using the Annual Rate of Indexed Credits as determined by the hypothetical historical lookback methodology in Section 4 to determine the limit. In other words, the tail wags the dog.
- In order for the lookback methodology to be comprehensively and cohesively written into #582, the model must be adjusted to delineate between assets that support a block of business, assets used to hedge particular features in the business and other assets that may contribute to returns in a policy indirectly, as in participating Whole Life. From there, it must determine appropriate frameworks for determining assumed investment returns for each category, including potentially using a hypothetical historical lookback methodology as is currently found in AG 49-A. This will undoubtedly be a long, arduous and complex process because of the far-reaching nature of the question.
- By contrast, the Coalition Proposal is consistent with #582 as written because it references *only* the assets used to support the policy block. It assumes that hedge assets are not in scope and

does not require the life insurer to determine a separate investment return for those assets.

Broad Historical Perspective of Model Reg 582

Model Reg 582 Objectives in 1995

1. Differentiate guarantees from nonguaranteed elements
2. Demonstrate how the product works

The industry succeeded with #1 and failed with #2 as a result of the combination of product innovations by insurers (generally a good thing) and the Model's scope limitations (variable excluded and future products such as NLG UL and IUL were unanticipated and ultimately incompatible with the Model). The time has come to resolve this.

The shift away from guarantees by many carriers - to indeterminate premium universal life policies introduced in the late 1970s - has enormously complicated the selling *and* buying process. Because universal life policies do not have specified premiums, and the required funding cost to sustain the policy until death would not be known for a number of years of fluctuating crediting rates (and policy expenses in a number of instances), producers (and their clients) have had no choice but to interpret "how the policy works" and "what the policy will cost" from computer-generated policy illustrations. Yet, as the Society of Actuaries commented in 1991:

"How credible are any non-guaranteed numbers projected 20 years into the future, even if constructed with integrity? How does a consumer ... [or agent!] ... evaluate the credibility of two illustrations if they are from different companies - or even from the same company - if different products with different guarantees are being considered?"

Most illustration problems arise because illustrations create the illusion that the insurance company knows what will happen in the future, and that knowledge has been used to create the illustration.”

Competitive practices led to the unintended and inappropriate use of illustrations as *projections* of nonguaranteed outlays, values and distribution, and spawned more than 40 years of “who has the best price” via comparative positioning. The illustration-based recommendations of a “best-price” product invariably rely on the most attractive current, nonguaranteed crediting and expense projections and/or the appearance of lowest premiums.

A 2016 academic paper by Professors Daniel Gottlieb and Kent Smetters determined that “...nearly 88% of universal life policies ultimately do not terminate with a death benefit claim.” This quote was footnoted to state “While term policies have a larger *annual* lapse rate, permanent policies are usually more likely to lapse over the actual life of the policy due to their longer duration.” The paper was updated in 2021 with similar statistical findings.

Under such circumstances of lapse, all anticipated income tax benefits of life insurance not only disappear, but if there has been a deferred gain in the policy, ordinary income taxes will be due by the policy owner in the year of lapse.

Broader Recommendations Concerning #582

While Index UL illustrations have been the focus of attention in recent years, the abusive use of nonguaranteed projections is not limited to Index UL. To continue to allow for innovations in product design that can benefit consumers, fulfillment of the objectives from 1995 requires:

1. Expansion to include all illustratable life insurance products, and
2. Replacement of constant assumed crediting rate projections with a principles-based regulation that allows for nonlinear representations of the NAIC's second purpose of the Model: To facilitate the consumer's understanding how the subject policy works.

We believe these objectives cannot be implemented without revising Model Reg 582 more broadly. Accordingly, we propose the following:

1. Establish a target for an NAIC vote on model amendments no later than December 31, 2025.
2. Establish a working group made up of five representatives appointed by the NAIC with representation from the industry, the profession and consumer groups with the charge to develop a principles-based model regulation amendment to 582. The model amendments should replace the constant rate illustration projection in favor of some dynamic methodology that can be standardized for consistent adoption by all manufacturers and distributors. The working group's objective should be the same as in 1995 but to eliminate the prevailing practice to using nonguaranteed illustrations as projections, used primarily and deceptively as a competitive comparison tool.
3. Establish that this working group collaborates with a FINRA working group to harmonize 582 as amended to include registered and variable life insurance products for illustrations. This working group should also address the glaring issue in IUL policies – that while clarified as general account products and therefore not requiring securities licensing – agents not holding a securities license are asked for (and often provide) investment advice as to the selection of complex index options.

Concepts in the scope of an amended 582 regulation which could be addressed by a working group should include:

- Fixed premium versus indeterminate premium use
- Products classified as securities (i.e., Variable UL and WL)
- Fixed Index (zero floor methodologies) (AG49 as amended)
- Structured index methodologies (negative floor or buffered)
- Recast Regulation definitions and treatment of nonguaranteed versus guaranteed elements with the explicit inclusion of products such as WL, NLG UL, NLG VUL, Hybrid fixed or variable, and Term.
- No Lapse Guarantee (AG37, AG38 as amended)
- Hybrid products (where the death benefit is accelerated or enhanced by riders, policy endorsements, etc. for LTC, Chronic, Critical or Terminal Illness)
- Self-supporting and non-lapse supported sections of the model are expanded to invalidate use in nonguaranteed illustrations of charge funded crediting or COI offsetting.

Signed,

The Coalition of Concerned Insurance Professionals

November 22, 2022

Mr. Fred Andersen
Chair, Indexed Universal Life (IUL) Illustration (A) Subgroup

Via Email: jfrasier@naic.org

Re: October 13 IUL Subgroup Exposure for Model Reg 582 Ideas

Dear Mr. Andersen:

The undersigned companies welcome the opportunity to comment on the exposure regarding Life Insurance Illustrations Model Regulation #582 (Model). We would like to acknowledge the efforts the IUL Illustration Subgroup and Life Actuarial Task Force (LATF) have put forth to date and appreciate the opportunity to participate in the process.

As regulators consider exploring a comprehensive, longer-term solution, we believe that the desired end state and specific regulatory goals for life insurance illustrations should be established before determining what changes, if any, are needed to the Model. We agree with the comments made by the American Council of Life Insurers (ACLI) in response to this exposure and recommend that any review of the illustration framework include the following principles:

- Focus on protecting consumers by enhancing their understanding of all life insurance products.
- Promotion of consumer access and a regulatory framework that fosters a fair and competitive playing field across all types of life insurance as consumers may be considering multiple product types.
- Accommodation of evolving product designs in response to consumer interest while mitigating the possibility of frequent updates to the Model or Actuarial Guideline.

We propose that these principles serve as a starting point for defining the best way to educate consumers on all life insurance products. As regulators look toward a potential comprehensive review, we recommend consideration of how all life insurance products illustrate not only Indexed Universal Life. With clearly defined goals, we will be in a better position to provide constructive input to support LATF and the IUL Illustration Subgroup in determining if this end state requires opening the Model, or if it can be achieved through an Actuarial Guideline or other means.

Building on the principles outlined above, we propose the following ideas be considered as a part of any effort to improve consumer understanding in the next phase:

- Expanded or updated disclosures to increase transparency and better explain product features for all products.
- Inclusion of varying returns in Indexed Universal Life illustrations and how it impacts the illustrated values and exploration of how this concept could enhance other types of life insurance illustrations.
- Strengthening consumer understanding of the guaranteed, average, and alternative ledgers.

Our companies make every effort to ensure customers choose the products and features that meet their needs. We are committed to supporting the efforts of regulators to enhance disclosures and illustrations. Thank you for your consideration and we look forward to future discussions.

Allianz Life
John Hancock
Lincoln National
National Life Group
Nationwide
Pacific Life
Sammons Financial Companies



November 22, 2022

Mr. Fred Andersen
Chair, Indexed Universal Life (IUL) Illustration (A) Subgroup (“IUL Subgroup”)
National Association of Insurance Commissioners

Re: IUL Subgroup Exposure for Model Reg 582 Ideas (October 13, 2022)

Dear Mr. Andersen,

The American Academy of Actuaries¹ Life Illustrations Work Group (the “work group”) is providing the below comments to the IUL Subgroup on the Exposure for Model Regulation #582 (“the Model”) Ideas from October 13, 2022.

In response to the IUL Subgroup’s request for comment, our work group reviewed the Model to identify sections that may need to be modified—to enact, allow for, or align with proposed IUL illustration changes. When contemplating changes to IUL illustrations, our work group has focused on satisfying the Type A Usage of illustrations,² which is intended to show the consumer the mechanics of the policy being purchased and how policy values or premium payments change over time.

As the work group performed this review, we determined that more clarity is needed as to how the IUL Subgroup thinks certain IUL features should be illustrated before we can respond to the questions in the exposure. To that end, the work group suggests that a public discussion of the following questions, and direction from the IUL Subgroup on these issues, would be helpful before determining which subsections, if any, of the Model to open:

1. How should index-based credits be illustrated?
 - o Should illustrated values based on a non-level pattern of index-based credited rates be shown?
 - o Should illustrated values based on more than one pattern or level of rates be shown?
 - o Should illustrated values based on historical index performance be shown?

¹ The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

² As defined in the SOA Task Force Research on Life Insurance Sales Illustrations as published in the *Transactions of the Society of Actuaries 1991–92 Reports*. The report concluded that Type B Usage, which is intended to project likely or best estimates of future performance and compare cost or performance of different policies, was inherently unworkable.

2. How should the maximum illustrated rate be determined?
 - o Should historical index performance be used?
 - o Should all index accounts have the same maximum illustrated rate?
 - If so, should that maximum be based on the S&P 500 index with an annual point-to-point crediting strategy (i.e., the current Benchmark Index Account (BIA))?
 - o Should a predetermined maximum illustrated rate similar to variable universal life (VUL) be used?
3. What is the desired balance between reflecting the current environment vs. long-term averages in illustrations (for example, in illustrated index parameters)?
4. Should the implied risk premium associated with the hedge budget be limited?
5. How should the risks and rewards of index-based credits be illustrated?
6. How can illustrations be designed to promote consumer understanding of the product features (e.g., multipliers, buy ups, participation rates, fixed bonuses, indexed loans)?
7. How can illustrations be designed to deemphasize the maximum illustrated rate while still demonstrating how product features operate?
8. How should any product with a tie to an index (for example, a dividend formula with interest credits related to an index) be addressed?

Note that several of these questions and concepts apply beyond just IUL illustrations. For example, many non-IUL products contain features such as fixed bonuses and leveraged loans that are currently illustrated.

Some types of illustration changes may be fully implemented through an actuarial guideline (i.e., without opening the Model), while others may require revision of multiple subsections in the Model. For example, if more than one level of credited rates is required for the illustrated scale, the work group has identified several subsections of the Model that may need to be considered for potential revision.

The work group appreciates the efforts of the IUL Subgroup to review Actuarial Guideline 49-A and Model Regulation #582. If you have any questions or would like to discuss the above topics, please contact Amanda Barry-Moilanen, life policy analyst, at barrymoilanen@actuary.org.

Sincerely,

Brian R. Lessing, MAAA, FSA
Chairperson, Life Illustrations Work Group
American Academy of Actuaries



November 22, 2022

Ms. Rachel Hemphill
Acting Chair, NAIC life Actuarial Task Force

Mr. Fred Andersen
Chair, Index Universal Life (IUL) Illustration (A) Subgroup (Subgroup)

via email to jfrasier@naic.org

Re.: Model Reg 582 Ideas

Dear Ms. Hemphill and Mr. Andersen:

The Transamerica Companies ("Transamerica") appreciate the opportunity to provide comments on the *Exposure for Model Reg 582 Ideas*. First, we would like to voice support for the ACLI letter. Second, presuming the model is opened, we would like to suggest a minor change that would be helpful for not only Indexed Universal Life policy owners, but owners of other life products as well.

Currently, in most states, insurance companies are prohibited from providing customers in force illustrations at then-current credited rates and charges under commonly occurring circumstances; the information in these illustrations is something that customers want and that companies want to provide.

The problem is that companies are not allowed to provide any illustration, including an in force illustration, that fails either the lapse-support test or the self-support test according to the model regulation. Many in force products, e.g., Universal Life, fail at least one of these tests at current credited rates and charges. Transamerica often receives requests for in force illustrations for such policies and customers are disappointed when informed that we cannot provide one. This prohibition also seems to run counter to Section 10.C of the Illustration Model Reg which states that "upon the request of the policy owner, an insurer shall furnish an in force illustration of the current and future benefits and values based on the insurer's present illustrated scale."

Below is a minor wording change to Section 10.C which would eliminate the requirement for in force illustrations to pass the self-support and lapse-support tests (recommended change in **bold**):

NAIC Model 582 Section 10.C

Upon the request of the policy owner, the insurer shall furnish an in force illustration of the current and future benefits and values based on the insurer's present illustrated scale. This illustration shall comply with the requirements of Section 6A, 6B **(except 6.B(9) and 6.B(10))**, 7A, and 7E. No signature or other acknowledgement of receipt of this illustration shall be required.

Thank you for your consideration.

Sincerely, Andrew DeMarco, Head of Life Solutions, Transamerica

Andrew DeMarco

Agenda Item 7

Discuss the American Academy of Actuaries (Academy)
Economic Scenario Generator (ESG) Working Group
ESG Simplified Corporate Model

Corporate Credit & Bond Fund Returns: Stylized Facts, Acceptance Criteria, and a Simplified Model

Jason Kehrberg, MAAA, FSA
Chair, Economic Scenario Generator Work Group (ESGWG)

Hal Pedersen, MAAA, ASA
Member, Economic Scenario Generator Work Group (ESGWG)

Iouri Karpov, MAAA, FSA
Member, Economic Scenario Generator Work Group (ESGWG)

National Association of Insurance Commissioners (NAIC) Life Actuarial (A) Task Force (LATF)
October 27, 2022

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Agenda—Corporate Credit & Bond Fund Returns

2

1. Background
2. Stylized Facts
3. Acceptance Criteria
4. A Simplified Model
5. Discussion and Q&A
6. Appendices

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3

1.

Background

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Background

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LATF asked the ESGWG to deliver a series of presentations focused on proposing qualitative **Stylized Facts** and quantitative **Acceptance Criteria** for the three major components of an ESG used for statutory reporting purposes: **Interest Rates**, **Equity Returns**, and **Corporate Bond Fund Returns**.

Prior presentations in this series:

- A Framework for Working with ESGs (8/8/22)
- ESG Governance Considerations (8/8/22)
- Equity Returns—Stylized Facts (8/9/22)

This and future presentations in this series:

- **Corporate Credit & Bond Fund Returns—Stylized Facts, Acceptance Criteria, and a Simplified Model**
- Interest Rates—Stylized Facts and Acceptance Criteria
- Equity Returns—Acceptance Criteria

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Background (continued)

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This presentation proposes **Stylized Facts** and **Acceptance Criteria** for Corporate Credit Spreads and Bond Index Fund Returns that (a) are independent of any specific ESG model, (b) can be used to identify and evaluate candidate ESG models, and (c) can be used to evaluate a set of stochastic scenarios.

In addition to Stylized Facts and Acceptance Criteria, this presentation also proposes a **Simplified Model**.

- Regulators expressed interest in the ESGWG proposing an alternative corporate bond fund return model that is **fully documented** so that the model can be appropriately reviewed and understood.
- Like GEMS, the simplified model simulates **four** U.S. corporate bond fund indices →

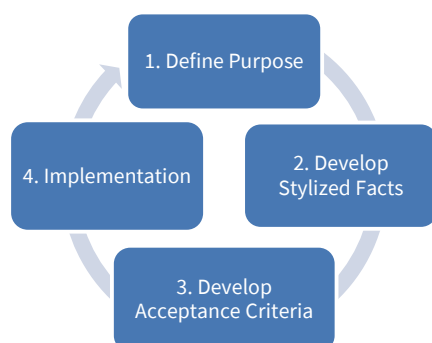
Label	Bond Fund Index
IG 1-5	U.S. Corp. Investment Grade 1-5 year
IG 5-10	U.S. Corp. Investment Grade 5-10 year
IG Long	U.S. Corp. Investment Grade Long (10-30 year)
HY	U.S. Corp. High Yield (Below Investment Grade)

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A framework for developing, implementing, and evaluating ESGs and the scenario sets they produce

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- Define Purpose:** The intended purpose of the ESG informs the economic variables to be simulated and the relative importance of their “stylized facts.”
- Develop Stylized Facts:** Stylized facts describe properties of the economic variables to be simulated. They are based on historical market data and economic theory and are prioritized relative to the defined purpose at hand. The establishment of stylized facts is critical for selecting candidate ESG models and a key prerequisite for the development of acceptance criteria.
- Develop Acceptance Criteria:** A set of quantitative metrics or target values at different time horizons or in different economic conditions used to ensure the scenarios produced by the ESG are consistent with defined stylized facts.
- Implementation:** ESG models are selected based on their ability to reflect defined stylized facts, then calibrated in accordance with acceptance criteria. Scenario sets are validated against defined acceptance criteria. This is an iterative process. It is important to periodically review and recalibrate the ESG as market conditions change over time.

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7

2.

Stylized Facts

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8

Groupings for Stylized Facts

Stylized Facts have been grouped into 6 categories with 1 to 3 Stylized Facts each:

- 3 categories for **Corporate Credit Spreads**
- 3 categories for **Bond Index Fund Returns**



Corporate Credit Spreads

1. General nature of credit markets and credit spreads
2. Relation across qualities and maturities
3. Relation to other market variables

Bond Index Fund Returns

4. General nature of bond index funds
5. Bond index fund return dynamics
6. Relation to other asset classes

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1. Corporate Credit Spreads—General nature of credit markets and credit spreads

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- a. Credit markets tend to be cyclical with elevated defaults and migrations at the end of credit cycles. Credit-related losses tend to be “lumpy” or episodic.
- b. Credit spreads are positive and have a strong tendency to revert to long-term normative levels (generally within three to four years).
- c. Credit spreads exhibit volatility clustering (i.e., regimes of high and low volatility), and volatility has a strong tendency to revert to long-term normative levels.

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2. Corporate Credit Spreads—Relation across qualities and maturities

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- a. As a bond's credit quality decreases credit spreads, spread volatility, and the risk of loss increase.
- b. Longer maturity bonds generally have higher credit spreads than shorter maturity bonds. However, the credit spreads on shorter maturity bonds are more sensitive to current market conditions, so during market stresses credit spreads on shorter maturity bonds may increase more than credit spreads on longer maturity bonds.
- c. Credit spreads for different qualities and maturities tend to be strongly correlated (e.g., 80% or more).

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3. Corporate Credit Spreads—Relation to other market variables

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- a. Credit spreads tend to be higher and more volatile in equity bear markets (i.e., strong positive correlation to equity volatility, strong negative correlation to equity returns).
- b. Credit spreads tend to be negatively correlated with Treasury rates (i.e., flight to quality during market stress).

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4. Bond Index Fund Returns—General nature of bond index funds

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- a. A corporate bond fund is generally actively managed (regularly rebalanced) to meet defined maturity and quality targets (e.g., 5- to 10-year investment grade bonds) by trading individual bonds into and out of the fund. Such trading tends to increase when the corporate bond market experiences high levels of credit migration.

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5. Bond Index Fund Returns—Bond index fund return dynamics

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- a. Bond index fund total returns reflect the impact of risk-free rates (and changes in risk-free rates) as well as credit-related returns in “excess” of risk-free rates.
 - **Total return** = Risk free return + Excess return
 - **Excess return** = Spread-based return - Frictional costs
 - **Spread-based return** reflects credit spread income and price returns (i.e., changes in market price due to spread movement).
 - **Frictional costs** reflect costs due to defaults (net of recoveries), migrations (e.g., selling downgraded bonds at a loss when they no longer meet the fund’s quality targets), and rebalancing.
- b. Bond index fund returns vary with the credit cycle.
 - **Spread-based return** tends to decline significantly when spreads explode but then recover as spreads mean revert and migrations/defaults occur (i.e., the portfolio is purged).
 - **Frictional costs** (which are generally not recoverable) tend to cluster and accumulate rapidly as bonds migrate/default, with severity depending on the magnitude and duration of the credit cycle.

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6. Bond Index Fund Returns—Relation to other asset classes

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- a. Bond funds have risk/reward relationships that are generally consistent with other asset classes over long horizons.
- b. Credit spreads for bond funds held in the separate account should be consistent with economic assumptions for bonds held in the general account.

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Goals related to bond fund scenarios from Conning/NAIC 12/17/20 presentation to LATF

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Goals relating to equity and bond fund scenarios:

1. Returns should be provided for funds representative of those offered in U.S. insurance products.
2. The ESG should be calibrated using an appropriate historical period.

Goals relating to the bond fund scenarios:

8. The same model should be used to produce bond fund returns for the Basic and Robust Data Sets*, and the returns should reflect credit rating transitions, defaults, and dynamic spreads.
9. Separate yield curves should be generated by rating, and they should be linked to each other.
10. The spread between Treasuries and corporate bonds should be stochastic.
11. The ESG should include bond credit rating transitions and they should be dynamic.

* Only goals that were related to the bond fund scenarios are listed above (goals 3-7 were only related to the equity scenarios).

- These goals are generally consistent with the stylized facts presented on the prior two slides.
- Note that stylized facts are generally *prioritized* based on the intended application, but the stylized facts themselves are generally independent of the intended application (largely based on historical data, sometimes supplemented with forward looking views).
- Note that stylized facts and their prioritization are generally independent of the model since models differ in their ability to reflect the various market properties described by stylized facts.

3.

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Acceptance Criteria

Given the intended purpose, acceptance criteria should be consistent with the Valuation Manual

17

VM-20 Section 9.F. prescribes deterministic tables of baseline defaults, current spreads, and ultimate spreads for projecting general account **individual bonds**.

- VM-20 prescribed spreads grade from current to ultimate over the first four years of the projection.
- VM-20 prescribed baseline default costs represent the annualized average default cost over the remaining life of a bond given its credit rating and weighted average life at the start of the projection.

The ESG produces bond fund returns for projecting separate account **bond funds**.

- These bond fund return scenarios should be consistent with VM-20's prescribed tables of spreads and defaults for use when projecting individual bonds in the general account.
- Bond fund indices experience significant frictional costs compared to individual bonds that are bought and held (largely from having to periodically rebalance bonds in the fund as they move outside the fund's target range for credit quality, or maturity).

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Credit spread steady-state targets and mean reversion should be consistent with VM-20

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Steady state credit spread targets:

- Determined by averaging VM-20 general account fixed income ultimate spreads at [12/31/21].

Steady state credit spread targets	IG 1-5	IG 5-10	IG Long	HY
Quality range	[Aa3/AA- to Baa1/BBB+]	[Aa3/AA- to Baa1/BBB+]	[Aa3/AA- to Baa1/BBB+]	[Ba3/BB- to B1/B+]
Maturity (WAL) range	[1 to 5 years]	[>5 to 10 years]	[>10 to 30 years]	[1 to 10 years]
Target (avg. VM-20 ult. spread at [12/31/21])	107 bps	141 bps	163 bps	448 bps

Mean reversion of credit spreads:

- VM-20 prescribes a 4-year grading period for general account fixed income spreads.
- Let "m" = the number of months into the projection when the average modeled credit spread is **halfway** between initial and steady state levels.
- Acceptance criteria: "m" should be between [22] and [26] (i.e., around two years).

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Target excess returns are derived from average VM-20 spreads and the historical relationship between excess returns and Option-Adjusted Spread (OAS) 19

Historical averages (1999 to 2021) from Bloomberg (bps)	IG 1-5	IG 5-10	IG Long	HY
Option Adjusted Spread (OAS)	124	156	1.80	534
Spread Return (determined from OAS and duration series)	129	168	1.95	559
Excess Return	98	100	88	311
Frictional Cost (Spread Return - Excess Return)	31	68	107	248

Historical OAS split –Frictional Cost vs. Excess Return	IG 1-5	IG 5-10	IG Long	HY
Frictional Cost % of OAS	25%	44%	60%	46%
Excess Return % of OAS	75%	56%	40%	54%

Steady state targets (bps)	IG 1-5	IG 5-10	IG Long	HY
Target OAS (avg. VM-20 ult. spread at [12/31/21])	107	141	163	448
Target Excess Return (Target OAS * Excess Return % of OAS)	80	79	66	240
Criteria for avg. annualized Excess Return in years [20-30]*	80 ±[10]	79 ±[10]	66 ±[10]	240 ±[20]

- Frictional Cost % of OAS increases with fund maturity, as longer debt incurs higher migration costs in the IG corporate universe.
- IG 5-10 and HY both have maturities of about seven years as well as similar Frictional Cost % of OAS.
- [Documentation on Bloomberg's excess return definitions/calculations \(pp. 85-88 of linked doc\)](#)

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Proposed cap on maximum excess return 20

The acceptance criteria on the previous slide ensures the **average** (across all scenarios) modeled excess return in years [20-30] is close to the target excess return.

The additional guardrail below protects against overly optimistic risk/reward relationships in an individual scenario.

- Rationale: The high spreads observed during periods of market stress have generally been offset by increased frictional costs and decreased performance of bond index funds (especially for IG Long and HY). Over the long term the upside on credit returns appears limited (capped).
- Let “a” = Target OAS (i.e., average VM-20 ultimate spread at [12/31/21]) + [50 bps].
- Let “b” = any one scenario’s annualized excess return over years [20-30] of the projection.
- “b” should not exceed “a”.

Illustrative application of additional guardrail (bps)	IG 1-5	IG 5-10	IG Long	HY
Target OAS (avg. VM-20 ult. spread at [12/31/21])	107	141	163	448
Target OAS + 50 bps (“a”)	157	191	213	498
Max annualized excess return over years [20-30]:				
Scenario Set ABC (“b”)	190	160	200	660
Scenario Set XYZ (“b”)	140	120	160	350

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Bond fund returns are correlated with equity returns and interest rates (and with other bond fund indices)

21

Modeled Spreads for bond indices should reflect a strong relationship to equity (SPX).

- Positive correlation of $[60\% \pm 10\%]$ to SPX Variance
- Negative correlation of $[-60\% \pm 10\%]$ to SPX Return

Credit risk tends to increase during volatile bear markets, which increases credit spreads.

Note: Acceptance criteria for the correlation of **total** bond index fund returns to equity and interest rates could also be developed.

Modeled Excess Returns for bond indices should also reflect a strong relationship to equity; but directionally inverse to Modeled Spreads.

- Negative correlation to SPX Variance
- Positive correlation to SPX Return

Frictional costs tend to increase during volatile bear markets, which also decreases excess returns.

Modeled Spreads and Excess Returns should reflect a very strong relationship across bond indices.

- Very similar dynamics → Correlations between bond fund indices should be greater than [80%].

Supporting Data:
Historical
Correlations
between Spread
and Equity/Interest
Rate Markets

	Int Rate Level	SPX Variance	SPX Return	IG 1-5 Spread	IG 5-10 Spread	IG Long Spread	HY Spread	Data Period
Int Rate Level	1.00							12/1960 - 12/2021
SPX Variance	0.02	1.00						12/1960 - 12/2021
SPX Return	-0.09	-0.68	1.00					12/1960 - 12/2021
IG 1-5 Spread	-0.18	0.52	-0.54	1.00				1/1990 - 12/2021
IG 5-10 Spread	-0.27	0.59	-0.63	0.92	1.00			1/1999 - 12/2021
IG Long Spread	-0.30	0.57	-0.60	0.82	0.94	1.00		1/1990 - 12/2021
HY Spread	-0.32	0.62	-0.67	0.80	0.87	0.84	1.00	11/1995 - 12/2021

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4.

22

A Simplified Model

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A simplified model for returns on corporate bond fund indices

23

The simplified model is consistent with Conning's previously presented goals and the ESGWG's recommended stylized facts and acceptance criteria.

The simplified model is fully documented, specified, and calibrated. It has been peer reviewed and is ready for implementation.

The model simulates excess returns on the same four corporate bond fund indices.

- Excess return = Spread-based return – Frictional costs.
- Ultimately, Total return (Treasury return + Excess return) would be simulated by adding excess returns to appropriately calculated and internally consistent returns on government bond funds of similar maturity profiles.

The model is simplified in that it implicitly reflects the impact of credit migration and defaults.

- For each of the funds in GEMS, the simplified model derives excess credit-related returns using stochastic credit spreads by rating but reflects the impact of credit migration, defaults, and recoveries as simplified frictional costs.
- The historically implied frictional cost is fitted using a linear functional relationship between the trailing OAS and the costs to rebalance the fund. This fitting approach ensures the frictional cost is positive and increases with the spread.

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A simplified model for returns on corporate bond fund indices (cont.)

24

Steady-state credit spread targets and mean reversion speeds are consistent with VM-20 general account fixed income spreads.

Duration is estimated as a function of bond maturity and bond yield.

- The model captures fluctuations in long maturity fund durations observed when the level of yield changes.

Modeled relationship between credit spreads

- We propose a single random driver for all the indices to ensure rational behavior of credit spreads and capture 90% of spread variation across the indices.

Relationship to Equity and Interest Rates

- Using a simplified correlation matrix, the model captures relationships between credit spreads, equity volatility, equity return, interest rate level, and interest rate volatility.
- This correlation matrix approach can be used to generate stochastic bond index fund excess returns which are consistent with any underlying stochastic interest rate and/or equity model.

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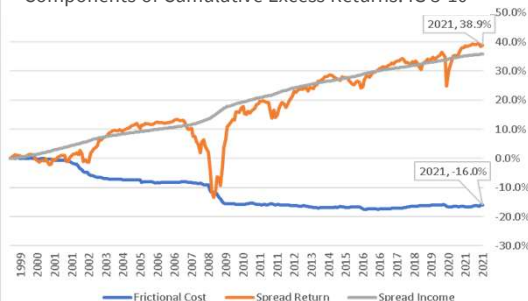
Simplified decomposition of bond index excess return into spread return and frictional cost

25

Excess Return = Spread Return – Frictional Cost, where:

- $Spread Return_t = Spread_{t-1}\Delta t - Duration_{t-1}(Spread_t - Spread_{t-1})$ reflects the earned credit spread as well as the change in market price due to spread movement.
- *Frictional Cost* reflects the effects of defaults, migrations, and otherwise forced rebalancing that occurs within the index fund.

Components of Cumulative Excess Returns: IG 5-10



- Cumulative Excess Return from 1999 to 2021 was 22.9% (100bps/year), as a combination of 38.9% in spread return (average OAS of 168bps) offset by frictional losses of 16% (70bps/year).
- Spread Return was calculated using Bloomberg OAS and duration time series, while the implied Frictional Cost was calculated as Excess Return less Spread Return.
- Spread Return varies with level of spreads, but ultimately reverts to earned spread income.
- Frictional Cost tends to be relatively stable, with costs accruing aggressively in early 1990s, 2000s (.com bubble) and in 2008 (financial crisis) as defaults and migrations punctuate the end of a credit cycle.

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Spread and frictional cost dynamics—Historical behavior

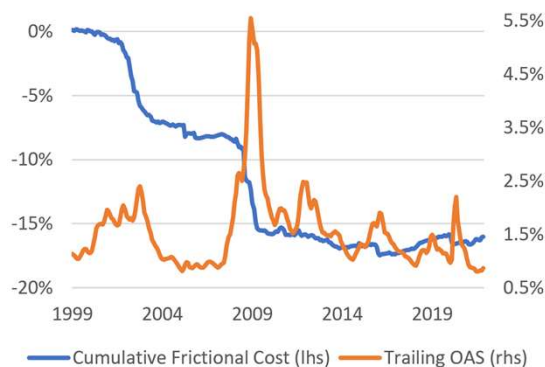
26

OAS exhibits strong mean reversion, zero bound, and clustering. These dynamics, which drive the volatility of Excess Return, are native to a lognormal [Ornstein-Uhlenbeck “OU” process](#).

Cumulative Frictional Cost exhibits a relatively smooth step-like progression with most of the costs occurring during periods of elevated spreads (e.g., during breaks in the credit cycle).

Note: The relationship between spreads, equity returns, and interest rates is captured by correlating the random factors based on the historical correlation of spread residuals.

Spreads and Frictional Costs (IG 5-10)



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Spread and frictional cost dynamics—Simplified modeling

27

Credit Spreads: Simplified model based on mean reverting stochastic processes for each credit rating.

$$ls_t = \min(ls_{t-1} + \beta(\ln(\tau) - ls_{t-1}) + \sigma Z_{ls,t}, \max\_spread) \text{ where } spread_t = e^{ls_t} \text{ subject to reasonable cap, } ls_0 = \ln(\text{init\_spread}),$$

τ (tau) = Target OAS (adj), and β (beta) = mean reversion.

Frictional Cost: Simplified model based on trailing 3-month credit spreads.

$$cost_t = a + m_1 \min(\bar{s}_t, \kappa) + m_2 \max(\bar{s}_t - \kappa, 0) \text{ where } \bar{s}_t = \frac{1}{3} \sum_{i=1,3} spread_{t-i} \text{ is the 3-month trailing avg spread, and } a = \text{drift.}$$

Excess Return: Simplified model based on Excess Return = Spread Return – Frictional Cost.

$$Excess\ Return_t = [spread_t \Delta t - \frac{1}{2}(Dur_t + Dur_{t-1})(spread_t - spread_{t-1})] - cost_t \text{ where:}$$

Dur_t is duration of the underlying fund based on its assumed maturity and semi-annual coupon determined as $coup_t = UST_{t,mat} + spread_t$.

Dur_t is determined using the closed-form approximation $Dur_t = .5(cS_n + nx^n)$ where $c = \max(\frac{1}{2}coup_t, .000001)$, $n = 2 \times \text{maturity}$,

$x = \frac{1}{1+c}$, and $S_n = \frac{x - (n+1)x^{n+1} + nx^{n+2}}{(1-x)^2}$ is the partial sum representing par-coupon durations, while nx^n represents the duration of the principal payment.

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Calibration of the Spread component

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The Spread component is calibrated to monthly historical OAS data sourced from relevant Bloomberg indices using Maximum Likelihood Estimation (MLE).

Index	Bloomberg Ticker	Data Period	Avg. Quality	Avg. Maturity (years)	Avg. OAS (basis points)	Avg. VM-20 Ultimate Spreads at 12/2021 (basis points)
U.S. Corp. IG 1-5	BUC1TRUU	1/1990 - 12/2021	A2 - Baa1	3	112	107
U.S. Corp. IG 5-10	BCR5TRUU	1/1999 - 12/2021	A2 - Baa1	7	156	141
U.S. Corp. IG Long (10-30)	LD07TRUU	1/1990 - 12/2021	A2 - Baa1	23	152	163
U.S. Corp. HY	LF98TRUU	11/1995 - 12/2021	Ba3 - B2	7	509	448

- A single shared random factor is used for all four indices to ensure reasonable relationships between indices (captures 90% of spread variation across the indices).
- Spread mean reversion (β) was set to 3% for all four bond fund indices to ensure reasonable relationships between indices and consistency with VM-20's 4-year grading period.
- Spread volatility (σ) was adjusted accordingly to preserve historical steady state process variance.
- Spread targets (τ) were adjusted to ensure average modeled spreads align with Target OAS (average VM-20 ultimate spread at [12/31/21]).

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Calibration of the Frictional Cost component

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The Frictional Cost component is calibrated to implied 3-month trailing frictional costs:

- Uses the same Bloomberg index data used to calibrate the Spread component.
- Implied frictional cost is determined as the difference between Bloomberg's excess return data and a spread return calculated using Bloomberg's historical duration and OAS data.

The calibration is performed using least squares optimization with constraints:

- Constraint: Drift (α) $\geq .0001$ (ensures a minimum cost).
- Constraint: Multipliers $m_1 \geq 0$ for IG and $m_1 \geq .001$ for HY (ensures dynamic behavior when spreads are low).
- A penalty function is used to constrain cumulative estimated cost to equal historical Frictional Cost during the calibration period (ensures modeled costs will be in line with historical spread levels).

Final adjustments:

- Drift (α) for IG Long was lowered to .0001 to align with the historical ratio of frictional cost to OAS.

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Proposed parameter values

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Parameters for the simplified model
of excess returns on bond index funds

Spread Model

	IG 1-5	IG 5-10	IG Long	HY
tau (τ , spread target)	0.00920	0.01298	0.01493	0.04134
beta (β , mean rev.)	0.03	0.03	0.03	0.03
sigma (σ , volatility)	0.13557	0.09756	0.10181	0.09565
maturity	3.0	7.0	23.0	7.0
max_spread	0.06900	0.05900	0.05000	0.18329
init_spread (12/31/20)	Market based inputs			
VM-20 spread target	0.01069	0.01408	0.01627	0.04475

Frictional Cost Model

	IG 1-5	IG 5-10	IG Long	HY
drift (α)	0.00010	0.00010	0.00010	0.00010
kappa (κ)	0.01239	0.01362	0.01556	0.03650
mult1 (m_1)	0.00000	0.00000	0.00448	0.00100
mult2 (m_2)	0.06265	0.13773	0.18706	0.12111

Parameters (correlations) for implementing the simplified
model alongside existing interest and equity models.

Simplified Corr. Matrix based on ACLI v1.3 & SLV Equity

	Rate Log Vol	Log Long Rate	SPX Log Vol	SPX Return	Credit Spread
Rate Log Vol	1.00				
Log Long Rate	0.00	1.00			
SPX Log Vol	0.00	0.00	1.00		
SPX Return	0.00	0.00	-0.63	1.00	
Credit Spread	0.20	-0.35	-0.55	-0.60	1.00

Simplified Corr. Matrix based on GEMS GFF rates & Heston Equity

	CIR ("level")	SPX Variance	SPX Return	Credit Spread
CIR ("level")	1.00			
SPX Variance	0.00	1.00		
SPX Return	0.00	-0.68	1.00	
Credit Spread	-0.25	0.60	-0.60	1.00

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Excess return cumulative wealth factors—comparison to GEMS

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The simplified model satisfies the acceptance criteria by design (its parameters were explicitly set to meet the criteria).

However, since GEMS results were readily available, and as an additional reasonableness check, the next four slides provide a comparison to GEMS.

- GEMS excess returns were determined by taking total returns from the four corporate bond fund indices and subtracting total returns from government bond fund indices with similar maturity profiles.

Summary

- **IG 1-5 and IG 5-10:** Simplified model and GEMS cumulative excess return distributions are relatively similar.
- **IG Long:** Simplified model cumulative excess return distribution is generally lower than GEMS.
- **HY:** Simplified model cumulative excess returns are significantly lower than GEMS in the right tail of the distribution.

Excess return cumulative wealth factors—IG 1-5

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IG 1-5: Simplified								
	Proj. year							
	1	5	10	15	20	25	30	
Min	0.93	0.90	0.93	0.95	0.99	1.02	1.09	
0.5%	0.97	0.95	0.98	1.02	1.05	1.09	1.13	
1.0%	0.98	0.96	1.00	1.03	1.06	1.10	1.15	
2.5%	0.98	0.98	1.01	1.04	1.08	1.12	1.16	
5.0%	0.99	0.99	1.02	1.05	1.09	1.13	1.18	
10.0%	0.99	1.00	1.03	1.06	1.11	1.15	1.20	
25.0%	1.00	1.01	1.04	1.08	1.13	1.18	1.23	
50.0%	1.00	1.02	1.06	1.10	1.16	1.21	1.27	
75.0%	1.00	1.02	1.07	1.13	1.19	1.25	1.31	
90.0%	1.01	1.03	1.09	1.15	1.21	1.28	1.34	
95.0%	1.01	1.04	1.09	1.16	1.22	1.29	1.37	
97.5%	1.01	1.04	1.10	1.17	1.24	1.31	1.38	
99.0%	1.01	1.04	1.11	1.18	1.26	1.33	1.40	
99.5%	1.01	1.05	1.11	1.19	1.27	1.34	1.42	
Max	1.01	1.06	1.15	1.24	1.31	1.41	1.50	

IG 1-5: GEMS								
	Proj. year							
	1	5	10	15	20	25	30	
Min	0.92	0.91	0.93	0.96	0.98	1.00	1.03	
0.5%	0.96	0.96	0.99	1.02	1.04	1.07	1.10	
1.0%	0.97	0.97	1.00	1.03	1.05	1.08	1.12	
2.5%	0.97	0.98	1.01	1.04	1.07	1.10	1.13	
5.0%	0.98	0.99	1.02	1.05	1.08	1.11	1.14	
10.0%	0.99	1.00	1.03	1.06	1.09	1.12	1.16	
25.0%	1.00	1.01	1.04	1.07	1.11	1.14	1.18	
50.0%	1.00	1.02	1.05	1.09	1.12	1.16	1.20	
75.0%	1.00	1.03	1.06	1.10	1.14	1.19	1.23	
90.0%	1.01	1.03	1.07	1.11	1.16	1.21	1.27	
95.0%	1.01	1.03	1.07	1.12	1.17	1.23	1.29	
97.5%	1.01	1.03	1.08	1.13	1.19	1.25	1.32	
99.0%	1.01	1.04	1.08	1.14	1.20	1.28	1.35	
99.5%	1.01	1.04	1.09	1.15	1.22	1.30	1.38	
Max	1.01	1.05	1.11	1.21	1.33	1.53	1.75	

Excess return cumulative wealth factors—IG 5-10

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IG 5-10: Simplified							
	Proj. year						
	1	5	10	15	20	25	30
Min	0.85	0.76	0.76	0.81	0.86	0.95	0.96
0.5%	0.93	0.88	0.92	0.94	0.98	1.03	1.09
1.0%	0.94	0.91	0.94	0.97	1.01	1.05	1.11
2.5%	0.95	0.93	0.96	1.00	1.04	1.09	1.14
5.0%	0.96	0.95	0.98	1.02	1.07	1.12	1.17
10.0%	0.97	0.97	1.01	1.05	1.10	1.15	1.20
25.0%	0.99	1.00	1.04	1.08	1.13	1.18	1.23
50.0%	1.00	1.02	1.07	1.11	1.16	1.22	1.27
75.0%	1.01	1.04	1.09	1.14	1.19	1.24	1.30
90.0%	1.02	1.05	1.10	1.15	1.21	1.26	1.32
95.0%	1.03	1.06	1.11	1.16	1.22	1.27	1.34
97.5%	1.03	1.06	1.11	1.17	1.22	1.28	1.35
99.0%	1.03	1.07	1.12	1.17	1.23	1.29	1.36
99.5%	1.03	1.07	1.12	1.18	1.24	1.30	1.37
Max	1.04	1.08	1.14	1.20	1.26	1.32	1.41

IG 5-10: GEMS							
	Proj. year						
	1	5	10	15	20	25	30
Min	0.86	0.81	0.78	0.83	0.87	0.89	0.91
0.5%	0.91	0.88	0.92	0.95	0.98	1.02	1.06
1.0%	0.92	0.91	0.94	0.97	1.00	1.04	1.08
2.5%	0.94	0.93	0.96	1.00	1.03	1.07	1.12
5.0%	0.95	0.95	0.98	1.02	1.06	1.10	1.14
10.0%	0.97	0.97	1.01	1.04	1.08	1.13	1.17
25.0%	0.99	1.00	1.04	1.08	1.13	1.17	1.22
50.0%	1.00	1.03	1.07	1.12	1.17	1.22	1.28
75.0%	1.01	1.04	1.09	1.14	1.20	1.26	1.32
90.0%	1.02	1.05	1.10	1.16	1.22	1.29	1.36
95.0%	1.02	1.06	1.11	1.17	1.24	1.31	1.38
97.5%	1.02	1.06	1.12	1.18	1.25	1.32	1.40
99.0%	1.02	1.06	1.12	1.19	1.26	1.34	1.43
99.5%	1.02	1.06	1.13	1.20	1.27	1.36	1.45
Max	1.02	1.07	1.16	1.25	1.36	1.45	1.62

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Excess return cumulative wealth factors—IG Long

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IG Long: Simplified							
	Proj. year						
	1	5	10	15	20	25	30
Min	0.61	0.57	0.57	0.60	0.56	0.67	0.65
0.5%	0.77	0.68	0.71	0.73	0.76	0.78	0.83
1.0%	0.80	0.71	0.74	0.76	0.80	0.82	0.87
2.5%	0.84	0.77	0.80	0.83	0.86	0.89	0.93
5.0%	0.87	0.82	0.85	0.88	0.91	0.95	0.98
10.0%	0.90	0.87	0.90	0.94	0.97	1.01	1.05
25.0%	0.95	0.96	0.99	1.03	1.07	1.11	1.15
50.0%	1.01	1.04	1.08	1.12	1.16	1.21	1.25
75.0%	1.05	1.10	1.14	1.18	1.24	1.29	1.34
90.0%	1.09	1.15	1.19	1.24	1.29	1.35	1.40
95.0%	1.11	1.17	1.22	1.26	1.32	1.38	1.44
97.5%	1.12	1.19	1.24	1.28	1.35	1.40	1.47
99.0%	1.14	1.21	1.26	1.31	1.37	1.43	1.50
99.5%	1.15	1.22	1.27	1.33	1.39	1.45	1.53
Max	1.20	1.28	1.32	1.41	1.46	1.53	1.63

IG Long: GEMS							
	Proj. year						
	1	5	10	15	20	25	30
Min	0.73	0.63	0.60	0.68	0.71	0.78	0.78
0.5%	0.82	0.77	0.81	0.86	0.88	0.93	0.97
1.0%	0.84	0.80	0.84	0.89	0.92	0.98	1.02
2.5%	0.87	0.85	0.89	0.94	0.98	1.03	1.08
5.0%	0.90	0.88	0.93	0.98	1.03	1.08	1.13
10.0%	0.93	0.93	0.97	1.03	1.08	1.13	1.19
25.0%	0.97	0.99	1.04	1.10	1.15	1.22	1.28
50.0%	1.00	1.04	1.10	1.17	1.23	1.30	1.38
75.0%	1.03	1.08	1.15	1.22	1.30	1.38	1.46
90.0%	1.04	1.11	1.19	1.27	1.36	1.44	1.53
95.0%	1.05	1.12	1.21	1.29	1.38	1.48	1.57
97.5%	1.06	1.13	1.22	1.31	1.40	1.50	1.60
99.0%	1.06	1.14	1.24	1.33	1.43	1.54	1.64
99.5%	1.07	1.16	1.25	1.35	1.45	1.56	1.66
Max	1.08	1.19	1.30	1.41	1.55	1.63	1.80

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Excess return cumulative wealth factors—HY

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HY: Simplified							
	Proj. year						
	1	5	10	15	20	25	30
Min	0.62	0.53	0.54	0.67	0.76	1.01	1.05
0.5%	0.81	0.75	0.84	0.94	1.06	1.22	1.45
1.0%	0.83	0.79	0.90	1.00	1.14	1.29	1.51
2.5%	0.87	0.85	0.96	1.09	1.24	1.41	1.62
5.0%	0.90	0.91	1.02	1.16	1.32	1.50	1.72
10.0%	0.93	0.96	1.09	1.24	1.41	1.61	1.84
25.0%	0.98	1.05	1.19	1.36	1.55	1.77	2.02
50.0%	1.02	1.13	1.29	1.47	1.68	1.92	2.19
75.0%	1.06	1.19	1.36	1.56	1.79	2.05	2.34
90.0%	1.10	1.24	1.42	1.62	1.87	2.15	2.46
95.0%	1.11	1.26	1.44	1.66	1.91	2.20	2.52
97.5%	1.13	1.27	1.47	1.68	1.94	2.24	2.57
99.0%	1.14	1.29	1.49	1.72	1.98	2.28	2.63
99.5%	1.15	1.30	1.50	1.73	2.00	2.31	2.66
Max	1.19	1.35	1.56	1.81	2.09	2.41	2.84

HY: GEMS							
	Proj. year						
	1	5	10	15	20	25	30
Min	0.81	0.86	0.89	0.87	0.99	1.07	1.15
0.5%	0.90	0.93	1.00	1.07	1.15	1.23	1.33
1.0%	0.92	0.96	1.03	1.10	1.18	1.28	1.37
2.5%	0.94	0.98	1.06	1.14	1.24	1.34	1.46
5.0%	0.97	1.01	1.09	1.18	1.29	1.41	1.55
10.0%	0.99	1.04	1.13	1.24	1.36	1.50	1.65
25.0%	1.02	1.08	1.20	1.34	1.50	1.67	1.87
50.0%	1.05	1.14	1.30	1.47	1.68	1.91	2.17
75.0%	1.07	1.20	1.41	1.65	1.92	2.22	2.56
90.0%	1.09	1.26	1.54	1.85	2.20	2.59	3.04
95.0%	1.10	1.30	1.63	2.00	2.40	2.88	3.40
97.5%	1.11	1.34	1.72	2.16	2.63	3.18	3.77
99.0%	1.12	1.40	1.87	2.36	2.93	3.56	4.22
99.5%	1.13	1.45	1.95	2.56	3.19	3.84	4.60
Max	1.18	1.87	2.65	3.89	4.30	5.79	6.83

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5.

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Discussion and Q&A

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Thank You

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- Amanda Barry-Moilanen, Life Policy Analyst, barrymoilanen@actuary.org

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6.1

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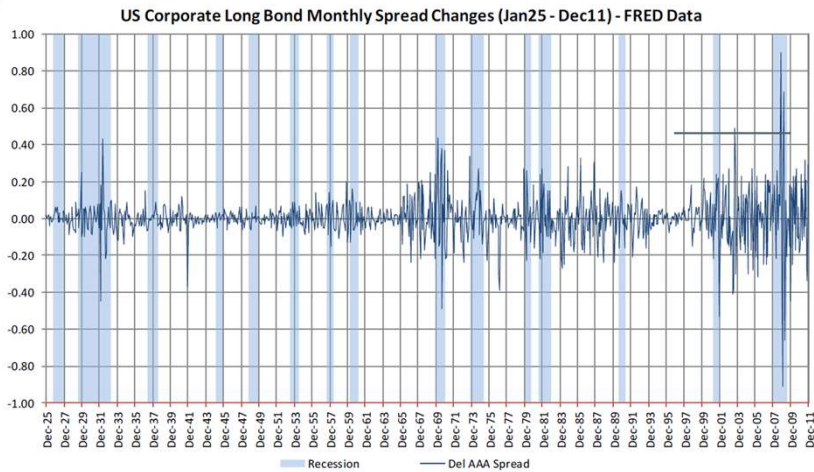
Appendix 1: Support for Stylized Facts

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Support for Stylized Facts: Monthly changes in U.S. credit spreads, 1925–2011

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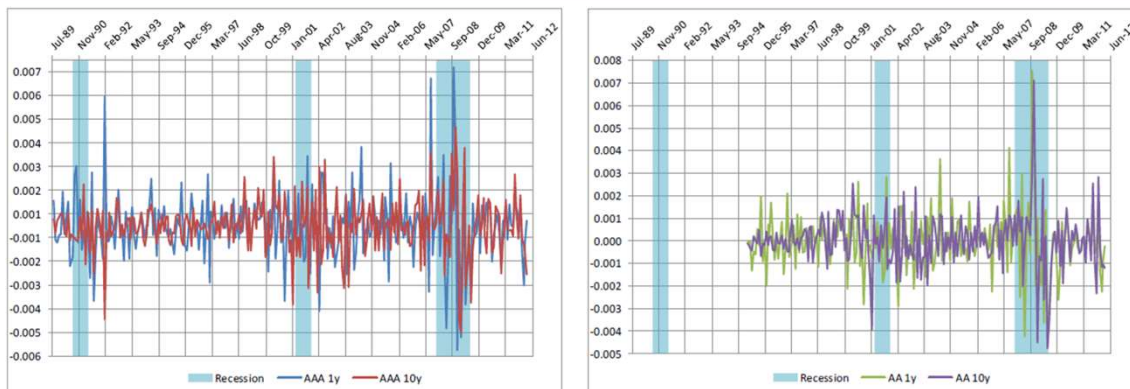
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Support for Stylized Facts: Monthly changes in U.S. credit spreads, 1989–2012 (AAA, AA)

40



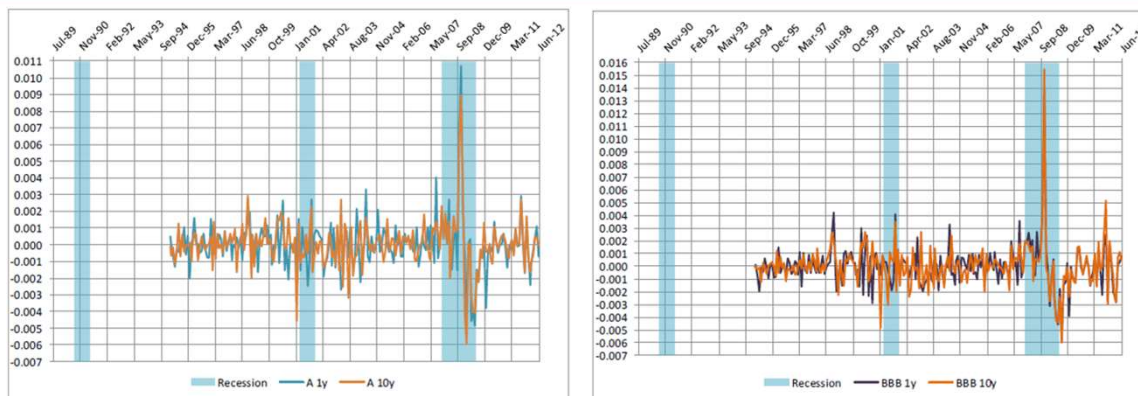
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Support for Stylized Facts: Monthly changes in U.S. credit spreads, 1989–2012 (A, BBB)

41



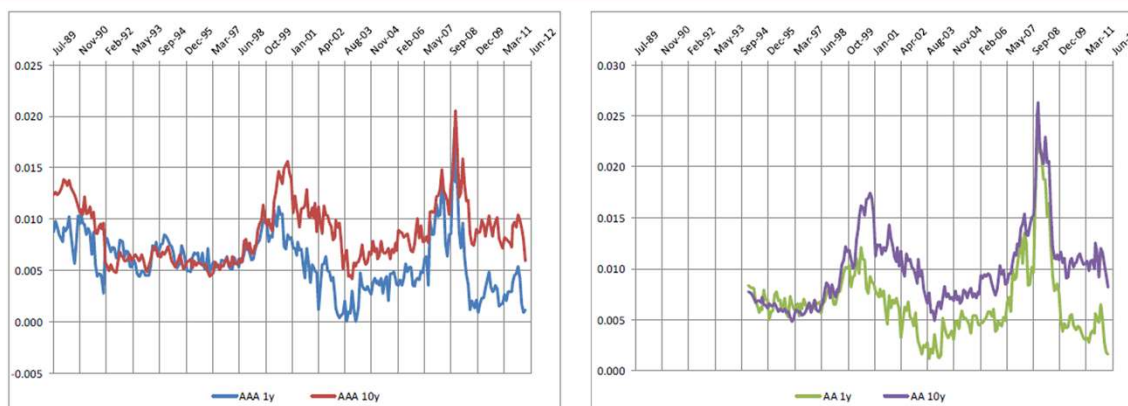
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Support for Stylized Facts: Spreads for U.S. industrial zero-coupon bonds, 1989–2012 (AAA, AA)

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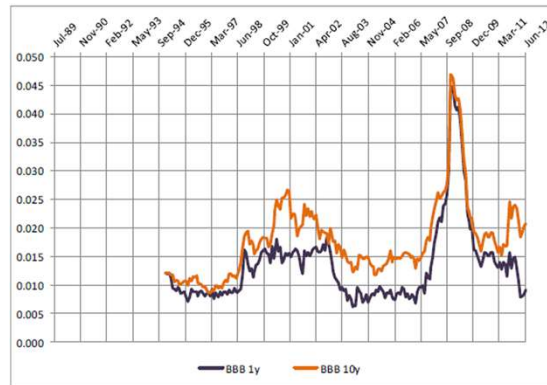
Source: *Economic Scenario Generators: A Practical Guide* (SQA, 2016)

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Support for Stylized Facts: Spreads for U.S. industrial zero-coupon bonds, 1989–2012 (A, BBB)

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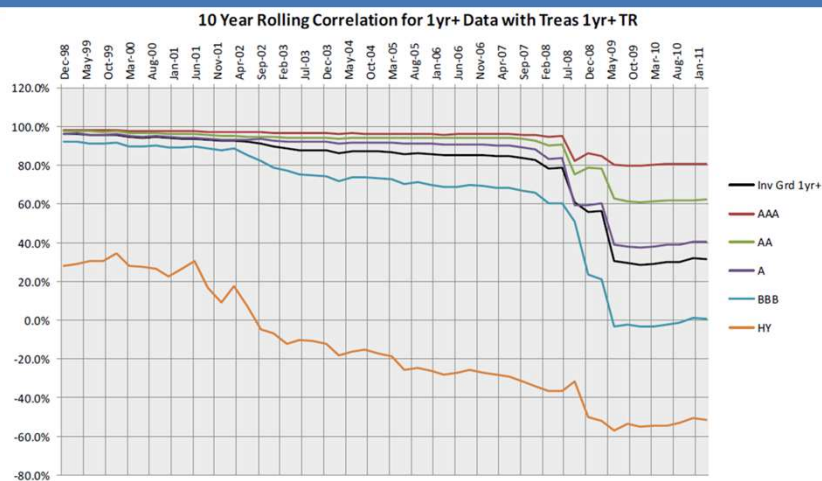
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Support for Stylized Facts: Correlations between corporate bonds and Treasuries, 1998–2011

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Source: *Economic Scenario
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Guide* (SOA, 2016)

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6.2

Appendix 2: Support for Acceptance Criteria

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Determining targets from VM-20 steady state spreads at 12/31/21

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WAL	Aaa AAA	Aa1 AA+	Aa2 AA	Aa3 AA-	A1 A+	A2 A	A3 A-	Baa1 BBB+	Baa2 BBB	Baa3 BBB-	Ba1 BB+	Ba2 BB	Ba3 BB-	B1 B+	B2 B	B3 B-	Caa1 CCC+	Caa2 CCC	Caa3 CCC-	Ca CC
1	37.01	46.90	56.78	64.93	73.08	81.23	98.73	116.22	133.72	218.70	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
2	42.33	53.95	65.58	74.14	82.69	91.25	109.41	127.57	145.72	224.70	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
3	47.64	61.01	74.38	83.35	92.31	101.27	120.09	138.91	157.73	230.71	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
4	52.96	68.07	83.18	92.55	101.92	111.29	130.77	150.25	169.73	236.71	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
5	59.45	74.31	89.17	99.51	109.85	120.19	140.42	160.65	180.88	242.28	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
6	65.94	80.55	95.16	106.47	117.78	129.08	150.07	171.05	192.03	247.86	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
7	68.50	84.18	99.86	110.50	121.14	131.79	152.75	173.72	194.69	249.19	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
8	71.07	87.81	104.55	114.53	124.51	134.49	155.44	176.39	197.34	250.51	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
9	73.63	91.44	109.25	118.56	127.88	137.19	158.12	179.06	199.99	251.84	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
10	75.37	93.27	111.17	120.30	129.44	138.58	159.70	180.83	201.95	252.82	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
11	77.11	95.10	113.08	122.05	131.01	139.97	161.28	182.59	203.90	253.79	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
12	78.85	96.92	115.00	123.79	132.57	141.36	162.86	184.36	205.86	254.77	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
13	80.59	98.75	116.92	125.53	134.14	142.75	164.44	186.12	207.81	255.75	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
14	82.33	100.58	118.84	127.27	135.70	144.14	166.01	187.89	209.77	256.73	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
15	84.07	102.41	120.76	129.01	137.27	145.53	167.59	189.66	211.72	257.70	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
16	85.81	104.24	122.68	130.76	138.84	146.92	169.17	191.42	213.68	258.68	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
17	87.54	106.07	124.59	132.50	140.40	148.31	170.75	193.19	215.63	259.66	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
18	89.28	107.90	126.51	134.24	141.97	149.70	172.33	194.96	217.59	260.64	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
19	91.02	109.73	128.43	135.98	143.53	151.09	173.90	196.72	219.54	261.61	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
20	92.76	111.56	130.35	137.73	145.10	152.47	175.48	198.40	221.50	262.59	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
21	94.50	113.39	132.27	139.47	146.67	153.86	177.06	200.26	223.45	263.57	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
22	96.24	115.21	134.19	141.21	148.23	155.25	178.64	202.02	225.41	264.55	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
23	97.98	117.04	136.11	142.95	149.80	156.64	180.22	203.79	227.36	265.52	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
24	99.72	118.87	138.02	144.69	151.36	158.03	181.79	205.56	229.32	266.50	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
25	101.46	120.70	139.94	146.44	152.93	159.42	183.37	207.32	231.27	267.48	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
26	103.20	122.53	141.86	148.18	154.49	160.81	184.95	209.09	233.23	268.46	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
27	104.94	124.36	143.78	149.92	156.06	162.20	186.53	210.86	235.18	269.43	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
28	106.68	126.19	145.70	151.66	157.63	163.59	188.11	212.62	237.14	270.41	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
29	108.42	128.02	147.62	153.40	159.19	164.98	189.68	214.39	239.09	271.39	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32
30	110.16	129.85	149.53	155.15	160.76	166.37	191.26	216.15	241.05	272.37	303.68	361.21	418.74	476.27	533.79	688.10	842.40	996.71	1151.02	1305.32

	Quality Range	WAL Range	Avg. Spread
IG 1-5	[Aa3 - AA- BBB+]	[1 to 5 yrs]	107
IG 5-10	[Aa3 - AA- BBB+]	[>5 to 10 yrs]	141
IG Long	[Aa3 - AA- BBB+]	[>10 to 30 yrs]	163
HY	[Ba3 - BB- B+]	[1 to 10 yrs]	448

Source: VM-20 Tables H & I at 12/31/21

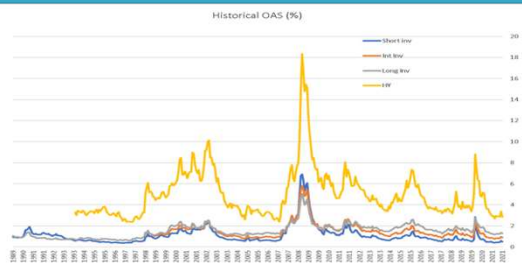
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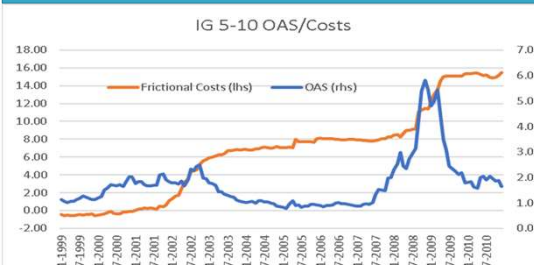
Spread and frictional cost dynamics—History

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- OAS exhibits mean reversion, 0-bound and clustering (OU process).
- Excess Return exhibits volatility driven by spread dynamics.



- Frictional Cost exhibits spikes at the break of the credit cycle when spreads are elevated.



Simplified Decomposition of Bond Fund Excess Return:

Excess Return = Spread Return – Frictional Cost, where $\text{Spread Return}_t = \text{Spread}_{t-1} \Delta t - \text{Duration}_{t-1} (\text{Spread}_t - \text{Spread}_{t-1})$

- *Spread Return* reflects the earned credit spread as well as the change in market price due to spread movement.
- *Frictional Cost* reflects the effects of defaults, migrations, and otherwise forced rebalancing that occurs within the bond fund.

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6.3

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Appendix 3: Additional Detail on Simplified Model

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Adjustments to spread parameters

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Adjustments:

- Beta (β , mean reversion) set to 3% to ensure reasonable spread relationships between indices.
- Sigma (σ , volatility) adjusted to preserve steady state process variance: $\sigma^2/(2\beta - \beta^2)$.
- Tau (τ , spread target) is adjusted to ensure the steady state mean aligns with the VM-20 target and accounts for the convexity in the log-OU process.

Unadjusted (Historical) Parameters					Adjusted Parameters				
	IG 1-5	IG 5-10	IG Long	HY		IG 1-5	IG 5-10	IG Long	HY
tau (τ)	0.01069	0.01408	0.01627	0.04475	tau (τ)	0.00920	0.01275	0.01536	0.04081
beta (β)	0.02927	0.03613	0.01951	0.03443	beta (β)	0.03000	0.03000	0.03000	0.03000
sigma (σ)	0.13394	0.10690	0.08231	0.10235	sigma (σ)	0.13557	0.09756	0.10181	0.09565
maturity	3.0	7.0	23.0	7.0	maturity	3.0	7.0	23.0	7.0
max_spread	0.06900	0.05900	0.05000	0.18329	max_spread	0.06900	0.05900	0.05000	0.18329
VM-20 target	0.01069	0.01408	0.01627	0.04475	VM-20 target	0.01069	0.01408	0.01627	0.04475

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Principle Components Analysis (PCA) Analysis

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The PCA 1 (“Parallel”) factor accounts for 90% of historical variation across modeled indices.

→ Use a single random variable for all four indices to ensure reasonable relationships between indices.

Eigenvector decomposition					Historical correlations between indices				
	PCA 1	PCA 2	PCA 3	PCA 4		IG 1-5	IG 5-10	IG Long	HY
IG 1-5	0.4924	0.6729	0.4257	-0.3515	IG 1-5	1.000			
IG 5-10	0.5192	0.1522	-0.1594	0.8258	IG 5-10	0.920	1.000		
IG Long	0.5007	-0.1262	-0.7382	-0.4340	IG Long	0.822	0.938	1.000	
HY	0.4871	-0.7128	0.4985	-0.0787	HY	0.797	0.871	0.836	1.000
Eigenvalue	3.5943	0.2093	0.1638	0.0325					
R ²	89.9%	5.2%	4.1%	0.8%					

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A simplified correlation matrix

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Correlations between spread and equity/interest rate drivers are based on the historical correlation of spread residuals.

- Correlations between the bond indices were derived using overlapping historical periods from 1/1999 to 12/2021.
- Correlations with equity and interest rate factors were derived based on all available data above.
- Correlations below 11% were set to 0% for brevity.
- Correlations between credit and other market factors were averaged and rounded to nearest 5% for simplicity.

Historical Correlation Matrix									
	CIR 1	CIR 2	CIR 3	SPX Var	SPX Ret	IG 1-5	IG 5-10	IG Long	HY
CIR 1	1.00								
CIR 2	0.00	1.00							
CIR 3	0.00	0.00	1.00						
SPX Var	0.00	0.00	0.00	1.00					
SPX Ret	0.00	0.00	0.00	-0.68	1.00				
IG 1-5	0.00	0.00	-0.18	0.52	-0.54	1.00			
IG 5-10	0.00	0.00	-0.27	0.59	-0.63	0.92	1.00		
IG Long	0.00	0.00	-0.30	0.57	-0.60	0.82	0.94	1.00	
HY	0.00	0.00	-0.32	0.62	-0.67	0.80	0.87	0.84	1.00



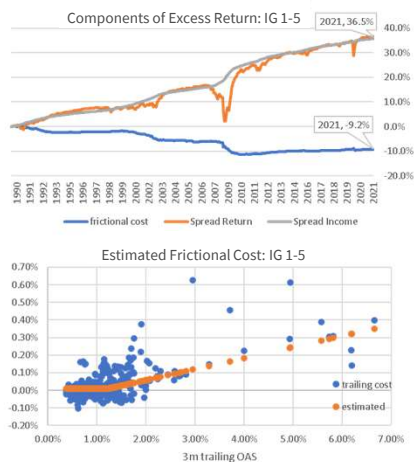
Simplified Correlation Matrix						
	CIR 1	CIR 2	CIR 3	SPX Var	SPX Ret	Spread
CIR 1	1.00					
CIR 2	0.00	1.00				
CIR 3	0.00	0.00	1.00			
SPX Var	0.00	0.00	0.00	1.00		
SPX Ret	0.00	0.00	0.00	-0.68	1.00	
Spread	0.00	0.00	-0.25	0.60	-0.60	1.00

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Historical statistics: IG 1-5

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Frictional Cost Model Parameters: IG 1-5

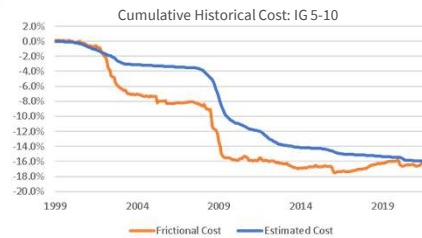
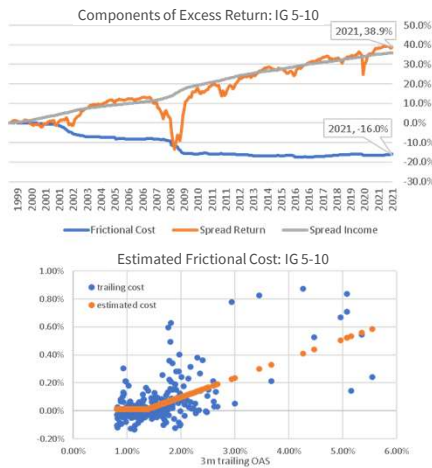
	IG 1-5
min_cost (a)	0.00010
kappa (κ)	0.01239
mult1 (m_1)	0.00000
mult2 (m_2)	0.06265

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Historical statistics: IG 5-10

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Frictional Cost Model Parameters: IG 5-10

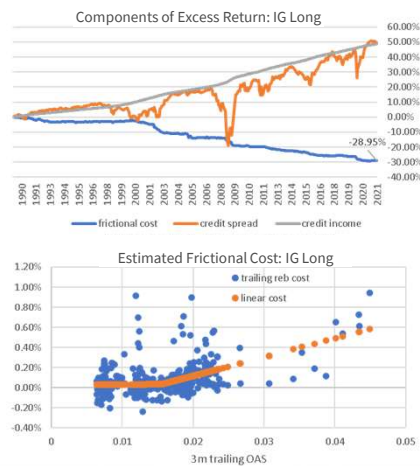
	IG 5-10
min_cost (a)	0.00010
kappa (κ)	0.01362
mult1 (m_1)	0.00000
mult2 (m_2)	0.13773

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Historical statistics: IG Long

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Frictional Cost Model Parameters: IG Long

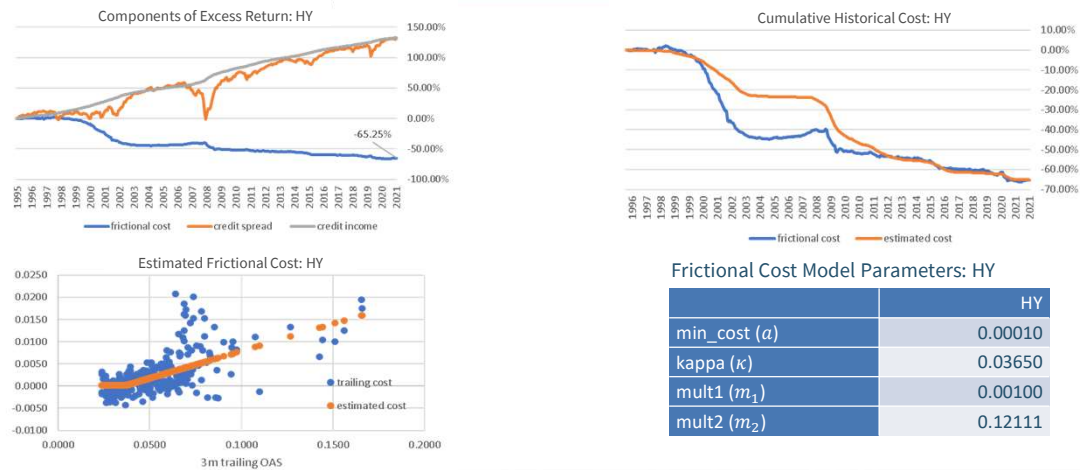
	IG Long
min_cost (a)	0.00010
kappa (κ)	0.01556
mult1 (m_1)	0.00448
mult2 (m_2)	0.18706

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Historical statistics: HY

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Simulation results compared to targets

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Average excess returns are aligned with historically implied targets and meet acceptance criteria for average annualized Excess Return.

The standard deviation (volatility) of monthly excess returns in the scenarios scale with maturity and lower quality (as expected).

Steady state Targets (bps)	IG 1-5	IG 5-10	IG Long	HY
Target OAS (avg. VM-20 ult. spread at [12/31/21])	107	141	163	448
Target Excess Return (Target OAS * Excess Return % of OAS)	80	79	66	240
Criteria for avg. annualized Excess Return in years [20-30]*	80 ±[10]	79 ±[10]	66 ±[10]	240 ±[20]

Simulation results (10,000 scenarios)	IG 1-5	IG 5-10	IG Long	HY
Avg. annualized Excess Return (bps)	72	78	69	256
Std. dev. annualized Excess Return (bps)	1.61%	3.06%	8.57%	8.63%

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Two sample scenarios: Tail 1% and Median

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Questions to the American Academy of Actuaries Economic Scenario Generator Work Group

1. On slide 13, where would bond fund returns solely based on the movement in treasury rates be reflected, in risk-free return, excess return (spread-based return), or somewhere else? For example, consider two years of returns on a bond index fund where the only difference in returns is due to a 100 bp increase in treasury rates in the second year. That is, credit spreads and frictional costs are the same in both years. The MV of the bond fund would be expected to drop in the second year due to the 100 bp rise. Would this drop in MV be reflected as a reduction in the risk-free return? But this does not make sense since the risk-free rate actually increased 100 bp. Do the returns on the bond index funds assume that bonds are held to maturity and therefore changes in MV due solely to movement in interest rates are not reflected in the returns? If bonds need to be sold before maturity, is any gain or loss due to interest rate movement reflected in the frictional cost?
2. On slide 14, I am trying to understand the purpose of the stylized fact that “credit spreads for bond funds held in the separate account should be consistent with economic assumptions for bonds held in the general account”. Is this saying that there should be consistency between how bonds are modeled in the GA and the SA? However, from slide 5, the stylized facts for credit spreads are independent of the model used. Why is this stylized fact under the category bond index fund returns when credit spreads, rather than index returns, are the subject of the stylized fact? Is the purpose of this stylized fact related to what is stated on slide 17, that SA bond fund return scenarios should be consistent with VM-20 prescribed spreads? So, is the stylized fact on slide 14 saying that the spread-based returns for bond funds in the SA should be consistent with the VM-20 prescribed spreads?
3. On bottom of slide 19, steady state targets, is not the comparison between Target OAS and Target Excess Return an apples-to-oranges comparison, since Excess Return is after defaults and the OAS is the average VM-20 ultimate spread which is before defaults?
4. What are the advantages and disadvantages of moving forward with the Academy’s Simplified Corporate Model instead of the Conning GEMS Corporate Model for use in determining statutory reserve and capital?
5. The AAA ESGWG’s stylized fact 6.b. states that “Credit spreads for bond funds held in the separate account should be consistent with economic assumptions for bonds held in the general account.”. When recommending consistency for the Simplified Corporate model, did the AAA ESGWG evaluate the VM-20 spread and default methodology for modeling individual bonds in the general account? If so, are there any assumptions or methodologies therein that could be improved or alternatives?
6. Is there any loss of conservatism in tail scenarios compared to the Conning GEMS Model (assuming similar targets) with the implicit modeling of defaults, recoveries, and credit migrations in the Academy’s Simplified Corporate Model?

Agenda Item 8

Hear from the Academy on ESG Interest Rate
Stylized Facts and Acceptance Criteria

Interest Rates— Stylized Facts and Acceptance Criteria

Jason Kehrberg, MAAA, FSA
Chairperson, Economic Scenario Generator Work Group (ESGWG)

Link Richardson, MAAA, FSA, CERA
Member, Economic Scenario Generator Work Group (ESGWG)

National Association of Insurance Commissioners (NAIC) Life Actuarial (A) Task Force (LATF)
December 11, 2022

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Agenda—Interest rates

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1. Background
2. Stylized Facts
3. Acceptance Criteria
4. Discussion and Q&A

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3

1.

Background

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Background

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LATF asked the Academy to deliver a series of presentations focused on proposing qualitative **Stylized Facts** and quantitative **Acceptance Criteria** for the three major components of an ESG used for statutory reporting purposes: **Interest Rates**, **Equity Returns**, and **Corporate Bond Fund Returns**.

This presentation proposes **Stylized Facts** and **Acceptance Criteria** for Interest Rates that (a) are independent of any specific ESG model, (b) can be used to identify and evaluate candidate ESG models, and (c) can be used to evaluate a set of stochastic scenarios.

Prior presentations in this series:

- A Framework for Working with ESGs (8/8/22)
- ESG Governance Considerations (8/8/22)
- Equity Returns—Stylized Facts (8/9/22)
- Corporate Credit & Bond Fund Returns—Stylized Facts, Acceptance Criteria, and a Simplified Model (10/27/22)

This and future presentations in this series:

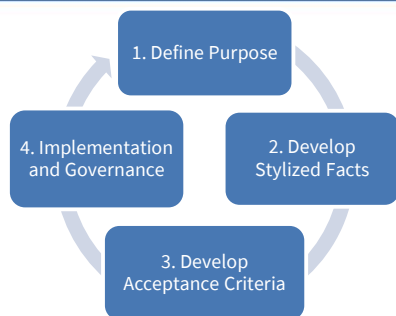
- **Interest Rates—Stylized Facts and Acceptance Criteria**
- Equity Returns—Acceptance Criteria

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A framework for developing, implementing, and evaluating ESGs and the scenario sets they produce

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"Statistical criteria are important in assessing the quality of an ESG. Statistical calibration criteria are usually numerically specified but can also be qualitative in nature. Statistical criteria belong to one of two broad categories: qualitative features and quantitative measures. The issues one must address in both categories are not amenable to a checklist approach, however, and expert judgment plays a role."
(quote from p. 96 of the 2020 CAS/Conning research paper on ESGs)

- 1. Define Purpose:** The intended purpose of the ESG informs the economic variables to be simulated and the relative importance of their "stylized facts."
- 2. Develop Stylized Facts:** Stylized facts describe properties of the economic variables to be simulated. They are based on historical market data and economic theory and are prioritized relative to the defined purpose at hand. The establishment of stylized facts is critical for selecting candidate ESG models and a key prerequisite for the development of acceptance criteria.
- 3. Develop Acceptance Criteria:** A set of quantitative metrics or target values at different time horizons or in different economic conditions that provide a simplified framework for ensuring sets of scenarios produced by the ESG are consistent with key stylized facts.
- 4. Implementation and Governance:** ESG models are selected based on their ability to reflect the stylized facts, then calibrated in accordance with acceptance criteria. Validation reports are produced on each candidate scenario set generated by the ESG. These reports compare scenario set statistics to acceptance criteria and contain other charts and tables useful for evaluation and signoff, which is ultimately a matter of judgement (no automatic "pass" or "fail" based only on acceptance criteria). Implementation is an iterative process. It is important to periodically review and recalibrate the ESG as market conditions change over time.

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Excerpts from the 2020 Casualty Actuarial Society (CAS)/Conning research paper on ESGs

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High-level features of a good ESG:

- "It produces simulation results that reflect the economic view of the risk manager.
- Scenarios are consistent with **realistic market dynamics**.
- A large simulation should produce some **extreme but plausible results** (i.e., the simulation covers and moderately exceeds the benchmark stylized facts).
- Component models and architecture must have sufficient flexibility to serve in multiple roles.

If one discusses the essential features of a good ESG with a diverse group of ESG experts, those experts' lists of features and the relative importance of those features will vary. However, they will set forth a common core of ideas that can serve as a checklist of best practices."

A good ESG:

1. "has a solid methodological foundation for the way the models are built and the way the variables are interrelated, and models are parsimonious, practical, and comprehensive.
2. provides a comprehensive suite of macroeconomic and financial variables and a multi-economy capability.
3. can accommodate many types of calibration views across a wide range of benchmarks.
4. produces simulation results that reflect a relevant view.
5. produces some extreme but plausible outcomes.
6. embeds realistic market dynamics.
7. is computationally efficient and numerically stable.
8. has fast and robust recalibration capabilities.
9. meets the requirements of regulators and auditing firms.
10. produces sufficient simulation detail for extensive validation."

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The NAIC presented LATF with preliminary goals for interest rates on 12/3/20 and preliminary boundary guidance on 2/17/22 7

Preliminary goal	Preliminary boundary guidance
1. The model's starting yield curve should fit the actual starting yield curve as closely as possible. 2. The model should produce a variety of yield curve shapes, and they should change over time.	<i>Yield curve fit and Yield curve shape (priority 4)</i> a) Review initial actual vs. fitted spot curve differences for a sampling of 5 dates representing different shapes and rate levels for the entire curve and review fitted curves qualitatively to confirm they stylistically mimic the different actual yield curve shapes b) The frequency of different yield curve shapes in early durations should be reasonable considering the shape of the starting yield curve (e.g., a flatter yield curve leads to more inversions). c) The steady state curve has normal shape (not inverted for short maturities, longer vs shorter maturities, or between long maturities)
3. Interest rates can be negative.	<i>Negative rates (priority 3)</i> a) All maturities could experience negative interest rates b) Interest rates may remain negative for multi-year time periods c) Rates should generally not be lower than -1.5%

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The NAIC presented LATF with preliminary goals for interest rates on 12/3/20 and preliminary boundary guidance on 2/17/22 (continued) 8

Preliminary goal	Preliminary boundary guidance
4. The model should be capable of producing a reasonable range of results for very long simulations.	<i>High rates (priority 2)</i> a) The scenario set should reasonably reflect history, with some allowance for more extreme high and low interest rate environments b) Upper Bound: i. 20% is $\geq$ 99th percentile on the 3M yield fan chart, and no more than 5% of scenarios have 3M yields that go above 20% in the first 30 years ii. 20% is $\geq$ 99th percentile on the 10Y yield fan chart, and no more than 5% of scenarios have 10Y yields that go above 20% in the first 30 years
5. The ESG should be capable of producing low interest rates for an extended period of time.	<i>Low for long (priority 1)</i> a) For scenarios generated as of 12/31/20, at least 10% of scenarios should have a 10-year geometric average of the 20-year US Treasury yield that is below its current level (e.g., 1.45% at 12/31/20) b) For scenarios generated as of 12/31/20, at least 5% of scenarios should have a 30-year geometric average of the 20-year US Treasury yield that is below its current level (e.g., 1.45% at 12/31/20)

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The NAIC presented LATF with preliminary goals for interest rates on 12/3/20 and preliminary boundary guidance on 2/17/22 (continued) ⁹

Preliminary goal	Preliminary boundary guidance
6. The model should produce interest rate levels that fluctuate significantly over long periods.	<i>Volatility (no priority given)</i> Preliminary boundary guidance not specified
7. The interest rate generator should be arbitrage free.	<i>Arbitrage free (priority 3)</i> No longer considered an explicit requirement in the 2/17/22 preliminary boundary guidance since the NAIC's ESG Drafting Group was proposing the use of a generalized fractional floor.
8. The ESG should be calibrated using an appropriate historical period.	<i>Historical calibration period (no priority given)</i> Preliminary boundary guidance not specified

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2.

Stylized Facts

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Groupings for stylized facts about interest rates

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Stylized Facts have been grouped into the following three categories:

1. Level of Interest Rates
2. Volatility of Interest Rates
3. Term Structure of Interest Rates (shape of yield curve)

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Stylized Facts

1. Level of Interest Rates

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The level of interest rates (the cost of borrowing money) changes due to a variety of complex and interrelated factors (e.g., supply of and demand for financing, business cycle, GDP, inflation, central bank actions to stimulate the economy or control inflation).

- a. Short-term rates (which the Fed has more control of) have generally fallen within a range of 0% to 20% and have most often been within the lower part of that range. Long-term rates have generally been within 300 bps of short-term rates.
- b. Negative interest rates are possible (have been observed outside the U.S.) but unlikely due to structural and market differences between the U.S. and other economies.
- c. Interest rates can exhibit multi-year trends (e.g., up, down, low-for-long). Interest rates can stay at very low levels for several years. Short-term rates can stay very near their lower bound for several years while higher long-term rates continue to fluctuate.

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Stylized Facts

2. Volatility of Interest Rates

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The volatility of interest rates varies over time, with periods of both high and low volatility.

- a. Monthly changes in interest rates are generally limited in size (less than 80 bps) but changes tend to be greater when the level of interest rates is higher.
- b. Monthly changes in short-term rates tend to be larger than monthly changes in long-term rates when short-term rates are not near their lower bound, but the opposite relationship tends to hold when short-term rates are near their lower bound.
- c. Volatility tends to increase in stressed markets.

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Stylized Facts

3. Term Structure of Interest Rates (shape of yield curve)

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The yield curve embodies the term structure of interest rates and takes a variety of shapes.

- a. The normal yield curve shape is upward sloping (long-term rates greater than short-term rates) and concave downward. Normal yield curve shapes can persist for extended periods of time.
- b. Non-normal yield curve shapes include inversions (downward sloping), humps, and valleys. Inversions (and other non-normal yield curve shapes) are often associated with key points in the business cycle (e.g., recession indicator) but generally don't persist for extended periods of time.
- c. The slope of the yield curve tends to be lower (even negative/inverted) when short-term rates are at relatively high levels.

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3.

Acceptance Criteria

Unless otherwise specified, tables and charts on the following slides are based on two primary data sources:

1. Historical U.S. Treasury yields from the "Historical Curves" tab of the August 2022 Academy Interest Rate Generator (AIRG) located at <https://soa.org/resources/tables-calcs-tools/research-scenario/>
2. Simulated U.S. Treasury yields from "10000_Path_Set_1a_Conning_GFF_Baseline_Equity_123121" located at <https://naic.conning.com/scenariofiles>

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This section discusses acceptance criteria around four key properties of interest rates identified in the stylized facts 16

1. Rate level

- Includes criteria around high, low, and negative rates.
- Only **steady state** criteria is being proposed at this point. **Interim** rate level criteria, which depend heavily on initial conditions, are being developed and will be proposed later.

2. Rate volatility

- Criteria varies by rate level (applies to interim and steady state).

3. Yield curve shape

- Criteria varies by rate level (applies to interim and steady state).

4. Low-for-long

- Although the ESGWG has not finalized its proposal for this key property of interest rates, we present our qualitative understanding of low-for-long for discussion and feedback.

Acceptance criteria provide a simplified framework for validating key scenario properties but are only part of a larger validation exercise that includes other charts, statistics, and of course, judgment.

Criteria were developed with the following principles in mind:

- The scenario set should include some extreme but plausible scenarios.
- Pathwise behavior is as important as point-in-time distributions.
- Scenarios should be consistent with realistic market dynamics over both short- and long-term horizons.

"The importance of pathwise model behavior is that it is the simulated path that represents the way an insurance company will experience the evolution of the economy. In other words, The pathwise behavior is the only thing of interest when we want to investigate simulation dynamics. If the overall distribution of returns for an asset class is correct but the pathwise behavior does not correspond to the nature of the fluctuations that we see in the historical record, then there is a potential model issue." (p. 107)

"A good ESG will be capable of being calibrated to coherent targets across multiple simulation horizons." (p. 106)
(quotes from the 2020 CAS/Conning research paper on ESGs)

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Rate level

Historical PEWs (see appendix for additional information on PEWs)

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- Selected 15-year half-life “Percentiles Exponentially Weighted” (PEWs) on historical month-end interest rates are proposed as steady state acceptance criteria for rate level (high, low, and negative).
 - Ideally, corresponding percentiles on scenario sets are “plausibly more extreme” than the PEWs.
- Calculated using data from April 1953, but unlike typical percentiles where data is weighted equally, PEWs give exponentially less weight to older data.
- PEWs are defined by their “half-life.” A half-life of 15 years means data that is 15 years older receives half the weight.
- A half-life of 15 years is suggested to give more weight to recent data while not overreacting to short-term fluctuations.

“Stability versus responsiveness: As a common trade-off and concern in general actuarial work, it is important to consider where the happy medium is between a long period of data (enhancing stability) and a recent shorter data period (that promotes responsiveness to more recent conditions).”
(quote from p. 129 of the 2020 CAS/Conning research paper on ESGs)

15-year half-life PEWs at 12/31/21	20Y	1Y
Max	15.52%	16.97%
99 th PEW	13.55%	13.86%
95 th PEW	9.35%	9.02%
85 th PEW	7.54%	6.22%
70 th PEW	5.77%	4.88%
60 th PEW	4.88%	3.34%
50 th PEW	4.33%	2.11%
40 th PEW	3.35%	1.31%
30 th PEW	2.83%	0.49%
15 th PEW	2.31%	0.16%
5 th PEW	1.78%	0.10%
1 st PEW	1.15%	0.07%
Min	0.98%	0.05%

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Rate level

Criteria for the distribution of steady state interest rates

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	20Y Criteria	1Y Criteria	“Buffers” could provide guidance on “too extreme”
Max	> 15.52%	> 16.97%	[300 bps]
99 th Percentile	> 13.55%	> 13.86%	[275 bps]
95 th Percentile	> 9.35%	> 9.02%	[250 bps]
85 th Percentile	> 7.54%	> 6.22%	[225 bps]
70 th Percentile	> 5.77%	> 4.88%	[200 bps]
50 th Percentile	> 3.35% and < 4.88%	> 1.31% and < 3.34%	n/a
30 th Percentile	< 2.83%	< 0.49%	[60 bps]
15 th Percentile	< 2.31%	< 0.16%	[70 bps]
5 th Percentile	< 1.78%	< 0.10%	[80 bps]
1 st Percentile	< 1.15%	< 0.07%	[90 bps]
Min	< 0.98%	< 0.05%	[100 bps]

- Criteria is based on 15-year half-life PEWs.
 - Scenarios should be “plausibly more extreme” than the PEWs.
 - But scenarios that exceed the PEWs by more than a “buffer” may be “too extreme”.
- Test statistics:
 - Percentiles of the [20Y] and [1Y] rate distributions at month [600] (year [50]).
 - Max and Min of the [20Y] and [1Y] rate distributions are from projection months [480] through [720] (years [40] through [60]).
- Note, the range for the 50th percentile (Median) is based on the 40th and 60th PEW.

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Rate level

Illustrative application of criteria to field test scenario set #1a

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	20Y Criteria	1Y Criteria	Buffers	20Y Stat	20Y Result	1Y Stat	1Y Result
Max	> 15.52%	> 16.97%	[300 bps]	25.66%	> Buffer (714 bps)	29.60%	> Buffer (963 bps)
99 th Percentile	> 13.55%	> 13.86%	[275 bps]	14.39%	In range	15.40%	In range
95 th Percentile	> 9.35%	> 9.02%	[250 bps]	10.60%	In range	11.09%	In range
85 th Percentile	> 7.54%	> 6.22%	[225 bps]	7.68%	In range	7.41%	In range
70 th Percentile	> 5.77%	> 4.88%	[200 bps]	5.76%	< PEW (1 bp)	4.71%	< PEW (17 bps)
50 th Percentile	> 3.35% and < 4.88%	> 1.31% and < 3.34%	n/a	4.20%	In range	2.35%	In range
30 th Percentile	< 2.83%	< 0.49%	[60 bps]	2.85%	> PEW (2 bps)	0.40%	In range
15 th Percentile	< 2.31%	< 0.16%	[70 bps]	1.85%	In range	0.07%	In range
5 th Percentile	< 1.78%	< 0.10%	[80 bps]	0.99%	In range	-0.26%	In range
1 st Percentile	< 1.15%	< 0.07%	[90 bps]	0.38%	In range	-0.53%	In range
Min	< 0.98%	< 0.05%	[100 bps]	0.22%	In range	-0.79%	In range

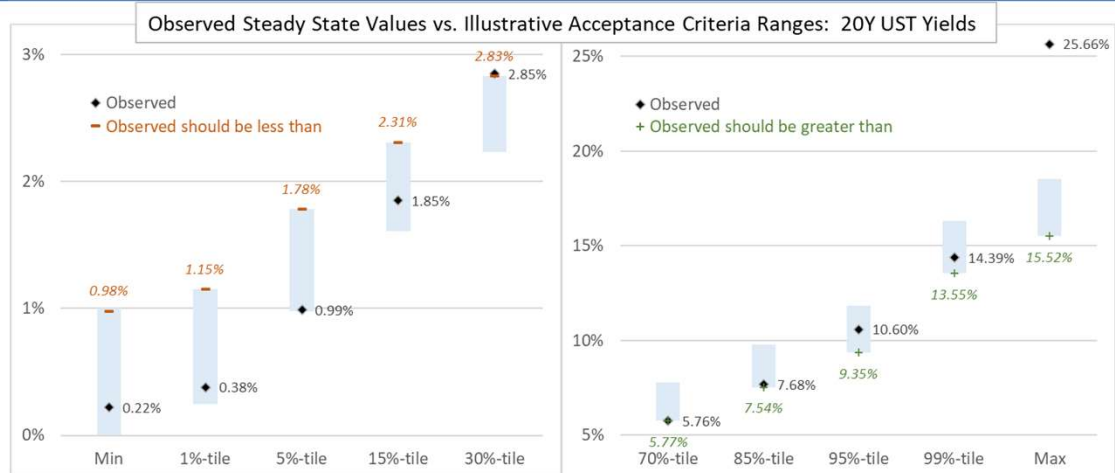
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Rate level

Illustrative application of criteria to field test scenario set #1a (continued)

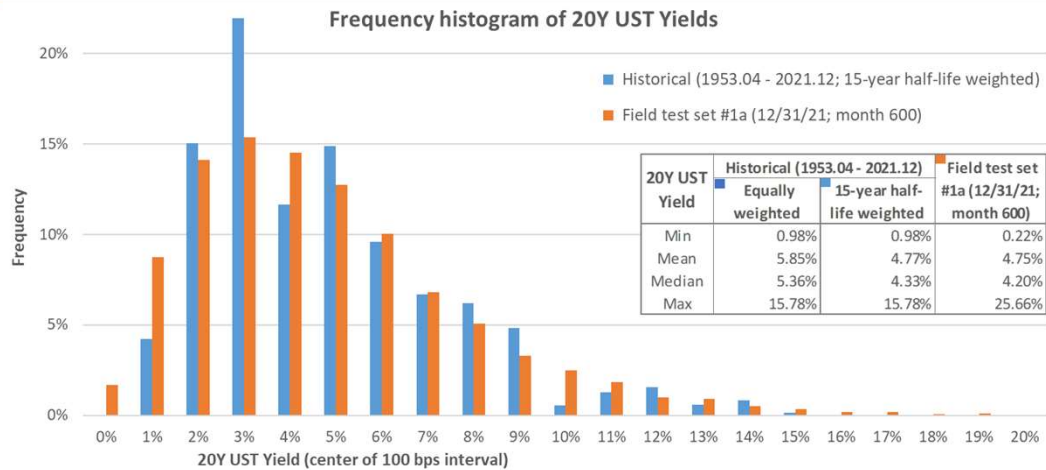
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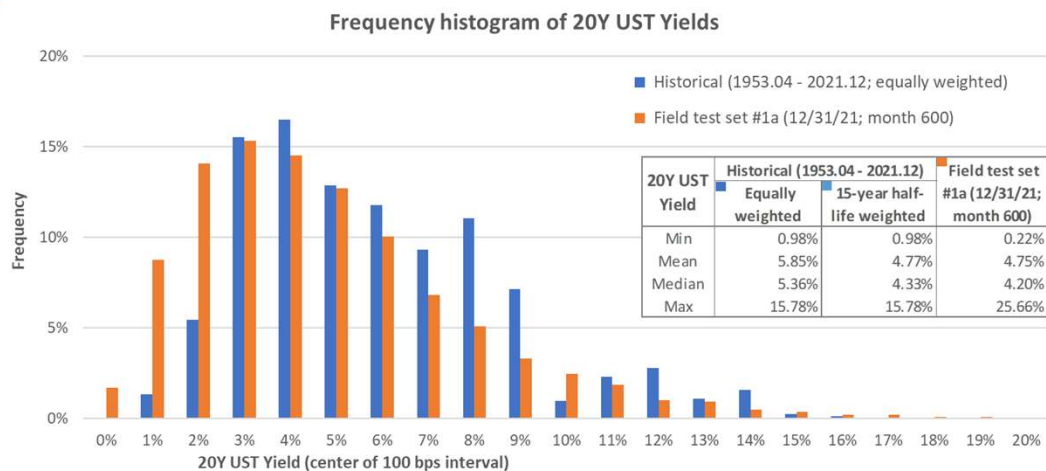
Rate level
Supplemental chart for evaluating rate levels on consistent basis with PEWs 21



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Rate level
Supplemental chart for evaluating rate levels on consistent basis with PEWs 22

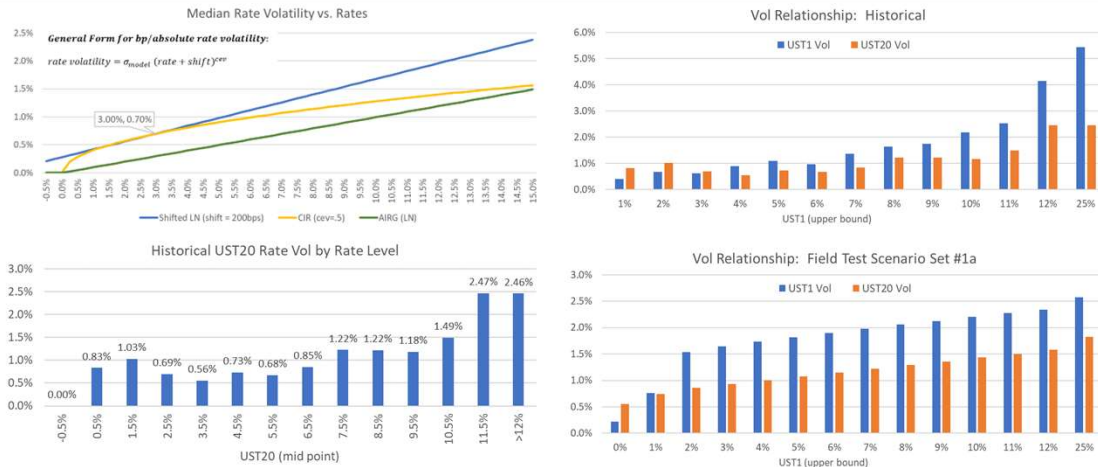


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Rate volatility Background

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Rate volatility Historical statistics and Criteria

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Historical volatility statistics

Annualized standard deviation of monthly yield changes from 1953.04 to 2021.12, bucketed by yield level at beginning of month (BOM):

Bucket	Yield Level (BOM)	1Y	20Y
Low	[≤ 3%]	0.59%	0.61%
Medium	[> 3%, ≤ 8%]	1.16%	0.74%
High	[> 8%]	3.32%	1.54%

Note that short (1Y) rate volatility tends to exceed long (20Y) rate volatility, except when rates are low.

Volatility criteria

- » For the relevant test statistics on the candidate scenario set, calculate the annualized standard deviation of monthly yield changes across all scenarios, bucketed by the rate level at the BOM.
 - Calculate the above test statistics for both the first [10] years and steady state, e.g., years [40] to [60].
- » The above test statistics should be “reasonably close” to the historical volatility statistics in the table to the left.
 - For example, the above test statistics should be within [X]% of historical volatility statistics.

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Rate volatility

Illustrative application of rate volatility criteria to field test scenario set #1a 25

Tabular comparison of annualized standard deviation of 1Y and 20Y UST rates to history

	Bucket	Yield Level (BOM)	History	First [10] years		Steady state*	
				Simulated	Difference	Simulated	Difference
1Y UST	Low	[≤ 3%]	0.59%	1.06%	47 bps above	1.05%	46 bps above
	Medium	[> 3%, ≤ 8%]	1.16%	1.88%	72 bps above	1.85%	69 bps above
	High	[> 8%]	3.32%	2.31%	101 bps below	2.31%	101 bps below
20Y UST	Low	[≤ 3%]	0.61%	0.66%	5 bps above	0.68%	7 bps above
	Medium	[> 3%, ≤ 8%]	0.74%	1.00%	26 bps above	1.11%	37 bps above
	High	[> 8%]	1.54%	1.61%	7 bps above	1.69%	15 bps above

* Years [40] to [60]

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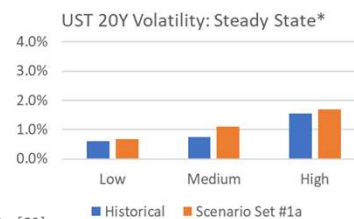
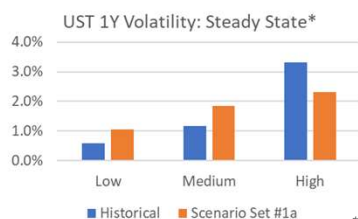
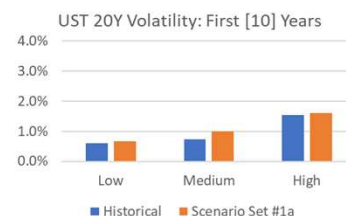
Rate volatility

Illustrative application of rate volatility criteria to field test scenario set #1a 26

Graphical comparison of annualized standard deviation of 1Y and 20Y UST rates to history

Observations on Set #1a:

- Initial and steady state volatility are similar
- Volatility is generally higher than history
- In the Low bucket:
 - 1Y volatility roughly double history
 - 20Y volatility roughly equal to history



*Years [40] to [60]

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Yield curve slope Historical statistics

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Historical yield curve slope statistics

Selected percentiles on the distribution of slope (month-end [20Y] less month-end [1Y] yields) from 1953.04 to 2021.12, bucketed by [20Y] rate:

Bucket	Yield Level (BOM)	% Inverted	Min	5%	15%	30%	Median	70%	85%	95%	Max
Low	[≤ 3%]	0%	0.0%	0.3%	0.5%	1.1%	1.6%	2.0%	2.3%	2.6%	2.9%
Medium	[> 3%, ≤ 8%]	17%	-1.4%	-0.5%	-0.1%	0.4%	0.9%	1.8%	3.3%	3.8%	4.3%
High	[> 8%]	25%	-3.4%	-1.5%	-0.8%	0.3%	1.2%	1.8%	2.1%	2.7%	3.9%

Criteria

- For the test statistics on the candidate scenario set, calculate selected percentiles on the distribution of slope ([20Y] less [1Y] yield) across all scenarios, bucketed by the level of the [20Y] yield level.
 - Calculate above for both the first [10] years and steady state, e.g., years [40] to [60].
- The [15th] and [85th] percentiles should be “plausibly more extreme” than history.

Historical data indicates the distribution of curve shapes (particularly inversions) varies by rate level.

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Yield curve slope Illustrative application of criteria to field test scenario set #1a

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Historical

Bucket	Inv %	Min	5%	15%	30%	Median	70%	85%	95%	Max
Low	0%	0.0%	0.3%	0.5%	1.1%	1.6%	2.0%	2.3%	2.6%	2.9%
Medium	17%	-1.4%	-0.5%	-0.1%	0.4%	0.9%	1.8%	3.3%	3.8%	4.3%
High	25%	-3.4%	-1.5%	-0.8%	0.3%	1.2%	1.8%	2.1%	2.7%	3.9%

Field test #1a (first [10] years)

Bucket	Inv %	Min	5%	15%	30%	Median	70%	85%	95%	Max
Low	6%	-4.5%	-0.2%	0.6%	1.0%	1.3%	1.6%	1.9%	2.2%	3.1%
Medium	35%	-9.2%	-2.6%	-1.3%	-0.3%	0.7%	1.5%	2.3%	3.0%	4.5%
High	62%	-10.0%	-5.2%	-3.4%	-2.0%	-0.7%	0.5%	1.3%	2.2%	3.7%

Difference (field test #1a less historical)

Bucket	Inv %	Min	5%	15%	30%	Median	70%	85%	95%	Max
Low	6%	-4.6%	-0.5%	0.1%	-0.2%	-0.3%	-0.5%	-0.4%	-0.4%	0.2%
Medium	18%	-7.9%	-2.1%	-1.2%	-0.6%	-0.3%	-0.3%	-1.0%	-0.8%	0.3%
High	37%	-6.7%	-3.7%	-2.5%	-2.3%	-1.9%	-1.3%	-0.8%	-0.5%	-0.2%

Notes:

- Slope = [20Y] less [1Y] yield
- Bucketed by [20Y] yield
- Buckets:
 - Low [≤ 3%]
 - Medium [> 3%, ≤ 8%]
 - High [> 8%]
- The [15th] percentile is more extreme than history if the difference is negative.
- The [85th] percentile is more extreme than history if the difference is positive.

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Yield curve slope

Illustrative application of criteria to field test scenario set #1a

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Historical

Bucket	Inv %	Min	5%	15%	30%	Median	70%	85%	95%	Max
Low	0%	0.0%	0.3%	0.5%	1.1%	1.6%	2.0%	2.3%	2.6%	2.9%
Medium	17%	-1.4%	-0.5%	-0.1%	0.4%	0.9%	1.8%	3.3%	3.8%	4.3%
High	25%	-3.4%	-1.5%	-0.8%	0.3%	1.2%	1.8%	2.1%	2.7%	3.9%

Field test #1a (steady state, e.g., years [40] to [60])

Bucket	Inv %	Min	5%	15%	30%	Median	70%	85%	95%	Max
Low	4%	-4.5%	0.3%	0.9%	1.2%	1.6%	2.0%	2.3%	2.6%	3.1%
Medium	19%	-10.5%	-2.0%	-0.4%	0.7%	1.7%	2.5%	3.1%	3.5%	4.6%
High	39%	-11.3%	-3.6%	-1.8%	-0.5%	0.6%	1.5%	2.2%	2.8%	4.2%

Difference (field test #1a less historical)

Bucket	Inv %	Min	5%	15%	30%	Median	70%	85%	95%	Max
Low	4%	-4.5%	0.0%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%
Medium	2%	-9.2%	-1.5%	-0.3%	0.4%	0.8%	0.8%	-0.2%	-0.3%	0.4%
High	14%	-8.0%	-2.0%	-1.0%	-0.8%	-0.6%	-0.3%	0.1%	0.1%	0.3%

Notes:

- Slope = [20Y] less [1Y] yield
- Bucketed by [20Y] yield
- Buckets:
 - Low [$\leq 3\%$]
 - Medium [$> 3\%, \leq 8\%$]
 - High [$> 8\%$]
- The [15th] percentile is more extreme than history if the difference is negative.
- The [85th] percentile is more extreme than history if the difference is positive.

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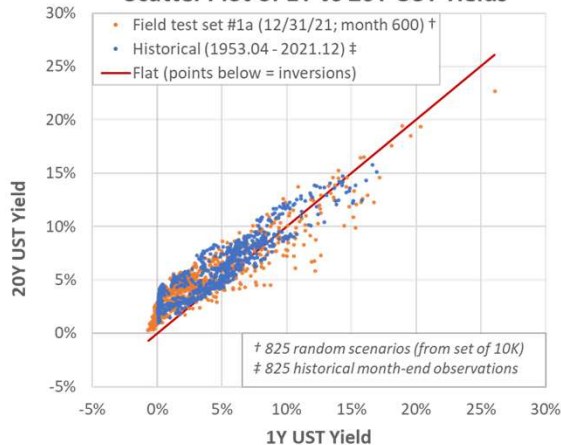


Yield curve slope

Supplemental chart for evaluating rate yield curve slope

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Scatter Plot of 1Y vs 20Y UST Yields



Statistics

Historical (1953.04 - 2021.12)

- Min spread = -336 bps
- Mean spread = 122 bps
- Max spread = 425 bps
- StDev spread = 132 bps
- Inversion freq. = 16%
- Mean inversion = -63 bps

Field test set #1a (12/31/21; month 600) *

- Min spread = -926 bps
- Mean spread = 129 bps
- Max spread = 448 bps
- StDev spread = 159 bps
- Inversion freq. = 17%
- Mean inversion = -146 bps

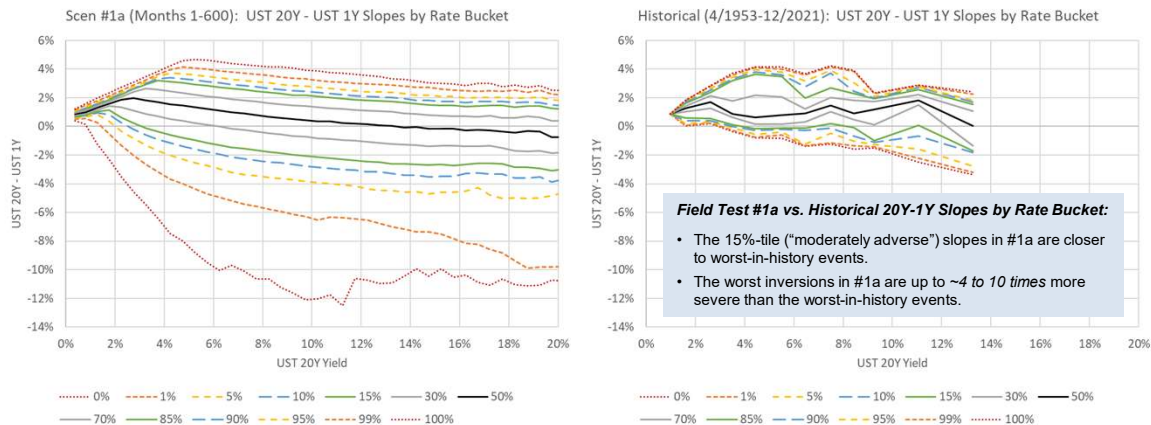
* Stats based on all 10K scenarios

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Yield curve slope Supplemental chart for evaluating rate yield curve slope

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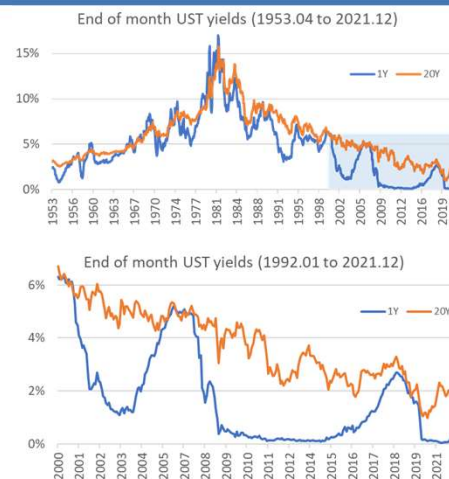
4. Low-for-long Qualitative understanding

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Although the ESGWG has not finalized its proposal for this key property of interest rates, we present our qualitative understanding of low-for-long for discussion and feedback.

Historical observations on low-for-long interest rate behavior:

- (a) The long rate [20Y] stays below a threshold [3%] for an extended period of time [5+ years]. (b) During this time, the long rate continues to fluctuate as usual.
- (a) The short rate [1Y] is "stuck" in a very narrow range [50bps] above zero. (b) During this time, short rate volatility (which normally exceeds long rate volatility) drops to near zero.
- Low-for-long is a relatively recent phenomenon (post-2000 in the US; limited historical data).



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4.

Discussion and Q&A

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Thank You

Contact:

- Amanda Barry-Moilanen, Life Policy Analyst, barrymoilanen@actuary.org

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Appendix

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PEWs

Additional information on Percentiles Exponentially Weighted (PEWs)

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The development of historical statistics for economic variables such as interest rates and equity rates involves subjective decisions such as how much history to include. One way to make use of all available data, but to focus more heavily on more recent data, is to develop exponentially weighted averages and percentiles.

An AWE is an Average Weighted Exponentially, with parameter Alpha. The most recent historical period, typically a month, gets an initial weight of 100%. Each prior historical period gets $(1-\alpha)$ times the weight of the next most recent period. Based on the number of historical periods of available data, the weights are then normalized so that their sum is 100%. The AWE is simply the weighted average of all the available or selected data. The “half-life” is then the period of time for which the cumulative weight reaches 50%.

PEWs apply the same concept to develop exponentially weighted percentiles. The historical values are unchanged, but their relative weight is dependent on when they occurred. Values are rank-ordered, with percentiles based on the sum of the relative weights up to the particular value. It may be desirable to assign percentiles at the center of each value’s weight range, especially if extreme values are important or statistical distributions will be fitted to the percentiles.

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PEWs Historical UST 20Y PEWs at different half-lives (12/31/2021)

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	Equally Weighted	20Yr Half-Life	15Yr Half-Life	10Yr Half-Life	5Yr Half-Life
Maximum	15.52 %	15.52 %	15.52 %	15.52 %	15.52 %
99th PEW	13.92 %	13.63 %	13.55 %	12.49 %	8.11 %
95th PEW	11.70 %	10.44 %	9.35 %	8.59 %	5.78 %
85th PEW	8.48 %	7.94 %	7.54 %	6.47 %	4.47 %
70th PEW	7.09 %	6.20 %	5.77 %	4.87 %	3.08 %
50th PEW	5.36 %	4.64 %	4.33 %	3.31 %	2.66 %
30th PEW	4.06 %	3.05 %	2.83 %	2.63 %	2.20 %
15th PEW	2.95 %	2.47 %	2.31 %	2.08 %	1.85 %
5th PEW	2.31 %	1.85 %	1.78 %	1.45 %	1.23 %
1st PEW	1.43 %	1.18 %	1.15 %	1.05 %	1.05 %
Minimum	0.98 %	0.98 %	0.98 %	0.98 %	0.98 %
Max minus Min	14.54 %	14.54 %	14.54 %	14.54 %	14.54 %
99th minus 1st	12.48 %	12.45 %	12.40 %	11.44 %	7.06 %
95th minus 5th	9.39 %	8.59 %	7.57 %	7.14 %	4.55 %
85th minus 15th	5.53 %	5.47 %	5.23 %	4.39 %	2.62 %
70th minus 30th	3.03 %	3.15 %	2.94 %	2.24 %	0.88 %

* Historical 20 year Treasury rates are from: 1) 1953.04 - 1977.01 - monthly average rates from Fed H15 monthly history report;
2) 1977.02 - 1993.09 - estimated month-end 20 year rates by averaging 10 year and 30 year; 3) 1993.10 - current: actual month end rates.

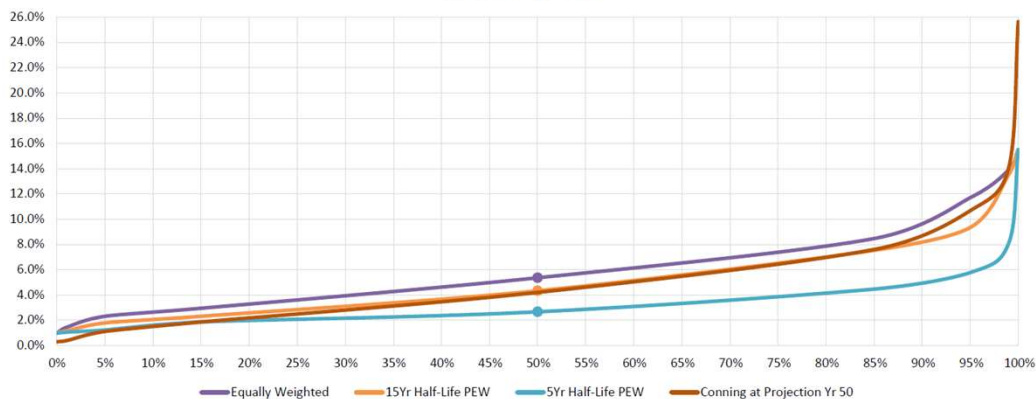
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PEWs Chart of UST 20Y PEWs at different half-lives (12/31/2021)

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20Yr Treasury Cumulative Distribution Function
1953.04 - 2021.12



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PEWs Historical movement in 15-year half-life PEWs

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	PEWs from April 1953 through:						
	1971.12 (50 years ago)	1991.12 (30 years ago)	2001.12 (20 years ago)	2011.12 (10 years ago)	2016.12 (5 years ago)	2020.12 (1 year ago)	2021.12 Current
Maximum	7.34 %	15.52 %	15.52 %	15.52 %	15.52 %	15.52 %	15.52 %
99th PEW	7.24 %	14.32 %	14.03 %	13.88 %	13.63 %	13.55 %	13.55 %
95th PEW	6.85 %	13.28 %	12.48 %	11.45 %	10.64 %	10.04 %	9.35 %
85th PEW	6.18 %	11.19 %	9.18 %	8.34 %	8.01 %	7.60 %	7.54 %
Mean (AWE)	4.60 %	8.03 %	7.38 %	6.24 %	5.46 %	4.91 %	4.77 %
50th PEW	4.20 %	8.11 %	7.05 %	5.68 %	4.91 %	4.47 %	4.33 %
15th PEW	3.30 %	4.25 %	5.46 %	4.19 %	2.77 %	2.49 %	2.31 %
5th PEW	2.86 %	3.49 %	3.96 %	3.61 %	2.31 %	1.78 %	1.78 %
1st PEW	2.60 %	2.80 %	2.93 %	2.66 %	1.90 %	1.15 %	1.15 %
Minimum	2.57 %	2.57 %	2.57 %	2.57 %	1.78 %	0.98 %	0.98 %
99th minus 1st	4.64 %	11.52 %	11.10 %	11.22 %	11.73 %	12.40 %	12.40 %
95th minus 5th	3.99 %	9.79 %	8.52 %	7.84 %	8.33 %	8.26 %	7.57 %
85th minus 15th	2.88 %	6.94 %	3.72 %	4.15 %	5.24 %	5.11 %	5.23 %

* Percentiles Exponentially Weighted (PEW) are determined by the specified alpha

* Historical 20 year Treasury rates are from: 1) 1953.04 - 1977.01 - monthly average rates from Fed H15 monthly history report;

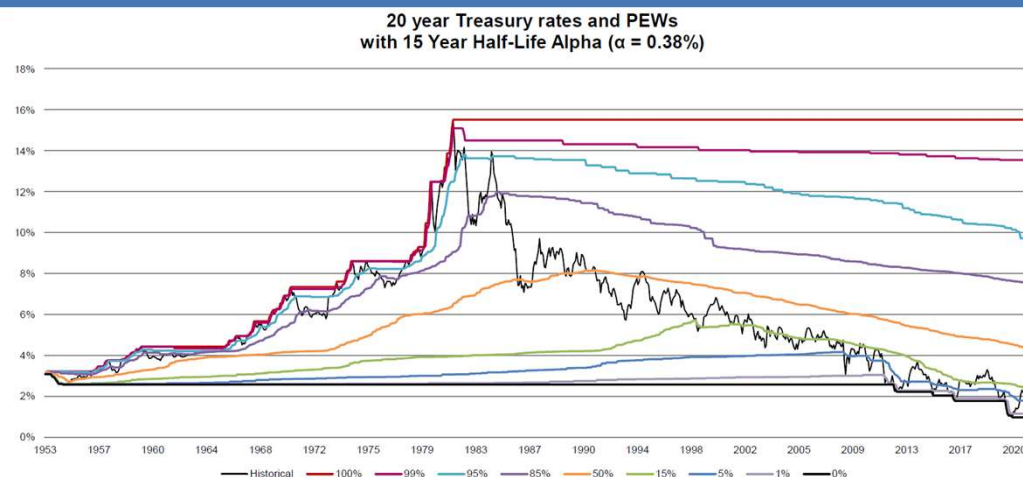
2) 1977.02 - 1993.09 - estimated month-end 20 year rates by averaging 10 year and 30 year; 3) 1993.10 - current: actual month end rates.

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PEWs Chart of historical movement in 15-year half-life PEWs

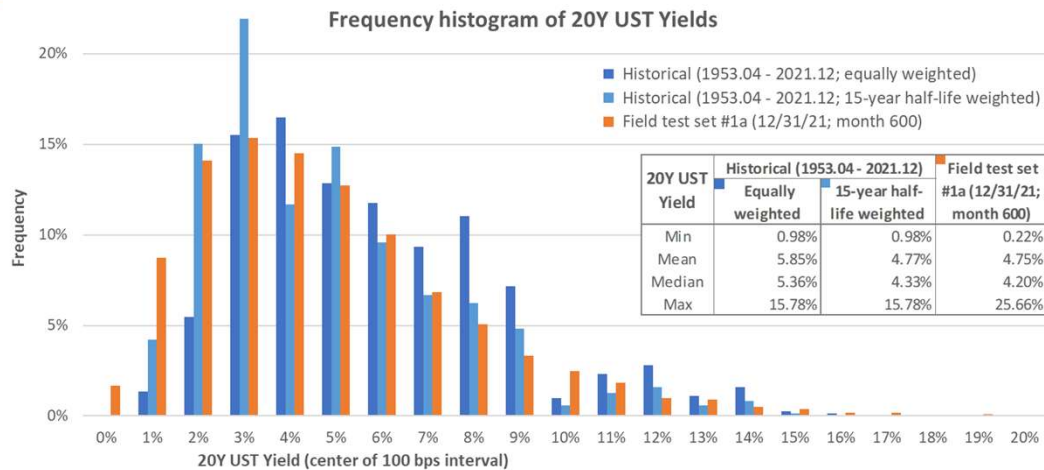
40



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Rate level Supplemental chart for evaluating rate levels on consistent basis with PEWs 41



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Yield curve slope (bucketed by 20Y rate) Historical Slope Data (4/1953 - 12/2020)

Observations:

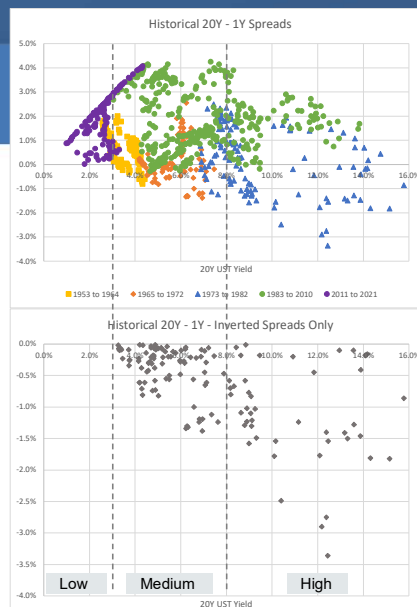
- No inversions for UST 20-year yields below 3%
- Severity of inversions generally increases with rate levels
- Other variations in curve steepness by rate level
- Recommend slope criteria based on simplified Low / Medium / High 20Y yield buckets to capture historical dynamics while not being overly constraining
- Also considers alignment with volatility buckets

ALL Spreads

Rate Bucket (20Y)	Inverted Months	Total Months	% Inverted	Min Spread	15%	50%	85%	Max Spread	Avg Spread
[0% 1%]	0	1	0%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
[1% 2%]	0	23	0%	0.0%	0.6%	1.3%	1.6%	1.8%	1.2%
[2% 3%]	0	107	0%	0.2%	0.5%	1.7%	2.4%	2.9%	1.6%
[3% 4%]	11	102	11%	-0.3%	0.1%	0.9%	3.2%	3.7%	1.4%
[4% 5%]	32	146	22%	-0.8%	-0.2%	0.6%	3.6%	4.1%	1.2%
[5% 6%]	18	89	20%	-0.8%	-0.1%	0.8%	3.5%	4.2%	1.3%
[6% 7%]	18	93	19%	-1.4%	-0.1%	0.9%	2.0%	3.7%	0.9%
[7% 8%]	10	82	12%	-1.2%	0.2%	1.5%	2.7%	4.3%	1.5%
[8% 9%]	14	79	18%	-1.6%	-0.1%	0.9%	2.3%	3.9%	1.1%
[9% 10%]	7	29	24%	-1.5%	-1.0%	1.2%	1.9%	2.3%	0.8%
> 10%	24	74	32%	-3.4%	-1.5%	1.4%	2.2%	2.9%	0.9%
All	134	825	16%	-3.4%	-0.1%	1.1%	2.7%	4.3%	1.2%

INVERTED Spreads Only

Rate Bucket (20Y)	Inverted Months	Total Months	% Inverted	Most Negative Spread	15%	50%	85%	Least Negative Spread	Avg Spread
[0% 1%]	0	1	0%	n/a	n/a	n/a	n/a	n/a	n/a
[1% 2%]	0	23	0%	n/a	n/a	n/a	n/a	n/a	n/a
[2% 3%]	0	107	0%	n/a	n/a	n/a	n/a	n/a	n/a
[3% 4%]	11	102	11%	-0.3%	-0.3%	-0.1%	-0.1%	0.0%	-0.1%
[4% 5%]	32	146	22%	-0.8%	-0.6%	-0.3%	-0.1%	0.0%	-0.3%
[5% 6%]	18	89	20%	-0.8%	-0.5%	-0.2%	-0.1%	0.0%	-0.3%
[6% 7%]	18	93	19%	-1.4%	-1.3%	-0.4%	-0.1%	0.0%	-0.7%
[7% 8%]	10	82	12%	-1.2%	-1.0%	-0.5%	-0.1%	-0.1%	-0.5%
[8% 9%]	14	79	18%	-1.6%	-1.2%	-0.7%	-0.2%	0.0%	-0.8%
[9% 10%]	7	29	24%	-1.5%	-1.3%	-1.1%	-0.8%	-0.2%	-1.0%
> 10%	24	74	32%	-3.4%	-2.2%	-1.4%	-0.2%	-0.1%	-1.4%
All	134	825	16%	-3.4%	-1.5%	-0.4%	-0.1%	0.0%	-0.6%



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Yield curve slope (bucketed by 1Y rate) Historical Slope Data (4/1953 - 12/2020)

Observations:

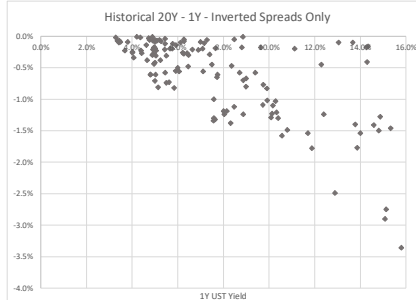
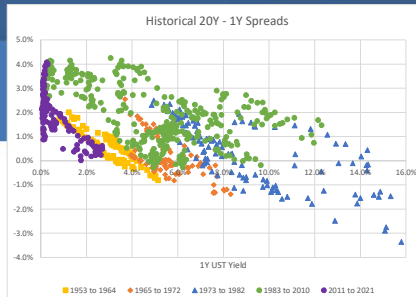
- No inversions for UST 1-year yields below 3%
- Severity of inversions generally increases with rate levels
- Other variations in curve steepness by rate level
- Recommend slope criteria based on simplified Low / Medium / High yield buckets to capture historical dynamics while not being overly constraining
- May bucket by 20Y instead of 1Y yields based on preference

ALL Spreads

Rate Bucket (1Y)	Inverted Months	Total Months	% Inverted	Min Spread	15%	50%	85%	Max Spread	Avg Spread
(0% 1%)	0	128	0%	0.5%	1.6%	2.5%	3.6%	4.1%	2.5%
(1% 2%)	0	69	0%	0.0%	1.0%	1.6%	3.6%	4.2%	2.1%
(2% 3%)	0	71	0%	0.1%	0.4%	0.9%	3.0%	3.6%	1.3%
(3% 4%)	8	103	8%	-0.2%	0.2%	0.8%	2.9%	4.3%	1.2%
(4% 5%)	22	89	25%	-0.6%	-0.2%	0.5%	1.7%	3.9%	0.8%
(5% 6%)	26	116	22%	-0.8%	-0.1%	0.9%	1.8%	3.0%	0.8%
(6% 7%)	12	76	16%	-0.6%	0.0%	1.2%	1.9%	2.5%	1.1%
(7% 8%)	14	56	25%	-1.3%	-0.3%	0.7%	1.9%	2.9%	0.8%
(8% 9%)	13	38	34%	-1.4%	-0.9%	0.5%	1.8%	2.8%	0.5%
(9% 10%)	7	26	27%	-1.1%	-0.7%	1.5%	2.1%	2.5%	0.9%
> 10%	32	53	60%	-3.4%	-1.6%	-0.4%	1.5%	2.0%	-0.3%
All	134	825	16%	-3.4%	-0.1%	1.1%	2.7%	4.3%	1.3%

INVERTED Spreads Only

Rate Bucket (1Y)	Inverted Months	Total Months	% Inverted	Most Negative Spread	15%	50%	85%	Least Negative Spread	Avg Spread
(0% 1%)	0	128	0%	n/a	n/a	n/a	n/a	n/a	n/a
(1% 2%)	0	69	0%	n/a	n/a	n/a	n/a	n/a	n/a
(2% 3%)	0	71	0%	n/a	n/a	n/a	n/a	n/a	n/a
(3% 4%)	8	103	8%	-0.2%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%
(4% 5%)	22	89	25%	-0.6%	-0.4%	-0.2%	0.0%	0.0%	-0.2%
(5% 6%)	26	116	22%	-0.8%	-0.7%	-0.2%	-0.1%	0.0%	-0.3%
(6% 7%)	12	76	16%	-0.6%	-0.5%	-0.3%	-0.1%	0.0%	-0.3%
(7% 8%)	14	56	25%	-1.3%	-1.3%	-0.5%	-0.1%	-0.1%	-0.6%
(8% 9%)	13	38	34%	-1.4%	-1.2%	-0.8%	-0.2%	0.0%	-0.8%
(9% 10%)	7	26	27%	-1.1%	-1.0%	-0.8%	-0.5%	-0.2%	-0.7%
> 10%	32	53	60%	-3.4%	-1.8%	-1.4%	-0.3%	-0.1%	-1.3%
All	134	825	16%	-3.4%	-1.3%	-0.4%	-0.1%	0.0%	-0.6%



Agenda Item 9

Consider Adoption of the NAIC Staff Recommendation
on a Replacement for the London Interbank Offered Rate (LIBOR)
Memorandum

MEMORANDUM

TO: Life Actuarial (A) Task Force

FROM: Pat Allison, NAIC Staff

DATE: November 17, 2022

RE: Recommended replacement related to APF 2022-04 Swap Spreads and LIBOR transition to SOFR

Background

The purpose of this memo is to recommend: 1) LATF adoption of Secured Overnight Financing Rate (SOFR) swap spreads as the replacement for LIBOR swap spreads effective 12/30/22, which is the last business day coincident with or preceding 12/31/22 (which is a Saturday) so that prescribed spreads as of 12/31/22 (which equal those on 12/30/22) are based on the approach specified in this memo; 2) The approach to be used in calculating current and long-term swap spread curves as of 12/30/22; and 3) Technical implementation details as recommended by the American Academy of Actuaries. These recommendations are consistent with APF 2022-04 (which is effective for the 2023 *Valuation Manual*), which identifies the SOFR as the replacement for LIBOR, and the VM-20 Section 9.F.8.d Procedure for Setting Prescribed Gross Asset Spreads, cited below:

A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between. The three-month and six-month points on the swap spread curves shall be the market-observable values for these tenors. Currently, this shall be the corresponding London Interbank Offered Rate (LIBOR) spreads over Treasuries. When the NAIC determines LIBOR is no longer effective, the NAIC shall recommend a replacement to the Life Actuarial (A) Task Force which shall be effective upon adoption by the Task Force.

The last sentence above notes that the NAIC shall recommend “a replacement”, which indicates an intent to replace the prescribed current and long-term swap spread curves with a single replacement, as opposed to continuing the NAIC’s prescription of LIBOR beyond the adoption date.

Determination that LIBOR is no longer effective

The Alternative Reference Rates Committee’s November 9 Meeting Readout highlighted continued progress in the transition from LIBOR to SOFR, with SOFR predominant across derivatives markets. Specifically, SOFR swaps have accounted for more than 90 percent of daily volumes on average of

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p | 212 398 9000

interest rate risk traded in the outright linear swaps market for the last two months while LIBOR swaps accounted for less than 4 percent of the overall volume in October. Based on this information, NAIC staff has determined that LIBOR is no longer effective.

Actuarial judgment may be required in the use of prescribed swap spreads (for example, in the case where companies have a combination of SOFR and LIBOR-based swaps). VM-20 Section 9.F.8.d states, in part “Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash-flow model *wherever appropriate* for transactions and operations...” (emphasis added).

Recommended Replacement for Current Benchmark Swap Spreads

Effective December 30, 2022, NAIC staff recommends that for each month-end date, LIBOR swap spreads shall be replaced with SOFR swap spreads¹:

- 3-month LIBOR spread should be replaced with 3m SOFR swap² spread
- 6-month LIBOR spread should be replaced with 6m SOFR swap spread
- 1-year swap spread should be replaced with 1yr SOFR swap spread
- ...
- 30-year swap spread should be replaced with 30yr SOFR swap spread

Recommended Replacement for Long-Term Benchmark Swap Spreads

Effective December 30, 2022, NAIC staff recommends the following approach for the calculation of long-term benchmark swap spreads, consistent with APF 2022-04:

1. Extract daily swap spread data over the prescribed observation period (rolling 15-year period) ending on the last business day of the quarter from at least two reputable data sources. If the data source provides swap rates rather than swap spreads, convert the daily swap rate for each maturity to a swap spread by subtracting the corresponding maturity Treasury yield from the swap rate.
2. Calculate SOFR swap spreads as follows for the last business day “u” of 2022, where “u” is the 12/30/22 effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed:
 - a. For each maturity “m” = 0.25, 0.5, 1 ... 30 years, and business day “u”:
$$\text{SOFR swap spread}(m,u) = \text{SOFR swap rate}(m,u) - \text{Treasury yield}(m,u).$$
3. Calculate SOFR swap spreads as follows for each business day before the 12/30/22 effective date of the adoption by the Life Actuarial (A) Task Force of SOFR swap spreads as the replacement for swap spreads previously prescribed, utilizing Bloomberg’s 2021-03-05 published USD Spread Adjustments:
 - a. For each maturity “m” = 3 or 6 months, and business day “u”,
 - i.
$$\text{SOFR swap spread}(3 \text{ months},u) = \text{LIBOR swap spread}(3 \text{ months},u) - 0.26161\% \text{ (the USD 3-month Spread Adjustment)}$$

¹ During 2021 the swap market evolved such that the definition of a standard n-year interest rate swap changed in January 2022 to be a SOFR swap from the LIBOR swap.

² 3-month and 6-month SOFR swap rates are defined herein as the fixed rate one party pays at the end of three months or six months in exchange for receiving at such time 3-month SOFR or 6-month SOFR, calculated on a compounded in arrears basis.

- ii. $\text{SOFR swap spread}(6 \text{ months}, u) = \text{LIBOR swap spread}(6 \text{ months}, u) - 0.42826\%$ (the USD 6-month Spread Adjustment)
 - b. For each maturity “m” = 1 ... 30 years, and business day “u”:
 $\text{SOFR swap spread}(m, u) = \text{LIBOR swap spread}(m, u) - 0.26161\%$ (the USD 3-month Spread Adjustment)
4. Average the swap spread data from the data sources by maturity over the prescribed observation (rolling 15-year period).
 5. Calculate the Long-Term Benchmark Swap Spreads as the 85% conditional mean for each of the 32 maturity categories (three-month, six-month, one-year, two-year, ... 30-year) using the same business trading days as were used in the 85% conditional mean for long-term bonds spreads.
 6. Publish the Long-Term Benchmark Swap Spreads in a table. Among tables published on the NAIC website (See Subsection H), Table J shows Long-Term Benchmark Swap Spreads

In Table J, NAIC staff shall clarify that from 12/31/22 forward, prescribed current and long-term benchmark swap spreads are SOFR swap spreads. [Drafting Note: The tables will be labeled to indicate they contain SOFR swap spreads.

Technical Implementation Details

NAIC staff recommends that implementation of prescribed current and long-term benchmark SOFR swap spreads be based on guidance included in a November 17, 2022 comment letter to LATF from the American Academy of Actuaries. The Academy letter provides technical details on the calculation of treasury par yield curve rates, as well as prescribed swap spread calculations and their publication. The letter outlines three alternative approaches to handle inconsistencies in the historical swap spreads. NAIC staff recommends alternative #2, which is recommended by the Academy in such comment letter. This would mean that for purposes of calculating long-term swap spreads, historical current swap spreads would be recalculated for December 31, 2021 through December 29, 2022, but only to remedy the inconsistency where spreads were a 50/50 blend of LIBOR swap spreads and SOFR swap spreads.



December 1, 2022

Ms. Rachel Hemphill
Chair, Life Actuarial (A) Task Force (LATF)
National Association of Insurance Commissioners (NAIC)

Re: Academy comment letter on “NAIC staff memo to LATF recommending LIBOR is no longer effective for 111722 LATF exp.docx” (the “Memo”), which is titled “Recommended replacement related to APF 2022-04 Swap Spreads and LIBOR transition to SOFR,” and which was exposed for 14 days by LATF on November 17, 2022

Dear Ms. Hemphill,

Please note that definitions of acronyms used in this letter that are not defined elsewhere in this letter, are as follows:

- “APF” means “APF 2022-04 on Swap Spreads and LIBOR transition to SOFR,”
- “LIBOR” means “London Inter-Bank Offered Rate,” and
- “SOFR” means “Secured Overnight Financing Rate.”

The Life Reserves Work Group, Annuity Reserves and Capital Work Group, and Variable Annuity Reserves and Capital Work Group of the American Academy of Actuaries¹ (the “Academy”) appreciates the opportunity to provide guidance on this topic. The Academy is thankful to LATF and NAIC staff as well for the November 17 LATF exposure of the Memo and an Academy letter to LATF on this topic, the July 30 LATF adoption of the APF, the June 9 and May 26 exposures of earlier versions of the APF and of the Memo, as well as for additional communications throughout the calendar year.

The Academy supports the Memo, which incorporates previous Academy input, and encourages the Memo’s adoption by LATF at the NAIC Fall National Meeting.

¹ The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

~ ~ ~

The Academy appreciates the efforts of LATF and NAIC staff on the APF and Memo. If you have any questions or would like further dialogue on the above topics, please contact Amanda Barry-Moilanen, life policy analyst, at barrymoilanen@actuary.org.

Sincerely,

Alan Routhenstein, MAAA, FSA
Member, Life Valuation Committee
American Academy of Actuaries



November 17, 2022

Ms. Rachel Hemphill
Chair, Life Actuarial (A) Task Force (LATF)
National Association of Insurance Commissioners (NAIC)

Re: Academy input on implementation on Treasury par yield curve rates and on prescribed swap spread calculations and their publication, for APF 2022-04 on swap spreads and London Inter-Bank Offered Rate (LIBOR) transition to Secured Overnight Financing Rate (SOFR) (the “APF”), and for the anticipated next version of a related memo (the “Memo”) from NAIC staff

Dear Ms. Hemphill,

The Life Reserves Work Group, Annuity Reserves and Capital Work Group, and Variable Annuity Reserves and Capital Work Group of the American Academy of Actuaries¹ (the “Academy”) appreciates the opportunity to provide guidance on this topic. The Academy is thankful to LATF and NAIC staff as well for the July 30 LATF adoption of the APF, the June 9 and May 26 exposures of earlier versions of the APF and of the Memo, as well as for additional communications throughout the calendar year.

The Academy has received an informal request from NAIC staff for input with regard to implementation of the APF and the Memo. More specifically, NAIC staff would like Academy input on what data source(s) and or methodology might be used, among numerous possibilities, to calculate Treasury rates that would be subtracted from SOFR swap rates (that the NAIC will obtain from other sources) on each business day to calculate prescribed swap spreads for SOFR swaps for the 32 maturities (3-month, 6-month, 1-year, 2-year, ... , 29-year, 30-year) in VM-20. Given that this topic is quite technical, this letter also includes Academy input, which covers additional implementation details for the APF and the Memo beyond what is specified in the APF, on prescribed swap spread calculations and their publication by the NAIC.

¹ The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

Academy input on Treasury yields to implement the APF:

After reviewing several possibilities and receiving some preliminary input from NAIC staff, the Academy recommends the following approach:

1. Obtain Treasury par yield curve rates for 10 on-the-run (OTR) maturities (3m, 6m, 1y, 2y, 3y, 5y, 7y, 10y, 20y, 30y) from either:
 - a. https://home.treasury.gov/resource-center/data-chart-center/interest-rates/TextView?type=daily_treasury_yield_curve&field_tdr_date_value=2022 ;
or
 - b. <https://www.federalreserve.gov/releases/h15/> ; (note on this page the Treasury par yield curve rates are labeled as “Treasury constant maturities”)
2. Utilize the “monotone convex spline” (MC) method to calculate par yield curve rates for the 32 swap spread maturities prescribed in VM-20, as such method has been adopted by the U.S. Treasury starting December 6, 2021, either A) by using a spreadsheet (e.g., a historical saved version is available by copy/pasting the following into an internet browser:
<http://web.archive.org/web/20180903055110/finmod.co.za/Monotone%20Convex%20Interpolation.xls>) created by Graeme West, who co-authored a paper titled “Methods for Constructing a Yield Curve” (as discussed below) or B) by using any mathematically equivalent approach:
 - a. Enter as percentages the par yield curve rates, for the 10 OTR maturities, into cells D1 to D10 of the “input” tab in the spreadsheet;
 - b. Click on the “Boot curve” button in the “input” tab in the spreadsheet; and
 - c. Extract from column B of the “curves” tab in the spreadsheet the Treasury par yield curve rates for the 32 maturities prescribed in VM-20 (which could be listed at the bottom of this tab via an Excel VLOOKUP formula or macro created by NAIC staff or the Academy).

Academy input on prescribed Current swap spread calculations and their publication:

3. Convert SOFR swap rates obtained from each data source to a bond-equivalent semi-annual Actual/Actual basis as needed. To perform these calculations, please note the following market conventions that are used in the trading of such derivative instruments:
 - a. 3-month and 6-month SOFR swap rates are quoted by the Chicago Mercantile Exchange on a 3-month Actual/360 and a 6-month Actual/360 basis, respectively.
 - b. 1-year, 2-year, 3-year ... 29-year, 30-year SOFR swap rates are quoted on an annual Actual/360 basis.

4. Convert any LIBOR swap rates obtained from each data source to a bond-equivalent semi-annual Actual/Actual basis as needed. To perform these calculations, please note the following market conventions that are used in the trading of such derivative instruments:
 - a. 3-month and 6-month LIBOR are quoted on a quarterly Actual/360 and a semi-annual Actual/360 basis, respectively.
 - b. 1-year, 2-year, 3-year ... 29-year, 30-year LIBOR swap rates are quoted on a semi-annual 30/360 basis.

5. Calculate prescribed Current swap spreads for each of the 32 swap spread maturities prescribed in VM-20 on a bond-equivalent semi-annual Actual/Actual basis, after first calculating SOFR swap spreads from each data source as the SOFR swap rates from such data source, converted to a bond-equivalent semi-annual Actual/Actual basis as needed, minus the par Treasury yield curve rate of the same maturity (note this formula is consistent with the APF). If the NAIC also publishes LIBOR swap rates for as long as it has sufficient data from data sources to do so, these should be calculated on a bond-equivalent semi-annual Actual/Actual basis, after first calculating LIBOR swap spreads from each data source as the LIBOR swap rates from such data source, converted to a bond-equivalent semi-annual Actual/Actual basis as needed, minus the par Treasury yield curve rate of the same maturity.

6. Specify the following, in the NAIC spreadsheets where prescribed swap spreads are published, that starting with the effective date (that the Academy expects will be December 30, 2022, which is the last business day in 2022) specified in the Memo:
 - a. These 32 Current swap spreads prescribed in VM-20 are expressed on a bond-equivalent semi-annual Actual/Actual basis.
 - b. For each of the 32 swap spread maturities, the prescribed Current swap spread is calculated as the difference of:
 - i. the average SOFR swap rate obtained by the NAIC from data providers for such maturity, after each rate obtained is converted to a bond equivalent (semi-annual Actual/Actual) basis as needed, minus
 - ii. the Treasury par yield curve rate for such maturity, where such Treasury par yield curve rate is determined using the process described in the “Academy recommendation on Treasury yields” section of this letter.
 - c. If the NAIC also publishes LIBOR swap rates for as long as it has sufficient data from data sources to do so, then for each of the 32 Current swap spread maturities, the LIBOR swap spread is calculated as the difference of:
 - i. the average LIBOR swap rate obtained by the NAIC from data providers for such maturity, after each rate obtained is converted to a bond equivalent (semi-annual Actual/Actual) basis as needed, minus

- ii. the Treasury par yield curve rate for such maturity, where such Treasury par yield curve rate is determined using the process described in the “Academy recommendation on Treasury yields” section of this letter.
 - d. The purpose of specifying the above information is for a company that has one or more models that (i) require the input of swap spreads over Treasury rates that are expressed on a different payment frequency and/or day count basis (e.g., the market convention for each maturity), and/or (ii) calculate Treasury rates and/or swap rates, based on input for Treasury rates and prescribed swap spreads for some or all of the 32 prescribed swap spreads, in a different manner than described above (e.g., a different interpolation method, and/or a different method for calculating OTR constant maturity Treasury yield curve rates that might be implemented by an economic scenario generator that the company uses), so that the company can transform the prescribed swap spreads to be precisely equivalent for use in the company’s models. Given that the NAIC is still working on technical details for the interest rate model in the GEMS ESG, which potentially could result in (i) and/or (ii) above, the Academy offers the opportunity to address this topic at the appropriate time with the NAIC ESG Technical Drafting Group.
7. Also, we recommend stating the following in the NAIC spreadsheets where prescribed swap spreads are published: “Prior to the effective date specified in the Memo, prescribed Current spreads were calculated using a less precise methodology than that being used starting on that effective date, such that the older prescribed Current spreads could not be described as:
- a. being spreads over a Treasury curve calculated on a specific basis that could be replicated by third parties, or
 - b. as having for all 32 maturities a specific payment frequency or day count basis.”

Before NAIC implementation, if such is request, the Academy would be pleased to peer review any NAIC preliminary calculations and/or provide the NAIC with formulas to implement the above recommendations.

Academy input for prescribed Long term swap spread calculations

The Academy has discussed the extent to which the Academy should recommend that starting on the effective date specified in the Memo, prescribed Long term swap spread calculations should involve NAIC recalculation of historical prescribed Current swap spreads to remedy inconsistencies discussed above. Below is a discussion of three alternatives for Long term swap spread calculations starting with the effective; the Academy views #2 as the most practical, as explained below.

- 1) Do not recalculate any historical Current swap spreads;

- 2) Recalculate historical Current swap spreads for December 31, 2021, through the business day preceding the effective date, but only to remedy that inconsistency where such spreads were a 50/50 blend of LIBOR swap spreads and SOFR swap spreads; or
- 3) Recalculate all historical swap spreads for the experience period (not longer than 15 years) to be used to calculate Long term swap spreads on the effective date, reflecting all of the modifications mentioned in this letter.

The Academy recommends that:

- Item #1 not be used because:
 - For 15 years starting with the effective date, about 1/15th of the prescribed Long term spread calculations (e.g., from 12/31/2021 to 12/30/2022) would involve use of Current swap spreads that deviated from VM-20.
- Item #2 is the most practical approach because:
 - It involves only a limited amount of extra work (e.g., following VM-20 to recalculate Current swap spreads from 12/31/2021 to 12/30/2022);
 - It does not involve the historical recalculation of Current swap spreads to reflect the above Academy input, starting with the effective date, on Treasury yields and Current swap spreads, and is this much easier for NAIC staff to implement than #3; and
 - Because, although #2 involves recalculation of about 1/15th of the historical prescribed Current swap spreads used in Long term swap spread calculations starting with the effective date, it is expected to result in a smoother transition than #3 (which involves recalculation of all of the historical prescribed Current swap spreads) in prescribed Long term swap spreads from the three month-end dates preceding the effective date.
- Item #3 not be used, even though it would be the most theoretically sound calculation prospectively, because
 - It involves more work for NAIC staff than #2; and
 - It is expected to result in a less smooth transition than #2 in prescribed Long term swap spreads from the three month-end dates preceding the effective date, which might cause an AAT, PBR or principles-based capital under RBC to result on the effective date for a company that is materially different from the qualified actuary's expectations.

Academy input on NAIC governance for prescribed swap spread calculations

Given that the calculations above involve several steps and multiple sources, and the possibility that human error could occur at a data provider or at the NAIC, the Academy recommends that the NAIC implement a quality control process to be used to ensure that prescribed spreads that are calculated and published, starting with the effective date specified in the Memo (e.g., December 30, 2022) are consistent with the APF, the Memo, and this Academy letter. The Academy would be pleased to provide private comments directly to NAIC staff on their proposed quality control process.

Academy input on the Memo

Please recall that on June 10, LATF exposed a June 9 draft of the Memo, which upon LATF adoption would implement the last sentence in Section 7.F.8.d, which reads: “When the NAIC determines LIBOR is no longer effective, the NAIC shall recommend a replacement to the Life Actuarial (A) Task Force which shall be effective upon adoption by the Task Force.” In coordination with NAIC staff, the Academy recommends that NAIC staff refine its earlier draft of the Memo to recommend LATF implementation of the Memo that is consistent with the above input in this Academy letter, ideally with an effective date of December 30, 2022, which is the last business day coincident with or preceding December 31, 2022 (which is a Saturday), so that prescribed spreads as of December 31, 2022 (which equal those on December 30, 2022) are based on the approach specified in the Memo and thus would be reflected in 2022 year-end reporting. In order to achieve such consistency, the Academy recommends that LATF expose for comment the next version of the Memo.

~ ~ ~

The Academy appreciates the efforts of LATF and NAIC staff on the APF and Memo. If you have any questions or would like further dialogue on the above topics, please contact Amanda Barry-Moilanen, life policy analyst, at barrymoilanen@actuary.org.

Sincerely,

Alan Routhenstein, MAAA, FSA
Member, Life Valuation Committee
American Academy of Actuaries

Brian Bayerle
Senior Actuary

Colin Masterson
Policy Analyst

November 30, 2022

Rachel Hemphill
Acting Chair, NAIC Life Actuarial (A) Task Force

Re: LIBOR to SOFR Transition

Dear Ms. Hemphill:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit feedback on the exposed NAIC staff memo "Recommended replacement related to APF 2022-04 Swap Spreads and LIBOR transition to SOFR".

ACLI does not have any notable objections to this exposure and its recommendations. However, we do have several requests as this effort moves forward.

First, ACLI members would request Table J (current LIBOR/SOFR blend) and the new SOFR-only versions as of 9/30/2022, 11/30/2022, and 12/31/2022 to perform impact analysis (i.e., before and after change tables). It would be helpful to have the revisions from past valuation dates as soon as possible to provide companies with maximum line of sight into expected impacts for year end and to allow adequate evaluation of any model changes necessary to anticipate correct spreads (e.g., removing adjustments to convert the blended spreads into SOFR-only spreads). If LATF moves forward with the Academy's option #2 for determining the long-term spreads, for full transparency, it may be sensible to provide the recalculated current spreads for each impacted valuation date.

Second, ACLI would appreciate if the NAIC could clarify how current spreads are determined from at least two reputable data sources. Is it a straight average across the different sources or are they determined by another approach?

We look forward to future discussions on this topic and we would like to take this opportunity to thank regulators for their efforts on this project.

 *Colin Masterson*

American Council of Life Insurers | 101 Constitution Ave, NW, Suite 700 | Washington, DC 20001-2133

The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI's member companies are dedicated to protecting consumers' financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI's 280 member companies represent 94 percent of industry assets in the United States.

Agenda Item 10

Receive an Update on VM-50, Experience Reporting Requirements, and VM-51, Experience Reporting Formats, of the Valuation Manual



NAIC
NATIONAL
MEETING
FALL 2022
TAMPA

**Update on Mortality
Experience Data
Collection**

Pat Allison, FSA, MAAA

December 11, 2022

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

NAIC NATIONAL MEETING **FALL 2022**

Agenda

- Update on 2021 Data Collection
- What's New In 2022?
- 2022 Data Collection Status
- 2022 Data Collection A/E Ratios
- Recommendation for Deadline Extension

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

Update on 2021 Data Collection

- 108 companies were selected for collection of mortality experience data for observation years 2018 and 2019.
- The NAIC processed 501 data submissions and over 456 million total data records (this includes companies that submitted multiple times).
- The final submissions represent approximately 92% of total in scope business. The NAIC is monitoring the percentage to ensure that at least 85% of industry claims are collected as required by VM-51 Section 2.C.

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

Update on 2021 Data Collection

- NAIC calculated Actual to Expected ratios for each company's mortality. This information was sent out after the data collection was over. We asked companies to review their A/E's and let us know if they are in line with expectations.
 - 80 companies have responded that their ratios look reasonable
 - 5 companies have not responded. We have reached out to the Missouri Department of Insurance for assistance in obtaining a response.
 - NAIC is working with the remaining companies to investigate possible causes for unusual A/E ratios.

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

2021 Data Collection A/E Ratios

- We have received questions regarding the methodology of the A/E calculation. This can be found in section 4.3 of this document:
<https://www.soa.org/globalassets/assets/files/research/experience-study-calculations.pdf>.
- As a result of the A/E analysis, some companies identified corrections that needed to be made to their data.
 - In order to maximize the amount of usable data, we have been allowing companies to submit corrected data files for the 2018 and 2019 observation years.

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

2022 Mortality Experience Data Collection What's New in 2022?

- New Data File Layout
 - Additional field to accommodate reinsurer / third-party administrator reporting
- New Plan Codes (voluntary in 2022 – VM amendment takes effect in 2023)
 - New plan codes to identify paid-up additions and one year term purchased with dividends.

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

2022 Mortality Experience Data Collection

What's New in 2022?

- New Cause of Termination (voluntary in 2022 – VM amendment takes effect in 2023)
 - Added a “Death due to Covid-19” option.
- Ability to Download Exceptions from RDC
 - Previously RDC exceptions were only available online within RDC

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

2022 Mortality Experience Data Collection

What's New in 2022?

- Data Dictionary
 - The data dictionary provides additional guidance and expectations for each field
- Rules-Based Validation Changes
 - Severity of some validations were modified (e.g. fields not involving mortality such as premium data were reclassified as low severity or warning only)

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

2022 Data Collection Status

- The companies selected remained the same from 2021. However, one company requested an exclusion (premiums below \$10 million) and another merged with an affiliate. This leaves us with 106 companies.
- 93 companies have submitted their data for the 2020 observation year. There are some companies that have resubmitted 2018 & 2019 data which has caused a delay in preparing their 2020 data.
- Many of the initial data submissions have over 80% acceptable data. This is significantly improved from the 2021 data collection.

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

2022 Data Collection A/E Ratios

- For the 2021 data collection, we provided Actual to Expected mortality ratios with some key breakouts (gender, smoker status, product type, etc.).
- For the 2022 data collection, we are preparing an Excel workbook with pivot tables that will allow companies to filter the results by up to 12 categories. This will be provided with the company's feedback package from the NAIC.
 - Some of the additional categories include Issue Year, Type of Underwriting Requirements, Issue Age, etc.

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

Recommendation for Deadline Extension

- The VM-51 deadline for corrected data submissions is 12/31/2022.
- NAIC staff recommends a deadline extension to 2/28/2023 to allow companies more time to review NAIC feedback, provide responses, and make corrections as needed.
 - Companies may need to submit more than one corrected file. We encourage companies to resubmit as soon as they feel they have addressed the data exceptions and any questions from the NAIC.
 - Since the NAIC is still working with companies to finalize the 2018 and 2019 data, this extension will allow the NAIC to have more time to analyze the 2020 data.
- This is not expected to delay delivery of aggregated data to the SOA by 5/31/2023.

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

Agenda Item 11

Consider Adoption of an NAIC Negative Interest
Maintenance Reserve (IMR) Staff Memorandum

November 17, 2022

To: Members of the Life Actuarial (A) Task Force

From: NAIC Staff

RE: Guidance on Allocating Negative IMR (PIMR) In VM-20, VM-21, and VM-30

Executive Summary

With the rapidly rising interest rate environment, companies selling fixed income assets for a loss are seeing their Interest Maintenance Reserve (IMR) balances decrease or even become negative. Current statutory accounting treatment makes negative IMR a non-admitted. While a longer-term evaluation of IMR is being considered by the Statutory Accounting Practices (E) Working Group (SAPWG), additional guidance on the proper practice for allocating IMR for Asset Adequacy Testing and Principle-based Reserving purposes may be helpful for companies in the near term.

Background

The letter to SAPWG from the American Council of Life Insurers (ACLI) (Attachment 1) notes that "...with the inclusion of a negative IMR balance in asset adequacy testing, the disallowance of a negative IMR can result in double counting of losses (i.e., through the disallowance on the balance sheet and the potential AAT-related reserve deficiency)." There are several sections of the Valuation Manual and RBC instructions where IMR is referenced in the letter. Some of these references contemplate allocating negative IMR (or pre-tax IMR (PIMR), as applicable) at the level of business that is being analyzed/reserved for. However, these references do not detail what to do when the total company IMR balance is negative – and therefore a non-admitted asset under current statutory guidance.

Other references do provide additional insight as to the allocation of IMR when the total company balance is negative/disallowable. VM-20 Section 7.D.7.b notes that "...the company shall use a reasonable approach to allocate any portion of the total company balance that is disallowable under statutory accounting procedures (i.e., when the total company balance is an asset rather than a liability)." Question 22 of the AAA's Asset Adequacy Practice Note (Attachment 2) states that "... a negative IMR is not an admitted asset in the annual statement. So, some actuaries do not reflect a negative value of IMR in the liabilities used for asset adequacy analysis." However, Question 22 also notes a 2012 survey data that showed varying practices across companies, including some companies that allocated negative IMR.

Recommendation

In order to assist state regulators in achieving uniform outcomes for year-end 2022, we have the following recommendation: the allocation of IMR in VM-20, VM-21, and VM-30 should be principle-based, "appropriate", and "reasonable". Companies are not required to allocate any non-admitted portion of IMR (or PIMR, as applicable) for purposes of VM-20, VM-21, and VM-30, as being consistent with the asset handling for the non-admitted portion of IMR would be part of a principle-based, reasonable and appropriate allocation. However, if a company was granted a permitted practice to admit negative IMR as an asset, the company should allocate the formerly non-admitted portion of negative IMR, as again a principle-based, reasonable and appropriate IMR allocation would be consistent with the handling of the IMR asset. This recommended guidance is for year-end 2022, to address the current uncertainty and concerns with the "double-counting" of losses. This recommended guidance will help ensure consistency between states and between life insurers in this volatile rate environment. Refinement of this guidance may be considered beyond year-end 2022.

Attachment 1

Mike Monahan

Senior Director, Accounting Policy
202-624-2324 t
mikemonahan@acli.com

Paul Graham

Senior Vice President, Chief Actuary
202-624-2164 t
paulgraham@acli.com

October 31, 2022

Mr. Dale Bruggeman, Chairman
Statutory Accounting Principles Working Group
National Association of Insurance Commissioners
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197

Dear Mr. Bruggeman:

Re: Proposal for the NAIC to Fulfill the Original Intent of the Interest Maintenance Reserve

The American Council of Life Insurers (ACLI) would like to request urgent action on an issue that was never fully resolved by the NAIC and has become a pressing matter for the industry due to the rapid rise in interest rates – the allowance of a net negative Interest Maintenance Reserve (IMR) balance.

The ACLI proposes the allowance of a negative IMR balance in statutory accounting. Negative IMR balances are expected to become more prevalent in a higher interest rate environment and their continued disallowance will only serve to project misleading optics on insurers' financial strength (e.g. inappropriate perception of decreased financial strength through lower surplus and risk-based capital even though higher rates are favorable to an insurer's financial health) while creating uneconomic incentives for asset-liability management (e.g. discourage prudent investment transactions that are necessary to avoid mismatches between assets and liabilities just to avoid negative IMR).

ACLI believes the necessary changes can be implemented quickly and with minimal changes to the annual statement reporting instructions.

American Council of Life Insurers | 101 Constitution Ave, NW, Suite 700 | Washington, DC 20001-2133

The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI's member companies are dedicated to protecting consumers' financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI's 280 member companies represent 94 percent of industry assets in the United States.

The remainder of this letter expands upon these points.

Historical Context and Background

The IMR, first effective in statutory accounting in 1992, requires that a realized fixed income gain or loss, attributable to changes in interest rates (but not gains or losses that are credit related), be amortized into income over the remaining term to maturity of the fixed income investments (and related hedging programs) sold rather than being reflected in income immediately.

Since statutory accounting practices for life insurance companies are the primary determinant of obtaining an accurate picture for assessing solvency, it was imperative that the accounting practices be consistent for assets, liabilities, and income and that they be reported on a financially consistent basis. If assets and liabilities were not reported on a financially consistent basis, then the financial statements would not be useful in determining an accurate assessment of solvency or whether there were sufficient assets to pay contractual obligations when they become due.

Amortized cost valuation of fixed income investments reflects the outlook at the time of purchase and amortization reflects the yields available at time of purchase. Policy reserve liabilities are established at the same time, and the interest rate assumptions are consistent with the yields at that time. But if fixed income investments are sold, with the proceeds reinvested in new fixed income investments, a new amortization schedule is established which may be based on an entirely different yield environment, which may be inconsistent with the reserve liabilities when they were established.

IMR was created to prevent the timing of the realization of gains or losses on fixed income investments, related to interest rates changes, to affect the immediate financial performance of the insurance company. This recognized that the gains and losses were transitory without any true economic substance since the proceeds would be reinvested at offsetting lower or higher interest rates.

For example, without the IMR, if a company sold all bonds in a declining interest environment (e.g., from 4% to 2%), and reinvested in new bonds, surplus would increase through significant realized gains. The increased surplus would inappropriately reflect increased financial strength that is illusory, due to a now lower yielding portfolio, as there would be no change to the income needed to support the liabilities.

Likewise, if a company sold all bonds in an increasing interest rate environment (e.g., from 2% to 4%), and reinvested in new bonds, surplus would decrease through significant realized losses. The decreased surplus would inappropriately reflect decreased financial strength that is similarly illusory due to the reinvestment at higher yields relative to when the bonds were originally purchased.

A net negative IMR is currently disallowed in statutory accounting. This handling is contrary to its original intent which recognized that interest related gains and losses are both transitory without any true economic substance since the proceeds would be reinvested at offsetting lower or higher interest rates, respectively. See attachment I to this letter that illustrates the financially consistent

treatment of assets, liabilities, and income and how IMR is needed to achieve that objective for both realized gains and losses.

That IMR should conceptually apply to both realized gains and losses was recognized by the NAIC during and after IMR development. The below is a quote from a 2002 report by the NAIC AVR/IMR Working Group to the E-Committee:

*“The basic rationale for the IMR would conclude that neither a maximum nor a minimum is appropriate. If the liability values are based on the assumption that the assets were purchased at about the same time as the liabilities were established, then there should be no bounds to the reserve which corrects for departures from that assumption; **if a company has to set up a large reserve because of trading gains, it is in no worse position than if it had held the original assets. As for negative values of the IMR, the same rationale applies. However, the concept of a negative reserve in the aggregate has not been adopted.**”*

While realized losses can offset realized gains in IMR, the IMR instructions require the disallowance of a net negative IMR balance (e.g., as noted in the last sentence of the aforementioned quote). See attachment II to this letter, which includes the pertinent IMR instructions where negative IMR balances are currently disallowed and in need of amendment.

When IMR was originally developed, it was intended to achieve its purpose in both a declining and rising interest rate environment. The originally adopted disallowed status of a negative IMR was expected to be addressed in subsequent years. However, over time with the persistent declining interest rates, the issue lost urgency since a negative IMR would not have been a significant issue for any company. The NAIC AVR/IMR Working Group ultimately disbanded without ever addressing this longstanding item on their agenda.

With a rising interest rate environment, it is important that the allowance of a negative IMR be addressed to fulfill its original purpose. In general, rising interest rates are favorable to the financial health of the insurance industry as well as for policyowners.

Without a change, the rising interest rate environment will give the inappropriate perception of decreased financial strength through lower surplus and risk-based capital and worse, create incentives for insurance companies to take action, or not take actions, to prevent uneconomic surplus impacts where the actions (or lack thereof) themselves may be economically detrimental.

Symmetrical treatment of a negative IMR (i.e., the allowance of a negative IMR balance) would appropriately not change surplus as a sale and reinvestment would not affect the underlying insurance company liquidity, solvency, or claims paying ability, just like with a positive IMR. See attachment III to this letter that illustrates that the sale of a fixed income investment, and reinvestment in a new fixed income investment, has no bearing on a life insurance company's liquidity, solvency, or claims paying ability.

As it was initially recognized by the NAIC that IMR should apply to both gains and losses, adequate safeguards were already built into the IMR instructions for asset adequacy, risk-based capital, and troubled companies.

Negative IMR – Reserve Adequacy and Risk-Based Capital

When IMR was developed, it was anticipated that a negative IMR balance would be reflected in asset adequacy analysis. This inclusion ensures that the assets, with the appropriate allocation from the IMR (whether negative or positive), would be adequate to fund future benefit obligations and related expenses of the company.

From the standpoint of reserve adequacy, the inclusion of a negative IMR balance appropriately reduces the investment income in asset adequacy testing. Without the inclusion of negative IMR, reserve inadequacies would potentially not be recognized.

Further, with the inclusion of a negative IMR balance in asset adequacy testing, the disallowance of a negative IMR can result in double counting of losses (i.e., through the disallowance on the balance sheet and the potential AAT-related reserve deficiency). The Actuarial Opinion that covers asset adequacy analysis requires the appropriate assessment of negative IMR in its analysis.

If a negative IMR balance is used in the asset adequacy analysis, its allowance is appropriate. Likewise, if only a portion of a company's negative IMR balance is reflected in the asset adequacy analysis, only the allowance for that portion of the negative IMR balance reflected is appropriate. If a negative IMR balance is disallowed, it would be inappropriate to include in asset adequacy analysis. It is imperative there is symmetry between both reserving and accounting considerations, and there is already precedent in the asset adequacy analyses for inclusion of IMR.

Below are the current references to IMR in the valuation manual and risk-based capital calculations.

Regulation	Use	IMR references
Actuarial Opinion and Memorandum Regulation (VM-30)	Asset adequacy analysis for annual reserve opinion	An appropriate allocation of assets in the amount of the IMR, whether positive or negative, shall be used in any asset adequacy analysis.
Life principle-based reserves (VM-20)	Calculation of deterministic reserve	Calculate the deterministic reserve equal to the actuarial present value of benefits, expenses, and related amounts less the actuarial present value of premiums and related amounts, less the positive or negative pre-tax IMR balance at the valuation date allocated to the group of one or more policies being modeled
Life principle-based reserves (VM-20)	Calculation of stochastic reserve	Add the CTE amount (D) plus any additional amount (E) less the positive or negative pre-tax IMR balance allocated to the group of one or more policies being modeled
Variable annuities principle-based reserves (VM-21)	Reserving for variable annuities	The IMR shall be handled consistently with the treatment in the company's cash-flow testing, and the amounts should be adjusted to a pre-tax basis.
C3 Phase 1 (Interest rate risk capital)	RBC for fixed annuities and single premium life	IMR assets should be used for C3 modeling.

Additional IMR Safeguards

The IMR instructions do provide additional safeguards in situations where it would be appropriate to recognize interest-rate related gains and losses immediately rather than be included in the IMR.

They were established to prevent situations where the liability the IMR supports, no longer exists. Examples noted in the annual statement instructions include:

- Major book-value withdrawals or increases in policy loans occurring at a time of elevated interest rates.
- Major book value withdrawals resulting from a “run on the bank” due to adverse publicity.

As a result, the IMR instructions include an IMR Exclusion whereby all gains or losses which arise from the sale of investments related to “Excess Withdrawal Activity” are to be excluded from IMR and reflected in net income. In short, Excess Withdrawal Activity is defined as 150% of the product of the lower of the withdrawal rate in the preceding or in the next preceding year calendar year times the withdrawal reserves at the beginning of the year.

Summary

With a rising interest rate environment, it is important that the allowance of a negative IMR be addressed to fulfill its original purpose. In general, rising interest rates are favorable to the financial health of the insurance industry as well as for policyowners. Without a change, the rising interest rate environment will give the inappropriate perception of decreased financial strength through lower surplus and risk-based capital.

The inability to recognize negative IMR could also impact the rating agency view of the industry, or worse, incentivize companies to avoid prudent investment transactions that are necessary to avoid mismatches between assets and liabilities. Furthermore, there are adequate safeguards in place to ensure that allowing a negative IMR does not cause any unrecognized reserve or capital inadequacies or any overstatement of claims paying ability.

Current statutory accounting guidance creates two equally objectionable alternatives for insurers and their policyowners. Following the current statutory guidance will improperly reflect financial strength through understating surplus, so additional surplus may need to be retained. Alternatively, one could take steps to manage the current situation by limiting trading of fixed income investments and related hedging programs, which would diminish significant economic value for policyowners, as well as create a mismatch between assets and liabilities.

Both scenarios encourage short-term non-economic activity not in the best long-term interest of the insurance company’s financial health or its policyowners. For insurers with diminishing IMR balances due to the rapid increase in interest rates, this dilemma is either here or fast approaching and can only be resolved now with certainty of the appropriate treatment of IMR by the NAIC.

The ACLI looks forward to urgently working with the NAIC toward fulfilling the original intent of IMR. It is imperative that insurers receive relief for year-end 2022.

If you have any questions regarding this letter, please do not hesitate to contact us.

Sincerely,

A handwritten signature in black ink, appearing to read "Monahan". The signature is fluid and cursive, with a long horizontal stroke at the end.

Mike Monahan
Senior Director, Accounting Policy

A handwritten signature in black ink, appearing to read "Paul A. Graham". The signature is cursive and includes a small "PA" monogram at the end.

Paul Graham
Senior Vice President, Chief Actuary

Simplified Example – Need for Reporting Assets, Liabilities, and Income on a Consistent Basis:

- This example shows the appropriate interrelationship of IMR on assets, reserve liabilities, and income.
- Assume a bond is held with the following characteristics:
 - Par Value: \$1,000
 - Coupon: 3%
 - Term-to-maturity: 10 years
- Assume the bond is then sold at “time zero” and the proceeds are immediately reinvested in a bond with the same characteristics (e.g., term-to maturity, credit quality, coupon equivalent to market rate, etc.).
- Assume a simplified example with no existing IMR balance, where the bond supports a fixed insurance liability with the same duration as the original bond, as well as a present value of \$1,000.

Table 1: Market Interest Rate Scenario			
	Same	Lower	Higher
Market interest rate	3%	2%	4%
Bond’s market value	\$1,000	\$1,090	\$919
Realized gain/(loss) if sold	\$0	\$90	(\$81)*

Realized gain/(loss) deferred to balance sheet IMR and amortized into income over remaining life of bond sold (i.e., 10 years).

Table 2: Statutory Investment Income			
IMR amortization	\$0	\$9	(\$8)
Interest income on new bond	\$30	\$21	\$38
Total annual stat income	\$30	\$30	\$30

On average, future income is approximately the same in each interest rate scenario as the IMR gets reduced through amortization to income.

Table 3: Statutory Balance Sheet			
Balance Sheet Bonds	\$1,000	\$1,090	\$919
IMR	\$0	(\$90)	\$0*
Stat assets net of IMR	\$1,000	\$1,000	\$919*
Reserves	\$1,000	\$1,000	\$1,000
Surplus	\$0	\$0	(\$81)*

Even though the sale of the bond (and subsequent reinvestment) is non-economic, and the same income is being produced to support the liability, a negative surplus position makes it appear there is now a deficiency. Allowing the negative IMR appropriately would show no surplus impact, as is shown when a gain occurs, as there is no change in reported reserve liabilities. Appropriately consistent financial results require the allowance of negative IMR

***The negative IMR balance is currently disallowed and directly reduces surplus. This treatment is not supported by theoretical rationale and gives a distorted view of solvency.**

Pertinent Annual Statement Instructions

Line 6 – Reserve as of December 31, Current Year

Record any positive or allowable negative balance in the liability line captioned “Interest Maintenance Reserve” on Page 3, Line 9.4 of the General Account Statement and Line 3 of the Separate Accounts Statement. A negative IMR balance may be recorded as a negative liability in either the General Account or the Separate Accounts Statement of a company only to the extent that it is covered or offset by a positive IMR liability in the other statement.

If there is any disallowed negative IMR balance in the General Account Statement, include the change in the disallowed portion in Page 4, Line 41 so that the change will be appropriately charged or credited to the Capital and Surplus Account on Page 4. If there is any disallowed negative IMR balance in the Separate Accounts Statement, determine the change in the disallowed portion (prior year less current year disallowed portions), and make a direct charge or credit to the surplus account for the “Change in Disallowed Interest Maintenance Reserve” in the write-in line, in the Surplus Account on Page 4 of the Separate Accounts Statement.

The following information is presented to assist in determining the proper accounting:

General Account IMR Balance	Separate Account IMR Balance	Net IMR Balance
Positive	Positive	Positive (see rule a)
Negative	Negative	Negative (see rule b)
Positive	Negative	Positive (see rule c)
Positive	Negative	Negative (see rule d)
Negative	Positive	Positive (see rule e)
Negative	Positive	Negative (see rule f)

Rules:

- a. If both balances are positive, then report each as a liability in its respective statement.
- b. If both balances are negative, then no portion of the negative balances is allowable as a negative liability in either statement. Report a zero for the IMR liability in each statement and follow the above instructions for handling disallowed negative IMR balances in each statement.
- c. If the general account balance is positive, the separate accounts balance is negative and the combined net balance is positive, then all of the negative IMR balance is allowable as a negative liability in the Separate Accounts Statement.
- d. If the general account balance is positive, the separate account balance is negative, and the combined net balance is negative, then the negative amount not covered by the positive amount is not allowable. Report only the allowable portion as a negative liability in the Separate Accounts Statement and follow the above instructions for handling the disallowed portion of negative IMR balances in the Separate Accounts Statement.
- e. If the general account balance is negative, the separate account balance is positive, and the combined net balance is positive, then all of the negative IMR balance is allowable as a negative liability in the General Account Statement.
- f. If the general account balance is negative, the separate account balance is positive, and the combined net balance is negative, then the negative amount not covered by the positive amount is not allowable. Report only the allowable portion as a negative liability in the General Account Statement and follow the above instructions for handling the disallowed portion of negative IMR balances in the General Account Statement.

IMR Illustration – Liquidity, Solvency and Claims Paying Ability

Essentially, a negative IMR balance from an individual trade represents the present value of the future positive interest rate differential, from the new investment compared to the old investment, that puts one in the same economic position, when compared to before the trade, including total liquid assets available to pay claims.

This phenomenon can be illustrated in the following table where a 10-year bond is sold, one year after purchase, and immediately reinvested in another 10-year bond with equivalent credit quality in an interest rate environment where market interest rates increased from 2% to 4% in the intervening year.

	Coupon Rate of Bond	Market Interest Rate @ Purchase	Par Value of Bond	Fair Value @ Purchase	Fair Value @ Time of Sale	Loss on Sale	Claims Paying Liquidity
Old Bond	2%	2%	100	100	85.13	14.87	85.13
New Bond	4%	4%	85.13	85.13	85.13	N/A	85.13

The short-term acceleration of negative IMR to surplus (e.g., its disallowance) is strictly a timing issue and not a true loss of financial strength or claims paying liquidity, but it does present a temporary and inappropriate optics issue in surplus/financial strength until the IMR is fully amortized.

This phenomenon can further be illustrated by comparing two separate hypothetical companies. Assume Company A and B both have the exact same balance sheets. Then assume Company A keeps the old bond and Company B affects the trade mentioned above.

With the disallowance of a negative IMR balance, Company B now has a balance sheet that shows a relative decline of financial strength of \$14.87. This weakened balance sheet contrasts with both the principle behind the development of IMR, the relative actual economic financial strength, and claims paying ability of the two entities.

There is no difference in balance sheet economics of the two entities. The negative IMR balance for Company B essentially represents the difference between cost and fair value of the investment sold, that is already embedded on Company A's balance sheet based on the existing interest rate environment. The negative IMR balance should be recognized as there is no change in economics pre and post trade (or in this instance between Company A and Company B) which is consistent with the overall principle behind IMR.

Attachment 2

A PUBLIC POLICY PRACTICE NOTE

Asset Adequacy Analysis

September 2017

Developed by the Asset Adequacy Analysis Practice Note Work Group
of the American Academy of Actuaries



AMERICAN ACADEMY *of* ACTUARIES

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Asset Adequacy Analysis

September 2017

Developed by the Asset Adequacy Analysis
Practice Note Work Group
of the American Academy of Actuaries



AMERICAN ACADEMY *of* ACTUARIES

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The American Academy of Actuaries is a 19,000-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

This practice note is not a promulgation of the Actuarial Standards Board, is not an actuarial standard of practice (ASOP), is not binding upon any actuary and is not a definitive statement as to what constitutes generally accepted practice in the area under discussion. Events occurring subsequent to this publication of the practice note may make the practices described in this practice note irrelevant or obsolete.

This practice note was prepared by a work group organized by the Life Valuation Committee of the American Academy of Actuaries (Academy). The work group was charged with updating the 2004 practice note (which itself replaced the original 1995 practice note) regarding asset adequacy analysis practices used by appointed actuaries in the United States.

The practice note represents a description of practices believed by the work group to be commonly employed by actuaries in the United States. The purpose of the practice note is to assist actuaries who are faced with the requirement of asset adequacy analysis by supplying examples of some of the common approaches to this work. In addition, references have been made to other relevant and readily available literature. However, no representation of completeness is made, nor is there an assertion as to whether the practices discussed herein constitute best practice; other approaches may also be in common use.

This practice note reflects the results of a survey of actuaries who practice in jurisdictions in which the model Standard Valuation Law (SVL) of the National Association of Insurance Commissioners (NAIC) applies. To the extent that the laws of a particular state differ from the NAIC model, practices described in this practice note may not be appropriate for actuarial practice in that state.

Comments are welcome as to the appropriateness of this practice note, desirability of periodic updating, validity of substantive disagreements, etc. Comments should be sent to lifepolicyanalyst@actuary.org.

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Section A: Introduction and Background

Q1. What current practices are the basis of this practice note?

Starting in 1986, actuaries have been performing asset adequacy analysis for certain annuity and other interest-rate-sensitive lines of business under the requirements of New York Regulation 126. The types of business subject to asset adequacy analysis expanded into all other product lines because of the adoption of the Actuarial Opinion and Memorandum Regulation (AOMR) and the release of several Actuarial Guidelines requiring stand-alone asset adequacy analysis. Many practices have been developed in response to these regulations and guidelines.

To better understand current practice, the Society of Actuaries Smaller Insurance Company section sponsored a survey in 2012 (in a manner similar to the survey referenced in the 2004 version of this practice note) on the practices followed by appointed actuaries. These survey results are incorporated into this practice note. Below is a breakdown of the survey respondents by company size (level of reserves):

<u>Level of Reserves</u>	<u>Responses</u>	<u>% of Total</u>
More than \$25B	24	13%
\$10B–\$25B	17	9%
\$5B–\$10B	16	9%
\$1B–\$5B	39	21%
Less than \$1B	88	48%
TOTAL	184	100%

It should be noted that, where appropriate, we have used certain results from the 2004 survey.

Q2. Is this practice note expected to become a standard that actuaries must follow?

No. This practice note documents what is understood to be current practice at the time of publication and is based upon the knowledge gained from surveys and supplemental discussions held by members of the work group. It is a reference guide to aid appointed actuaries and other members of the Academy. The work group assumes no responsibility for any action taken as a result of using the information contained in this practice note.

There are several reasons why an actuary could elect to use methods other than those documented within this practice note, including:

- The actuary could be aware of special circumstances pertaining to a particular company or block of business that warrant the use of other methods.

- The economic conditions that exist at the time the actuarial opinion is to be made may warrant practices and/or methodologies not contemplated in this note.
- The actuary may have developed other acceptable testing methods.
- While the practice note was prepared and reviewed by actuaries familiar with the topic of the practice note, and these actuaries have concluded that the practice note represents approaches that fall within current practice, other approaches that could properly be termed “current practices” may not be documented here.

Q3. What is the goal of asset adequacy analysis?

The goal of asset adequacy analysis is to ascertain the ability of a block of assets to support a corresponding block of liabilities, taking into account the cash flows associated with the assets and liabilities, as well as interactions among the cash flows (e.g., asset returns may impact liability crediting rates)..

Some actuaries may view the value of asset adequacy analysis to be limited to the satisfaction of regulatory requirements. Other actuaries may value asset adequacy analysis additionally for its ability to inform management of actual or possible problems that may arise due to the underlying characteristics or current management of the business. In fact, many regulators take a keen interest in how the asset adequacy results are communicated to management. The regulatory asset adequacy issues summary (RAAIS)—refer to Q102—is used by some actuaries for communication with management as well as regulators.

There are a number of regulations and guidelines that require asset adequacy analysis, including but not limited to:

- 2001 Actuarial Opinion and Memorandum Regulation (2001 AOMR)
- Valuation of Life Insurance Policies Model Regulation
- New York Regulation 126
- 2001 CSO Model Regulation
- Actuarial Guideline XXXVIII (Application of the Valuation of Life Insurance Policies Model Regulation)
- Actuarial Guideline XLIII for Variable Annuities (AG43)

Q4. How is an asset (reserve) adequacy analysis different from a solvency test?

The 2001 AOMR (Section 6B(6)) asks an actuary to opine, in certain circumstances, that

the reserves and related items, when considered in light of the assets held by the company with respect to such reserves and related actuarial items ... make adequate provision, according to presently accepted actuarial standards of practice,

for the anticipated cash flows required by the contractual obligations and related expenses of the company.

Thus, the 2001 AOMR opinion is an opinion related to the ability of the assets backing reserves to meet policyholder obligations and expenses. There are two key differences between asset adequacy analysis and a solvency test:

- A solvency test is more inclusive, as all of the assets (including capital) and liabilities of the company are included in a solvency test.
- A solvency test typically requires a higher degree of certainty (e.g., 95%) than what may be necessary for asset adequacy analysis (e.g., 67%–83%, refer to Q91 and other material in Section J: Analysis of Results).

There is no requirement in either the ASOPs or the model SVL to test for a company's solvency in connection with the actuarial opinion that is filed with the statutory annual statement. However, as reserves are typically the largest liability of a life insurance company, asset adequacy analysis may be one of the tools used in assessing the overall financial health of life insurance companies. Risk-based capital (RBC) ratios also serve as a leading indicator of overall financial health.

Q5. What resources are available to assist the appointed actuary in understanding the requirements of asset adequacy analysis?

Actuarial firms, associations, and regulatory bodies have developed and maintained numerous resources to assist the appointed actuary in understanding the requirements of asset adequacy analysis. The primary providers of these resources include the Society of Actuaries (SOA), the Academy, the NAIC, and state regulatory bodies.

Valuation Actuary Symposium: The SOA sponsors the Valuation Actuary Symposium. This annual meeting provides the appointed actuary with practical information about anticipated regulatory changes that will impact the asset adequacy analysis process. The symposium also provides the appointed actuary with a forum to discuss issues with groups of peers or with recognized experts. These meetings are recorded to provide a useful resource for those not attending the symposium. The SOA also sponsors periodic continuing education sessions on specific topics related to asset adequacy analysis, including modeling. Other available resources include SOA section newsletters such as *The Financial Reporter* and recordings of SOA meetings.

Actuarial Standards of Practice (ASOPs) / Actuarial Compliance Guideline (ACG) No. 4: The Academy, through select ASOPs adopted by the Actuarial Standards Board, provides resources to assist the appointed actuary in asset adequacy analysis. In addition, ACG No. 4 focuses on statutory statements of opinion not including an asset adequacy analysis (Section 7 of the 1991 AOMR / New York Regulation 126).

Among the current ASOPs that discuss considerations for the appointed actuary performing asset adequacy analysis are:

- ASOP No. 7, *Analysis of Life, Health, or Property/Casualty Insurer Cash Flows*
- ASOP No. 11, *Financial Statement Treatment of Reinsurance Transactions Involving Life or Health Insurance*
- ASOP No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers*
- ASOP No. 23, *Data Quality*
- ASOP No. 41, *Actuarial Communications*

Life and Health Valuation Manual: The Academy also publishes a Life and Health Valuation Manual each year. This publication provides a state-by-state summary of valuation standards and provides a one-stop source for model laws and Actuarial Guidelines pertaining to valuation requirements.

National Association of Insurance Commissioners: The NAIC maintains information on model law adoption, as well as drafts of proposed legislation on its website. This information is intended to be an up-to-date source that can be used by the appointed actuary to determine whether new requirements that may impact the analysis process have been approved. In particular, the NAIC recently adopted a Valuation Manual that includes new requirements and guidance for the appointed actuary. The NAIC also provides educational information to state insurance department personnel regarding the work done by the appointed actuary. In addition, the *Accounting Practices and Procedures Manual* contains information useful for the appointed actuary.

State Regulatory Bodies: A few state regulatory bodies (New York and California, for example) currently provide the appointed actuaries of companies licensed in those states an annual letter describing specific considerations, requirements, and expectations related to asset adequacy analysis.

The remainder of this practice note is intended to be a resource to the appointed actuary by providing information regarding current practices in asset adequacy analysis.

Section B: Procedures for Accepting/Resigning the Position of Appointed Actuary

Q6. What are procedures that an actuary follows in accepting or resigning a position as appointed actuary?

The AOMR (Section 5B) defines a “qualified actuary.” Section 5C identifies certain steps in the appointment process: “Assuming the actuary is qualified, the regulation states that a company shall give the commissioner of insurance timely written notice of the name of the appointed actuary, title (and, in the case of a consulting actuary, the name of his or her firm), and manner of appointment. ... If an appointed actuary replaces a previously appointed actuary, the notice shall so state and give the reasons for replacement.”

The AOMR does not contain procedures for the actuary to follow when accepting or resigning the position; however, some states (for example, New York and Ohio) have additional requirements in their versions of the regulation.

According to the *Code of Professional Conduct*, Annotation 10-5, when an actuary consults with a previous appointed actuary, the previous actuary “shall cooperate in furnishing relevant information, subject to receiving reasonable compensation for the work required to assemble and transmit pertinent data and documents.”

Section 3.2 of ASOP No. 22 instructs a prospective appointed actuary to determine that he or she meets the requirements of the Academy’s *Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States*. According to Section 3 of the Qualification Standards, this includes the Specific Qualification Standards, as well as the General Qualification Standard. Section 3.2 of ASOP No. 22 also requires that the acceptance of, or withdrawal from, the position be in writing.

VM-30 *Actuarial Opinion and Memorandum Requirements* of the NAIC’s Valuation Manual (VM-30) includes some changes to the AOMR. There are additional requirements when the appointed actuary is replaced by action of the board. According to Section 2A(2), the insurer will be required to notify the insurance department in the state of domicile within five business days of the event. According to Section 2A(3), within 10 business days, the insurer is also required to provide a separate letter stating whether in the 24 months preceding such event there were any material disagreements with the former appointed actuary regarding the content of the opinion, and cites additional steps to be taken.

Q7. What information may the appointed actuary wish to obtain from the previous appointed actuary?

Prior to accepting the position as appointed actuary, some actuaries believe that it is prudent to meet with the most recent appointed actuary of the company to review: (1)

reasons for the appointed actuary's termination and (2) the most recent actuarial opinion and supporting memorandum and documentation. This may inform the actuary of any items of concern to the previous appointed actuary (e.g., inadequate access to management or the board of directors, the qualifications of the persons or firms providing major reliance, or adverse scenarios in the cash flow testing (CFT) performed). Such a meeting could take place even if not required by a particular state.

Q8. What is the relationship between the appointed actuary and the board of directors?

The AOMR states that either the board of directors or an executive officer of the company acting under the board's authority is responsible for choosing the appointed actuary. The following is a list of questions that some actuaries consider prior to accepting the position as appointed actuary:

- Will the actuary be permitted to appear before the board of directors to present the statement of actuarial opinion and supporting memorandum, if the actuary wishes to do so?
- If the statement of actuarial opinion and supporting memorandum are presented to the board by a person other than the appointed actuary, is there assurance that the opinion and supporting memorandum will be presented in their entirety and will not be amended or edited by the third party?
- Will the actuary be permitted to meet with the board of directors at such other times as the actuary believes appropriate in order to communicate problems that may emerge between the annual statements of opinion?
- Will the board of directors agree to keep the actuary informed of certain transactions or conditions specified by the actuary via an agreed-upon process (e.g., attendance at board meetings, copies of board minutes and agendas)?
- Will the actuary have access to information, records, and members of company management as necessary to perform the duties of the appointed actuary?
- Will the resources required to fulfill the actuary's duties (e.g., electronic data processing, support staff) be made available?
- Will the board (or its designee) agree to make available such persons or officers identified by the actuary that the actuary may need to rely upon to form the opinion (e.g., the investment officer or the administrative officer)? If the requested persons or firms refuse to be relied upon or are found to be unqualified, will the actuary be permitted to consult with the board of directors regarding alternative resources?

Some appointed actuaries inform the board of directors and/or senior management of the results from asset adequacy analysis. According to the 2012 survey, asset adequacy analysis results are presented to the following:

Chief Actuary	65%
Chief Financial Officer	70%
Other Senior Management	77%
Board of Directors	55%

In addition, VM-Appendix G, *Corporate Governance Requirements for Principle-Based Reserves* of the NAIC's Valuation Manual (VM-G), covers corporate governance guidance for valuations performed under principle-based reserves (PBR). Section 2 provides guidance for the board of directors, Section 3 provides guidance for senior management, and Section 4 provides guidance for qualified actuaries, including the appointed actuary. All three parties mentioned will have responsibilities with regard to corporate governance for PBR valuations, and communication among the parties will be essential.

Q9. What documentation is provided with regard to the appointed actuary's personal qualifications?

Qualification requirements are addressed in the Academy's *Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States*. The Qualification Standards include basic education requirements, experience requirements, and continuing education requirements; Section 6 of the Qualification Standards includes requirements to keep timely records of continuing education. In addition to those requirements, the actuary may wish to document his or her personal breadth and depth of knowledge regarding the products, markets, and strategies of the particular company and, in doing so, identify areas where support or reliance may be needed to allow the actuary to perform his or her duties as appointed actuary.

Section C: General Considerations for Performing Asset Adequacy Analysis

Q10. How does the actuary decide what to test?

According to the 2010 AOMR, Section 5E, the opinion “shall apply to all in force business on the statement date.” According to Section 3, the opinion must be based on asset adequacy analysis. So, it follows that asset adequacy analysis applies to virtually all policyholder reserves and claims liabilities, subject to the following considerations.

According to ASOP No. 22 (Section 3.3.4.c.), “For a reserve or other liability to be reported as not analyzed, the actuary should determine that the reserve or other liability amount is immaterial.” (Section 6A(2) of the AOMR still identifies items not analyzed.) Guidance on materiality is provided in Section 7 of the Preamble to Statutory Accounting Principles (i.e., “Is this item large enough for users of the information to be influenced by it?”).

A possible measure of materiality a percentage of total reserves. Five percent is mentioned in a letter to appointed actuaries dated Nov. 3, 1994, from the Illinois Department of Insurance. Another possible measure is a fixed dollar limit in determining materiality, considering other financial information of the company. In addition, the actuary may want to do a closer inspection of any product with an immaterial reserve to confirm that the reserve properly reflects the significant risks of the product, if any. Actuaries could evaluate materiality at a product level and/or in aggregate. In the final analysis, the actuary may exercise professional judgment to confirm that inclusion of “immaterial” amounts that have been excluded from the analysis would not result in different findings in his or her actuarial opinion, report, or recommendation.

In the 2012 survey of appointed actuaries, approximately 80 percent of the respondents indicated that they exclude 5 percent or less of the general account liabilities from testing. For separate account liabilities, about 67 percent of the respondents that have separate account liabilities exclude 1 percent or less of those liabilities. Specific lines that have been excluded by survey respondents are listed below, mostly due to the relative immateriality in the context of the respondent’s book of business:

- Group business
- Accident and health
- Supplementary contracts
- Accidental death benefit
- Waiver of premium and disability riders
- Other supplemental benefits
- Claim reserves

Q11. What methods are used when performing asset adequacy testing?

As indicated by the responses to the 2012 survey of appointed actuaries, the most commonly used method in asset adequacy analysis is CFT (see ASOP No. 7).

The survey responses exhibited the following percentage breakdown of average tested reserves by asset adequacy method:

Cash flow testing	86%
Gross premium valuation	6%
Demonstration of conservatism	2%
Risk theory techniques	1%
Loss ratio	1%
Other	4%

Although asset adequacy analysis does not necessarily imply CFT, the actuary, exercising professional judgment, may decide that CFT is the most appropriate methodology for certain lines of business. For instance, the product design of universal life and deferred annuity lines of business generally renders their reserves sensitive to fluctuations in interest rates. According to ASOP No. 22, Section 3.3.2, “cash flow testing is generally appropriate where cash flows of existing assets, policies, or other liabilities may vary, or where the present value of combined asset, liability, or other cash flows may vary under different economic or interest-rate scenarios.” For certain purposes, such as to aggregate results of several lines of business, it may be useful to cash flow test certain non-interest-sensitive lines of business, such as term life insurance, in a manner consistent with interest-sensitive lines. There could also be a desire for consistency under X-factor testing (e.g., sensitivity test mortality on a consistent basis for universal life and traditional life). If the appointed actuary aims to treat results in aggregate, such as using positive cash flow from a non-interest-sensitive line of business to offset a deficit in an interest-sensitive line of business or incorporating overhead expenses at a company level, a consistent CFT approach across all lines may be the preferred method to determine asset adequacy.

However, as is indicated in the above table, CFT is not the only acceptable method for testing the adequacy of reserves. ASOP No. 22, Section 3.3.2, goes on to say that “asset adequacy test methods other than cash flow testing may be appropriate in other situations.” The actuary may also wish to consider Sections 3.2.1 and 3.2.2 of ASOP No. 7, *Analysis of Life, Health, or Property/Casualty Insurer Cash Flows*, which address the relative appropriateness of CFT in various situations.

Section 3.3.2 of ASOP No. 22 lists several alternative approaches that may be appropriate methods, depending on the circumstance. These include the following:

Gross Premium Valuation. A gross premium valuation (GPV) involves a projection of the liability premiums, benefits, and expenses. It determines the value of a book of business based on the present value of the benefits and expenses less gross premiums. A liability model is necessary, along with a projection based on that model and reasonable

assumptions, but an asset projection is not needed. (See Q21 for discussion of setting the discount rate.) The appointed actuary may have already developed liability models, or may have access to models that others in the company have developed for pricing or other internal purpose. A GPV may be appropriate where the policy and other liability cash flows are sensitive to moderately adverse deviations in the actuarial assumptions underlying these cash flows but are not sensitive to changes in interest rates (see ASOP No. 22 for an example).

Demonstration of Conservatism. Some actuaries demonstrate asset adequacy through the conservatism found in some reserves, that is, where the actuary considers the degree of conservatism in the reserves to be so great that moderately adverse deviations in the actuarial assumptions underlying the policy cash flows are covered. For example, this type of method may be appropriate for a block of older life insurance if that block is reserved using conservative valuation interest rates and mortality/morbidity tables. In this case, demonstration of conservatism could be observed as the valuation rate being moderately lower than the ultimate reinvestment rate in any scenarios that might be considered. Another example that may be appropriate for this type of method is with respect to policies reserved for using a Principle-Based Approach (PBA). In this case, the assumptions used in the valuation (including interest rate paths of a stochastic scenario path) or the method (e.g. CTE70) used to determine the reserve may be judged by the actuary to meet a moderately adverse degree of conservatism. (See Section L for further discussion.) Nevertheless, if there is any doubt about the level of conservatism not being at least moderately adverse, most actuaries may prefer to use one of the other methods described herein.

Risk Theory Techniques. If the liability under consideration is short term in nature, risk theory techniques may be sufficient to demonstrate asset adequacy. For instance, risk theory might be appropriate for a short-term disability coverage that is supported by short-term assets. Probabilities of continuance of disability claims can be calculated based on a distribution developed from historical claim experience. The parameters of the function associated with this probability distribution can be varied to develop the sensitivities under moderately adverse deviations. Given the short-term nature of the assets assigned to back their liabilities, it may be appropriate to ignore the effect of interest.

Loss Ratio Methods. Loss ratio methods may be appropriate for short-term health insurance business, assuming that the supporting assets are also short term. Aggregate incurred health claims could be estimated by applying estimated loss ratios to earned premiums. Again, various moderately adverse deviation sensitivity tests can be developed to ascertain asset adequacy.

Q12. What are the primary differences between cash flow testing and gross premium valuation?

GPV is described in Q11. In a GPV, the value of the liability is calculated as the present value of the projected benefits and expenses less gross premiums. The projection of these

liability cash flows is generally the same as in CFT, with the complexity of modeling depending on the material risks in the liability. However, unlike CFT, a projection of asset cash flows is not developed. As the asset cash flows are implicitly provided for through the use of discount rates in the calculation of present values, GPV models tend to be somewhat simpler than those used for CFT. So, they may be set up and managed on a less structured platform, such as a simple spreadsheet model.

A GPV may be appropriate when the liabilities are not interest sensitive and when the asset cash flows are either not interest sensitive or can be reasonably represented by varying the discount rate. Term life, whole life, disability income, long-term care, major medical, Medicare supplement, and accidental death and dismemberment are examples of insurance products for which GPV has been used to test asset adequacy. CFT may be more appropriate where cash flows vary significantly under different economic or interest rate scenarios. A simple GPV typically cannot indicate when there are interim cash flow or duration mismatches in the portfolio.

A GPV is generally validated in the same manner as is CFT. The 2004 survey of appointed actuaries indicated that most appointed actuaries do a static validation of a GPV, where opening balances of the models are checked against actual inforce. About half also conduct certain dynamic validations (refer to Q19 for further information), where projections from the model are compared against financial forecasts.

Approaches taken to reflect reinsurance generally apply to GPV as they would for CFT.

Q13. Are different lines of business aggregated for purposes of asset adequacy analysis?

The board of directors for each company names one appointed actuary for that company. In general, the appointed actuary opines on the adequacy of the company's reserves in the aggregate. Thus, lines of business, such as life insurance, annuities, and health, may be combined. As a practical matter, actuaries commonly perform tests by groupings, such as major product lines or business units. These product or business units may not necessarily correspond with annual statement lines of business.

The 1991 AOMR allowed aggregation of reserves and assets before analyzing the adequacy of the combined assets to support the combined liabilities. It also allowed aggregation of the results of separate asset adequacy analyses if the appointed actuary has determined that the results are developed under consistent economic scenarios and the business is subject to mutually independent risks. Specifically, it allowed redundancies in one line to offset deficiencies in another, provided that either (1) the results have been developed using consistent economic scenarios, or (2) the lines involve mutually independent risks.

The 2001 AOMR (which is in effect in most states as of the date of this practice note) does not give precise guidance on aggregation, although it refers to "aggregate reserve"

and “aggregate surplus.” Some states have different requirements related to aggregation across major lines of business, some of which require approval for aggregation, or do not permit aggregation in certain circumstances.

Because there is no uniform guidance regarding aggregation across lines of business for determining reserve adequacy, aggregation practices vary. The following table summarizes responses to the 2012 survey of appointed actuaries regarding aggregation for modeling purposes and to determine reserve adequacy:

<u>Model Runs</u>	<u>Measurement of Reserve Adequacy</u>		
	<u>In Aggregate</u>	<u>By Line of Business</u>	<u>Smaller Blocks</u>
In Aggregate	√		
By Line of Business	√	√	
Smaller Blocks	√	√	√

Product lines often subject to stand-alone reserve adequacy included long-term care, certain types of UL with secondary guarantees, separate account products, life insurance, group life, annuities, and health (due to the gross premium floor). Stand-alone testing is now required for certain products or lines of business in many states.

When reviewing interim (year-by-year) results, 80 percent of the 2012 survey respondents indicated that they aggregate reserves in the same manner as they do when reviewing terminal (end of projection horizon) results. Among those who aggregate differently, 14 percent aggregate at the major line of business level, 4 percent aggregate at the total company level, and 2 percent aggregate at the block of business level.

When aggregating the results of asset adequacy analysis of various lines of business, many actuaries believe it is usually desirable to have consistency among the economic scenarios used for each of the lines of business. If different projection periods are used for the lines being combined, then the results typically can be aggregated at a common valuation point. For this aggregation approach, some actuaries project each line separately and discount the excess of the ending market value of assets less liabilities back to the projection date, in order to get results that may be combined on a consistent, scenario-by-scenario basis.

If different analysis methods are used to determine the asset adequacy for various lines of business (e.g., GPV for some and CFT for others), it may be inappropriate to combine results unless consistent economic scenarios are used. GPV results usually can be aggregated with CFT results when consistent economic scenarios are used for each of the lines of business, even if different projection periods are used.

Q14. How are assets allocated among lines if cash flow testing is done separately for each line?

Many states require that any assets contractually allocated to a specific line for a special purpose (such as by reinsurance treaty or separate account) be allocated to that line for CFT. Beyond that, if the company has segmented assets by line of business (formally or notionally), then the allocation of assets to these segments may represent one good place to start. Similarly, some states require that “pledged” or “encumbered” assets be excluded from the assets available to support reserves. Assets cannot be allocated to multiple liabilities at the same time.

To the extent that the actuarial opinion covers all lines of business, it may be appropriate to assign assets differently from how they were allocated under an asset segmentation arrangement. However, to be prudent, the actuary would usually confirm that the same assets are not used for multiple liabilities.

Some actuaries take a pro-rata slice of each asset in proportion to the reserves of each line, although this method may not be preferred if the characteristics (e.g., effective duration) of the liabilities differs materially between lines.

Actuaries may also use different methods of asset allocation at different levels of modeling or testing. For example, while a company may have a single formal asset segment for interest-sensitive business, the actuary may choose to refine the allocation within the segment by duration for universal life, deferred annuities, and payout annuities.

Thus, the 2012 survey of appointed actuaries allowed respondents to specify more than one method for allocating assets by line of business:

Formal segmentation	67%
Pro-rata of all assets	37%
Other	15%

The most common “other” method is to allocate assets specifically to achieve a better matching of asset and liability cash flows. Also, many companies use some combination of these three methods at different levels.

Many actuaries maintain reasonable consistency from year to year in the method of allocating the assets to product lines. If a significant change in allocation method is made, the appointed actuary may consider documentation of the change and related impact on the asset adequacy results.

Q15. Can the actuary use a testing date prior to Dec. 31 for the purpose of the year-end actuarial opinion?

Because it can be difficult to complete an asset adequacy analysis in time for the March 1 deadline using year-end data, it may be common to use data from a prior date. ASOP No. 22 (Section 3.3.4) gives guidance for using data prior to year-end in an asset adequacy analysis, and states that “The actuary should document the reasonableness of such prior period data, studies, analyses, or methods; that key assumptions are still appropriate; and that no material events have occurred prior to the valuation date that would invalidate the asset adequacy analysis on which the actuary’s opinion is based.”

Approximately 60 percent of the respondents to the 2012 survey of appointed actuaries indicated they base their testing on a liability as-of date earlier than Dec. 31, with 93 percent of those using a date of Sept. 30 and the remainder using a later date. Comparable responses were provided regarding the as-of date for assets, and there is evidence of occasional differences between the valuation dates of inforce assets versus liabilities.

When an actuary chooses a testing date earlier than the valuation date, the actuary may wish to provide a demonstration that there have been no material changes between the two dates. To make this demonstration, an actuary may compare assets by asset category for the testing date versus year-end, considering the mix of assets and the nature of assets (e.g., duration, yield, type). Similarly, an actuary may compare the size of the liabilities by type and the nature of the liabilities (e.g., average size, policy counts, mix) as of the two dates. Some actuaries consider changes in the interest rate curve, equity movements, and the level of investment reserves between the testing date and year-end. Also, some may use additional sensitivity scenarios where the Dec. 31 yield curve is applied to earlier data.

From the 2012 survey of appointed actuaries, following is a summary of the percentage of respondents who use the respective methods to demonstrate whether there have been material changes between the testing date and the valuation date:

Change in liability volume	73%
Change in liability mix of business	69%
Change in asset volume	56%
Change in asset mix	79%
Changes in AVR, IMR, or DTA	27%
Change in yield curve	87%
Other (including spreads)	12%

With respect to the issue of changes in the yield curve, about one-third of the respondents indicated they use the year-end yield curve, while most of the rest use the yield curve for an earlier date. However, 40 percent of the respondents said they “look at yield curves as of the annual statement date,” while 30 percent of the respondents said they “look at yield curves as of the opinion signing date.” Of that 70 percent of the respondents, most indicated that they use some combination of interpolation, sample testing, sensitivity

testing, or full retesting to calculate the impact of the change in yield curve, depending on the materiality of the change and other circumstances.

Q16. How do actuaries interpret “moderately adverse conditions” in asset adequacy analysis for purposes of compliance with ASOP No. 22?

Item 3.4.2 of ASOP No. 22 states the following:

When forming an opinion, the actuary should consider whether the reserves and other liabilities being tested are adequate under moderately adverse conditions, in light of the assets supporting such reserves and other liabilities. To hold reserves or other liabilities so great as to withstand any conceivable circumstances, no matter how adverse, would usually imply an excessive level of reserves or liabilities.

Item 2.15 of ASOP No. 22 defines “moderately adverse conditions” as follows:

Conditions that include one or more unfavorable, but not extreme, events that have a reasonable probability of occurring during the testing period.

Some actuaries believe this item implies that asset adequacy analysis would ordinarily be performed with at least one scenario or set of conditions that are more adverse than current conditions. Although ASOP No. 22 does not call for reserves to be adequate under extreme or worst-case conditions, some actuaries would say that reserves have not been adequately tested if testing conditions assume that all situations will get less adverse and no situation will be more adverse than the present. Many actuaries consider moderately adverse conditions applicable to several assumptions within a scenario, not just one assumption.

Also, some actuaries consider the current economic environment when determining what constitutes “moderately adverse conditions.” For example, in a period of very low interest rates, some actuaries would view several of the decreasing scenarios required by New York Regulation 126 (such as the falling scenario and the pop-down scenario) as going beyond the definition of “moderately adverse conditions.” This is particularly true when considering a long projection period, such as 20 years or more. But in times of high interest rates, some actuaries would view these decreasing scenarios as an appropriate level of moderately adverse conditions.

Finally, some actuaries interpret moderately adverse conditions by looking at the conditions and assumptions used for each scenario, rather than by looking at the financial results coming out of the scenarios. The same conditions can produce adverse results for one type of business or risk profile and favorable results for another, and two types of business might offset each other to some extent.

Section D: Modeling Considerations – General

Q17. What modeling platforms are used to model liabilities?

Based on the results of the 2012 survey, there were 15 commercial software packages used by the respondents for the liability projections. The 2012 survey responses also indicate that internally developed systems or internally developed spreadsheets are commonly used by companies to model a portion of the liability cash flows.

See Q41 for a discussion of platforms used to model assets.

Q18. How long are the projection periods used by actuaries?

ASOP No. 22 (Section 3.3.4.b) states the following: “Asset adequacy should be tested over a period that extends to a point at which, in the actuary’s professional judgment, the use of a longer period would not materially affect the analysis.”

Approximately 52 percent of the respondents in the 2012 survey indicated that they do not establish a projection period using criteria based solely on the extent of the original liabilities that are expected to mature. Of the 48 percent who responded that they do use a materiality level to determine the length of the projection period, 75 percent use a materiality level of 90 percent.

Approximately 45 percent of the 2012 survey respondents indicated they use the same projection period for all products. Relative to these respondents, 50 percent use a projection period of 21–30 years, 12 percent use a projection period of 31–40 years, and 23 percent use a projection period of more than 40 years.

The 55 percent of 2012 survey respondents who use different periods by product responded offered additional usage details, summarized in the following. Percentages noted are based on the responses that indicated different projection periods by product:

- The most common period for individual traditional life products is 21–30 years, including term insurance and permanent insurance, whether par or nonpar (39 percent). However, 28 percent of the respondents used a period longer than 40 years.
- For individual fixed deferred annuities, 41 percent use between 21 and 30 years, while 32 percent use 11–20 years. Of group annuities, 50 percent use 20 years or less, but about one-third use greater than 40 years. Fixed payout annuities and structured settlements had longer periods. Of payout annuities, 39 percent use more than 40 years, although 33 percent use 21–30 years. Of structured settlements, 73 percent use more than 40 years. In the 2004 survey, in contrast, 70 years was the most common projection period for structured settlements.

- For universal life with secondary guarantees, 46 percent of companies use more than 40 years.
- For other universal life, 85 percent use 21 years or more, but were fairly evenly divided among the 21–30-, 31–40-, and greater-than-40-year groupings.
- Health products other than long-term care and disability tend to use shorter periods, with 75 percent being 30 years or less and fairly evenly divided among the less than 20, 11–20 and 21–30 time periods for other health. Disability insurance is somewhat longer, with 41 percent using greater than 40 years and 27 percent using 21–30 years.
- Long-term care had longer periods as well, with 63 percent of respondents using more than 40 years.

Q19. What types of model validation do appointed actuaries perform?

In the 2012 survey of appointed actuaries, 88 percent of the respondents stated that they perform static validations, such as comparing opening balances, policy counts, and other key metrics against actual amounts.

Dynamic validations are performed by 51 percent of the respondents. In a dynamic validation, the actuary compares projections coming from current models against recent actual results (retrospective) or financial forecasts, such as company plan. Furthermore, some actuaries compare actual results with the prior year's models in order to improve current models.

In addition to static and dynamic validations, some actuaries perform attribution analysis, during which the actuary performs a step-by-step analysis of the change from the prior year's models to the current year to confirm that the model appropriately reacts to changes in inforce, actuarial assumptions, and/or macroeconomic conditions. Depending on the use, attribution analysis is performed using either deterministic or stochastic scenarios.

Q20. How is the discount rate determined that is used to calculate the present value of ending surplus at the valuation date?

There are currently several methods used to determine a discount rate. One is to use the pre- or after-tax earnings rate (i.e., the average investment earnings rate) over the projection period used in each scenario, either including or excluding the impact of policy loan interest. Another method is to rerun the scenario adding \$1,000 (or 1 percent) to the initial assets. The change in the ending difference can be used to determine the discount rate for that scenario. Another alternative is to use the pre- or after-tax Treasury spot rates for the length of the projection period—e.g., 20 years—which is generated under each scenario. Although outlier discount rates may distort the present values, only 22 percent of actuaries use floors, caps, or other methods to minimize such distortions.

From the 2012 survey of appointed actuaries, approximately 15 percent of the respondents indicated they do not calculate a present value of ending surplus. Of those who do, below is a summary of the methods used to determine the discount rate:

After-tax earnings rate, including policy loan interest	36%
After-tax earnings rate, excluding policy loan interest.	24%
After-tax Treasury spot rates for the length of projection period	4%
Pre-tax earnings rate, including policy loan interest	6%
Pre-tax earnings rate, excluding policy loan interest	4%
Pre-tax Treasury spot rates for the length of projection period	6%
Rerun the scenario with additional initial assets, determine discount factor based on change in surplus	4%
Other	16%

In the above table, “other” methods include such items as:

- A single specified rate
- Pre- or after-tax new money rates

Q21. How does the actuary set the discount rates for a gross premium valuation?

The discount rate used in determining the present values of a given scenario is generally consistent with the expected earned rate on the assets backing the liabilities for that scenario. Some actuaries use a level net earned rate based on a recent average portfolio yield of the assets (use of pre-tax or after-tax rates may relate to treatment of taxes within the model). Another method in use is to derive the discount rate curve from the projected after-tax net earned rate of the actual assets in the portfolio and purchased based on the investment strategy. For conservatism, some actuaries set the earned rate used for discounting purposes lower than the rate earned by the company’s assets.

Sometimes a single-level discount rate will be used for a given scenario. However, if new money rates have recently moved or are expected to change going forward within the scenario being tested, some actuaries consider a change in the discount rate over time. If future new money rates are expected to be lower than the rate currently earned on the current assets, then the discount rate generally could be assumed to decline over time as the liabilities increase or as assets roll over and earn future new money rates due to maturities, calls, or prepayments. The discount rate may also be subject to a floor (e.g., 0 percent) determined by the actuary. If the scenario has new money rates rising, the discount rate might be increased over time. If changes in asset yield for a material block of business cannot be adequately modeled through the use of discount factors, some actuaries consider using CFT instead of GPV.

Some actuaries test the option risk in assets (e.g., calls) by assuming an immediate drop in the discount rate used in the GPV. The drop test is often set as severe as needed to represent a drop in earned rate that would occur if all options were exercised.

Q22. The AOMR states that the interest maintenance reserve (IMR) should be used in asset adequacy analysis. Why?

The IMR is part of the total reported statutory reserves. The IMR typically defers recognition of the portion of realized capital gains and losses resulting from changes in the general level of interest rates. These gains and losses are amortized into investment income over the expected remaining life of the investments sold, rather than being recognized immediately. This amortization is after tax.

The purpose of the IMR usually is to maintain the original matching between assets and liabilities that might be weakened by the sale of an asset. Originally, it was anticipated that the IMR would be allowed to become negative, as long as the asset adequacy analysis showed that the total statutory reserves, including the negative IMR, were sufficient to cover the liabilities. However, a negative IMR is not an admitted asset in the annual statement. So, some actuaries do not reflect a negative value of IMR in the liabilities used for asset adequacy analysis.

In the 2012 survey of appointed actuaries, more than 80 percent of the respondents indicated they include the IMR in their testing. Some actuaries use a starting IMR of zero if IMR is negative. Other actuaries use negative IMR to adjust starting assets and therefore model future lower asset yields than if zero IMR were assumed. Half of the respondents who indicated they used IMR in testing also indicated they lower assets by the absolute value of a negative IMR balance; the other half indicated they use a value of zero for the starting IMR if it is negative at the beginning of the projection period. There is no prohibition regarding the use of negative IMR within asset adequacy analysis. So, a number of actuaries allow the IMR to fall below zero within the testing period. About 60 percent of actuaries responding to the survey indicated they do not have to deal with a negative IMR.

Q23. How does the actuary determine which portion of the IMR can be used to support certain products? How is the portion of the IMR used?

If the actuary allocates the assets and IMR by line, then one possible approach is line of business-level inclusion of starting assets in the amount of the unamortized portion of the IMR relating to those assets that were owned by the line prior to being sold. Another possible approach is the allocation of company-level IMR proportionately to starting assets. An advantage of this second approach is that it is generally simpler, while a disadvantage is that longer liabilities probably have longer assets, which usually produce higher capital gains when sold, after a given drop in interest rates, than shorter assets do,

leading to an overallocation of IMR to the shorter liabilities. Another approach may be to allocate based upon reserve balance and effective duration within each segment.

Respondents to the 2004 survey indicated the following methods of allocating starting IMR by line:

In proportion to total assets by line	56%
In proportion to unamortized IMR for each line	16%
In proportion to asset types within each line	10%
Other	20%

If the actuary has software that can be used to model the development of the IMR itself, then he or she could start with assets equal to reserves plus the portion of the IMR and model the changes to IMR as assets are sold during the projection.

Q24. How is the asset valuation reserve treated in cash flow testing?

From the 2012 survey of appointed actuaries, 45 percent of the respondents indicated they do not include the Asset Valuation Reserve (AVR) in testing. Those respondents who indicated they do include AVR (55 percent of the total) reported three issues they typically consider regarding the use of the AVR:

1. The amount of assets to include at the beginning of the projection;
2. Whether to model the change in the AVR during the projection; and
3. How to treat any AVR remaining at the end of the projection.

The AOMR states that AVR may be used to provide for default risks but that it cannot be used for other risks. Many actuaries (in the 2012 survey of the appointed actuaries, 51 percent of those who model the initial AVR) believe that it is preferable for the beginning assets supporting the AVR to be no more than the present value of defaults. There are several choices in using beginning AVR assets, including the following.

1. For each scenario, develop two sets of projections: (1) without defaults and (2) with defaults. Discount the difference in ending surplus back to the projection date at an appropriate sequence of interest rates for the scenario. The maximum present value of this difference for all specified scenarios is the present value of defaults. If it is less than the pro-rata portion of the AVR described in Q25, then the actuary may run the projections without the AVR assets and without defaults (under the assumption that the AVR covers the cost of defaults).
2. If the pro-rata share of AVR is not sufficient to cover the present value of the cost of defaults for all scenarios, then for each scenario the actuary typically adds assets equal to the pro-rata AVR and runs the projections with defaults modeled.

3. A conservative, simple choice is to model defaults but exclude the AVR.

Effective in April 2014, the NAIC adopted a proposal to limit the inclusion of AVR in the calculation of total adjusted capital to the amount not used in asset adequacy analysis in support of the actuarial opinion. As such, the appointed actuary may consider consultation with others in the company to ensure appropriate treatment in the actuarial opinion and the company's annual statement.

In addition to the above choices concerning beginning assets, if the actuary can model the development of the AVR itself, then the actuary usually can start with assets equal to the liability reserves, plus the full pro-rata AVR (limited to the amount of present value of defaults), and model the contributions to AVR, as well as project defaults. While some actuaries prefer more complex models that use defaults and AVR, others prefer the simpler models without AVR.

See Q26 for how actuaries usually treat any remaining AVR at the end of the projection.

Q25. How does the actuary determine the portion of the AVR that can be used to support a certain business unit?

Some actuaries use a pro-rata share of the default component of the AVR to help support the obligations of a specific business unit, based on the assets chosen to back the line from page 29 (the first AVR page) in the annual statement,¹ with the following variables (note that the page and line references in this answer are from the 2015 NAIC annual statement format):

ratio (maximum value of 1)	actual current bond and preferred stock component (line 8) maximum current bond and preferred stock component (line 9) or comparable lines for the mortgage or other components
Factor	reserve factor by investment-grade group (page 30 or 31 of the annual statement)
statement value	amount in Schedule D, Part 1, Column 11 (book/adjusted carrying value) of the assets equal to reserves backing the particular line of business by investment grade

If this approach is used, the pro-rata share of the AVR for the assets backing the line is equal to the sum over all investment-grade groups (ratio × factor × statement value). In addition, the appointed actuary may consider including the AVR on the assets that are assumed to back AVR (i.e., the AVR on the AVR).

¹ Annual statement references in this practice note are based on the NAIC Life/Health blank as of Dec. 31, 2015.

Other approaches used are to (1) allocate the default component of the AVR in aggregate to each line of business, and (2) allocate each asset category of the default component of the AVR separately to each line of business.

Respondents to the 2004 survey who used AVR reported the following methods for allocating beginning AVR:

In proportion to total assets by line	62%
In proportion to default component by line	19%
In proportion to asset types within each line	7%
Other	12%

Q26. If products with relatively short durations are cashed out at the end of the projection period, and the IMR and AVR are being modeled, what happens to the IMR and AVR at the end of the period?

The IMR may be positive (or negative) when there are no policies left in force that need to have interest maintained. When the IMR is included in testing, some actuaries believe it is preferable to include the value of the ending IMR in the value of ending surplus.

The AOMR requires that AVR be used only to cover default risk. If there are still assets left at the end of the projection period, the AVR could be considered when determining the value of those assets. Some actuaries believe that only method 1 below is appropriate. Others believe that methods 2 and 3 below are more conservative and are therefore also appropriate.

1. Reflect value of ending AVR in determining ending surplus;
2. Exclude value of ending AVR in determining ending surplus; or
3. Add value of ending AVR only to the extent that assets are sold at a loss at the end; otherwise, exclude ending AVR.

Some actuaries consider it appropriate to reflect ending AVR only in the calculation of book surplus, with market surplus calculated by subtracting ending AVR from the otherwise ending market surplus. Some actuaries believe that releasing the AVR, if assets run out, is not consistent with using AVR only for default risk.

Q27. What are some methods for reflecting any net deferred tax asset (DTA) or net deferred tax liability (DTL) in the asset adequacy determination?

Some actuaries use CFT models that specifically project taxable income (e.g., tax reserves different from statutory reserves, deferred acquisition cost (DAC) tax accruals, and amortization). Some actuaries believe that the DTA and DTL (the admitted portion in the case of DTA) are analogous to the IMR and include the appropriate allocated portion in the modeling. In the case of DTAs, the DTA is usually part of the assets backing the reserves, replacing other assets. In the case of a DTL, additional assets may be assigned to back the DTL. Of course, in the case of a DTL, one conservative alternative would be to not reflect it in the modeling. Explicit modeling of projected future DTAs and DTLs may or may not be performed, depending on whether the appointed actuary believes there is a significant effect on interim results that may affect the opinion on adequacy.

Alternatively, some actuaries use CFT models that do not specifically project taxable income (e.g., taxable income is assumed to equal statutory income). In the most common situation where there is a DTA (whether admitted or not), this kind of projection is generally conservative with regard to projection of total taxes paid, so it would generally be appropriate to not take into account the DTA. In the situation where there is a net DTL, the projection usually would be understating future taxes, and some actuaries consider it appropriate to include a provision for additional taxes as indicated by the DTL.

In the 2012 survey of appointed actuaries, a small number of the respondents indicated that they project DTA and DTL balances (e.g., tax reserves, DAC tax accruals). The majority of respondents (85 percent) do not model initial DTA balances, with about half of those not modeling DTA balances because they are immaterial.

Q28. How are shareholder dividends treated?

ASOP No. 7, *Analysis of Life, Health, or Property/Casualty Insurer Cash Flows*, Section 3.10.4 states the following: “The actuary should consider how applicable law, and other external requirements relating to such things as financial statements and operating ratios, federal income taxes, insurer capitalization, and distribution of an insurer’s earnings to policyholders or shareholders are likely to affect future cash flows or constrain the range of possible scenarios. These factors should be appropriately reflected in the analysis.”

Based on the results of the 2012 survey, 51 percent of the respondents indicated that shareholder dividends are excluded because shareholder dividends are not applicable. Of the remaining 49 percent, about 10 percent explicitly include shareholder dividends in their model.

Given the small percentage of respondents who currently consider shareholder dividends in their testing, it is difficult to define common practice for modeling shareholder dividends. The actuaries who do model shareholder dividends typically do so based on company expectations.

Q29. How are policyholder dividends treated?

Some actuaries treat policyholder dividends as fixed over all scenarios when modeling future cash flows, using the projected dividends under the current dividend scale. Other actuaries model policyholder dividends dynamically over the projection period, varying them by scenario based on changes in interest rates, expenses, or other parameters during the projection period. Because companies declare dividends for a year at a time, some actuaries build in a lag factor between experience changes and the time it takes to recognize and reflect those experience changes through changes in dividends.

Based on the 2012 survey of appointed actuaries, below is a summary of how policyholder dividends are modeled for those companies with policyholder dividends:

Modeled to approximate actual dividend policy	71%
Modeled in a simplified way	15%
Ignored as not material	12%
Other	2%

If the current dividend scale provides for an allocation of surplus to be paid out as dividends, some actuaries include the expected future allocation of surplus in the testing, clearly disclosing this in the actuarial memorandum. Others use dividends lower than their current dividend scale, reducing the dividends for the amount contributed from surplus.

Q30. Do actuaries reflect reinsurance in modeling?

ASOP No. 7, Section 3.8 states the following:

The actuary should consider whether reinsurance receivables will be collectible when due, and any terms, conditions, or other aspects that may be reasonably expected to have a material impact on the cash analysis.

ASOP No. 11, Section 3.2 states:

When preparing, reviewing, or analyzing financial statement items that reflect reinsurance ceded or reinsurance assumed, the actuary should consider potential cash flows that may, in the actuary's professional judgment, have a material impact under the reinsurance agreement.

In the 2012 survey of appointed actuaries, 64 percent of the respondents indicated they model reinsurance in a way meant to approximate treaty terms.

ASOP No. 7, Section 4.3.g.(8), also states that the characteristics of any reinsurance agreements and how they were reflected in the analysis should be documented in the memorandum.

Q31. How is modified coinsurance treated in asset adequacy analysis?

The AOMR focuses on whether reserves are included or excluded from the analysis. However, in the case of modified coinsurance, the risks and the potential profits and losses may not accrue to the same statutory entity that holds the reserves on its balance sheet. Many actuaries believe it is preferable for the asset adequacy analysis to occur in the statutory entity where the risks are present. This might mean performing CFT on assumed modified coinsurance, even though the assuming company does not hold the reserve balance or the assets on its balance sheet. Conversely, it might mean not performing CFT on ceded modified coinsurance even though the reserves and assets are reported on the ceding company's balance sheet. Nevertheless, this does not necessarily mean that those reserves are excluded from asset adequacy analysis. They might be reported in the opinion as being included in the analysis but as representing minimal asset risk (because the risks have been ceded to another company). Although the ceding company may not have to perform CFT on ceded modified coinsurance, some actuaries do review the rating and the CFT work done by the assuming company to confirm that the risk to the ceding company is indeed minimal.

Section E: Modeling Considerations—Scenarios

Q32. What approaches to modeling economic scenarios are currently included in appointed actuaries' practice when doing asset adequacy analysis?

Economic scenarios used for asset adequacy analysis usually incorporate interest rates and/or equity returns as key variables, as they are the most important economic variables for many lines of business. Other economic scenario variables that may be included, if material to the results, include separate account fund returns, inflation rates, asset spreads, and asset default rates. In fact, some actuaries limit their economic scenarios to interest rates and/or equity returns, and treat other economic variables through sensitivity tests, if appropriate.

Approaches currently used to represent interest rate and/or equity return scenarios in actuarial models may be categorized broadly as deterministic and stochastic. In a deterministic approach, one or more handpicked scenarios of future rates/returns are used. An example of this is the seven required interest rate scenarios described in New York Regulation 126, often referred to as the New York 7 scenarios. These scenarios are determined each year so that the initial values are set to the current interest rate yield curve. The New York Department of Financial Services has released bulletins that describe the manner of constructing the interest scenarios.² Past bulletins have included direction on use of a maximum rate of 25 percent, a floor of one-half of the starting five-year Treasury rate, and yield curve shifts. Some actuaries also add inverted yield curve scenarios to the basic seven. In the 2012 survey of appointed actuaries, when testing with the New York 7, 32 percent of the respondents indicated that they floor the rates at half the initial rate for each maturity, 39 percent at the initial rate less half of the initial five-year Treasury rate, 12 percent at half of the initial five-year Treasury rate, and 3 percent at a specified rate, while 6 percent indicated that they do not apply a floor and 7 percent indicated they use some other floor. Another example of a deterministic interest-rate scenario would be based on the company's best estimate, commonly the forward curve that can be observed from the yield curve as of the valuation date.

Stochastic methods generally fall into two categories: realistic (real-world) scenario models and option-pricing (risk-neutral) models. Real-world scenario models use probability distributions of future scenarios based on a combination of historical experience, current economic conditions, and future expectations (e.g., economists' predictions). Risk-neutral scenario models have scenario probabilities or rates calibrated to replicate existing asset values and are not necessarily representative of realistic future expectations. Some actuaries believe that risk-neutral scenarios are especially appropriate for multi-scenario CFT. In the 2012 survey, 47 percent of the respondents reported they use stochastic interest rate scenarios, of which 72 percent use only realistic scenarios, 14

² At the time this practice note was published, the insurance industry hub of the New York Department of Financial Services website was at http://www.dfs.ny.gov/insurance/dfs_insurance.htm.

percent use risk-neutral scenarios, and 14 percent use a combination of realistic and risk-neutral scenarios. When generating stochastic scenarios, some actuaries consider correlations among variables, such as short- and long-term interest rates, or interest rates and equity returns. The survey results reflect that most actuaries incorporate such correlation in scenario generation, primarily by use of historical data or leveraging what has been produced by the American Academy of Actuaries.³

Q33. Which of the above approaches are appropriate if asset adequacy analysis is required, and how many and what types of scenarios are tested?

ASOP No. 7 (Section 3.10.1) contains the following statements:

Depending on the purpose of the analysis, more than one scenario may be used.
and

Scenarios may be generated by either deterministic or stochastic methods.

Section 3.10.1.b also states:

[T]he actuary should consider a sufficient number of scenarios to reasonably represent the underlying variability of the asset, policy, or other liability cash flows.

Asset adequacy analysis seeks to determine whether the reserves and other liabilities are adequate under moderately adverse conditions. Any approach that provides sufficient information to make this determination is generally appropriate. Testing of the New York 7 scenarios had been required by many states, and some actuaries believe that these provide a sufficient variety of scenarios for their analysis. The 2001 AOMR, which has been adopted in most states, no longer requires that the New York 7 scenarios be tested. Nevertheless, some actuaries believe there is an expectation either to continue testing these scenarios as a useful benchmark or to treat them as the minimum required scenarios.

In the 2012 survey of appointed actuaries, 87 percent of the respondents indicated they test at least the New York 7 scenarios; 14 percent test the “modified” New York 7 (the New York 7, plus one or two additional deterministic scenarios, which may be an inverted yield curve and/or a best estimate based upon the forward curve). More than nine deterministic scenarios are tested by 50 percent of the respondents, and 16 percent test 20 or more. Some respondents test fewer than seven scenarios. In the same survey, 66 percent of the respondents said that the New York 7 scenarios are used for the asset adequacy opinion, 10 percent said they are not used, and 24 percent said they had made “other changes” to their reserve adequacy criteria.

³ See <http://www.actuary.org/content/economic-scenario-generators>.

As noted above, 47 percent of the respondents indicated they test stochastically generated interest rate scenarios, with the median number of scenarios tested being 100. Some actuaries generate a large number of stochastic scenarios (e.g., 1,000 or 10,000) but then select a smaller, representative subset (e.g., 50 or 100) that is actually used in the testing. The representative subset is usually chosen so that such metrics as the mean, median, range, and variance of the subset approximate the distribution of the full set of scenarios. Relative to the 47 percent of the respondents indicating they test stochastically generated interest rate scenarios, 16 percent use stochastic testing for assumptions other than interest rates. The vast majority of this group use it for separate account equity returns, although a few respondents indicated its use for mortality or morbidity.

Some actuaries who base their conclusions on the results of stochastic scenarios still find the New York 7 useful for model validation. Those who take this position generally believe the New York 7 scenarios have clear movements (e.g., pop-up and pop-down) that allow the user to inspect whether the results of the model are reasonable, given such rate changes. For example, the pop-down scenario would generally be expected to show larger asset prepayments; the pop-up scenario, to show larger cash surrenders (assuming the existence of such interest-sensitive assets and liabilities).

Approximately one-third of the respondents indicated they include separate account equity return scenarios in testing. Of the respondents who include separate account equity return scenarios in testing, 40 percent use deterministic scenarios only, while 60 percent use stochastic scenarios. When using stochastic equity return scenarios, the survey results indicated that the number of equity indices modeled range from one to six or more, with the most common number of indices being one or four.⁴

Q34. Is there any time when a single interest rate scenario path may be appropriate?

For products that have little or no exposure to interest rate risk, such as short-term health insurance backed by short-term assets, some actuaries believe it may be appropriate to use a single interest rate path across all scenarios that vary other assumptions.

Q35. What types of stochastic scenario models are included in current actuarial practice?

There are several types of stochastic scenario models commonly used. One approach is to use a binomial lattice to generate future rates, although this typically is limited to risk-

⁴ Actuaries wishing to follow research in this area may choose to refer to an ARCH 2004.1 article, "Modeling of Economic Series Coordinated with Interest Rate Scenarios: A progress report on research sponsored by the Casualty Actuarial Society and the Society of Actuaries," by K. Ahlgrim, S. D'Arcy, and R. Gorvett.

neutral models, while another is to use a Monte Carlo approach to calculate period-to-period changes in interest rates.

Sometimes, changes in long- and short-term interest rates are calculated separately (i.e., using distinct distribution functions), and an interpolation procedure is used to approximate a yield curve. The lognormal probability distribution is also commonly used. However, some actuaries believe, especially if the tails of the probability distribution are a concern, that the lognormal distribution does not necessarily produce enough extreme scenarios. One approach that produces results with so-called fat-tailed distributions is the regime-switching model. The regime-switching model has been used, for example, in recent Academy proposals for scenarios associated with setting RBC and reserve requirements for variable annuity guarantees and the analysis of guarantees provided by segmented fund products (similar to variable annuities) in Canada. The Academy's proposals include calibration criteria that may be applied to results of other scenario generators. If the parameters of these scenario generators are adjusted so that their results meet the criteria, then these scenario generators may be an appropriate alternative to other methods.

There is a large amount of literature available regarding stochastic scenario generators. Lists of references may be found in the specialty guides, *Asset-Liability Management BB-1-03* and *U.S. Statutory Financial Reporting and the Valuation Actuary I-2-97*. These guides are available on the SOA website.

Q36. What is reversion to the mean?

Reversion to the mean is a tendency, built into a model, for random values to move toward a target value (mean) over time. For stochastic scenario models, this is accomplished by modifying the output of the sampling procedure, perhaps by multiplying by a reversion factor that, in turn, is a function of a parameter called the strength of mean reversion. If the strength is zero, no mean reversion occurs; if it is unity, the interest rate is immediately set to the target value. Mean reversion accomplishes two things: It reduces longer-term volatility and it pushes the average of the scenarios toward a desired target.

For interest rate scenarios, various choices of target rates have been used, including the initial rate, a historical average, a rate based on the forward rates in the initial yield curve, and economists' projections. Mean reversion may have more effect on pricing (where the mean of the scenario results is used) or the amortization pattern of an amount of capitalized expenses than on asset adequacy analysis (where the concern is on adverse scenarios), but the actuary may choose to consider the extent to which the existence of mean reversion in the scenarios might contribute to volatility across scenarios that is not as large as expected or desired.

In the 2012 survey of appointed actuaries, more than 90percent of the respondents who indicated they test stochastic interest scenarios for fixed interest rate instruments use mean reversion, with more than 70 percent of them using a mean reversion target based on

historical averages. Several actuaries said they use the assumptions embedded in the Academy generator or the RBC-200 model. For those using mean reversion, there was considerable diversity in the time period used to revert to historical rates, with time periods ranging from 90 days to 50 years and a slight concentration at 10 years. One-third of the respondents answered “not applicable” to this question even though they do use mean reversion, while 17 percent said simply that they use the Academy generator.

The 2012 survey did not ask about mean reversion for equity scenarios, but it did ask about the expected annual (compound) return of large-cap U.S. stocks. Most responses were in the range of 5.0-9.0 percent, with a median of 7.5 percent.

Q37. How can an economic scenario generator be validated?

A risk-neutral generator can usually be validated by testing that the assets valued using the scenarios replicate existing market values. A realistic scenario generator can typically be validated by testing various statistics (e.g., distribution of rates, percentage of inverted yield curves) against historical distributions.

Q38. If some elements of a set of stochastic scenarios are clearly unreasonable, can these be ignored or replaced?

Some actuaries believe in using each element within a set of stochastic scenarios, without replacement or de-emphasizing, based upon a statistical argument. They reason that throwing out selected scenarios in a random sample could destroy the randomness of the sample. In addition, they reason that recent history is not necessarily a safe guide to judge what is reasonable within a set of stochastic scenarios.

For example, the high interest rates of the early 1980s were unforeseen in the 1970s; similarly, the current low interest rates were not forecast in the 1980s. However, if the set of resulting interest rates as a whole appears to exhibit more than expected numbers of extreme scenarios (however defined by the actuary—e.g., negative or almost zero interest rates, or rates in excess of 30 percent), it implies that either the model parameters are incorrect (wrong distribution) or the model is insufficiently robust to produce an accurate sample for that number of scenarios. Under those conditions, many actuaries would consider modifying the parameters and generating another set. In addition, an actuary could introduce constraints, such as no negative interest rates or no rates less than 10 basis points. According to the 2012 survey of appointed actuaries, about two-thirds of those using stochastically generated interest rates impose a floor of zero percent or higher, while 31 percent of this same group impose a cap on the maximum interest rate, generally ranging from 18 to 28 percent. Similarly, 16 percent of all respondents said they apply some sort of yield curve normalization if the initial yield curve is unusually sloped.

Some actuaries, based upon the “moderately adverse” testing framework of asset adequacy analysis, believe that there are some situations where unreasonable scenarios

can be excluded or de-emphasized when analyzing results (i.e., when those scenarios cause the overall result to include more margin than necessary to cover conditions that are considered moderately adverse).

Section F: Modeling Considerations—Assets

Q39. What types of assets are used by actuaries in asset adequacy analysis?

The actuary may need to select certain assets for testing from a total portfolio of available assets. For example, assets backing a product are typically greater than the product liabilities, due to existence of surplus, although assets equal to liabilities are used for testing. When faced with a choice, some actuaries select assets with reasonably predictable cash flows and lower market value volatility, rather than assets with highly uncertain cash flows or very volatile market values, such as securities with equity characteristics. Thus, some actuaries regard cash and fixed-income securities in good standing as the preferred choices. Fixed-income securities include most bonds, preferred stock, and mortgages, as well as various types of securitized and structured obligations. Equity real estate with stable rental income characteristics also typically has the attractive features of a fixed-income security, although its market value may be volatile. Nonperforming collateralized instruments such as mortgages in foreclosure generally have predictable cash flows and market values (at least on a portfolio basis). Other asset classes that may be reflected include bank loans, securities lending, emerging market debt, and mutual funds.

While common stocks usually have fairly predictable cash flows in the form of dividends (on a portfolio basis), these cash flows are generally not the primary reason investors hold these instruments. Common stocks are usually held for their potential gain in market value, and most of the benefit of holding common stocks is realized when they are sold for a capital gain. Due to their substantial volatility in market value, even on a portfolio basis, and the possibility of extended periods of depressed valuations, many actuaries consider these instruments less suitable as investments to support most types of insurance liabilities, with the exception being designated funds for which the risk is passed on to policyholders on a transparent basis. As a result, many actuaries generally do not include common stocks in asset adequacy analysis. To the extent that common stocks are utilized, care should be taken to include additional scenarios that focus on the volatility of these investments.

Actuaries may choose to consider using derivatives in their analysis if the company holds such instruments to hedge risk arising from certain product designs, such as equity-indexed annuities, guaranteed benefits associated with variable annuities, payout annuities with guaranteed minimum interest rates, or other products with long-term interest rate guarantees (e.g., long-term care). This can be especially appropriate where such derivatives are integral to managing the risks for these products. From the 2012 survey of appointed actuaries, between 12 and 24 percent of the respondents indicated that they use the following derivatives in their models: hedge funds, floating rate notes, options, swaps, swaptions, and caps/floors.

When determining what asset types to include in their reinvestment models, the survey respondents indicated that they employed a similar rationale to that described above. Most

typically, combinations of fixed-income securities are used in relative proportion to the makeup of the existing portfolio with heavier emphasis placed on the makeup of recent purchases. This reinvestment assumption would typically be discussed with the company's investment managers.

Q40. How are policy loans treated in asset adequacy analysis?

Approximately 70 percent of the survey respondents indicated they model policy loans by assuming the loan balances remain proportional to the cash value throughout the projection. Approximately 10 percent assume policy loan balances reflect the interest rate scenario dynamics, and approximately 10 percent do not include policy loans in their testing. The remaining 10 percent use other approaches.

Q41. What software platforms are used by appointed actuaries to model assets?

From the 2012 survey of appointed actuaries, nearly 20 different types of software purchased from outside vendors were listed as being used for at least a portion of their asset portfolio. For the majority of asset classes, 45 percent used the same software to project existing asset cash flows that is used to project liability cash flows, with 52 percent stating that existing asset cash flows are projected externally and then brought into the liability projection system as fixed-scenario-dependent cash flows. Many actuaries use a combination of software purchased from multiple vendors and/or purchased software plus internally developed spreadsheet systems to project assets depending on the type of asset being projected.

When using purchased software to project asset cash flows, actuaries often check the parameters set by the vendor to ascertain whether the parameters are reasonable relative to the company's experience and asset characteristics, which can vary materially by company. If the actuary determines that the default software parameters are not appropriate for the company, the actuary may exercise professional judgment and make discretionary adjustments to them.

Q42. How is asset management strategy modeled for asset adequacy analysis?

Asset management strategy varies significantly from one company to another. Some companies use a fairly passive strategy, holding securities they purchase for lengthy periods of time. Others might take advantage of capital gain opportunities to earn additional returns, at least in the short term. The actuary generally determines whether and to what extent to reflect the company's asset management strategy in the cash flow model. Considerations may include identifying how consistently the stated strategy has been followed in the past and how recently the strategy has been reviewed and approved by senior management, coupled with actuarial judgment as to the likelihood that the strategy will be followed under the scenarios being projected.

Most insurers adhere to a predetermined investment strategy, stated in terms of allocation to various classes of assets, quality rating of securities purchased, sector allocations, and duration of the portfolio. If the overall strategy is followed consistently and the liability structure remains the same, securities sold will generally be replaced by instruments of similar characteristics, except for temporary deviations to take advantage of market opportunities. However, if the future asset management strategy is expected to vary significantly from the past and the portfolio composition is likely to be affected significantly as a result, many actuaries believe it is preferable to reflect this in the model.

Some actuarial software permits the modeling of specific investment strategies, such as duration matching. In this case, the allocation of assets to various instruments within the generic reinvestment portfolio usually is determined dynamically, based on the durations of the assets and liabilities. Dynamic allocations may be made to achieve a desired mix of assets after the period's purchases are made.

Where static allocations are used, the actuary typically considers certain potential resultant problems. For example, the regular purchase of a constant mix of short and long assets may result in holding what would appear to be an excessive percentage of long assets, because maturing short assets are replaced with this constant mix of short and long assets while the long assets held have not yet matured.

Q43. How is the reinvestment strategy modeled?

Net positive cash flows arise from future premiums and deposits, interest earnings, asset maturities and sales, and other cash inflows, net of policy or contract benefits, expenses, taxes, and other cash outflows.

Net positive cash flows are generally invested in the model. The most common practice is to construct a simple "reinvestment" portfolio consisting of a small number of securities that collectively represent the quality, duration, and asset class characteristics reflecting the company's investment strategy.

The yields on these instruments generally are determined dynamically based on the interest rate scenario, using yield spreads reflecting the credit quality and embedded options of these instruments, with the intention that yields produced reflect the economic conditions within the scenarios tested.

In terms of the asset classes modeled, approximately 60 percent of the 2012 survey respondents said they model non-callable public corporate bonds. Other asset classes that were commonly modeled (where 20–25 percent of the survey respondents indicated they model these asset classes) are Treasuries, non-callable private corporate bonds, Government National Mortgage Association (GNMA) and Federal National Mortgage Association (FNMA) securities, common/preferred stock, and commercial/agricultural mortgages.

The 2012 survey results indicated that 90 percent of the respondents employ a consistent reinvestment strategy across scenarios. (For purposes of the survey, a strategy that can be expressed regardless of economic environment, such as duration match or target portfolio mix, was considered consistent. A strategy that is different simply because rates are high or rising, rather than low or falling, was not considered consistent.)

Q44. What spread assumptions (i.e., spreads to Treasuries) are used to model reinvestments of fixed-income securities?

Approximately 50 percent of the 2012 survey respondents indicated they use current spreads grading to historical spreads, while approximately 25 percent use current spreads and approximately 15 percent use historical spreads. About 5 percent aligned spreads to the default assumption basis (e.g., if historical defaults were used, so were historical spreads).

Some actuaries believe it is appropriate to set spreads on a basis that is consistent with the default assumptions, which means if historical defaults are used, then perhaps historical spreads might be used. Similarly, if current defaults are used, then perhaps current spreads might be used.

During the 2008 financial crisis, spreads widened considerably, which prompted some actuaries to rethink the use of current spreads for CFT purposes. Other actuaries considered the widened spreads created by the crisis as consistent, given the increased uncertainty relative to Treasuries, and as an appropriate spread to maintain while higher levels of defaults are being considered in the projections.

Q45. How is disinvestment modeled?

When negative cash flow arises in the model, actuaries use a number of different approaches. Most actuaries model a disinvestment strategy that is largely consistent with company practice, as modeling limitations or the requirement to exclude new business in asset adequacy analysis may make an exact replication of the company's policy difficult to implement.

For small shortfalls, many actuaries assume the shortfall can be covered by short-term borrowing at the prevailing short-term rate applicable to the company, based on its credit standing. The actuary might then assume that all subsequent positive cash flows would be used first to repay the loans.

Many actuaries believe that large shortfalls are best modeled by selling assets. One common assumption is that sales will occur from liquid investments with low bid-ask spreads, consistent with the actual practice of most investors. If no consistent pattern of liquidation practices exists at the company, a pro-rata liquidation of all liquid investments

might be assumed. Many companies use a pro-rata approach on asset sales because it is difficult to predict specific assets that will be sold, and a pro-rata portion would leave the asset makeup (duration, etc.) consistent with the makeup prior to sale. Another common assumption is a prioritized liquidation: For example, one possible order of priority might be money-market investments and T-bills first, followed by Treasury notes, Treasury bonds, agency issues, high-quality corporate bonds, high-yield issues, and real estate.

In reviewing results that combine reinvestment and disinvestment strategies, many actuaries believe it is appropriate to examine any distortion of results due to unrealistically large amounts of borrowing or unrealistically large concentrations in certain asset categories.

In instances where there is a large amount of borrowing, the actuary would typically consider estimating the impact of any unintended arbitrage advantage on margins or adjusting the reinvestment or disinvestment assumption to reduce the borrowing. For example, the actuary may want to check that the rates are consistent with the market scenarios so that the projections are not benefiting from an unintended arbitrage advantage. For instance, when separate projections are run for two lines of business and one generates positive cash flows while the other generates negative cash flows, it may make sense to borrow at the average reinvestment rate (which implicitly assumes that the loan is being made from one line to the other and reduces arbitrage advantage). Another alternative is to presume “internal borrowing,” in the case where cash flows are computed separately for several lines of business, and one line forecasts negative cash flows but the rest show consistently positive cash flows.

Q46. What are the sources of guidance on how to select assumptions for asset modeling?

The ASOPs provide the most authoritative professional guidance on the general considerations to take into account in selecting assumptions but do not address specifics. The practice notes are also helpful, especially from the perspective of providing information on what other actuaries facing similar issues are doing. *The Dynamic Financial Condition Analysis Handbook*, prepared by the SOA, offers valuable information. SOA professional actuarial specialty guides on asset-liability management and life insurance company investments are useful references.

Rules and requirements set by regulators (e.g., the NAIC and New York Regulation 126) may provide more specific guidance and, due to their binding legal nature, may supersede guidance derived from other sources. Historically, regulatory guidance and rules have covered assumptions on default rates for various types of assets and conditions under which the AVR might be used. For example, New York Regulation 126 indicates that, in the absence of credible data, default losses of not less than 10 percent of AVR maximums may be assumed.

Where the data appear to be credible and it can be reasonably expected that the experience will continue in the future, many actuaries rely upon internal company experience in selecting assumptions. The historical patterns might be adjusted for anticipated economic conditions (e.g., the economy is heading for a downturn) and expected future changes in company practices. It may also be appropriate to grade company experience into industry- or economy-wide experience, particularly in those cases where the company experience has been substantially better than industry average, unless the actuary has determined that the reasons for the superior experience are expected to continue.

In those cases where the company's own data are not credible or are unavailable, many actuaries use an industry- or economy-level assumption. Data from credit rating agencies are commonly used. Current credit loss experience is frequently studied in the academic literature, and current data can be obtained from a literature search. Credit spreads, historical interest rates and yield curves, and other economic data (inflation, employment, gross domestic product) are widely available data series. Actuaries often select their modeling assumptions based on this data.

In the case of highly complex instruments such as collateralized mortgage obligations (CMOs), actuaries frequently rely on models and assumptions constructed by vendors. Investment professionals with expert knowledge of assets construct vendor models that are generally proprietary (i.e., the details are not available to the user). Many actuaries believe it is appropriate to examine the results of these models to evaluate their reasonableness.

From the 2012 survey of appointed actuaries, a little more than half (51 percent) indicated they use published experience as a primary source of information for asset default, while about one-fifth (22 percent) use their own company experience. One-third of those surveyed (33 percent) use a blend of the two. Of the respondents, 13 percent use information from external advisers (such as investment banks), which is commonly proprietary to the adviser and nonpublic. Only 3 percent of survey respondents use the AVR contribution factor as an asset default source, likely reflecting the increased availability of relevant published asset default data and the fact that the AVR contribution factor is not revised to reflect dynamic market conditions.

Q47. What are the main asset-specific characteristics that affect cash flows?

Fixed-income securities have contractually promised cash flows. However, the amount and timing of the cash flows can be impacted by credit losses and options embedded in the securities. Among other considerations, credit losses are related to the current and anticipated future creditworthiness of the issuer and the degree and quality of collateral. Credit losses, particularly for issues of lower quality, are generally correlated with business cycles.

The extent of the impact of options on the amount and timing of fixed-income cash flows generally depends on realization of conditions under which it is attractive for the debtor to

exercise the options and the behavioral characteristics of the debtor with respect to the exercise. Common options encountered allow the early or delayed repayment of some or all of the principal; the attractiveness of exercising these options generally depends on the interest rates at the time when the options become exercisable and the availability of economically favorable refinancing options for the debtor. Prepayment behavior is difficult to model and depends on a number of factors other than the relationship between the coupon rate on the debt and the prevalent market rate.

For equity-type assets, which might include equity in physical or financial assets, there are often no contractually predetermined cash flows. Nevertheless, certain cash flows occur with some predictability, such as payment of dividends on stocks. The bulk of the cash flows on most equity securities is realized as capital gains or losses upon sale, and the central issue in modeling these instruments usually is the pattern of change in market values, which drives the capital gains and losses. Many factors impact stock values, including overall market movements and the beta of the stock. The Academy report to the NAIC, *Recommended Approach for Setting Regulatory Risk-Based Capital Requirements for Variable Products with Guarantees (Excluding Index Guarantees)*, presented in 2002,⁵ includes significant analysis of stock market movements. In addition, equity modeling approaches described in AG43 may also provide helpful guidance for asset adequacy analysis purposes.

Cash flows on derivatives are mathematically related to the value of the underlying instrument or index and the terms of the derivative contract.

Q48. What types of asset-embedded options are modeled for cash flow testing?

The 2004 survey of appointed actuaries had indicated that more than 80 percent of the respondents model asset optionality in at least one asset type. The 2012 survey asked appointed actuaries what were the primary sources of information for asset calls and prepayments, the two critical assumptions for modeling asset optionality. A plurality of companies (37 percent) use software algorithms from third-party software vendors as their primary source of asset calls and prepayments. An additional 32 percent of companies use either company experience (10 percent), published experience (8 percent), or a combination of the two (14 percent). Another 16 percent of appointed actuaries use judgment of investment experts in the company as their primary source of call and prepayment information.

In addition, the 2012 survey indicated that 11 percent of the respondents model asset prepayments stochastically.

⁵ Located at http://www.actuary.org/pdf/life/rbc_16dec02.pdf.

Q49. How are bond options modeled?

Options commonly found in bonds include calls, conversions, and puts.

A callable bond allows the issuer of the bond to prepay the bond under certain conditions by paying a call premium to the company. The likelihood of exercise generally depends on the relationship of the call price (and associated expenses to execute the call) to the present value of remaining coupon and principal payments, based upon the characteristics of the bond and other economic factors.

Generally, a call option “at the money” is not exercised due to the cost that an issuer might incur to refinance the debt. It is a common practice to model calls only if the option is “in the money” by a certain amount. This level is generally based on internal studies.

Many bonds are callable at a “make-whole” premium, which means the issuer will pay the holder an amount to compensate for any loss when the bond is called. It is a common practice to model these bonds as noncallable.

If callable bonds are an insignificant part of the portfolio, the impact of the call feature is usually excluded from consideration. What constitutes “insignificant” usually depends on the size of the callable bond portfolio in relation to the total portfolio, the characteristics of the callable bonds, and the size of the potential gain or loss if the bonds are called.

As a practical matter, it is difficult to model conversions, and it is usually conservative to treat a bond as if it were not convertible.

Not many bonds have put options, which give the bondholder the right to put the bond back to the issuer for cash. Some actuaries take the conservative approach of not modeling put options.

Q50. How are expected credit losses on bonds modeled?

A significant majority (93 percent) of the respondents to the 2012 survey of appointed actuaries indicated that they use available quality ratings of a security as a factor in varying the credit loss assumption. It is a common practice to model each bond issue separately. An annual default loss is usually assumed, based on the current quality rating.

Some actuaries take business cycles into account by increasing the assumed default loss for the next few years if it appears that the economy is about to enter a recession or is in the middle of one, and grading down to a long-term average thereafter. Some actuaries also reflect quality rating movements over time, using default loss assumptions that change with these changes in rating. These “rating transitions” are studied extensively by rating agencies, with the results generally published annually. For high-quality bonds, this transition effect will increase default losses over time. For low-quality bonds, default loss rates may actually decrease over time for the remaining bonds that survived the higher

default rates of the earlier years of a projection.

In the 2012 survey, approximately 17 percent of survey respondents indicated they model transition of asset quality ratings over time.

With respect to private placement bonds, default losses by quality are available from regularly published SOA studies. To date, these studies have shown private placement loss experience to be similar to that of public bonds at the same quality rating. The latest study showed private placements with somewhat higher default probabilities, but somewhat lower loss severities, with a similar overall loss by quality.

With respect to mortgage loans, default losses by rating are available from published studies. Approximately 69 percent of the 2012 survey respondents indicated they had mortgage loans in their companies' investment portfolios that require modeling. Of those with mortgage loans, approximately two-thirds changed their default assumptions for mortgages since 2007. The changes varied, but the most common change was methodology that increased defaults following the financial crisis, then decreased defaults following the economic recovery to historical averages or current experience.

Default losses involve lost interest and principal (net of recovery). Interest loss can be modeled as a reduction to coupon cash flow. Anticipated loss of principal can be modeled as an adjustment to the carrying value of the bond at the time of default. Actuaries also model these two components together by assuming a net reduction to yield as a result of default losses.

For bonds in default, no coupon payments are typically included in CFT. The market value of bonds in default is indicative of the recovery expected and reflects the expected amount of recovery, as well as the uncertainty in the recovery amount, through the implied discount rate. For practical purposes, a defaulted instrument is akin to an equity investment and is subject to the modeling difficulties that are present in equities—factors that are reflected in the volatility of market values for defaulted bonds and their sensitivity to economic conditions. For the same reasons that many actuaries do not include equities in their CFT (see Q39), they sometimes do not include defaulted bonds.

In the 2004 survey, about one-third of the respondents indicated that they reflect their own company's experience in setting the default assumptions. The remaining respondents reported a variety of sources, with Moody's being the most common (50 percent), and others being Standard & Poor's, the Altman Z-score, data from investment advisers, and AVR contributions. In the 2012 survey of appointed actuaries, such historical experience was utilized by the respondents in a number of ways, including the following:

- Use historical defaults for all asset categories for the entire projection (38 percent)
- Use current default rates but grade to historical averages (20 percent). Grading periods varied from two to five years.

- Use historical defaults but make adjustments to reflect default cycles related to the economic environment, such as the 2008 financial crisis (19 percent)
- Use current default rates based on recent company or industry experience, rather than historic average experience (9 percent).

Q51. Do bond credit losses vary by interest rate scenario?

It is a common practice to assume that default rates and recoveries do not vary by interest rate scenario, because studies have not established a strong link between the shape or level of yield curves and credit losses. There is usually a stronger link between yield spreads, defaults, and economic conditions, which is the reason some actuaries model higher default losses when weaker economic conditions are expected. Only 2 percent of survey respondents reported that they model asset defaults stochastically.

Q52. How are variable rate bonds modeled?

In practice, most variable rates are based on an index other than Treasury yield rates (on which CFT is usually based), such as the London Interbank Offered Rate (Libor). If variable rate bonds are material to the portfolio, it may be appropriate to devise a method to determine the reset coupons based on Treasury yields. Linear regressions of Libor vs. Treasuries often produce a good fit and are appropriate in many instances, though it should be noted that the Libor will be phased out in 2021. Any minor distortions are usually not a problem, especially if variable rate assets and liabilities are modeled consistently.

The considerations used in modeling prepayments on variable rate bonds, in general, are somewhat different from those for fixed-rate bonds. For example, prepayments may be more closely related to absolute interest rate levels than relative interest rates. In addition, bond issuers may be looking to refinance at fixed rates for a longer term than that of the variable rate bond.

Q53. What are the relevant aspects of residential mortgages and securities collateralized by them (CMO/MBS)?

While direct ownership of individual residential mortgage loans by insurance companies does exist, companies more commonly hold such assets in the form of a securitized arrangement. These arrangements pool multiple loans, the cash flows of which collateralize the security. The two main types of securitized arrangements are mortgage-backed securities (MBSs) and collateralized mortgage obligations (CMOs). About three-quarters of the 2012 survey respondents included CMOs and MBSs in asset adequacy analysis.

The holder of an MBS investment receives the actual principal and interest payments from the underlying residential loans in the pool as a direct pass-through (net of servicing and other similar deductions). Some MBSs (e.g., GNMA, FNMA, and Federal Home Loan Mortgage Corporation (FHMLC) pools) contain guarantees on the principal and interest payments, backed by the respective agency. Losses are generally more significant on nonagency issues, and may warrant incorporation into the model so as to reflect the potential impact of such credit losses in the analysis. While the agency issues are very highly rated and not as subject to losses, it is still common to assume a nominal basis point reduction.

CMOs are structured securities that break up the total principal and interest payments from the pooled loans into components, or “tranches,” with each tranche sold as a separate investment. There are many types of CMOs, with various levels of risk, depending on the type of tranche. Types of tranches include, but are not limited to, sequential pay, accrual, floater, planned amortization class (PAC), PAC support, target amortization class principal only, and interest only.

Q54. What are the key risks associated with CMOs and MBSs?

MBS and CMO investments exhibit cash flow uncertainty due to both defaults and cash flow variation, as payments to the insurance company are directly impacted by the prepayment activity of the underlying pool of mortgages.

Prepayment and Extension Risk

In general, as interest rates decline, there exists *prepayment risk*, a specific type of reinvestment risk that cash flows will arrive earlier than planned (due to higher prepayments), and the proceeds are subject to reinvestment in lower-yielding assets. As rates rise, there exists *extension risk*, wherein cash flows arrive later than planned (due to fewer prepayments) and the insurance company cannot reinvest to take advantage of the higher rate environment. Prepayment speeds for an MBS depend on many factors, including the differential between the coupon rate of the underlying mortgages and current market rates and seasoning of the mortgage pool, among others. CMO cash flow variations can be impacted by these factors, as the prepayment activity of a particular tranche depends upon the prepayment activity of all the higher-priority tranches. Future cash flows on MBSs and CMOs typically are critically affected not only by the interest rate paths in the future, but also by the entire history of interest rates and cash flows since initiation of the underlying pool of mortgages.⁶

Due to the large impact this can have on a company with a significant investment in these securities, and the complexity of many of these instruments, regulators are often

⁶ For more discussion of the factors that impact prepayment speeds, see *The Handbook of Fixed Income Securities*, by Frank J. Fabozzi.

particularly sensitive to the proper modeling and evaluation of the risk of MBS and CMO investments.

Default Risk/Credit Losses

If a company holds a large portfolio of unsecuritized residential mortgages, modeling the default effect in some detail may be appropriate. As a result of the 2008 financial crisis, loss of principal became a more significant concern, even for residential mortgages that were adequately collateralized, due to widespread foreclosures. Historically, for GNMA or FNMA/FHLMC issues, one common practice was to assume a zero default rate, due to the guarantee of principal and interest by these agencies, which are considered to have direct or indirect government support. The same applied for structured securities such as CMOs, which generally have AAA ratings and may also be supported by credit enhancements. The 2008 financial crisis brought plausibility to the notion of default of these assets, and as such, actuaries have included nonzero default rates (especially FNMA/FHLMC), either in the base asset adequacy projections, or have layered on for sensitivity purposes. A substantial drop in market value of the underlying property can occur in certain economic scenarios and in some locations, which could impact asset adequacy results if the company's disinvestment strategy involves asset sales.

Q55. What typically constitutes an adequate CMO model?

The desired sophistication and accuracy of a CMO model used for cash flow projections generally depends on the materiality of the CMO holdings in the portfolio and the expected volatility of the CMOs held. A suitable model generally will have, as a minimum, the following model features:

- Cash flows of the modeled tranche are dependent (if appropriate) on cash flows of other tranches; and
- Prepayment rates are dynamic over time and vary as interest rates change.

A significant challenge in modeling CMOs is the lack of readily available data on CMO structures after issue, as a company may not have the ability to see all tranches. Therefore, it is common for actuaries—particularly those at companies that have a large exposure to CMO issues—to obtain CMO cash flows for each interest rate scenario from an independent vendor.

Cash flows supplied by recognized vendors generally satisfy both of the above features for a suitable model. Specifically, because of the dependency of a tranche's cash flows to preceding tranches, it is often necessary to model not only the tranches a company owns but also the preceding tranches. This, combined with the additional complexity that is required to model appropriately cash flows from CMOs, makes obtaining a high level of robustness generally not feasible without subscribing to the databases of a recognized vendor that covers a comprehensive universe of CMO issues. Because the modeling

algorithms utilized by these companies are typically proprietary, it is often difficult to get the necessary information to review the cash flows or adequately describe them for summary documents.

However, use of a vendor does not guarantee that a particular tranche can be modeled directly. As a result, the cash flows for CMO holdings may be generated for each individual security (when available) or for representative CMO securities based on groupings of CMO assets with similar cash flow characteristics (when individual security modeling is not available). The actuary may choose to use grouping methods for CMO assets that are not included in the system's database of CMOs. Also, vendor systems may not include all Committee on Uniform Securities Identification Procedures (CUSIPs) numbers in their databases. An approach to take these into account is to assume these nonincluded assets have like characteristics (including paydowns) similar to other tranches in the portfolio.

Validation techniques are available to companies using an internally generated model. One method of testing the suitability of an internally generated model is to compare results over different scenarios for a sample of assets, with the results projected by CMO databases and systems operated by broker-dealers or independent vendors. A second method that can provide insight is to compare the cash flows that would have been used in testing one year ago with the actual cash flows received in the past year from the CMOs.

Q56. What are some considerations for modeling prepayment assumptions for securities collateralized by residential mortgages?

Following is a list of some of the items that the actuary may choose to check for reasonableness.

- The prepayment rate generally rises as interest rates decrease, and such changes typically follow an S curve or arctangent-curve (likewise, the prepayment rate typically slows as interest rates increase).
- Prepayments are generally slower for lower coupon collateral and faster for higher coupon collateral.
- Prepayment rates usually vary by type of collateral (GNMA versus FNMA/FHLMC; 15-year versus 30-year; new versus seasoned mortgages, fixed versus floating rate⁷).

⁷ Base prepayment rates on floating-rate mortgages appear to be higher than those on fixed-rate mortgages, perhaps because some floating-rate mortgage holders may be waiting for the most efficient time to convert to a fixed-rate mortgage or they are more sensitive to or aware of changes in interest rates. The actuary may

- Prepayment rates are usually consistent across CMOs with comparable collateral.
- Prepayment rates for the level-interest-rate scenario bear a reasonable relationship to street median PSAs or historical PSAs (PSAs are those from the Public Security Association Standard Prepayment Model⁸).
- Prepayments may slow due to the “burn-out” factor—those mortgage holders who watch interest rates closely tend to prepay when interest rates are first lowered, while those remaining may not react as much to subsequent interest rate changes.

The validity of the cash flow analysis relative to CMOs and MBSs typically depends, to a large extent, on the validity of the prepayment model. Typically, the actuary generally is not trying to predict a specific prepayment rate as much as trying to correlate prepayment rates with changes in interest rates and other economic variables. The actuary’s primary objective typically is to ensure that the correlations are reasonable. Validation techniques employed in practice are to compare the results of the model of a sample of mortgages under various interest scenarios, to confirm the direction and magnitude of movement. Also, comparing the relative sensitivity of several mortgages under a particular scenario, both using the model that is generating cash flow for asset adequacy as well as outside systems, is prevalent.

In order to understand the sensitivity of cash flow models to changes in parameters, the actuary may choose to evaluate the sensitivity of results to the prepayment function. If the company has a material exposure to CMOs, sensitivity testing with respect to the prepayment function may be appropriate in order to evaluate the sensitivity. Some actuaries alter the base prepayment rates in their models as a result of this sensitivity testing.

Q57. What are some common methods for determining the market value of CMOs and MBSs at a future point in time?

For fixed-income securities, the current market value is the present value of anticipated cash flows (discounted at a rate reflecting the current yield curve and the credit quality of the instrument), plus the value of the embedded options. The options available in the underlying pool of mortgages can have a significant impact on CMO/MBS values, and

choose to evaluate the sensitivity of indexed tranches with regard to the link of the index to the scenario interest rate.

⁸ These rates represent an assumed monthly rate of prepayment that is annualized to the outstanding principal balance of a mortgage loan. The PSA model is one of several models used to calculate and manage prepayment risk. The PSA model acknowledges that prepayment assumptions will change during the life of the obligation and affect the yield of the security. The model assumes a gradual rise in prepayments, which peaks after 30 months. The standard model, called “100 percent PSA,” starts with an annualized prepayment rate of 0 percent in month zero, with 0.2-percentage-point increases each month until peaking at 6% after 30 months.

valuing these options is difficult. In addition, calculating market values for future points in time may be appropriate if a significant amount of CMOs and MBSs are modeled as being available for sale over the projection period.

Actuaries who model the market value of these assets may use different methods. The following are three such approaches that involve projection and discounting of future cash flows:

- An option pricing approach involving stochastic projections for each market value calculation. Some types of actuarial modeling software support this method, although their use can result in slow run times. Hence, some actuaries only use this approach if it is important to the assessment of asset adequacy, if alternative methods are unsuitable, and perhaps only for judiciously chosen scenarios.
- Similar to a stochastic method, but using just one scenario. It assumes that the interest rates remain level from the point being valued.
- Using the cash flows generated for the CFT scenario, so no additional projection of CMO cash flows is made.

Q58. What are the relevant aspects of commercial mortgages?

Commercial mortgages are loans collateralized by income-producing commercial properties, such as apartment buildings, shopping centers, hotels, or office buildings. While pooling and considering the risk and cash flow characteristics on a portfolio basis is common procedure in the case of *residential* mortgages, a case-by-case analysis is sometimes preferable for *commercial* mortgages because the large size of an individual loan and the unique features of the properties have an important effect on the risk and cash flow. However, some actuaries use the conclusions of the analysis at an aggregate level in CFT.

There are three important aspects in which commercial mortgages generally differ from residential mortgages. First, commercial mortgages usually have some level of call protection or “make whole” provisions. These can take the form of prepayment lockout periods, defeasance provisions, prepayment penalty points, or yield maintenance charges. The second major difference is that commercial loans are usually not fully amortized over the duration of the loan term. As a result, there typically is a significant balloon (or extension) risk at the end of the term. The implications of this risk for modeling purposes will be addressed in the following question. Lastly, a higher percentage of commercial mortgages tend to be adjustable rate when compared to residential mortgages.

Components of commercial mortgages can be restructured into commercial mortgage-backed securities, as either pass-throughs or pay-throughs, with the latter having tranches that redistribute cash flows in a variety of patterns and create a variety of credit risk levels.

Q59. What are the risks associated with commercial mortgages?

As with most types of fixed-income securities, many actuaries believe that the key risks can be categorized in the following ways:

- *Credit quality (tenant quality, occupancy rates)*

Given the case-by-case nature of commercial mortgages, often the actuary will examine trends in cash flow and occupancy, lease terms, and profitability of underlying tenants prepared by the company's investment department to gain better understanding.

- *Reinvestment risk or extension risk*

While there is usually more prepayment protection for commercial mortgages than for residential mortgages (due to prepayment lockout periods and make-whole provisions), there might be extension risk to be considered, with restructuring at below-market-yield rates. Evaluating restructuring risk based upon company and overall experience may help to ascertain reinvestment risk.

- *Concentration risk (location, number of properties, use)*

Actuaries typically evaluate documentation provided by the company's investment department.

- *Interest rate risk*

Because many commercial mortgages are adjustable rate, companies run the risk of loss of coupon income as a result of falling interest rates.

- *Liquidity risk*

While yield degradation assumptions can provide an adequate measure of the amount of expected losses, actuaries providing services to companies with significant mortgage holdings or with a significant need for liquidity may choose to consider incorporating additional sensitivity tests in their CFT. For example, some studies have shown that the time from initial default to ultimate disposition is around three years. In a depressed environment, it may be reasonable to assume either a longer time period or a lower price at disposition.

Q60. What are some approaches used to model default losses on mortgages?

The *Mortgage Loan Portfolio Profile*, published quarterly by the American Council of Life Insurers (ACLI), has extensive information on a high percentage of the life insurance industry's mortgage loans, including commercial, one- to four-family, and agricultural loans. Property type and geographical distributions are shown, as are delinquencies, loans in process of foreclosure, restructured loans, and completed foreclosures. The actuary may choose to refer to this profile to evaluate industry experience and as a basis for comparison to company experience.

Spreads to Treasuries for commercial mortgages are available on a monthly basis from the Barron's/John B. Levy & Company National Mortgage Survey. Spreads wider than historical averages may be indicative of anticipated unfavorable experience. In this case, the actuary may choose to make some upward adjustments to default loss assumptions, perhaps grading to long-term averages over a reasonable period.

Research done in the course of development of mortgage RBC factors found default experience typically to be most closely related to a contemporaneous loan-to-value ratio. This ratio differs from a typical loan-to-value ratio in that the loan is valued at current interest rates before being compared to its current property value. Debt-service-coverage ratios are also usually a significant factor in estimating mortgage losses. An actuary who uses this type of ratio in projecting default losses may also choose to develop and use a mortgage quality rating system.

About two-thirds of those responding to the 2012 survey reported using their company's own experience in selecting the default loss assumption for mortgages. Some reported using a combination of company and external data. A variety of published external sources related to the mortgage sector were used by respondents, such as ACLI, Bloomberg, and Moody's. The most common factors by which the survey respondents varied mortgage losses were quality of the investment, year of projection, performing vs. nonperforming asset, and yield spread.

Q61. How is existing foreclosed real estate modeled?

Most actuaries exclude real estate due to the higher volatility of rental income. If real estate is included, many actuaries prefer to analyze foreclosed real estate on a property-by-property basis. While the results of such analysis typically may be summarized at an overall level that can be used for asset adequacy analysis, possible variations in the risk characteristics by property may be too great to make the use of broad-based assumptions feasible. This can be more important if the amount is expected to have a material effect on results. Because of the inherent difficulties and limitations in analyzing foreclosures, often these assets are excluded from asset adequacy analysis, if possible.

Q62. How might limited partnerships be evaluated?

Limited partnerships can serve different purposes. Some limited partnerships are designed such that complex or capital-intensive assets (energy, commodity, real estate) are placed into special purpose vehicles potentially to provide potential capital relief, with an income stream based upon the underlying assets. Others may relate to an equity interest in an entity.

The varied nature of limited partnerships may lead some actuaries to consider whether inclusion is practical for asset adequacy analysis, or even appropriate for asset adequacy analysis. As an example, some actuaries believe that equity interests are best placed in surplus, and are therefore excluded from asset adequacy analysis. In some cases, because of the inherent difficulties and limitations in analyzing limited partnerships or the complex underlying assets, assets are removed from asset adequacy analysis due to practicality. If they are included, one method actuaries use to evaluate limited partnerships is to be consistent with the evaluation of such assets under RBC; i.e., to look through the limited partnership package to the underlying assets. Each asset would then be evaluated on its own merits.

Q63. What are the relevant considerations for asset-backed securities?

As with MBSs and CMOs, it is common for actuaries providing services to companies with material holdings of asset-backed securities (ABSs) to use a vendor package to project cash flows. While certain types of ABSs do not have the interest rate sensitivity of other ABSs, MBSs, and CMOs, the data needed to track and project the underlying collateral often make using a vendor package a practical option.

As noted earlier in this practice note, even the best vendor packages may not cover 100 percent of a company's invested assets. The actuary may choose to map those assets not modeled to a similar asset, or the entirety of modeled holdings may be scaled up to approximate nonmodeled assets. Many actuaries prefer that the percentage of nonmodeled assets be small.

Q64. Are derivatives included in asset adequacy analysis, and if so, how are they typically modeled?

Actuaries may choose to consider using derivatives in their asset adequacy analysis if the company holds such instruments to either hedge risk arising from certain product designs or to hedge risk arising from adverse macroeconomic or microeconomic outcomes. Consideration for inclusion of derivatives in asset adequacy testing may depend on the extent to which such derivatives are integral to managing the asset-liability risk profile for these products. Examples of product designs that may necessitate use of hedge instruments are equity-indexed annuities, guaranteed benefits associated with variable annuities, or fixed annuities with guaranteed minimum interest rates. In order to hedge

macroeconomic and/or microeconomic risks, companies utilize interest rate swaps, swaptions, caps and floors, credit default swaps, and other options and futures. An example could be the use of swaps and swaptions to back interest rate risk on a block of long-term care business or immediate annuities.

Inclusion of derivatives in asset adequacy analysis varies in practice. For those companies that hold derivatives in their portfolio, 75 percent of the 2012 survey respondents included those derivatives held as of the testing date in asset adequacy analysis, and a subset of this group modeled future derivative purchases. Consequently, 25 percent of the companies that held derivatives as of the testing date did not incorporate those derivatives in asset adequacy analysis, possibly due to modeling difficulties.

If derivatives are deemed to be appropriate for inclusion in asset adequacy analysis, decisions need to be made on both a point-in-time (testing date) and projected basis. As of the testing date, a carrying value that is consistent with statutory values is desired, and would appropriately reflect various interest rate scenarios.

With regard to the projection, derivatives are typically modeled on a seriatim basis to recognize the timing of cash flows as well as each asset's characteristics. Some companies elect to use external vendor software to model derivatives. Testing is typically performed on deterministic scenarios for cash flow testing, although in some cases, and depending on the type of derivative, stochastic analysis is used. The underlying mechanics typically utilize various underlying models to price the optionality including Black-Scholes, the Black formula, other lognormal forward models, and similar approaches. The complexity of the models can vary significantly and typically are reliant on an actuary's input, comfort level with the formulae, and input from investment analysts. Materiality is another key consideration as to whether derivatives are included.

Finally, concerning documentation, some states may require detailed descriptions, modeling methodology, and output relative to derivatives included in asset adequacy analysis.

Section G: Modeling Considerations—Policy Cash Flow Risk

Q65. What is policy cash flow risk?

Policy cash flow risk, as defined in both ASOP No. 7 and ASOP No. 22, is as follows:

The risk that the amount or timing of cash flows under a policy or contract will differ from expectations or assumptions for reasons other than a change in investment rates of return or a change in asset cash flows.

This risk is commonly referred to as C-2 risk, or pricing risk.

Q66. How might the appointed actuary typically decide on the scope of policy cash flow risk testing?

A good first step usually is to identify the material or most significant policy cash flow risks. These risks may be identified through a review of sensitivity analyses from prior pricing and/or projection work, combined with the appointed actuary's general knowledge of the product line(s). In deciding on the scope of testing, many actuaries consider the potential volatility of future experience, the significance of any anticipated variance in terms of its effect on results (i.e., ending surplus), the existence of any known repricing capability for nonguaranteed elements, and any known interrelationships with asset, investment rate-of-return, or other policy cash flow risks.

The policy cash flow risks considered generally include mortality, morbidity, lapse, and expense risks, as well as any significant options held by the policyholder, such as interest rate guarantees, policy loan utilization, the flexibility to pay or not pay premiums, guaranteed minimum death benefits (GMDB), guaranteed minimum withdrawal benefits (GMWB), or guaranteed minimum income benefits (GMIBs).

While both favorable and unfavorable deviations in future experience are possible, given the “moderately adverse” framework of asset adequacy analysis, many actuaries believe the appointed actuary's primary focus regarding any policy cash flow risk is the potential for adverse deviation.

Q67. What is meant by “sensitivity testing” for policy cash flow risk?

Sensitivity testing for policy cash flow risk involves the testing of non-asset-related variables under various scenarios to demonstrate the adequacy of reserves. After the completion of the testing of the adequacy of assets supporting specified liabilities under a basic set of scenarios (each scenario involving different economic assumptions that focus

primarily on asset and/or investment rate-of-return risk), the appointed actuary choosing to do such sensitivity testing may perform additional tests. These tests incorporate, for each significant type of policy cash flow risk (where significant is defined by the appointed actuary), a range of variations from the base policy cash flow assumption. The range in value for each assumption is generally determined based on the actuary's judgment of the reasonable possibility that such variations will occur. The basic economic scenarios generally are then rerun to determine the impact of such variation in the policy cash flow variables.

Certain sensitivity tests also can be run in order to evaluate the impact of adverse experience of more than one variable at a time.

Q68. What type of sensitivity testing is commonly done?

New product designs and benefits, and an increased recognition of the materiality of certain risks, have brought more focus on sensitivity testing, from both appointed actuaries and regulators. In the 2012 survey, respondents cited examples that have generated increased focus for sensitivity testing, including dynamic lapse parameters, interest or equity rates, reinvestment spreads, and payout annuity mortality.

From the 2012 survey of appointed actuaries, the following table gives the top 10 items most frequently sensitivity tested:

Lapse	91%
Life insurance mortality	80%
Expenses	71%
Asset defaults	57%
Payout annuity mortality	38%
Morbidity	36%
Interest or equity rates	36%
Reinvestment spreads	30%
Dynamic lapse parameters	27%
Premium persistency	20%

Q69. What policy cash flows are typically sensitivity tested under a gross premium valuation?

Sensitivity testing is usually performed for a GPV. Most respondents to the 2012 survey of appointed actuaries indicated that they perform sensitivity tests on the key variables for policy cash flows (e.g., expenses, lapses, mortality, and morbidity).

Q70. Do actuaries use their company’s own experience to set modeling assumptions for policy cash flow risk?

Most actuaries use their own company’s experience, wherever possible, to establish the key assumptions related to policy cash flow risk. The following table summarizes the percentage of respondents to the 2012 survey of appointed actuaries who reported setting their key assumptions by either company experience, industry experience, both, or actuarial judgment. A response of “Not applicable” was also included to capture responses where an assumption was not considered relevant:

Assumption	Company	Industry	Both	Actuarial Judgment	Not Applicable
Lapse	66%	2%	20%	4%	7%
Mortality	42%	11%	38%	2%	7%
Disability and recovery	16%	15%	17%	1%	51%
Morbidity	24%	8%	19%	1%	48%
Dynamic policyholder behavior	19%	4%	11%	42%	25%

Q71. When may the use of dynamic lapse assumptions be appropriate?

Several factors can affect lapse rates for a product, including attained age, policy duration, level of surrender charges, sophistication of the market, qualified vs. nonqualified status, distribution system, and the difference between the rate credited on the policy versus rates that could be earned on other similar products in the marketplace. Certain products are known to have increased lapses when interest rates increase. When the product being tested is known to be interest-sensitive (e.g., fixed deferred annuities), the actuary may choose to consider the use of dynamic lapse assumptions—i.e., to vary the lapse rates from scenario to scenario and from year to year—based on the dynamics involved. For policies that are not interest-sensitive (e.g., disability income), actuaries would not typically use dynamic lapse assumptions.

In the 2012 survey of appointed actuaries, roughly 72 percent of those surveyed responded that they use dynamic lapse assumptions for interest-sensitive products that allow surrender, 7 percent responded that they do not use a dynamic lapse assumption, and 22 percent responded that the assumption was not applicable.

Q72. How might the actuary address longevity risk in the setting of mortality and mortality improvement assumptions?

Longevity risk is the risk related to the increasing life expectancy of policyholders, which may translate to higher-than-expected cash flows. As with most assumptions, the extent to

which an actuary considers longevity risk in asset adequacy analysis depends upon the underlying products being tested, though products such as payout annuities, pension risk transfer business, and longevity swaps typically would be materially impacted by longevity risk.

A possible approach to setting assumptions for asset adequacy analysis may be to incorporate both a mortality table and a mortality improvement scale. Q70 references current practice in selecting mortality assumptions, focused more on base table assumptions. For improvement scales, there are standard industry tables available, both with and without margin. Some actuaries may choose to develop their own assumptions. Also, the actuary could include mortality improvement through a reduction in the base mortality rates.

The actuary may consider applying a margin to mortality tables and mortality improvement scales. There are available reference points for each. In selecting margins to apply to the mortality table, the actuary may consider the 10 percent margin generally included in annuity valuation tables. Larger margins may be appropriate for very small blocks of business, and smaller margins may be appropriate for larger blocks of business. For mortality improvement, Canadian valuation guidance⁹ calls for a 50 percent margin for 25 years from the valuation date and zero percent thereafter.

Other considerations in addressing longevity risk in asset adequacy analysis are correlation of assumptions and sensitivity testing. Regarding correlation, the actuary may consider the relationship of margins on the base mortality table and the margins on the mortality improvement scale. Depending on the risks to be covered by these margins, the margins could adjusted for correlation. For example, if the margin is intended to cover random fluctuation risk, there is likely not any correlation. However, if the margin is intended to cover the risk of a severe mortality event such as a pandemic, correlation may be considered.

On sensitivity testing, such scenarios may incorporate all types of risk with simple increases/decreases to base assumptions. Another approach is to evaluate specific components of the risk (e.g., pandemic, etc.) as described above. Sensitivity testing could help identify assumptions that are relatively more significant to the results and contain more variability, and therefore may involve relatively more analysis to develop.

At the time this practice note was published, additional information on longevity risk was located at <https://www.actuary.org/committees/dynamic/LRTF>.

⁹ [*Guidance for the 2016 Valuation of Insurance Contract Liabilities of Life Insurers*](#); Canadian Institute of Actuaries; August 2016, page 7.

Q73. What are “secondary guarantees” and what additional policy cash flow risks are associated with them?

An account balance product is an insurance or annuity product that has an explicit visible account balance upon which surrender and other benefits depend. Typical account balance products include fixed and variable universal life and deferred annuities. For traditional account balance products, the continuation of benefits other than surrender depends entirely on the continuing existence of a positive account balance, as the costs for those benefits are charged directly against the account balance and the benefit is no longer available after the account balance drops to zero. A secondary guarantee may be extended to a benefit whose amount and/or duration may exceed that supported by the account balance. Examples of secondary guarantees include no-lapse guarantees on universal life insurance, and death benefits, maturity benefits, withdrawal benefits, and income benefits on annuities. Thus, the secondary guarantee adds the risk that the account balance will be insufficient to fund the guaranteed benefit. Therefore, secondary benefits require testing over various scenarios of interest rates and/or equity returns to ascertain whether the reserve is sufficient to fund the secondary guarantees.

Q74. What methods are used to perform asset adequacy analysis for products with secondary guarantees?

ASOP No. 22 (Section 3.3.1) states the following in determining the approach for asset adequacy analysis:

The actuary should consider the type of asset, policy, or other liability cash flows, and the severity of risks associated with those cash flows, including the investment rate-of-return risk.

CFT methodologies are often used for products where future cash flows may vary under different economic or interest rate scenarios. For example, CFT may be used for a variable annuity with a fixed account option, or for one with a guaranteed minimum benefit design that varies materially by economic scenario, or for variable life business with significant death benefit guarantees or other secondary benefits in the general account.

Over the past decade, new minimum reserve regulations and guidelines for products with secondary guarantees have been introduced requiring multi-scenario projections and dynamic analysis to set the minimum reserve, replacing the deterministic formulaic approach for these products. This subject is addressed in more detail in Section L of this practice note.

Section H: Modeling Considerations—Expenses

Q75. What kinds of expenses are modeled for asset adequacy analysis?

In ASOP No. 22, gross premium reserves (Section 2.9), other liability cash flows (Section 2.16), and policy cash flows (Section 2.18) are all defined to reflect expenses.

The expenses to be considered typically include maintenance expenses, commissions, investment expenses, and overhead expenses associated with the liabilities to be tested.

ASOP No. 22, Section 3.3.4.c, states the following:

The asset adequacy analysis should take into account anticipated material cash flows such as renewal premiums, guaranteed and nonguaranteed benefits, **expenses**, and taxes [emphasis added].

Q76. Must acquisition expenses be considered?

ASOP No. 22 focuses on the cash flows arising from inforce business, which does not typically include acquisition expenses. Nevertheless, it is possible that a business in its first policy year may still have acquisition expenses associated with it, which would, therefore, usually be considered expenses related to the business being tested.

Q77. How are expense assumptions checked for reasonableness?

In the 2012 survey of appointed actuaries, nearly all responding actuaries indicated they set unit expenses based on their own company's experience. Other approaches used by responding actuaries included the use of pricing expenses or industry data (e.g., expenses from LOMA (formerly, Life Office Management Association), SOA studies, or the Generally Recognized Expense Table (GRET)).

A majority of respondents stated that they reconcile modeled expenses to the income statement. At least one state (California) requires an annual reconciliation of modeled expenses to the annual statement.

Q78. Some pricing actuaries assume that expenses will decrease over time, as economies of scale are reached. May this be reflected in testing?

Appointed actuaries sometimes reflect possible changes in future expense levels by splitting the expenses into fixed and variable components, with different assumptions for each. Another practice in use is to use pricing assumptions. If pricing assumes a decline in unit costs, a sensitivity test that assumes the level of expenses remains at the current level

(i.e., does not decrease) may be performed.

ASOP No. 7, Section 3.5.2, states the following:

Considerations that might affect the projection include ... expense-control strategies...

Q79. Are insurance expenses generally adjusted for inflation?

Eighty-one percent of the respondents in the 2012 survey stated that they adjust expenses for inflation. A common way to do this is to have per-unit expenses and/or per-policy expenses—i.e., those that relate to fixed expenses—increase with the level of inflation appropriate to each scenario. Of those in the survey who model inflation, approximately 45 percent indicated they use a flat inflation assumption for all scenarios and 55 percent indicated they vary the inflation rate by scenario. Certain expenses, such as those that vary as a percentage of reserves or account values, would automatically change as the level of reserves per policy changes over time. The level of inflation appropriate to a given scenario may be related to consideration of the long-term average real returns on the projected comparable investments.

Q80. Do actuaries perform sensitivity tests on the expense levels assumed in testing?

ASOP No. 7 (Section 3.10.2) states that the appointed actuary

should consider and appropriately address the sensitivity of the model to the effect of variations in key assumptions.

For some products and/or companies, expenses may be considered a key assumption. In the 2012 survey of appointed actuaries, 71 percent of the respondents indicated they do some sensitivity testing on expenses. Those respondents further indicated that additional sensitivity tests are performed on inflation and investment expense assumptions.

Q81. How are overhead expenses commonly reflected in testing?

There are many definitions of overhead expenses in use. Additionally, there are many opinions as to proper reflection of overhead to tested lines of business.

With respect to definition of overhead, some overhead expenses, such as management salaries, are typically viewed as recurring expenses. Other overhead expenses are extraordinary or nonrecurring. For example, some appointed actuaries would view expenses associated with the attempt to acquire a new block of business as extraordinary in nature, not as obligations of the inforce business being tested, but rather as being an

obligation of the new block of business after it is acquired. Other actuaries point out that a similar level of extraordinary expense occurs each year and therefore include it as part of the maintenance expenses used in CFT.

With respect to reflection of overhead, the 2012 survey showed a fairly wide range of practices with respect to the allocation of overhead in testing models. The majority (73 percent) of appointed actuaries let unit expenses fully reflect all policy-related maintenance and overhead expenses. Others let unit expenses reflect the policy related expenses only and reflect overhead through a separate model or an on-top adjustment to the results. Still others do not reflect the overhead in the unit expenses at all.

Q82. How are investment expenses typically handled in cash flow testing?

There are several practices that have been observed:

- Develop investment expenses as part of their analysis of their company's total expenses and therefore do not explicitly model them.
- Develop formulas that only allocate such expense at acquisition and disposition of an asset.
- Develop a formula of investment expenses as a number of basis points per year, which are deducted from the earned rate for each asset type.
- Reflect investment expenses explicitly or use, in the projections, an earned rate that is already reduced by the investment expense assumption.

Regardless of the approach used, some actuaries check the reasonableness of their modeled investment expenses by reconciling to the annual statement or to other company data.

Section I: Reliance on Other Parties

Q83. What is the relationship between the appointed actuary and those on whom the actuary relies?

Prior to accepting the position of appointed actuary, or as soon as practicable thereafter, the actuary may choose to meet with the persons or firms upon whom the actuary intends to rely. The following documents contain guidance on reliance:

- ASOP No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers*, Sections 4.3 and 4.4;
- 2010 AOMR, Sections 6B(3)-(5) and 6E; and
- ASOP No. 23, *Data Quality*, Sections 3.5 and 3.6.

Respondents to the 2012 survey of appointed actuaries indicated that reliance statements are typically received from the following:

- Company investment staff: 63%
- Senior company management: 47%
- IT or administrative staff: 46%
- Line of business actuaries: 34%
- External investment advisers: 15%
- Consultants: 7%
- Other (mostly third-party administrators, reinsurers, or accountants): 21%

Sensibly, the actuary will typically not rely upon a person for whom the actuary has a high degree of oversight and control of work product (e.g., an actuarial student who reports to him or her). Also, the actuary will typically not rely upon the company's external auditor, as per a Notice to Practitioners dated February 1991 from the American Institute of Certified Public Accountants:

The auditor should not consent to be referred to in an actuarial opinion in which the actuary expresses reliance on the auditor for the accuracy of the underlying data. If the auditor becomes aware that an actuary has expressed such reliance on the auditor, the auditor should advise the actuary that he or she does not consent to such reference, and the auditor should consider other actions that may be appropriate and may also wish to consult with legal counsel.

Q84. What data reliability tests might the appointed actuary perform?

The statement of actuarial opinion applies to all inforce business on the statement date. Tests of data reliability will typically depend upon the method used for asset adequacy analysis and whether the appointed actuary has relied upon others in developing data, procedures, or assumptions.

AOMR-recommended language varies with respect to what is included in the reliance as well as with respect to the extent of the actuary's review (refer to Q85). Tests of data reliability may include evaluation of data for reasonableness and consistency and reconciliation of the underlying records to applicable exhibits and schedules of the annual statement (e.g., Exhibits 5, 6, and 7; claim liabilities in Exhibit 8, Part 1; and equivalent items in the separate account statement).

Other references for tests of data reliability are:

- ASOP No. 7, *Analysis of Life, Health, or Property/Casualty Insurer Cash Flows*;
- ASOP No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers*; and
- ASOP No. 23, *Data Quality*.

Q85. Upon whom may the appointed actuary rely for substantial accuracy of records and information?

Many actuaries believe that the person they are relying upon should have the necessary breadth and depth of knowledge with respect to the related subject matter. Section 6A(3) of the AOMR allows the appointed actuary to rely on other experts in developing data, procedures, or assumptions, supported by a statement of each such expert in the form prescribed by Section 6E. Section 6E states the following:

If the appointed actuary relies on the certification of others on matters concerning the accuracy or completeness of any data underlying the actuarial opinion, or the appropriateness of any other information used by the appointed actuary in forming the actuarial opinion, the actuarial opinion should so indicate the persons the actuary is relying upon and a precise identification of the items subject to reliance. In addition, the persons on whom the appointed actuary relies shall provide a certification that precisely identifies the items on which the person is providing information and a statement as to the accuracy, completeness or reasonableness, as applicable, of the items. This certification shall include the signature, title, company, address and telephone number of the person rendering the certification, as well as the date on which it is signed.

Two types of reliance are mentioned in the AOMR:

- Reliance on other experts to develop certain portions of the analysis.
- Reliance on others with respect to the underlying asset and liability records.

Regarding the first type of reliance, if the appointed actuary has relied on other experts to develop certain portions of the analysis, Section 6B(3) of the AOMR provides language for the actuarial opinion. This reliance should be accompanied by a statement by each of the experts in the form prescribed by Section 6E. The appointed actuary may wish to take particular note of the sentence included in the recommended language: “I have reviewed the information relied upon for reasonableness.”

Regarding the second type of reliance, two alternatives for recommended language are provided, depending on the extent of the actuary’s review:

1. The appointed actuary has the option of personally reviewing the underlying basic records. In that case, recommended language is presented in Section 6B(4). Some actuaries are reluctant to take this responsibility unless they are also qualified auditors.
2. If the appointed actuary chooses not to review the underlying records and has relied upon data prepared by others, Section 6B(5) offers recommended alternative language for the actuarial opinion. This reliance would typically be accompanied by a statement by each person relied upon in the form prescribed by Section 6E. The appointed actuary may wish to take particular note of the following from the recommended language:

I evaluated that data for reasonableness and consistency. I also reconciled that data to [exhibits and schedules to be listed as applicable] of the company’s current annual statement. In other respects, my examination included review of the actuarial assumptions and actuarial methods used and tests of the calculations I considered necessary.

Regardless of the type of reliance, the accuracy and comprehensiveness of data supplied by others are the responsibility of those who supply the data.

See Q86-Q88 on the level of detail used by actuaries to review the underlying data records. Both ASOP No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers* (Section 4.3), and ASOP No. 23, *Data Quality* (Section 3.5) contain guidance governing the actuary’s obligations to satisfy herself or himself that data and analyses provided by third parties are reasonable and consistent. Other guidance and state regulations may also apply.

Q86. What level of detail is used to review the underlying liability inforce records from a third party?

From the 2004 survey of appointed actuaries, 131 respondents answered this question as follows:

No review, just reliance from third party	14%
A limited, cursory review looking for glaring discrepancies	11%
A moderate review of reasonableness and consistency	73%
An in-depth analysis (audit level)	2%

Within the “moderate review” category, one or more of the following methods was used:

Verify inforce against company work papers	92%
Compare data with prior year for consistency	84%
Perform test to identify questionable values	45%
Other	1%

Q87. What level of detail is used to review the underlying asset inforce records from a third party?

From the 2004 survey of appointed actuaries, 130 respondents answered this question as follows:

No review, just reliance from third party	18%
A limited, cursory review looking for glaring discrepancies	26%
A moderate review of reasonableness and consistency	53%
An in-depth analysis (audit level)	3%

Within the “moderate review” category, one or more of the following methods was used:

Verify inforce against company work papers	90%
Compare data with prior year for consistency	85%
Perform tests to identify questionable values	60%

Q88. What level of detail is used to review assumption support from a third party?

From the 2004 survey of appointed actuaries, 117 respondents answered this question as follows:

No review, just reliance from third party:	8%
A limited, cursory review looking for glaring discrepancies	11%
A moderate review of reasonableness and consistency	79%
An in-depth analysis (audit level)	3%

Within the “moderate review” category, one or more of the following methods was used::

Compare data with prior year analysis	87%
Compare assumptions with company data studies and analysis	80%
Other	3%

Section J: Analysis of Results

Q89. What measures are commonly used to test reserve adequacy for the actuarial opinion?

Among the respondents to the 2012 survey of appointed actuaries, 42 percent indicated they use the present value of ending surplus as the primary basis to determine reserve adequacy, while 50 percent focus on accumulated value. Still another 8 percent use other present values (such as present value of profits) as the primary basis to determine reserve adequacy.

Of the 92 percent who use either present value or accumulated value of surplus, 47 percent of survey respondents rely primarily on book value of surplus to determine reserve adequacy, 32 percent rely primarily on market value, and 13 percent use market value of assets minus book value of liabilities as their definition of surplus for this purpose.

One basis used by many actuaries is the estimated “ending net market value,” calculated by estimating the market value of assets at the interest rates in effect at the end of the scenario, and deducting the present value (as of the end of the projection, at the same interest rates) of the remaining projected benefits and expenses. This gives an estimate of the market value of ending surplus. Some actuaries assume that the remaining liabilities are lapsed for cash value with the liquidation of assets at market value to cover the cash surrender.

When asked how market value of liabilities (MVL) were determined, 35 percent of survey respondents answered that MVL was not relevant to their work. Of those for whom MVL was relevant, some respondents gave different answers for different lines of business, such that the following percentages add to more than 65 percent: 26 percent used cash surrender value, 20 percent used the present value of future cash flows (as of the end of the projection), and 4 percent used a gross premium reserve. Also, 32 percent said that they used the book value of liabilities or the statutory reserves as their proxy for MVL.

Some actuaries project the book values (as opposed to market values) until the remaining liabilities are not material, with positive book value of surplus at the end of the test period considered acceptable. Some regulators require that ending value of surplus results be presented on a market value basis.

Q90. How do actuaries define the criteria used to determine reserve adequacy?

The 2012 survey asked, “What is your current criteria for establishing reserve adequacy?” Of those who responded, 70 percent chose answers suggesting use of a predetermined rule or guideline. Their answers broke down as follows:

- Thirty-six percent indicated that their criterion was “Enough to pass a specified number of New York 7 scenarios, but not necessarily all of them.”
- Nineteen percent indicated that their criterion was “Enough to pass all of the New York 7 scenarios.”
- Eleven percent answered “Enough to pass a specified percentage of the stochastic scenarios”
- Three percent answered “Enough to pass the level interest scenario.”

The remaining 30 percent gave answers indicating that they were applying some kind of additional judgment. Of the total respondents, 6 percent indicated that they opined based on their own alternate deterministic scenarios. Others gave written answers describing a series of (or combinations of) diverse tests. For example, passing a specified number (but not all) of the New York 7 and a specified percentage of stochastic scenarios was the choice of 8 percent of the respondents.

In interpreting these survey results, it is important to consider the low-interest-rate environment that existed when the survey was taken (fall 2012). One might expect that the responses may have been different if interest rates were closer to historical levels.

Q91. What factors are considered in setting the criteria for reserve adequacy?

Some actuaries believe that the development of appropriate criteria for reserve adequacy is heavily dependent on the degree of conservatism used to establish the assumptions for each scenario. Some actuaries use a criteria of positive surplus in all scenarios tested for the reserve to be deemed adequate if all of the scenarios in the study represent moderately adverse or more favorable conditions (refer to Q16 for a definition of “moderately adverse conditions”). On the other hand, some actuaries believe that if stochastic approaches were used (generating scenarios that represent the universe of possible outcomes, including extremely adverse conditions “in the tail”), additional reserves would not usually be necessary if a specified small percentage of the scenarios produced negative surplus.

ASOP No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers*, states that failing any particular scenario does not necessarily require additional reserves. If many scenarios were considered, failure of a small percentage of them would not necessarily indicate that the reserves are deficient. In judging the results of a multi-scenario test, the actuary will typically bear in mind that the surplus generated by any scenario typically is subject to a number of assumptions used in the testing (e.g., investment strategy, interest crediting strategy, and dynamic lapse formula). The liberalism or conservatism of these various assumptions can influence the interpretation of the results.

Additionally, to the extent the actuary considers mandatory scenarios (such as the New York 7), certain of these scenarios may be considered beyond moderately adverse, depending on the current economic environment. ASOP No. 22 gives guidance in this area. Section 3.4.2 states that “the actuary should consider whether reserves ... are

adequate under moderately adverse conditions.” Actuarial judgment may indicate that certain mandatory scenarios exceed this requirement. In such cases, testing similar, but less severe, scenarios may be appropriate in reaching a determination.

Although the criteria for establishing reserve adequacy are generally better understood now than they were 20 years ago, one article that is still a useful general reference is “Zen and the Art of Reserve and Asset Adequacy,” by D. Becker, M. Smith, and M. Zurcher. This article was first published in Lincoln National’s *Reinsurance Reporter* (3rd quarter, 1993), which is now published by Swiss Re Life & Health America.

For sets of randomly generated scenarios, some actuaries consider what percentage of scenarios failed and by how much. As noted above in Q4, an actuarial test of reserve adequacy is not a solvency test. While a test of solvency generally would involve the passing of a very large percentage of scenarios (and a reasonable limit to the severity of a failure), a reserve typically may be considered adequate as long as a reasonable percentage of scenarios, including a high percentage of moderately adverse scenarios, is passed.

In establishing adequacy criteria, some actuaries consider whether the guidelines apply at the line of business (or product) level or for the entire company. Some actuaries believe that the tolerance for adverse results will be lower at the aggregate than at a line of business level.

Ultimately, the decision to establish additional reserves depends on the actuary’s judgment, regardless of the chosen criteria. The basis of the judgment is typically documented in the supporting memorandum. If additional reserves are recommended and management decides not to strengthen reserves, then the appointed actuary may issue an opinion other than a nonqualified opinion. See Q97 for a discussion of other types of opinions.

To get some indication of the impact of deliberate conservatism in asset adequacy analysis, the following question was included in the 2012 survey: “If you intentionally hold implicit or explicit margins of conservatism, by how much do these impact overall results?” Eighteen percent of respondents estimated the impact of conservatism on results at zero to 5 percent; 31% chose the range 6-10 percent; 9% selected an impact of 11 percent or more. Twenty-one percent answered “Not applicable” and 21% answered “Don’t know.”

Q92. How often have actuaries established additional reserves as a result of asset adequacy analysis?

Approximately 45 percent of those responding to this question in the 2012 survey of appointed actuaries reported that they have increased reserves as a result of asset adequacy analysis at some point in the past.

Of those who answered yes to this question, 50 percent established additional reserves for year-end 2011.

Q93. To what extent do actuaries look at interim results to determine reserve adequacy?

In the 2012 survey of appointed actuaries, 74 percent of the survey respondents indicated they consider projected results in interim periods as “important” (67 percent) or “critically important” (7 percent). The remaining respondents said that such interim results are either “not very important” (18 percent) or “unimportant” (8 percent).

Consistent with the above responses, 75 percent of all respondents look at the projected results in interim periods and 7 percent look at the year-by-year present value of those interim results. Of all respondents, 58 percent use book value of surplus when examining interim results, while 11 percent use market values and 6 percent use market values of assets less book value of liabilities.

With regard to the scenarios that are considered, 63 percent of the respondents look at all of the New York 7 scenarios, 16 percent look at New York 7 scenario No. 1 only, while the remaining respondents look at (i) subsets of the New York 7 scenarios Nos. 1 to 7, (ii) all deterministic scenarios, or (iii) all deterministic and stochastic scenarios.

Of those who strengthened reserves based on interim results, the method used to release the strengthened reserves generally varied based on the reasons the reserves were strengthened. For example, some reserves are released over the life of the business (e.g., to reflect mortality deterioration or low interest rates) while others are released over a fixed period (e.g., to cover a short-term period of higher asset defaults).

The AOMR (2001 and later) requires the preparation of a regulatory asset adequacy issues summary (RAAIS). The RAAIS requests commentary on any interim results that may be of significant concern to the appointed actuary. Such commentary may generally include, at a minimum, discussion of large negative values, early negative values, and protracted periods of negative value. Refer to Q102 for further discussion of the RAAIS.

Some states may impose additional requirements with respect to interim results. As an example, California specifically requires that “[i]f negative interim or ending surplus results are of no significant concern to the Appointed Actuary, explain why”.

Q94. If, based on asset adequacy analysis, the reserves are judged to be inadequate, how does the actuary decide upon the amount of additional reserves?

Approximately one-half of the respondents to this question in the 2012 survey indicated that they never had to set up additional reserves. Of the remainder, 65 percent indicated that they calculate the present value necessary to eliminate the deficiency based on the same criteria they use for establishing reserve adequacy, and 18 percent indicated that, in

addition to using present values, they also make adjustments to reflect deficiencies in interim results. The remaining 17 percent reported use of a variety of techniques, including conditional tail expectation measures, gross premium reserves, amounts necessary to keep results positive for a predetermined length of time, and professional judgment.

Q95. When additional reserves are established or released, does the change in reserve go through the gain from operations, or is it booked directly to the surplus of the company?

Information may be found in the NAIC *Accounting Practices and Procedures Manual*:

Appendix A-822 states:

If the appointed actuary determines as the result of asset adequacy analysis that a reserve should be held in addition to the aggregate reserve held by the company and calculated in accordance with methods set forth in the Standard Valuation Law, the company shall establish the additional reserve. (Section 5E(2))

Additional reserves established ... above and deemed not necessary in subsequent years may be released. ... The release of such reserves would not be deemed an adoption of a lower standard of valuation. (Section 5E(3))

Statement of Statutory Accounting Principles (SSAP) No. 51R—*Life Contracts*, states the following:

The difference between the policy reserve for life contracts at the beginning and end of the reporting period shall be reflected as a change in reserves in the summary of operations, except for any difference due to a change in valuation basis (paragraph 35). A change in valuation basis (except for those required by AG43) shall be defined as a change in the interest rate, mortality assumption, or reserving method (e.g., net level, preliminary term, etc.) or other factors affecting the reserve computation of policies in force and meets the definition of an accounting change as defined in SSAP No. 3—Accounting Changes and Corrections of Errors (paragraph 36).

Based on this, some actuaries believe that the change in reserves resulting from asset adequacy analysis, including any subsequent release of the reserve, would typically be recorded through the gain from operations, rather than directly to surplus.

Q96. What might the appointed actuary do if notified of a material reserve misstatement?

In the 2013 NAIC's *Annual Statement Instructions* for Life, Accident and Health Insurers (Instruction 12 of the Actuarial Opinion section therein), the following is noted:

The insurer required to furnish an actuarial opinion shall require its appointed actuary to notify its board of directors or its audit committee in writing within five (5) business days after any determination by the appointed actuary that the opinion submitted to the domiciliary Commissioner was in error as a result of reliance on data or other information (other than assumptions) that, as of the balance sheet date, was factually incorrect. The opinion shall be considered to be in error if the opinion would have not been issued or would have been materially altered had the correct data or other information been used. The opinion shall not be considered to be in error if it would have been materially altered or not issued solely because of data or information concerning events subsequent to the balance sheet date or because actual results differ from those projected.

and

No appointed actuary shall be liable in any manner to any person for any statement made in connection with the above paragraphs if such statement is made in a good faith effort to comply with the above paragraphs.

Recent NAIC *Annual Statement Instructions* do not include such language, but such language may inform a path for the appointed actuary to take, including communication with the board of directors and the state of domicile.

Section K: Preparing the Opinion and Memorandum

Q97. How do actuaries define “qualified opinion”?

The 2001 AOMR does not define what constitutes a “qualified opinion,” so the appointed actuary has been required to make that determination.

VM-30 of the NAIC’s Valuation Manual, which is currently being adopted by states, includes changes to the AOMR. As part of those changes, the terms “adverse opinion,” “qualified opinion,” and “inconclusive opinion” are defined. The appointed actuary will need to identify whether the opinion is unqualified, adverse, qualified, or inconclusive in the table of key indicators. If the opinion is adverse, qualified, or inconclusive, the appointed actuary should explicitly state the reason for such an opinion (Section 3A(10)).

Q98. What determines whether a reserve is in the formula reserve, additional reserve, or other amount column of the reserve table that appears in the scope paragraph of the actuarial opinion?

The AOMR includes a reserve table in Section 6B(2) that gives a suggested format for listing reserves that are to be included in the actuarial opinion. Footnotes (a) and (b) of that table describe additional actuarial reserves and analysis methods used, respectively. However, other than the headings on the columns, it does not provide a detailed description of how to prepare the remaining columns. One possible approach to preparing this table follows:

- **Column (1) - Formula Reserves:** This is for reserves that are subject to asset adequacy analysis. Formula reserves consist of reserves calculated by application of a statutory formula. However, formula reserves also include any reserves that do not have a specified statutory methodology but are calculated by a standard methodology or procedure each year.
- **Column (2a) - Additional Actuarial Reserves:** Footnote (a) of the reserve table states that the additional actuarial reserves are the reserves established in accordance with the results of the asset adequacy analysis. These additional reserves are addressed under Paragraph (2) of Section 5E of the AOMR.
- **Column (2b) - Analysis Method:** Footnote (b) of the reserve table states that this is the method used for asset adequacy analysis determined in accordance with the standards for asset adequacy analysis referred to in Section 5D of the AOMR. The appointed actuary may choose to list more than one method for each line in the table (e.g., CFT, GPV), with the corresponding reserve amounts for each method. The appointed actuary may refer to ASOP No. 22 in doing this.

- Column (3) - Other Amounts: This column is for reserves that were not subject to asset adequacy analysis. A common reason for not analyzing certain business is that the business is not material.
- Column (4) - Total Amount: This is the total of columns (1), (2), and (3). Many actuaries believe that Section 5E(1) of the AOMR requires that these amounts reconcile with the respective reserves of Exhibits 5, 6, and 7 and claim liabilities in Exhibit 8, Part 1, and equivalent items in the separate account statement or statements.

VM-30 of the NAIC's Valuation Manual, which has been adopted by many states, includes changes to the AOMR. One change is to add a column for "Principle-Based Reserves" between Formula Reserves and Additional Actuarial Reserves in the reserve table. It also includes the table as prescribed wording. If changes are made to the scope section, which includes the table, the appointed actuary may indicate that the table does not follow prescribed wording.

To see a discussion of the testing methods and the survey results on the use of these methods by appointed actuaries, refer to Q11.

Q99. What types of actuarial reports do actuaries prepare in connection with asset adequacy analysis?

All states require the preparation of an actuarial opinion that is filed with the annual statement. The SVL requires that an actuarial memorandum be prepared, which provides details of the analysis to support the actuarial opinion. However, most states do not require that the actuarial memorandum be filed along with the actuarial opinion. A few states require that the actuarial memorandum, or an executive summary of the actuarial memorandum, be filed.

New York Regulation 126 requires that an actuarial memorandum be submitted by all licensed insurers (not only domestic companies). However, if the nondomestic company receives a letter from an accredited state that has reviewed the company's actuarial opinion and memorandum from the prior year and the letter indicates the documentation was found acceptable, the memorandum is only filed if requested by the New York Commissioner.

The 2001 AOMR and VM-30 require that the RAAIS, an executive summary of the memorandum, be submitted by the appointed actuary, typically by March 15 of each year (refer to Q102).

In addition to regulatory reports, many actuaries prepare reports for other audiences such as internal management, external auditors, the board of directors, and rating agencies. Management reports typically include an executive summary of the memorandum rather than the entire memorandum. Some actuaries use the same executive summary for

management that is used for regulators, while others prepare a modified summary that may contain information not included in the regulatory summary. External auditors typically request copies of both the memorandum and the executive summary for management, along with supporting analysis and documentation. Rating agencies typically request copies of both the actuarial opinion and memorandum.

Q100. What level of detail is typically included in the actuarial memorandum?

Below is a table giving the responses from the 2012 survey of appointed actuaries for the general type of information respondents include in the memorandum. The percentages represent the percentage of respondents that include the respective item in the memorandum:

Description of scenarios used	99%
Description of sensitivity tests	98%
Description of company and markets in which products are sold	92%
Product description of each product modeled	89%
Products subject to asset adequacy	89%
Breakdown of modeled reserves by line and by type of reserve	88%
Description of reinsurance	87%
Aggregation methods used	83%
Description of reserves not tested	79%
Results by each line of business	79%
Breakdown of modeled assets by line and by asset type	79%
Interim results in the aggregate	72%
Interim results by line of business	56%
Definition of moderately adverse conditions	53%
Factors causing better or worse results in each line of business	48%
Reconciliation between Sept. 30 and Dec. 31	41%

Responses from the survey regarding the level of detail for liability assumptions by line of business:

Detailed listing of key assumptions, high-level description for others	64%
Detailed description and/or listing of assumption factors used	60%
Only high-level description of assumptions	17%

Responses from the survey regarding the level of detail for asset assumptions by portfolio:

Asset segmentation/allocation description	75%
Detailed listing of key assumptions, high-level description for others	56%
Detailed description and/or listing of assumption factors used	43%
Only high-level description of assumptions	23%

Q101. What is typically contained in the executive summary for management?

The information included in the executive summary for management differs widely, depending on the types of items that are of interest to company management. Many actuaries include a description of the asset adequacy methods used, a description of the major changes in assumptions and/or methods from the prior year, a description of the criteria used to determine asset adequacy, and a summary of the asset adequacy results. Some executive summaries give a brief history of the objectives of asset adequacy analysis, the areas that contributed to the study, a description of the scenarios used, and results that highlight the particular concerns of management. Other items that are sometimes included are projections of RBC levels at certain future points, interim results during the projection period, and breakdowns of CFT results by major product line. In any event, discussion of the conditions that pose a risk to asset adequacy and how the company could manage under such conditions might be valuable.

Q102. What is discussed in the regulatory asset adequacy issues summary (RAAIS)?

The 2001 AOMR lists the following items to be included in the RAAIS:

- Descriptions of the scenarios tested (including whether those scenarios are stochastic or deterministic) and the sensitivity testing done relative to those scenarios;
- Whether there are ending surplus results that are negative, and the amount of any additional reserve established to eliminate the negative surplus at the end of the testing period;
- Any material differences in assumptions from the year before;
- The reserves subject to asset adequacy the year before, but not subject in the current opinion;
- Comments on any interim results that may be of significant concern;
- The method used to recognize the impact of reinsurance; and
- Whether the actuary recognized all options embedded in assets.

Some states, including New York and California, require additional disclosures within the RAAIS.

Q103. What are regulators' suggestions for improvement in actuarial opinions and memoranda?

A group of insurance regulators who are actuaries responded to an open request for comments in 2003 concerning actuarial opinions and memoranda. Some areas they identified for improvement, which should not be interpreted to be an exhaustive list, are:

Reliance statements: Adding clarity to identify who developed and took responsibility for certain assumptions. (Sources of information for reliance statements now include ASOP

No. 23, *Data Quality* and ASOP No. 41, *Actuarial Communications*; the topic is addressed most directly in the 2001 AOMR).

Assumption detail. Adding detail and discussion of analysis performed. Paragraph 3.2—Actuarial Report, of ASOP No. 41, *Actuarial Communications*, states the following:

In the actuarial report, the actuary should state the actuarial findings, and identify the methods, procedures, assumptions, and data used by the actuary with sufficient clarity that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary's work as presented in the actuarial report.

Reinsurance. Additional documentation regarding the inclusion / exclusion of reinsurance cash flows, and if included, commentary on model fit.

Off-balance-sheet items. Additional documentation regarding the inclusion / exclusion of off-balance-sheet items (such as derivatives) is sought.

Sensitivity testing. Expanding sensitivity testing and including in memorandum. One regulator opined that professional practice includes due attention to those risks that the business is most sensitive to, not simply the risks most commonly addressed by a particular analysis method. For example, sensitivity testing of morbidity, lapse rates, or claim termination rates may be considerably more instructive for some lines of business than testing the impact of changes in the interest rate environment. For example, reasonable limits on rate increases in accident and health insurance would typically be applied in order to realistically analyze C-2 risks.

Investment assumptions. Providing support for investments assumptions used in model.

Expense. More discussion and demonstration were desired to show that expenses used in the model are reasonable and appropriate. There was interest in demonstration that separate account fees cover all expenses allocated to the separate account and cover any general account expense allowances for separate account reserves.

Clarity. Some regulators desired a clear discussion of actual or potential problem areas, with adequate attention to interim results and a clear statement to indicate if an opinion is "qualified." Others were concerned that executive summaries were too long and did not always include clear descriptions of potential problems.

Section L: Impact of AG43, PBR, and Other Nonformulaic Valuation Standards

Q104. What is the “history” of statutory valuation and how is the role of asset adequacy analysis changing?

Elizur Wright established minimum reserve standards for Massachusetts insurance companies in 1858. These reserves were based on a formulaic method with prescribed assumptions such as mortality and valuation interest rate. Later, some companies tested their reserves using a GPV, but, as late as 1985, neither regulators nor the actuarial profession mandated use of CFT. With the introduction of interest-sensitive products having a flexible crediting rate closely related to the rate earned on assets backing the reserves, it became apparent that simplified formula reserves might become inadequate if the company could not earn the guaranteed minimum crediting rate. This situation was exacerbated by the inflationary and unstable interest rate experience in the 1980s, which caused further mismatch between assets and liabilities.

In response to this experience, regulators have gradually introduced more dynamic and flexible valuation requirements. The commissioners’ annuity reserve valuation method (CARVM) was introduced in 1980, requiring multi-scenario analysis of deferred annuities, with the scenarios depending on lapse and mortality experience, rather than interest rate paths. CARVM was further clarified in 1998 with Actuarial Guideline XXXIII (AG33). Dynamic valuation interest rates were introduced in 1982. The Academy drafted “Recommendation #7” requiring CFT, and in 1985, New York incorporated this draft language into Regulation 126; this was the first U.S. regulatory requirement for asset adequacy analysis. Since then, the regulatory requirement for asset adequacy analysis has grown to include almost all products and companies. In the early 1990s, the first version of the AOMR was adopted, bringing a level of standardization to asset adequacy analyses performed throughout the industry.

Flexible mortality assumptions for calculation of deficiency reserves were introduced in 2000 in the Valuation of Life Insurance Policies Model Regulation commonly known as “Regulation XXX.” Its successor, Actuarial Guideline XXXVIII (AG38), followed as new product designs were introduced. The year 2009 saw the introduction of AG43 for variable annuities, requiring a stochastic projection of interest rate and equity return scenarios, along with lapse and mortality assumptions that were fully responsive to varying economic conditions in different scenarios. (The need for AG43 followed more than 10 years of research and committee work by the Academy, which was unable to find an appropriate simplified valuation method for valuing variable annuities with GMIBs.) Around the same time, it became apparent that ordinary life insurance and other products were also moving in the same direction, with multiple options and dynamic crediting rates embedded in these products. Meanwhile, it was apparent that AG38 and Regulation XXX sometimes produced reserves that were well in excess of those reasonably required for regulatory purposes. This led to increased focus on a principle-based reserve (PBR)

concept for valuation, wherein reserve calculation methods and assumptions are fully dynamic and flexible, following actuarial principles rather than prescribed formulas or assumptions, and result in reserve levels that are already deemed to be adequate based on how they are calculated. Because this theoretical concept had not yet proved its reliability, the emerging standards took on a diverse mixture of old (formulaic, prescriptive) and new (experience-based, company-specific, actuarial professionalism) guidance. Consequently, new reserving methods following a principle-based approach (PBA) have been introduced in recent years, and these continue to evolve (refer to Q105).

Q105. Which emerging standards follow the principle-based approach?

Recently introduced PBA reserve requirements include AG43 for variable annuities and Actuarial Guideline XXXVIII, Section 8D (AG38 8D) for some blocks of universal life policies with secondary guarantees. In addition, some requirements exist for stand-alone asset adequacy reserve analysis, such as for life insurance business subject to AG 38 Section 8C (AG38 8C). Most recently, the revised Valuation Manual (currently adopted by most states) contains Section VM-20—*Requirements for Principle-Based Reserves for Life Products* (VM-20), which addresses life product reserving (even prior to adoption, AG38 8D referred to the VM-20 approach). AG43 is incorporated into the Valuation Manual as VM-21. All of these analyses resemble the asset adequacy analysis required by the AOMR in that they involve projections of asset and liability cash flows. Differences appear, though, in the level of prescription of assumptions and the testing requirements (e.g., scenarios), as well as the scope and issue date range of the business included.

Beyond statutory reserves, there are also capital requirements such as RBC C-3 Phase 1 for fixed annuities and single-premium life insurance and RBC C-3 Phase 2 for variable annuities. These, too, can involve projections of asset and liability cash flows, with differences in the level of prescription of assumptions and the testing requirements (e.g., scenarios), as well as the scope of the business included.

Q106. Does meeting the requirements of a PBA reserve simultaneously satisfy the requirements of AOMR?

All inforce business is subject to AOMR, regardless of the method used to determine the reserve. However, while the AOMR requirements are commonly met via a method such as CFT, other methods are possible (refer to Q11).

Some actuaries believe that a reserve determined via a PBA automatically meets the “moderately adverse conditions” associated with AOMR, and thus include such business in the analysis via the method of Demonstration of Conservatism. Some actuaries will substantiate this through simplified testing or sensitivity analysis. Other actuaries will continue to include PBA-reserved business in CFT or other analysis as part of AOMR.

In considering whether the PBA reserve meets the AOMR requirements, an actuary may wish to take the following into account:

- An actuary might consider product-specific aspects (optionality, volatility of experience, sensitivity to various assumptions, etc.) as well as distribution of results (where available) under different financial conditions. Indeed, with varying financial conditions, as well as possible differing product characteristics at different policy durations, it is possible that the decision made by the actuary could be different on different valuation dates.
- There is a further complication in that, under the Valuation Manual, only some of a company's reserves are subject to PBA methods, rendering the AOMR aggregate comparisons incomplete.

Given these many facets, it is not surprising that a wide range of practice currently exists:

- From the 2012 appointed actuary survey, 16 percent of responding actuaries defined AG43 as meeting the AOMR requirement, some with additional sensitivity testing, while 23 percent continued to include the business in a CFT or other analysis. It is noted that 61 percent of the survey respondents indicated that AG43 was not applicable to their business (i.e., the business does not have variable annuities in force).
- From the 2012 appointed actuary survey, 33 percent of responding actuaries indicated that they would likely consider PBA (VM-20) requirements for life products as meeting AOMR, while 42 percent indicated that they would likely continue with CFT or some other analysis, at least until more of the inforce business was subject to the PBA. It is noted that 25 percent of the survey respondents indicated that the PBA was not applicable or that they were undecided on their approach.
- From the 2012 appointed actuary survey, 27 percent of responding actuaries indicated that they would likely consider PBA requirements for fixed annuities as meeting AOMR, while 35 percent indicated that they would likely continue with CFT or some other analysis, at least until more of the inforce business was subject to the PBA. It is noted that 38 percent of the survey respondents indicated that the PBA was not applicable or that they were undecided on their approach.

With the advent of PBR and the Valuation Manual for life insurance, optionally effective on Jan. 1, 2017 for new business, it is likely that practice in this area will continue to evolve.

Q107. How does AOMR interact with AG43 / VM-21?

Like all inforce business, reserves for variable annuities determined under AG43 / VM-21 are subject to AOMR. Given the PBA nature of AG43 / VM-21, some actuaries believe that the reserve determined automatically meets the “moderately adverse conditions” associated with AOMR and thus include it in the analysis via the method of Demonstration of Conservatism. While such a reserve may be considered conservative at a particular valuation date, margins may deteriorate in the future under the same calculation method and assumptions. Thus, some actuaries will perform a simplified analysis (perhaps a single scenario) to satisfy themselves that the AG43 / VM-21 reserve remains adequate.

Alternatively, some actuaries take the approach of continuing to fully incorporate the AG43 / VM-21 business in the AOMR through a method such as CFT. In doing so, any elements of excess conservatism included in the AG43 reserve calculation (for example, a standard scenario amount significantly exceeding the corresponding conditional tail expectation (CTE) amount might be considered excessive conservatism) may become available as additional sufficiency in AOMR (and alternatively, any insufficiency would also be reflected).

From the 2012 appointed actuary survey, 45 percent of the survey respondents reporting AG43 / VM-21 reserves defined AG43 as meeting the AOMR requirement, some with additional sensitivity testing, while 55 percent included the business in a CFT analysis.

Where the results of variable annuity product projections are included in the aggregate company results, it is necessary to first determine the reserve requirement under AG43 / VM-21, as this serves as the initial reserve tested under AOMR.

Q108. How does AOMR interact with AG38?

There are currently two sections in AG38 that may interact with AOMR: Sections 8C and 8D. Both sections scope in universal life with secondary guarantees issued during certain periods. Section 8C includes all universal life with secondary guarantees issued between Jan. 1, 2007, through Dec. 31, 2012, and Section 8D includes universal life with secondary guarantees with multiple sets of charges issued between July 1, 2005, and Dec. 31, 2012. Section 8C includes a stand-alone asset adequacy analysis that tests the formulaic reserve used for products subject to this requirement. Section 8D is a reserve calculation using a PBA method. There is potential overlap between Sections 8C and 8D, resulting in some policies being subject to both of these requirements, as well as AOMR.

AG38 8C:

Like all inforce business, reserves determined under AG38 are subject to AOMR. In completing AOMR, many actuaries make use of various models, each representing different blocks of business, that are then summed to determine the aggregate results for

the company. In such cases, the AG38 8C asset adequacy analysis may represent one of these subset blocks of the company. Alternatively, some actuaries may combine the AG38 8C policies with other policies of the company in completing AOMR. In such cases, the aggregate result may not be equal to what otherwise would have been the “sum of the parts.” Alternatively, an actuary could choose to consider the AG38 8C business as “tested”: in such case, any sufficiency found within the AG38 8C block would effectively not be included in the aggregate company results. (Note: If the AG38 8C result is a potential insufficiency, an additional reserve may be established to achieve adequacy. Such additional reserve would become part of the initial reserve tested for the AG38 8C business under AOMR. Hence, it would not be expected that there could be a situation where an “insufficiency” could be ignored when choosing not to include the AG38 8C results in the aggregate AOMR.)

AG38 8D:

Like all inforce business, reserves determined under AG38 are subject to AOMR. Given the PBA nature of AG38 8D, some actuaries believe that the reserve determined meets the “moderately adverse conditions” associated with AOMR and thus these actuaries include the reserve in the analysis via the method of Demonstration of Conservatism. While such a reserve may be considered conservative at a particular valuation date, there may be changes in conditions or other factors that affect the margins. Thus, some actuaries will perform a simplified analysis (perhaps a single scenario) to satisfy themselves that the AG38 8D reserve remains adequate under the requirements of asset adequacy analysis.

Alternatively, some actuaries take the approach of continuing to fully include the AG38 8D business in AOMR through a method such as CFT. In doing so, elements of conservatism included in the AG38 8D reserve calculation may become available as additional sufficiency in AOMR.

Where the results of the AG38 8D products are included in the aggregate company results, it is necessary to first determine the reserve requirement under AG38 8D, as this serves as the initial reserve tested under AOMR.

Q109. How does AG38 8C interact with AG38 8D, and in turn with AOMR?

There are three combinations of the AG38 8C and AG38 8D policies to consider:

- a) Policies that are subject to AG38 8C, but not to AG38 8D:

Most actuaries would calculate the AG38 8C formulaic reserve and use this as the initial reserve in the stand-alone asset adequacy analysis. If an additional stand-alone asset adequacy analysis is indicated, this reserve would become part of the initial reserve for AOMR. Some actuaries would then perform AOMR, possibly with this block as a subset of the total, or possibly combined with other business. Alternatively, some actuaries would consider AOMR to have already been met.

b) Policies that are subject to AG38 8D, but not to AG38 8C:

Most actuaries would first calculate the AG38 8D reserve. Some actuaries would then consider this reserve to meet the requirements of AOMR via the method of Demonstration of Conservatism, possibly confirming this through a simplified analysis or other approach. Alternatively, some actuaries would include the AG38 8D business in the AOMR models, with its contribution to the sufficiency (or insufficiency) reflected in the company's aggregate result.

c) Policies that are subject to both AG38 8C and AG38 8D:

Most actuaries would first calculate both the AG38 8C formulaic reserves and the AG38 8D reserves, and determine the higher to be the appropriate initial reserve for the policy. If the AG38 8D reserve is higher, some actuaries would consider this reserve to automatically meet the "moderately adverse conditions" associated with AOMR. Alternatively, some actuaries would complete a stand-alone asset adequacy analysis to determine whether any additional reserve were required. If an additional stand-alone asset adequacy analysis is indicated, this reserve would become part of the initial reserve for AOMR. Some actuaries would then perform AOMR, possibly with this block as a subset of the total, or possibly combined with other business. Alternatively, some actuaries would consider AOMR to have already been met.

It is noted that some of the aforementioned blocks may be combined, for example, AG38 8D that is also AG38 8C, with AG38 8C that is not also AG38 8D, in performing the AG38 8C asset adequacy analysis. Such approaches may vary given practical modeling and materiality considerations.

Q110. If an actuary establishes an additional reserve, is this additional reserve included in subsequent analyses?

Asset adequacy analysis is a test of the "initial reserve" for inforce policies as reported in the current statement. Thus, if an "additional reserve" is part of the initial reserve, it is generally included in the analysis.

For example, AG38 8C may result in an additional asset adequacy analysis reserve established. This becomes part of the reported reserve of the AG38 8C business. When the AG38 8C block is then tested under AOMR, the entire initial (reported) reserve is included (i.e., tested) in AOMR.

Q111. What differences exist between completing the asset adequacy analysis required under AOMR versus that required under AG38 8C?

Asset adequacy analysis methods described earlier in this practice note apply under both aggregate analysis (AOMR) and stand-alone analysis (AG38 8C). Thus, methods and approaches will be similar. Scope (business included) obviously differs. Assumptions and scenarios considered would generally not differ. However, some actuaries may include larger margins in stand-alone analyses given that natural offsets with other blocks of business are unavailable. Similarly, for stand-alone analysis, it may be that some scenarios otherwise considered for the total company are not applicable. Documented substantiation of differences applied to the policies that fall under these two requirements may be valuable.

Q112. What differences exist in establishment of additional reserves under AOMR versus AG38 8C stand-alone asset adequacy analysis?

Many actuaries would use the same models, assumptions, scenarios, etc., in completing both of these requirements for the same block of business. As such, results of the analyses would be expected to be the same. However, some difference could exist if the AG38 8C business is combined with other business of the company in completing AOMR. Regardless, the actuary will establish any additional reserve based on the results. Consistency in analytic approach (refer to Q11) is generally desired. However, some actuaries believe that a more stringent standard should be applied when reviewing stand-alone testing results that do not have the opportunity for offset in the aggregate with other business of the company.

Q113. What differences exist in the reporting requirement of AOMR versus other regulatory analyses?

The specific reporting requirements for AOMR, AG38 8C, AG38 8D, AG43, VM-20, etc., are found in the respective model regulation or guidelines. Many analyses require that a “stand-alone report” be prepared. As there can be substantial repetition of information among related reports, some actuaries will create a “base” report and then reference it in other reports where necessary. Some actuaries will create common report “chapters” or “appendices” that can be combined in different ways to meet the multiple reporting requirements. Some actuaries will create a single “giant report” that includes all requirements. Other actuaries will create separate, distinct reports, potentially with significant repetition of data. Often the exact structure of the reports will vary depending on the relative importance of each block of business (materiality), the degree of complexity of the analysis, and/or in response to preferences expressed by the company’s domestic regulator or other recipient of the report. See also Q99 and Q100.

Appendix A: Acronym Definitions

ABS	Asset-Backed Security
Academy	American Academy of Actuaries
ACG	Actuarial Compliance Guideline
ACLI	American Council of Life Insurers
AG38 8C	Actuarial Guideline XXXVIII, Section 8C
AG38 8D	Actuarial Guideline XXXVIII, Section 8D
AG43	Actuarial Guideline XLIII for Variable Annuities
AOMR	Actuarial Opinion and Memorandum Regulation
ASOP	Actuarial Standard of Practice
AVR	Asset Valuation Reserve
CFT	Cash Flow Testing
CMO	Collateralized Mortgage Obligation
DAC	Deferred Acquisition Cost
DTA	Deferred Tax Asset
DTL	Deferred Tax Liability
FHLMC	Federal Home Loan Mortgage Corporation
FNMA	Federal National Mortgage Association
GMIB	Guaranteed Minimum Income Benefit
GNMA	Government National Mortgage Association
GPV	Gross Premium Valuation
IMR	Interest Maintenance Reserve
Libor	London Interbank Offered Rate
MBS	Mortgage-Backed Security
MVL	Market Value of Liabilities
NAIC	National Association of Insurance Commissioners
PAC	Planned Amortization Class
PBA	Principle-Based Approach
PBR	Principle-Based Reserve
PSA	Public Securities Association Standard Prepayment
RAAIS	Regulatory Asset Adequacy Issues Summary
RBC	Risk-Based Capital
Regulation XXX	Valuation of Life Insurance Policies Model Regulation
SOA	Society of Actuaries
SSAP	Statement of Statutory Accounting Principles
SVL	Standard Valuation Law
VM-20	Valuation Manual-20
VM-30	Valuation Manual-30
VM-G	Valuation Manual-Appendix G

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November 30, 2022

Ms. Rachel Hemphill
Acting Chair, NAIC Life Actuarial Task Force (LATF)

Re: Negative IMR handling in Principle-based Reserves and Asset Adequacy Testing

Dear Ms. Hemphill:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit the following comments on the exposure soliciting feedback on 2022 year-end guidance on the handling of negative IMR in VM-20, VM-21, and VM-30.

ACLI appreciates LATF's intent on providing guidance on the handling of negative IMR in principle-based reserves and asset adequacy testing. As stated in our letter to the Statutory Accounting Practices Working Group (SAPWG), ACLI believes that the NAIC should review the current practice of non-admitting net negative IMR on the balance sheet. The IMR is a necessary component of an amortized cost-based accounting system when market-value sales of assets occur to ensure a consistent matching of assets and liabilities. It neutralizes the impact of the capital gains or losses, which keeps the timing of the asset returns consistent with the liability valuation rates. However, until that review by SAPWG is completed, there is a potential for double-counting of capital losses when an actuary includes a net negative IMR in the calculation of principle-based reserves or in their asset adequacy testing.

The staff letter to LATF includes the following recommendation:

In order to assist state regulators in achieving uniform outcomes for year-end 2022, we have the following recommendation: the allocation of IMR in VM-20, VM-21, and VM-30 should be principle-based, "appropriate", and "reasonable". Companies are not required to allocate any non-admitted portion of IMR (or PIMR, as applicable) for purposes of VM-20, VM-21, and VM-30, as being consistent with the asset handling for the non-admitted portion of IMR would be part of a principle-based, reasonable and appropriate allocation. However, if a company was granted a permitted practice to admit negative IMR as an asset, the company should allocate the formerly non-admitted portion of negative IMR, as again a principle-based, reasonable and appropriate IMR allocation would be consistent with the handling of the IMR asset. This recommended guidance is for year-end 2022, to address the current uncertainty and concerns with the "double-counting" of

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The American Council of Life Insurers (ACLI) is the leading trade association driving public policy and advocacy on behalf of the life insurance industry. 90 million American families rely on the life insurance industry for financial protection and retirement security. ACLI's member companies are dedicated to protecting consumers' financial wellbeing through life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, and dental, vision and other supplemental benefits. ACLI's 280 member companies represent 94 percent of industry assets in the United States.

losses. This recommended guidance will help ensure consistency between states and between life insurers in this volatile rate environment. Refinement of this guidance may be considered beyond year-end 2022.

ACLI agrees with the recommendation but would suggest a slight change to the wording to include some background for the recommendation, as well as a few clarifying edits. We suggest the following:

With the rapidly rising interest rate environment, there is a growing likelihood that life insurers will have a net negative Interest Maintenance Reserve (IMR) for year-end 2022. While NAIC statutory accounting non-admits any net negative IMR, the NAIC Valuation Manual does not explicitly provide guidance on what an "appropriate" allocation of a net negative IMR should be in the calculation of principle-based reserves or in asset adequacy testing. As a result, actuaries are making different interpretations for the treatment of net negative IMR. In order to assist state regulators and companies in achieving uniform outcomes for year-end 2022, ~~we have the following recommendation:~~ LATF recommends that the allocation of IMR in VM-20, VM-21, and VM-30 should be principle-based, "appropriate", and "reasonable". Companies are not required to allocate any non-admitted portion of IMR (or PIMR, as applicable) for purposes of VM-20, VM-21, and VM-30. ~~as being consistent~~ This consistency with the asset handling in the balance sheet for the non-admitted portion of IMR would be ~~part of~~ a principle-based, reasonable, and appropriate allocation. However, if a company ~~was~~ has been granted a permitted practice to admit negative IMR as an asset, the company should allocate include the ~~formerly non-admitted portion of~~ negative IMR in the calculation of principle-based reserves and in asset adequacy testing, as again a principle-based, reasonable, and appropriate IMR allocation would be consistent with the handling of the IMR asset. This recommended guidance is for year-end 2022, to address the current uncertainty and concerns with the "double-counting" of capital losses. ~~This recommended guidance will help ensure consistency between states and between life insurers in this volatile rate environment.~~ Refinement of this guidance may be considered beyond year-end 2022.

Ultimately, ACLI believes that non-admitting IMR is not necessary, as any shortfall in assets necessary to retire the liabilities will be evident in asset adequacy testing, requiring higher reserves. Furthermore, reserves developed under VM-20 and VM-21 also reflect IMR allocated to the block of reserves, which would serve to increase policy reserves when IMR is negative.

In the meantime, while SAPWG considers this issue, this guidance from LATF to state regulators and companies regarding negative IMR is very important. Future guidance should align with any decisions made by SAPWG regarding the handling of net negative IMR.

ACLI thanks you for your quick attention to this matter.

Sincerely,



Paul S. Graham, III, FSA, MAA



Mike Monahan

cc: Scott O'Neal, NAIC

Agenda Item 12

Consider Exposure of APF 2022-08

Life Actuarial (A) Task Force/ Health Actuarial (B) Task Force Amendment Proposal Form*

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Brian Bayerle, ACLI – Clarify requirements on groups of contracts that use the Alternative Method/AG33 in VM-21 and are not subject to a principles-based valuation. Such contracts should not be not subject to VM-G but still require a sub-report under VM-31.
2. Identify the document, including the date if the document is “released for comment,” and the location in the document where the amendment is proposed:

Valuation Manual Jan. 1, 2023 Edition; VM-21 Section 3.E, VM-31 Section 2.A, VM-G Section 1 and Section 4.A.3.
3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on “track changes” in Word®) version of the verbiage. (You may do this through an attachment.)

See attached.
4. State the reason for the proposed amendment? (You may do this through an attachment.)

There is some ambiguity about the governance requirements if a principles-based valuation is not performed.

* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated.

NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
11/4/22	SO		
Notes: APF 2022-08			

VM-21

Section 3: Reserve Methodology

E. Alternative Methodology

For a group of variable deferred annuity contracts that contain either no guaranteed benefits or only GMDBs—i.e., no VAGLBs—the reserve may be determined using the Alternative Methodology described in Section 7 rather than using the approach described in Section 3.C and Section 3.D. However, in the event that the approach described in Section 3.C and Section 3.D has been used in prior valuations for that group of contracts, the Alternative Methodology may not be used without approval from the domiciliary commissioner.

The reserve for the group of contracts to which the Alternative Methodology is applied shall not be less than the aggregate cash surrender value of those contracts.

Groups of contracts to which the Alternative Methodology is applied are only subject to the applicable requirements for the Alternative Methodology in VM-21. Groups of contracts to which the Alternative Methodology is applied are subject to the applicable sub-report requirements outlined in VM-31 Sections 3.E and 3.F. Groups of contracts to which the Alternative Methodology is applied are not subject to the requirements of VM-G Sections 2 and 3.

VM-31

Section 2: General Requirements

- A. Each year a company shall prepare, under the direction of one or more qualified actuaries, as assigned by the company under the provisions of VM-G, a PBR Actuarial Report if the company computes a deterministic reserve or stochastic reserve or performs an exclusion test for any policy as defined in VM-20, or computes an aggregate reserve for any contract as defined in VM-21.

A company that does not compute any deterministic or stochastic reserves under VM-20 for a group of policies as a result of the policies in that group passing the exclusion tests as defined in VM-20 Section 6 must still develop a sub-report for that group of policies that addresses the relevant requirements of Section 3.

A company that computes reserves under the Alternative Methodology defined in VM-21 must still develop a sub-report with the applicable requirements to the Alternative Methodology for that group of policies that addresses the relevant requirements of Section 3.

VM-G

Section 1: Introduction, Definition and Scope

- A. The corporate governance guidance provided in VM-G is applicable only to a principle-based valuation calculated according to methods defined in VM-20 and VM-21, **except for the following condition:**

For a company that does not compute any deterministic or SR under VM-20 as a result of passing the exclusion tests as defined in VM-20 Section 6, and ~~it does not calculate any~~ all contracts subject to reserves under VM-21 are determined by application of the Alternative Methodology, VM-G Sections 2 and 3 below are generally not applicable; the requirements of Section 4 are still applicable. However, if the company calculated the SERT using the DR method outlined in VM-20 Section 6.A.2.b.i.a, or the Stochastic Exclusion Demonstration Test outlined in VM-20 Section 6.A.3, then VM-G Sections 2 and 3 are applicable.

Section 4: Responsibilities of Qualified Actuaries

- A.3 The responsibility for providing a summary report to the board and to senior management on the valuation processes used to determine and test PBR, the principle-based valuation results, the general level of conservatism incorporated into the company's PBR, the materiality of PBR in relationship to the overall liabilities of the company, and significant and unusual issues and/or findings.

If Sections 2 and 3 are not applicable because the company met the requirements to be exempt from Section 2 and Section 3 as outlined in Section 1.A, this particular reporting to board and senior management is limited to:

- a. For VM-20, notifying senior management if the company is at risk of failing either exclusion test, and if so, reporting on the company's readiness to calculate deterministic and SR; and
- b. For VM-21, notifying senior management if the company may not be able to use the Alternative Methodology for all business subject to VM-21, and if so, reporting on the company's readiness to calculate a SR.

Agenda Item 13

Hear an Update from the Academy Life Practice Council

Life Practice Council Update

Ben Slutsker, MAAA, FSA
Vice President, Life Practice Council

Donna Claire, MAAA, FSA
Chairperson, Life Experience Committee

Life Actuarial Task Force (LATF) Meeting
December 12, 2022

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Academy Webinars and Events

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- Recent
 - [Webinar on VM-31 Principle-Based Reserves \(PBR\) Actuarial Report Reviews](#) (Nov. 9)
 - [Annual Meeting—Envision Tomorrow](#) (Nov. 2 – 3)
 - [Inflation webinar](#) (Oct. 29)
 - ASOP No. 22 webinar related to asset adequacy testing—[The Revised ASOP No. 22: What You Need to Know](#) (July 28)
- Upcoming
 - Post-NAIC update on asset topics
 - PBR webinars in 2023

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Recent Activity

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- Presented further input for the newly adopted C-2 mortality factors to the NAIC's Life Risk-Based Capital (E) Working Group
 - An in-depth document on how to classify different products into the new C-2 categories (pricing flexibility vs. without pricing flexibility)
- Provided further input to LATF on transitioning from London Inter-Bank Offered Rate (LIBOR) to Secured Overnight Financing Rate (SOFR), following the adoption of APF 2022-04
 - Worked with NAIC to develop more details around methodology for the transition

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Recent Activity (continued)

4

- Shared a comment letter for the NAIC's Index-Linked Variable Annuity (A) Subgroup on the nonforfeiture interim value actuarial guideline exposure
- Submitted multiple comment letters on IUL illustrations to the NAIC's Indexed Universal Life (IUL) Illustration (A) Subgroup and Life Actuarial (A) Task Force
- Developed multiple education sessions on economic scenario generators and acceptance criteria for the NAIC's Life Actuarial (A) Task Force
- Provided a proposal for the NAIC's Valuation Manual (VM)-22 (A) Subgroup for exclusion testing on single premium immediate annuities

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Academy Life Experience Committee

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- A committee to assist practicing actuaries and regulators with respect to assumptions regarding life insurance and annuity products
- Requesting feedback from regulators as to what topics they would like to be addressed

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Reflection of COVID-19 in Mortality Improvement

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- LATF answered question as to the maximum historical and future mortality improvement rates that can be used in PBR
- Academy Life Experience Committee worked on considerations for actuaries in asset adequacy, PBR, and company testing:
 - How does own experience compare?
 - Expectations for future
- Margins used in mortality improvement rates for PBR testing and asset adequacy do not have to be the same, but differences should be justified
 - *Reflection of COVID-19 in Life Insurance Mortality Improvement (actuary.org)*

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Discussion Brief on Inflation

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- Meant to provide ideas of what actuaries should consider with respect to current economy when doing PBR and asset adequacy testing, product development and pricing, business planning
- Should consider inflation/economy in terms of
 - Interest rate scenarios
 - Stock market volatility
 - Potential recession
- Provides sources of information on where to find more details
 - [Reflection of Inflation, Interest Rates, Stock Market Volatility and Potential Recession \(actuary.org\)](#)

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Discussion Brief on Credibility

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- In much of the work actuaries do, there is the concept of relevant and credible experience
- What is relevant and credible, for example:
 - What to consider when using industry data?
 - How many lapses make for credible data?
 - What to do when considering outliers?
- Provides sources of information on where to find more details (includes Valuation Manual, Society of Actuaries, Canadian Institute of Actuaries, Academy and other sources)
- https://www.actuary.org/sites/default/files/2022-12/Credibility_Discussion_Brief.pdf

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Discussion Brief on Margins

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- In much of the work actuaries do, they deal with assumptions as to what happens in the future depending on the work done, margins should be added to the best estimate assumption to develop prudent estimates.
- How should margins be determined:
 - Sometimes guidance is given, e.g., the Valuation Manual states that prudent margins should be on all assumptions
 - Some feel that margins should cover X% (e.g. one standard deviation) of past experience
 - Sometimes things are not that clear
- Brief provides sources of information on where to find more details (includes valuation manual, SOA, CIA, Academy, UK and other sources)
- https://www.actuary.org/sites/default/files/2022-12/Margins_Discussion_Brief.pdf

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Thank you

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Questions?

- For more information, please contact the Academy's life policy analyst, Amanda Barry-Moilanen, at barrymoilanen@actuary.org.

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Agenda Item 14

Hear an Update on Society of Actuaries (SOA)
Research and Education



SOCIETY OF ACTUARIES RESEARCH UPDATE TO LATF

December 11, 2022

R. DALE HALL, FSA, MAAA, CERA, CFA
Managing Director of Research



Presentation Disclaimer

The material and information contained in this presentation is for general information only. It does not replace independent professional judgment and should not be used as the basis for making any business, legal or other decisions. The Society of Actuaries assumes no responsibility for the content, accuracy or completeness of the information presented.



2022 Mortality Improvement Company Survey

- Follow up to Mortality Improvement Survey done for Yearend 2018
- Current Survey investigates impact of pandemic
- Examines durational improvement assumptions for individual life and annuity pricing and financial reporting
- Investigates by Age and Duration



Comparison of Median Results

Life Products

Age	Pricing Year 1		Pricing Year 21	
	2019	2022	2019	2022
35	0.73%	0.65%	0.80%	0.50%
55	1.00	1.00	1.00	0.75
75	1.03	1.15	1.01	0.63
95	0.26	0.35	0.40	0.00

Age	Financial Year 1		Financial Year 21	
	2019	2022	2019	2022
35	0.65%	0.60%	0.75%	0.75%
55	0.90	0.90	0.79	0.75
75	1.00	1.00	1.00	0.75
95	0.44	0.40	0.40	0.25

Annuity Products

Age	Pricing Year 1		Pricing Year 21	
	2019	2022	2019	2022
35	1.00%	1.00%	0.84%	0.88%
55	1.20	1.20	1.00	1.00
75	1.44	1.05	1.30	1.00
95	0.40	0.20	0.35	0.20

Age	Financial Year 1		Financial Year 21	
	2019	2022	2019	2022
35	1.00%	1.00%	1.00%	1.00%
55	1.21	1.00	1.20	1.00
75	1.34	1.00	1.30	1.00
95	0.40	0.47	0.40	0.30



Key Takeaways

- Mortality improvement factors from 2022 (prior to COVID-19 adjustments) are generally lower than 2019 for life, and lower at older attained ages for annuity products.
- Median mortality improvement rates tend to be lower for females than males, especially for life products.
- Mortality improvement factors tend to be higher in Year 1 than in later years, especially for life pricing
- To date, few companies have adjusted their durational mortality improvement rates because of COVID-19.



MIM-2021-v3

- Consistent approach for projecting mortality improvement across actuarial practice areas
- Introduced in 2021
- Third iteration: Report, tools, and user guides; updated annually
- Application Tool has been modified
 - New user interface
 - Introduction of parameter set for life and annuity products
 - Expansion of COVID mortality adjustment



<https://www.soa.org/resources/research-reports/2022/mortality-improvement-model/>



Climate, Weather and Environmental Sources for Actuaries

- Update of the 2016 report
- Collection of data and research sources
- Sources chosen with practicing actuaries and the public in mind



Climate, Weather and Environmental Sources for Actuaries

SEPTEMBER | 2022



<https://www.soa.org/resources/research-reports/2022/climate-weather-environment/>

Additional Climate Risk Research and Education

- Series of Reports: Working with Weather Datasets
- Climate Risk Certificate Program



A Practical Guide for Working with Weather Datasets, Topic #1: The Main Types of Weather Datasets

Patrick Wiese, ASA

October 2022

<https://www.soa.org/resources/research-reports/2022/practical-guide-working-weather-datasets/>

The Society of Actuaries and Milliman Collaborate to Develop First Climate Risk Certificate Program

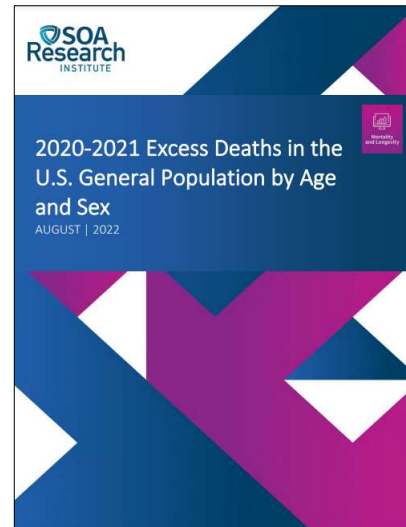
The newest addition to the SOA's certificate program provides comprehensive professional education on climate risk management and measurement

Schaumburg, IL, and Seattle, WA — October 21, 2022 — The Society of Actuaries (SOA) and Milliman today announced the first certificate program focused on measuring and managing climate risk for actuaries. This Climate Risk Certificate Program pairs the risk management acumen of actuaries with the interdisciplinary expertise necessary to manage the complexity of climate risk.



SOA U.S. Population Excess Death Analysis

- Covers 2020 and 2021
 - Updates prior analysis released in June 2021
- SOA analysis contains age/sex breakdowns
 - CDC analysis performed across all ages and sexes
- Age/sex results useful for comparisons to insured population results
- Provides educational material on this process
- <https://www.soa.org/resources/research-reports/2022/excess-death-us/>



Additional Life Research



Experience Studies

Project Name	Objective	Link/Expected Completion Date
2000-2020 U.S. Historical Population Mortality Rates	Publish unsmoothed SSA-Style historical mortality rates for 2000-2020.	https://www.soa.org/resources/research-reports/2022/us-historical-pop-mort-rates-00-20/
2022 Life Mortality Improvement	Develop AG38 mortality improvement assumptions for YE 2022.	https://www.soa.org/resources/research-reports/2022/ind-life-mort-imp-scale-2022/
COVID-19 Individual Life Mortality Study - Experience Study Report - 3Q 2021	Complete a mortality study assessing the impact of COVID-19 on Individual Life Insurance.	https://www.soa.org/resources/experience-studies/2022/us-ind-life-covid-mort-q3/
COVID-19 Cause of Death Study - 3Q 2021 Update	Publish a cause of death study for individual life insurance.	https://www.soa.org/resources/experience-studies/2022/cause-death-q3/
COVID-19 Individual Life Mortality Study - Experience Study Report - 4Q 2021	Complete a mortality study assessing the impact of COVID-19 on Individual Life Insurance.	https://www.soa.org/resources/research-reports/2022/ind-life-covid-mort-4q/
COVID-19 Reported Claims Analysis - 1Q 2022	Draft a research study reviewing Covid-19 reported deaths by quarter.	https://www.soa.org/resources/experience-studies/2022/us-ind-life-covid-rca-q1/
Economic Scenario Generator - 2022 Update	Update the AAA Economic Scenario Generator Annually.	https://www.soa.org/resources/tables-calcs-tools/research-scenario/
GRET for 2023	Develop the Generally Recognized Expense Table (GRET) for 2023	https://www.soa.org/resources/research-reports/2022/2023-gret-recommendation/
Group Life COVID-19 Mortality Survey Update - Report	Complete an update on a mortality study assessing the impact of COVID-19 on Group Life Insurance.	https://www.soa.org/resources/experience-studies/2022/group-life-covid-19-mortality-03-2022/
Old Age Mortality Study	Analyze old age mortality in the ILEC and possibly other databases and draft a report of the results.	https://www.soa.org/resources/experience-studies/2022/old-age-mortality/
COVID-19 Cause of Death Study - 2021 Q4 Update	Publish a cause of death study for individual life insurance.	11/30/2022
COVID-19 Reported Claim Study - 2Q 2022 Update	Draft a research study reviewing Covid-19 reported deaths by quarter.	11/30/2022
Group Life COVID-19 Mortality Survey Update - through June 2022	Complete an update on a mortality study assessing the impact of COVID-19 on Group Life Insurance.	11/30/2022
2011-2015 Deferred Annuity Mortality Study	Examine the mortality experience from 2011-2015 in deferred annuity contracts and release a report with the findings and a database with the experience data.	12/16/2022
2014-19 Individual Payout Annuity Experience Study - Report	Examine the mortality experience from 2014-19 under individual payout annuity contracts.	12/16/2022
Life Predictive Mortality Model	The theme is around the sharing and warehousing of PA tools and information, similar to a data science environment.	12/16/2022
US Population Mortality Observations: Updated with 2021 Experience	Explore observations from the release of the 2021 U.S. population mortality data.	1/25/2023



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Practice Research & Data Driven In-house Research

Project Name	Objective	Link/Expected Completion Date
2021 Emerging Risks Survey-Applicability Report	Provide analysis of the applicability of the 2021 Emerging Risk Survey.	https://www.soa.org/resources/research-reports/2022/15th-survey-emerging-risks/
2021 Emerging Risks Survey-Report	Tracks the trends and thoughts of risk managers on emerging risks across time.	https://www.soa.org/resources/research-reports/2022/15th-survey-emerging-risks/
2021 US Population Provisional Mortality Results	Review of CDC 2021 Provisional Population Mortality.	https://www.soa.org/resources/research-reports/2022/2021-provisional-us-pop-mort/
2022 MIM-2021 update (Fall Update)	Update MIM-2021 to address user feedback and to reflect RPEC changes.	https://www.soa.org/resources/research-reports/2022/mortality-improvement-model/
Expert Opinion on Impact of COVID-19 on Future Mortality	Survey panel of experts on short and mid term thoughts on future population and insured mortality.	https://www.soa.org/resources/research-reports/2022/covid-19-short-term-impact-us-mort/
Mortality Improvement Trends Analysis	Identify how mortality improvement varies by driver.	https://www.soa.org/resources/research-reports/2022/mortality-improvement-trends/
International Comparison of Regulatory Requirements Study Note; 2021.08	Capital Adequacy Regulatory Requirements in Life Insurance across 4 key models in the US, Canada, EU and Bermuda.	11/15/2022
2022 Mortality Improvement Company Survey	Survey life insurers and annuity companies to see how mortality improvement assumptions have changed in light of COVID.	11/30/2022
Mortality and Mental Illness	Examine the impact on mortality of mental illness during the COVID-19 pandemic.	11/30/2022
Maternal Mortality	Study maternal mortality in US and compare to other countries	12/16/2022
Mortality and Race	Summarize available literature on mortality and race and discuss actuarial aspects.	1/31/2023
Unhealthy Longevity	Examine differences in mortality/longevity between impaired vs healthy lives	1/31/2023



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Agenda Item 15

Consider Re-exposure of Amendment Proposal Form (APF) 2022-07

Dates: Received	Reviewed by Staff	Distributed	Considered
11/18/22	SO		
APF 2022-07			

Life Actuarial (A) Task Force/ Health Actuarial (B) Task Force
Amendment Proposal Form

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Brian Bayerle, ACLI – Clarification of adjustments to mortality for policies subject to the NPR and for policies that pass the Life PBR Exemption when anticipated experience exceeds the prescribed CSO table.

2. Identify the document, including the date if the document is “released for comment,” and the location in the document where the amendment is proposed:

Valuation Manual (January 1, 2022 edition), VM-20 Section 3.C.1.g, VM-20 Section 6.B.5.d.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on “track changes” in Word®) version of the verbiage. (You may do this through an attachment.)

See attached.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

The purpose of this proposed amendment is to clarify the intent and calculation of the mortality adjustments to the CSO table when anticipated mortality exceeds the prescribed CSO table. The current wording of Section 3.C.1.g has led to confusion by many and a lack of consistent interpretations. The APF does not change the current requirements of VM-20, it only provides clarification. This APF revises the edits made by APF 2018-57.

There are five questions the APF is trying to answer:

1. **What policies are intended to be addressed by Section 3.C.1.g?**

The primary intent of Section 3.C.1.g is to address the higher anticipated mortality for policies that are not subject to full underwriting (FUW), such as simplified issue policies and final expense policies. It is typical for these types of policies to have mortality experience worse than the CSO table, and thus, an adjustment is necessary.

The intent of Section 3.C.1.g. is not to test every possible FUW subset (e.g., attained age blocks, individual underwriting classes with lower credibility, etc.) to determine if its mortality experience is higher than the CSO table even though more aggregate mortality experience is lower than the CSO table. However, if a large, credible block or subset of FUW policies (e.g., a block of FUW business assumed from another company that has significantly different mortality experience than the rest of the assuming company’s FUW business, or a large block of business from an era when the company had significantly more permissive underwriting, etc.) is expected to have worse experience than the CSO table, then the adjustments in 3.C.1.g should be made.

A guidance note has been added following Section 3.C.1.g. to provide this clarification.

2. **What is meant by the current language in Section 3.C.1.g that the “adjustments should be consistent with the adjustments made for the DET Net Premium test” in Section 6.B.5.d?**

This wording has led to a lot of confusion. Some have interpreted this wording to mean that the adjustment factors should be the same as those defined in Section 6.B.5.d. Others have concluded that this means the form of the adjustments should be the same. Others have concluded that this means the same methodology should be used to determine the adjustments. And if the company does not elect to use the DET, there are no adjustment factors to be consistent with.

This APF clarifies that for the group of policies where the DET has been elected, the methodology to test whether adjustments are needed should be consistent with Section 6.B.5.d (that is, using a comparison of the PV of future death claims) and a reasonably consistent approach should be used to determine the adjustment factors). For groups of policies where the DET has not been elected, a reasonably consistent approach should be used.

3. Are the adjustments to the CSO table in Section 3.C.1.g determined on a seriatim basis or can policies be grouped to determine the adjustments?

The current wording is not clear as to whether the adjustments are determined on a seriatim basis or grouped basis, resulting in inconsistent interpretations. This APF clarifies that the adjustments to the CSO table for the NPR calculation are to be determined using a group of policies (consistent with the approach used in Section 6.B.5.d), not on a seriatim basis. Since the NPR is calculated on a policy-by-policy basis, the application of the adjustments must be applied to each policy on a seriatim basis, but the factors themselves can be determined using a group of policies.

Determining the adjustment factors on a seriatim basis is inconsistent with determining mortality experience for any other purpose. When data is not credible, the resulting mortality rates may not be smooth or consistent. For example, if the anticipated experience for male age 50 results in an adjustment factor of 1.3, but the adjustment factor for male age 48 is 2.1 (based on limited non-credible data), this results in the mortality rate for male 48 being higher than the rate for male 50.

This APF clarifies that the determination of the adjustment factors in Section 3.C.1.g. is to be done on a grouped basis. However, similar to the DET requirement, a company may not group together policies with significantly different risk profiles.

4. How do the requirements of Section 3.C.1.g apply to policies that pass the Life PBR Exemption?

Policies that pass the Life PBR Exemption are still subject to the requirements of Section 3.C.1 (per Section II.G.4 of the Valuation Manual). But Section 3.C.1.g includes references to the NPR and the DET which do not apply to these policies. To clarify, section 3.C.1.g. has been split into two sections: 1) policies that pass the Life PBR Exemption and 2) policies that are not utilizing the Life PBR Exemption and are subject to the NPR requirements. For policies that pass the Life PBR Exemption, all references to the NPR and DET have been removed.

5. How do the requirements in Section 3.C.1.g. apply when calculating deficiency reserves?

Policies that pass the Life PBR Exemption still must determine deficiency reserves, which has led to confusion on how the requirements of section 3.C.1.g apply when determining deficiency reserves. Section 3.C.1 is based on the basic reserve calculation (Section 3.B.6). Once the valuation mortality rates have been adjusted (if needed) by Section 3.C.1.g for the basic reserve, then the calculation of X-factors for the deficiency reserve follows the normal approach as described in VM-A and VM-C. This APF clarifies that the mortality adjustment in 3.C.1.g only applies to the basic reserve for policies that pass the Life PBR Exemption, and not the deficiency reserve.

Deficiency reserves are not needed for policies that are not utilizing the Life PBR Exemption. The NPR for policies other than term and ULSG equals the basic reserve defined in VM-A and VM-C, the NPR for term and ULSG follow the requirements of Section 3.4 and 3.5, and the DR and SR calculations already reflect the circumstances that give rise for the need for a deficiency reserve.

Section 3: Net Premium Reserve

C. Net Premium Reserves Assumptions

1.g For a group of policies where the anticipated mortality experience exceeds the prescribed CSO mortality rates determined in Section 3.C.1.a through 3.C.1.d~~f~~ above, the company shall adjust the CSO mortality rates as follows:

- i. For policies that pass the Life PBR Exemption, the CSO mortality rates used to determine the basic reserve for each policy shall be adjusted in a manner commensurate with the anticipated mortality experience for the policies. The methodology used to test whether adjustments are needed can be performed on an aggregate basis for the group of policies using a reasonable method to compare the respective mortality rates, such as comparing the present value of future death claims discounted at the valuation interest rate used for VM-A and VM-C. However, for the purposes of this comparison, a company may not group together policies with significantly different risk profiles. If an adjustment is needed, the determination of the adjustment factors should use a reasonable methodology, subject to a cap that ensures that mortality rates do not exceed 1,000 per 1,000.
- ii. For policies where the Life PBR Exemption is not utilized, the CSO mortality rates used in the NPR calculation shall be adjusted in a manner commensurate with the anticipated mortality experience for the policies.
 - a) When the company elects to use the DET in Section 6.B for a group of policies, the methodology used to test whether adjustments are needed should be consistent with the methodology used in Section 6.B.5.d (that is, using a comparison of the PV of future death claims discounted at the valuation rate used for the NPR). For the purposes of this comparison, a company may not group together policies with significantly different risk profiles. If an adjustment is needed, the determination of the adjustment factors should use a reasonably consistent methodology to the one used in Section 6.B.5.d., subject to a cap that ensures that the mortality rates do not exceed 1,000 per 1,000.
 - b) For the group of policies where the DET is not used, the company should use a reasonably consistent approach to the one described in paragraph a) above to test whether adjustments are needed and to determine the adjustment factors. The resulting adjustment factors are not required to be identical to the adjustment factors determined in paragraph a) above.

The resulting NPR must not be lower than the NPR calculated without adjustments to the CSO mortality rates.

Guidance Note: It is anticipated that the 3.C.1.g adjustments are generally applicable but not limited to policies with limited underwriting, such as simplified issue or final expense. The intent of Section 3.C.1.g. is not to test every possible group of policies FUW subset (e.g., attained age blocks, individual underwriting classes with lower credibility, etc.) to determine if its mortality experience is higher than the CSO table even though more aggregate mortality experience is lower than the CSO table. However, if a large, credible block or group of policies subset of FUW policies (e.g., a block of FUW business assumed from another company that has significantly different mortality experience than the rest of the assuming

company's **FUW** business, or a large block of business from an era when the company had significantly more permissive underwriting, etc.) is expected to have worse experience than the CSO table, then the adjustments in 3.C.1.g should be made.

Section 6: Stochastic and Deterministic Exclusion Tests

B. Deterministic Exclusion Test (DET)

- 5.d. If the anticipated mortality for the group of policies exceeds the **prescribed CSO mortality rates for the NPR determined in Section 3.C.1.a through 3.C.1.g**, then the company shall use anticipated mortality to determine the valuation net premium. For this purpose, mortality shall be measured as the present value of future death claims **as of the valuation date** discounted at the valuation interest rate used for the NPR.

Date: September 12, 2022

Virginia is submitting comments regarding the following exposure:

APF 2022-07 (Clarify NPR Mortality Adjustment)

Comments:

1. In the opening paragraph in Section 3.C.1.g, the phrase “prescribed CSO mortality rates” is not entirely accurate because the CSO rates may have been adjusted as specified in Section 3.C.1.e and Section 3.C.1.f. Therefore, I suggest the following revised wording:

For a group of policies where the anticipated mortality experience ~~materially~~ exceeds the prescribed CSO mortality rates determined in Section 3.C.1.a through 3.C.1.d above, adjusted as necessary pursuant to Section 3.C.1.e and Section 3.C.1.f, the company shall adjust/further adjust the CSO mortality rates as follows:

2. In Section 3.C.1.g.ii, the word “policies” is incorrectly shown to be changed to the word “policy” when the current version of VM-20 already has the word “policy”. However, the word “policy” should be changed to “policies”, as follows:

“...manner commensurate with the anticipated mortality experience for the ~~policies~~policy, subject to a cap...”

3. In the Guidance Note, I believe “FUW” is an acronym for “fully underwritten”. In the way “FUW” is used in this Guidance Note, it appears to distinguish from guaranteed issue business since the FUW category includes policies with limited underwriting. “FUW” should be changed to “fully underwritten” for clarity since “FUW” does not appear anywhere else in VM-20 and is not defined. Or perhaps, a better approach, would be to use “non-guaranteed issue”, since the phrase “fully underwritten” may not be entirely accurate when describing policies with limited underwriting, such as simplified issue.
4. In Section 6.B.5.d, the phrase “prescribed CSO mortality rates” is not entirely accurate because the CSO rates may have been adjusted as specified in Section 3.C.1.e and Section 3.C.1.f. Therefore, I suggest the following revised wording:

If the anticipated mortality for the group of policies exceeds the prescribed CSO mortality rates for the NPR determined in Section 3.C.1.a through 3.C.1.d, adjusted as necessary pursuant to Section 3.C.1.e and Section 3.C.1.f ~~valuation~~

~~mortality~~, then the company shall use ~~the~~ anticipated mortality to determine the valuation net premium. For this purpose, mortality shall be measured as the present value of future death claims as of the valuation date discounted at the valuation interest rate used for the NPR.

Thank you for your consideration of these comments.

Craig Chupp, FSA, MAAA
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Virginia Bureau of Insurance
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Brian Bayerle
Senior Actuary

Colin Masterson
Policy Analyst

September 22, 2022

Rachel Hemphill
Acting Chair, NAIC Life Actuarial Task Force (LATF)

Re: APF 2022-07

Dear Ms. Hemphill:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit feedback on the exposed APF 2022-07 proposing a clarification of adjustments to mortality for policies subject to the NPR and for policies that pass the Life PBR Exemption when anticipated experience exceeds the prescribed CSO table.

ACLI is open to pursuing regulators' suggestions to simplify the APF and "de-link" the approach used for the NPR and the DET as discussed during the LATF meeting on September 8, 2022. We would also like to express our interest and willingness to work with regulators on drafting the language that would allow for this simplification to occur.

Thank you for your consideration,



Colin Masterson

cc: Scott O'Neal, NAIC

Agenda Item 16

Discuss the ESG Field Test Qualitative Survey Results



NAIC
NATIONAL
MEETING
FALL 2022
TAMPA

**Summary of Company
Responses to the Economic
Scenario Generator (ESG)
Qualitative Survey**

Pat Allison, FSA, MAAA
Scott O'Neal, FSA, MAAA

December 12, 2022

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS



NAIC NATIONAL MEETING **FALL 2022**

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I. Purpose

This presentation has several purposes:

- To provide qualitative information that may aid in understanding and interpreting quantitative field test results to be presented later
- To support the work of the newly formed VM-20/VM-21 ESG Drafting Group on topics that were not fully addressed prior to the field test. To facilitate this, comments are broken out by topic such as scenario subset selection methodology, SERT scenario methodology, etc.
- To support the work of the newly formed ESG Governance Drafting Group, by summarizing company comments related to this topic
- To summarize company comments relating to future ESG development and a 2nd field test

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II. Limitations

- This summary relies on information submitted by companies in response to the ESG Qualitative Survey. It is intended to be based on a clear read of the responses, but there is some risk of misinterpretation.
- Survey responses received by 11/29/22 are summarized in this presentation. One participant has not yet responded to the survey or provided quantitative results.
- This presentation summarizes many, but not all survey responses. Explanations of reserve and RBC changes between field test and baseline runs (VA questions 10 and 11) will be summarized and presented with quantitative field test results.
- This presentation does not follow the organization of the questions in the survey. To improve the useability for future ESG development and analysis, responses were grouped by topic, regardless of where they appeared.
- Some survey questions were not entirely clear, so follow-up questions will be sent to participants.

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III. Notice Regarding Confidentiality

- This presentation provides a summary of company responses to the Economic Scenario Generator (ESG) Qualitative Survey, which was part of the ESG field test conducted from 6/1/22 through 11/29/22. This survey is publicly available here (<https://naic.conning.com/scenariofiles>).
- The survey information was requested from field test participants under both the authority of the general examination authority of the Texas Department of Insurance pursuant to Tex. Ins. Code §§ 401.051, et seq., and the Standard Valuation Law, Tex. Ins. Code §§ 425.051, et seq., and is considered to be confidential under these provisions. These provisions also permit the Texas Department of Insurance to share this confidential information with other state regulators and the NAIC, including the Life Actuarial (A) Task Force (LATF), the Life RBC (E) Working Group, the Valuation Analysis (E) Working Group (VAWG), and NAIC staff. Company specific information will remain confidential pursuant to these statutory provisions.
- This presentation does not contain any company-specific or other company-identifiable information, and any information contained herein has been aggregated or edited as needed in order to protect the confidentiality of the information.

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IV. Background

- A. Survey Participation
- B. Characteristics of Baseline Run
- C. Inforce File Adjustments

IV.A. Survey Participation

Nearly all field test participants provided responses to the survey. The table below shows the number of respondents for each section.

Survey Section	Number of companies
VM-21 and C3 Phase II	31
VM-20	15
C3 Phase 1	25
All Products	39
Total Respondents	40 out of 41 participants

- Responses to survey questions provided information aiding in the ongoing review of quantitative field test results. Many companies also provided comments on topics not specifically addressed in the survey.
- Some companies left certain survey questions blank because they did not have enough time or resources to fully analyze field test results.

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IV.B. Characteristics of Baseline Run

(i.e. actual 12/31/21 reported results)

Framework	Valuation Dates Used for Baseline Runs	Baseline and Field Test Scenario Subsets	Was a proprietary ESG used for the Baseline Runs?																
VM-21 and C3P2 31 companies	12/31/21	<table><tr><th><u>Scenarios</u></th><th><u># Companies</u></th></tr><tr><td>1,000</td><td>25</td></tr><tr><td>>1,000</td><td>2</td></tr><tr><td><1,000</td><td>2</td></tr><tr><td>Inconsistent</td><td>2</td></tr></table>	<u>Scenarios</u>	<u># Companies</u>	1,000	25	>1,000	2	<1,000	2	Inconsistent	2	<table><tr><th><u>Response</u></th><th><u># of Companies</u></th></tr><tr><td>Yes</td><td>5*</td></tr><tr><td>No</td><td>26</td></tr></table>	<u>Response</u>	<u># of Companies</u>	Yes	5*	No	26
<u>Scenarios</u>	<u># Companies</u>																		
1,000	25																		
>1,000	2																		
<1,000	2																		
Inconsistent	2																		
<u>Response</u>	<u># of Companies</u>																		
Yes	5*																		
No	26																		
VM-20 15 companies	14 used 12/31/21 1 company submitted SERT only using 9/30/21	<table><tr><th><u>Scenarios</u></th><th><u># Companies</u></th></tr><tr><td>1,000</td><td>7</td></tr><tr><td>200</td><td>4</td></tr><tr><td>Inconsistent</td><td>1</td></tr><tr><td>N/A</td><td>3**</td></tr></table>	<u>Scenarios</u>	<u># Companies</u>	1,000	7	200	4	Inconsistent	1	N/A	3**	One company used a proprietary ESG for the Baseline runs.						
<u>Scenarios</u>	<u># Companies</u>																		
1,000	7																		
200	4																		
Inconsistent	1																		
N/A	3**																		
C3 Phase 1 25 companies	12 used 12/31/21 13 used 9/30/21	• 5 companies used 200 scenarios for Baseline and Field Test runs • 20 companies used 50 scenarios for Baseline and 200 for Field Test runs	N/A																

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* Most used modified versions of the AIRG (with different changes)

** (SERT passed or only SERT was submitted)

IV.B. Characteristics of Baseline Run (cont.)

Survey Question

Baseline #1 should match what was reported in the VA Supplement/VM-20 Reserves Supplement. Is this the case?

Response	VM-21	VM-20	Total
Yes	16	6	22
No	15	8	23
N/A (only SERT submitted)	N/A	1	1
Total responses	31	15	45

“No” responses seemed acceptable for 11 VA participants and 6 VM-20 participants, with mismatches typically occurring due to exclusion of immaterial blocks of business, restatement of the Baseline (e.g. to reflect modeling enhancements or additional business that should have been included in the Supplement), or exclusion of topside adjustments.

- Baseline results do not appear reasonable for some companies, so we will be comparing against the Supplement and following up with companies as needed.

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IV.C. Inforce File Adjustments

Survey Question

If the inforce files were adjusted for the field test runs, describe the changes that were made.

Field test instructions regarding adjustments

- For runs where the starting yield curve for the Treasury model is set to the 12/31/19 level plus 200 BP, participants may need to make appropriate adjustments to their 12/31/21 inforce assets and/or liabilities.
- The field test does not require that participants perform these adjustments in a certain fashion, rather, it is expected that participants will take advantage of existing processes for starting yield curve sensitivities.
- Some participants may elect to enter the 12/31/21 yield curve at time zero for these runs followed by the relevant 12/31/19 + 200 BP scenario data to allow their models to make these adjustments. Other participants may make specific adjustments to their inforce assets and/or liabilities as appropriate. Other methodologies may also be appropriate.

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IV.C. Inforce File Adjustments (continued)

Survey Question

If the inforce files were adjusted for the field test runs, describe the changes that were made.

Responses	Number of companies
No adjustments or N/A	23
No response or unclear response	6
Inforce adjustments were made	10
Total companies	39

- Companies that made inforce adjustments used a variety of approaches.
 - We will be following up with companies that did not make inforce adjustments or did not respond to determine if this could materially impact results.

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V. Modeling and Assumption Changes

- A. Changes Made for Negative Interest Rates
- B. Other Modeling and Assumption Changes
- C. Fund Mapping Changes

V.A. Changes Made for Negative Interest Rates

The field test instructions included the following guidance regarding negative interest rates:

- The two ESG Treasury models used for the field test include scenarios with negative interest rates, so companies will need to consider whether any modeling or assumption changes are needed to handle this. It is recommended that companies read and consider the information in the paper below:

[Potential Modeling Challenges in a Negative Interest Rate Environment](#)

Author: Zohair Motiwalla, FSA, MAAA

Principal and Consulting Actuary, Millima

- For purposes of the field test, companies may make assumption changes as appropriate to reflect negative interest rates, but this is not required given the amount of time this may take.

V.A. Changes Made for Negative Interest Rates (continued)

Survey Question

Did the company make any changes to assumptions or modeling approach for the field test runs because the ESG produces negative interest rates? If so, describe the changes that were made. If not, describe changes anticipated when the new ESG is adopted.

Participant Responses

- Most companies responded that no changes were made for negative interest rates, and no changes are anticipated when the ESG is adopted.
 - It is unclear whether the potential modeling changes cited in the Milliman paper were considered.
 - Some companies stated that no changes are necessary because their models can handle negative interest rates. However, the question didn't specifically ask about modeling capability and most companies were silent on this.
- Responses indicated that some companies did not model negative interest rates for the field test, or they made other modifications to the scenarios.

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Follow-Up Questions on Negative Interest Rates

- We will be asking field test participants these follow-up questions:
1. Does your modeling software appropriately handle negative interest rates?
 2. Were the field test scenarios used as is?
 3. If the field test scenarios were modified in any way, please describe the changes that were made.
 4. Did you consider potential assumption and modeling changes that may be necessary due to negative interest rates (see Milliman paper cited in the field test instructions)?
 5. Do you anticipate that any changes cited in the Milliman paper would materially impact your results?

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V.B. Other Modeling or Assumption Changes

Survey Question

Were any other changes to assumptions or modeling made for the field test runs?

Response	VM-21 and C3P2	VM-20
Yes	4	1
No	27	14
Total companies	31	15

For companies that responded “Yes”, fund mapping and/or various simplifications were cited.

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V.C. Fund Mapping Changes

Survey Question

If the fund mapping for the field test scenarios had to change from what was included in the ESG used for reporting, please describe the new fund mapping and why it was necessary. Note: The field test instructions asked companies not to change fund mapping unless necessary.

Response	VM-21 and C3P2	VM-20
No change or N/A	27	13
Changes were made	3	0
No response	1	2
Total companies	31	15

- Few companies made changes to fund mapping. Those that did cited the desire to replace the AAA aggressive equity with GEMs NASDAQ and EM indices, or the need to map the GEMs indices to proprietary funds.

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V.C. Fund Mapping Changes (continued)

Survey Question

Would your company need to create a more refined mapping to equity and bond funds given the expanded set of returns offered by the GEMS ESG? If yes, please provide a quantitative or qualitative explanation of how it might impact your results.

Responses	Number of companies
No	14
Yes/Maybe	11
No response or N/A	10
Equity and bond funds are out of scope	3
Unclear response	1
Total companies	39

Companies have not determined the impact of fund mapping changes on results.

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V.C. Fund Mapping Changes (continued)

Companies that would consider fund mapping changes noted that additional analysis will be needed in the following areas:

- Review of consistency with scenario generators employed for other use cases
- Review of metrics/indices currently used in the company's hedging programs.
- Characteristics such as volatility, correlation, credit quality, duration, etc.
- Whether this would better align the VA model projections to best estimates, given the potential for improvements to the fund mapping correlation results
- Whether there is industry evidence that a further refined mapping gives substantially more meaningful results that assist in risk management. This would be needed to justify the increased runtime from expanding the number of fund indices in the mapping.

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VI. Hedging (VA Only)

A. Hedging Methods

B. Hedge Effectiveness

VI.A. Hedging Methods

Survey Questions

Did you use an implicit method or explicit method to model hedging? If implicit, have you reassessed whether it is still appropriate in light of the field test scenarios?

Responses	Number of companies
Implicit	8 (Half have reassessed appropriateness)
Explicit	9
Did not model hedging	10
Other (please explain)	4 (runoff of existing hedges, or index credit only)
Total companies	31

- For companies that did not model hedging, it is unclear whether they do not hedge, or whether they are modeling the runoff of existing hedges. This is being reviewed.

VI.B. Hedge Effectiveness

Survey Question

Did the new ESG impact hedge effectiveness?

Responses	Number of companies
N/A or no response	14
No	11
Yes	4 (all use the explicit hedging method)
Not measured; more information needed	2
Total companies	31

Survey responses included company-specific comments regarding hedging which will be used in the analysis of quantitative field test results.

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VII. Capturing Potential Impact of Scenarios on Results

- A. Comments on Sensitivity Tests and Custom Scenarios
- B. Availability of Conning API Tool

VII. Capturing Potential Impact of Scenarios on Results

Survey Question

To what extent did the field test capture the potential impact of the scenarios on results? Were there areas that could not be assessed (e.g. due to the need for additional scenario sets, new or existing simplifications)?

Responses	Number of companies
Potential impact was captured well	9
Potential impact was captured well with some simplifications	6
Suggestions for improvement were provided in response to this question*	14
No response, N/A, or unclear response	10
Total companies	39

*Many participants provided suggestions, although not necessarily in response to this particular question. Suggestions are grouped by topic in this presentation.

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VII.A. Comments on Sensitivity Tests and Custom Scenarios

Approximately 25% of VA participants said they would like more sensitivity tests and/or the ability to generate custom scenario sets to perform additional analysis.

Company Comments

- We need the ability to run interest rate sensitivities to assess current hedge strategy when interest rate risk profiles with respect to RBC appear to have changed significantly. While we gain a small amount of insight from the single interest rate sensitivity included in the field test, it is insufficient to understand the interest rate risk profile. Parallel and symmetrical interest rate sensitivities (e.g. +/-25bps; +/-100bps; +200bps) would be more productive toward building this understanding.
- Testing was limited by only having published test scenario sets without the ability to generate our own. The ability to generate scenarios is necessary to test potential impacts at future points in time and for new product pricing.

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VII.A. Comments on Sensitivity Tests and Custom Scenarios (continued)

- Lack of the access to the source code doesn't allow testing of customized initial condition shocks and other capital stress tests.
- Granting field test participants at least partial access to the GEMS tool would allow us to run additional tests that would deepen our understanding of the impacts on our reserves and capital and give us more confidence on the path forward. Given the inability to create custom scenarios, we were unable to test impacts to SSAP108 processes and other sensitivity analysis we typically perform. Lack of autonomy over the scenario generation process will also cause additional logistical and technical barriers to deeper reserve and capital analysis in the future.
- Scenario sets were not provided to test the following: typical rate sensitivities such as parallel shocks and key rate duration sensitivities; potential ORSA, forecast, or pricing impacts; alternative investment and/or hedging strategies; field test run 6 with the 12/31/2019 +200bps starting rate environment, which would have given a useful comparison point to 1a/2a, 1b/2b, 5a/5b.

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VII.B. Availability of Conning API Tool

- Conning's API tool is available to software clients for no additional charge and non-clients free of charge under a 90-day software evaluation agreement.
- The API tool allows companies to create custom scenario sets and test different calibrations of the Conning ESG.
- Companies can contact Conning for assistance in installing the API tool.

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VIII. Participant Comments by Topic

- A. Scenario Subset Selection Methodology
- B. Linkage Between Interest Rates and Equity Returns
- C. SERT and Deterministic Reserve Scenarios
- D. ESG Calibration
- E. Acceptance Criteria

VIII.A. Scenario Subset Selection Methodology

Some companies commented on limitations of the AIRG subset selection methodology. (The field test scenario subsets were created using the AIRG methodology).

Company Comments

- The current AIRG picking tool relies on the 20 yr UST for scenario selection so it's not particularly effective at selecting subsets of scenarios for products that are sensitive to equity performance or other Treasury maturities. If the published subsets from the proposed generator are selected in the same manner, it will have a similar issue of not being effective at selecting subsets for products sensitive to equity markets.
- Scenario subset selection methodology will distort the impact from business where equity returns are a major driver (i.e. VM-21 business, VUL business in VM-20). A comparison of the equity return distribution for the full 10,000 scenarios vs. the 1,000 scenario subsets shows material differences in the equity return distribution since scenario subset selection was stratified on interest rates only and changes between runs.

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VIII.A. Scenario Subset Selection Methodology (continued)

Company Comments

- The most extreme scenarios were not often making it into the scenario subsets, which may cause misestimation of impacts for high CTE levels (i.e. VM-21/C3P2 CTE98).
- For the variable annuity field tests, differences in equity scenarios impacted results of all field test runs because each scenario set represented a different subset of 1,000 equity scenarios. The VM-21 and C3 Phase II results may be misleading as the equity scenario sets were not consistent.

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VIII.A. Scenario Subset Selection Methodology (continued)

Approximately 25% of VA participants indicated the AIRG scenario picker tool was not used for Baseline reported results.

Company Comments

- The company selected a scenario subset for Baseline reported results using their own methodology.
- A VM-20 scenario selection based solely on interest rates may not be appropriate for a heavily equity sensitive liability, is not required by VM-21/C3P2, and is not used in our actual reporting.
- A parameter release would be ideal for each set, including a significance value/ranking for each scenario based on the picking methodology, and significance values/ranks for some other metrics (e.g. S&P total return, shorter interest rate tenors). This could allow companies to select different subsets based on product (i.e. remove the burden from companies to develop alternative scenario picking measures/methodologies for different products, e.g. VA, to have subsets that are representative of the full distribution).

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VIII.B. Linkage Between Interest Rates and Equity Returns

Approximately a third of participants commented on the ESG's linkage between interest rates and equity returns.

Company Comments

- The constant mean Equity Risk Premium should be removed from the scenarios and replaced with a constant mean return (inverse ERP) relationship. The constant mean ERP simplification is not supported by historical experience, economic theories/models like the Dividend Discount Model, or the Fed's use of monetary policy where we can see that equity risk premium contracts when rates rise and expands when rates fall.
- We believe the direct linkage between interest rates and equity returns is a non-standard practice and conflicts with observed historical metrics. Changing to a more realistic linkage would be desirable.
- We suspect the link between the treasury rates and the gross wealth ratios is too strong.

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VIII.B. Linkage Between Interest Rates and Equity Returns (continued)

- These scenarios appear to be significantly worse than historical experience would suggest is likely in a moderately adverse environment. The equity returns are lower than historical average returns, and interest rates remain below historical minimum rates for significant periods of time in a high percentage of scenarios. The correlation between equity returns and rates, while theoretically sound, appears to compound the issue and results in a significant number of tail scenarios that are beyond moderately adverse.
- We would like to further explore the equity / interest rate linkage within the equity models, as we were not fully satisfied with the calibration of the baseline equity model used in 1a/1b/2a/2b. Specifically, we noticed that the gross wealth ratios in 1a vs. 2a produced unintuitive results in the tail – in shorter durations, 2a produced higher equity returns than 1a, but in longer durations this relationship didn't hold.

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VIII.B. Linkage Between Interest Rates and Equity Returns (continued)

- A desirable property is that equity returns should not be closely correlated to short term treasury rates. Such a relationship is not supportable by historical data. The calibrated gross wealth factors should align more closely with those produced by the AIRG Equity model, which the company thinks is more reasonable.
- The constant mean ERP may lead to more aggressive scenarios and lower TAR. For example, the risk of high interest rates combined with low equity returns may be understated. High rates can cause hedge losses and for some products can cause disintermediation risk.
- The relationship between interest rates and equity returns would make attribution of changes in results from period to period difficult to perform and understand. If interest rates rise and this affects the distribution of equity returns along the projection in the next period results, it makes attribution between interest rate and equity changes difficult to separate, explain, and understand. The ability to construct clear attributions is important for companies to understand how emerging risks impact their business and to be effective in managing them.

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VIII.C. Stochastic Exclusion Ratio Test (SERT) Scenarios

Approximately a third of the VM-20 participants commented on the SERT scenarios.

Company Comments – SERT Methodology

- The methodology for creating SERT scenarios for interest rates seems inconsistent with the AIRG approach and creates significantly more extreme scenarios. The scenarios seem more consistent with an approach of calculating the applicable percentiles for each individual time period (e.g. the 10th percentile of rates in each individual year). The AIRG approach is more consistent with calculating percentiles based on aggregate results up to and including the period. We would recommend reviewing this methodology to validate alignment with the AIRG methodology.
- We need a better description of how the SERT scenarios are being calibrated in the different Tests. Field Test 1b has a peculiar jump at the start of the projection. The Generalized Fractional Floor calibration technique results in dramatically low rates for SERT Scenario 4. We need to understand these relationships better and understand how the SERT scenarios would change in different interest rate environments.

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VIII.C. Stochastic Exclusion Ratio Test (SERT) Scenarios (continued)

Company Comments – Whole Life SERT Failures

- For most scenarios there was a large increase in the calculated SERT volatility even for conservatively priced whole life products. This was driven by SERT scenarios that are very extreme relative to history and seem beyond a moderately adverse standard. As an example, SERT scenarios 3 & 4 for scenario set 1a has the 10- year Treasury Rate drop below the historical minimum and remain around the historical minimum range (35 – 65 bps) for the full 100 years.
- The combination of conservative calibration and change in SERT methodology results in participating whole life failing SERT. Due to the wider dispersion of scenarios and their impact to the net asset earned rates, the ratios exceed 6% in some scenario sets. This is inappropriate given the participating nature of the product and general conservatism that goes into pricing. The SERT scenarios (particularly the low-rate scenarios such as pop down, low equity) reflect conservatism beyond what one would expect in moderately adverse scenarios used for reserving.

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VIII.C. Stochastic Exclusion Ratio Test (SERT) Scenarios (continued)

Company Comments – Term SERT Failures and 6% Threshold

- For Term business, the SERT passes under certain scenarios with the new calibrations but fails under others. We want to further explore this and perhaps should revisit the 6% threshold. We expect that this business should pass the SERT.
- If due to the calibration and/or methodology changes the SERT scenarios are ultimately going to reflect such a large increase in the severity of interest rate sensitivities, we would recommend the 6% threshold and deterministic reserve scenario description be revisited to ensure they remain consistent with the original intention and range of risks intended to be captured.

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VIII.C. Stochastic Exclusion Ratio Test (SERT) Scenarios (continued)

Approximately half of VM-20 participants provided these comments on the DR scenario:

- Introducing a stochastic element to the DR scenario caused volatility in the path of equity returns vs. the AIRG which could lead to volatility in reserves quarter to quarter.
- The DR scenario is overly conservative. We suggest developing this scenario separately from the GEMS scenario generator.
- We recommend revisiting the DR scenario description to ensure it remains consistent with the original intention and range of risks intended to be captured.
- For DR, we're probably not seeing the full potential impact of interest rate differences between scenario sets. At this point in the product life cycle (all PBR business is issued since 2017) we're currently most sensitive to long maturity rates (e.g., 20Y and 30Y UST) while scenario differences are most pronounced for short and medium maturities.

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VIII.C. Stochastic Exclusion Ratio Test (SERT) Scenarios (continued)

Issues with Certain Field Test SERT Scenario Sets:

- After feedback from field test participants, it was determined that there were issues with the Stochastic Exclusion Ratio Test (SERT) scenario sets listed below. Field test participants have been notified of the issue.
- Corrected versions of the SERT scenario sets have been posted on the NAIC/Conning scenario [website](#). The original erroneous sets are also available, with the label of "FOR_REFERENCE_ONLY_ORIGINAL" at the start of the start of the filename
- The NAIC is not asking participants to redo the affected SERT scenario runs. Participants that wish to provide results with the corrected SERT scenarios should contact [Scott O'Neal](#).
- SERT Scenario Sets with Issues:
 - SERT_Scenarios_1b_Alt_Shdw_Baseline_Equity_093021
 - SERT_Scenarios_2a_Conning_GFF_Baseline_Equity_123119Up200BP
 - SERT_Scenarios_Set_5a_Conning_GFF_Conning_Equity_123121
 - SERT_Scenarios_Set_5a_Conning_GFF_Conning_Equity_093021
 - sert_scenarios_set_5b_conning_gff_conning_equity_123119up200bp
 - SERT_Scenarios_Set_5b_Conning_GFF_Conning_Equity_123119Up200BP
 - SERT_Scenarios_6_Conning_GFF_ACLI_Equity

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VIII.D. ESG Calibration - Low and High Interest Rates

Many companies provided comments on ESG calibration:

- The current calibration of stochastic scenarios is too conservative, with too many low-for-long and high-for-long scenarios. Boundary guidance previously adopted by LATF is exceeded (i.e. beyond the old AXXX level of ULSG reserves).
- We are concerned about the diverging nature of the interest rate distribution where both low and high rates in the tails reach some unreasonable values.
- The alternative calibration with the shadow floor produced more reasonable results than the generalized fractional floor, although we would be interested in testing a calibration that has less extreme high interest rates.
- Earlier yield reversion to the mean is recommended in the Treasury model.

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VIII.D. ESG Calibration - Negative Interest Rates

- The frequency and severity of negative interest rate scenarios seems quite extreme and out of sync with history and sound economic theory. A disproportionate weighting to an environment that has yet to materialize seems unnecessarily conservative and could strain the VA industry with unnecessarily high capital/reserve requirements.
- Long-dated liabilities are subject to more exposure to unprecedented and prolonged low and negative rates in the current format. Negative interest rates in short duration tenors are more prevalent than expectations and are overweighted in the C3 calculation.
- Reduce the frequency and severity of negative rates and reflect structural differences between different economies.
- Negative rates were not a large driver of observed impacts, but the frequency at which negative rates are produced is considerably higher than expectations. We would recommend additional focus on interest rate model calibration.

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VIII.D. ESG Calibration - Interest Rate Floor and Yield Curve Shapes

- The interest rate distribution from the underlying model seems extreme, leading to a very high percentage of scenarios being impacted by the floor. It would be preferable to adjust the model structure/calibration directly.
- We have concerns regarding the large number of scenarios that are floored due to the high prevalence of negative rates, differences in the amount and severity of various yield curve shapes relative to history, and the amount and severity of extreme equity scenarios in some of the calibrations.
- Yield curves that are inverted 15% of the time, sometimes by more than 100 bps and for 40+ years straight, do not align with historical data or intuition.
- Allow for more appropriate relationships between maturities (spreads and volatilities) and address overly frequent, severe, and prolonged rate curve inversions. These relationships could skew hedging results or disincentivize ALM matching.

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VIII.D. ESG Calibration - Volatility

- The field test scenarios produce volatile results to different starting interest rates that can lead to low reserves and capital when rates rise as can be seen in field test runs 2a, 2b, and 5b. We are experiencing rising rates in 2022 with rates up significantly since 12/31/21 so the field test scenarios could lead to low reserve and capital levels as well as volatile balance sheets when markets move.
- Look at scenario behavior over a wider range of sensitivities to starting conditions and changes to long-term targets (e.g. higher / lower interest rate mean reversion target) to get a better sense of potential volatility.

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VIII.D. ESG Calibration - Equity Model

- The jump diffusion feature of the model is a reasonable addition that captures a real risk observed in equity markets. However, the parameters are set such that the jumps are not particularly large and are frequent. This has the effect of simply creating a second source of 'traditional' volatility rather than capturing jump risk as originally intended. The ACLI calibration is parameterized in such a way that these jumps are less frequent and more severe, which better reflects the original intention of adding the jumps to the model.
- Adopt equity jump and mean reversion of equity vol parameters that are more consistent with historical data. This is already in Scenario Set #6 but not the others.
- The AAA equity scenarios have a desirable property of remaining unchanged month-over-month. This enhances the ability to analyze/compare scenario results from period to period.

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VIII.D. ESG Calibration - Other Comments

- It is desirable to have a scenario distribution that aligns with actual expectations for the probability of future events; however, the field test distributions have overweighted the tail scenarios relative to our expectations. If the tails of the distribution are not reflective of the true probability of such economic events occurring, models could produce distorted measurements of risk and the costs/benefits of hedging.
- Address the overconcentration of the rate distributions (particularly for short maturities) at or below worse-than-history levels. There should be some scenarios that are worse than history, but it doesn't make sense for ~25%-30% of the stochastic scenarios to be worse or for VM-20 DR to always drop to worst-in-history levels.
- The field test scenario distribution is more extreme than the AAA scenarios, which may imply that a lower CTE level should be considered for C-3 Phase II. During VA Reform, CTE98 was recommended in conjunction with the AAA ESG, but CTE95 was recommended with an alternative, more severe scenario set.

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VIII.E. Acceptance Criteria

- We recommend that the NAIC continue the recent work to develop a comprehensive set of stylized facts and acceptance criteria based on these stylized facts. Acceptance criteria can then be used to calibrate a scenario set that may represent a better balance of the desired outcomes for a scenario set to be utilized for life and annuity reserves and capital.
- In developing acceptance criteria for interest rates, the frequency and severity of negative rates are key metrics to include. Reporting on each scenario set should be done on a pathwise as well as point in time basis.
- Distributions of gross wealth factors at different percentiles and time horizons should be a key focus for equity and credit funds on a price and total return basis. Focus on the severity of the tail of the equity distribution as this is a meaningful contributor to results for multiple products. Also focus on relationships of gross wealth factors between different indices, e.g. S&P vs. other indices since refinements may be needed in future iterations.

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IX. Participant Comments Relating to a 2nd Field Test

- A. Field Test Starting Conditions
- B. Attribution Analysis
- C. Other Field Test Considerations

IX.A. Field Test Starting Conditions - Interest Rates

- Both 2019 and 2021 are periods following a prolonged low interest rate environment. The historical data used by the model is similar and it results in similar patterns in the generated scenarios. It remains unknown how the proposed model will respond to changing interest rate environments.
- It would be helpful for companies to understand what the scenarios look like under different starting market conditions. This could include interest rate and volatility shocks as well as changes to long term assumptions such as mean reversion parameters.
- While rates were already historically low as of 12/31/2021, reflecting a lower or even negative rate environment as of the valuation date may be useful in future iterations.

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IX.A. Field Test Starting Conditions - Interest Rates (continued)

- Scenario sets should be provided to test lower initial interest rate conditions to assess their overall impact on results, including the differences between Generalized Fractional Floor and Shadow Flooring methodologies and impact on equity returns.
- Tests for sensitivity to changes in the starting yield curve should include an inverted starting yield curve.
- Field test #2 had a sudden shock up in the yield curve which is not a realistic real-world scenario – rates will not spike up 200 bps within one quarter. There will always be a lead period for rates to hike up and that period will be part of the historical data that the model reads in.

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IX.A. Field Test Starting Conditions - Equities

- We suggest including runs with initial equity values down 25% or so. This would produce more tail scenarios and provide better information as to the impact.
- Another valuation date should be tested for equities. Since 12/31/2021 was the height of equity markets many variable annuity blocks were close to at-the-money. Testing as of 3/31/2020 would likely reveal much more significant impacts to reserves.
- Starting conditions that increase the ITM of living benefit guarantees should be tested since the impacts would likely be larger. As of 12/31/2021 the living benefit guarantees were not very in-the-money due to favorable equity markets.
- Additional testing using a different starting date as a baseline would be ideal to better understand how different equity and rate environments could affect the sensitivity of VM-21 reserves and capital. Cash values were high as of 12/31/21 because of a strong equity and low-rate environment at that time. Many scenarios were floored at these high cash values, which may distort some of the field test results.

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IX.B. Attribution Analysis

- We would like to receive more information on why each test was chosen and additional commentary on the specific element of the new ESG that each test is designed to analyze to assist in our understanding the results and guide more detailed thinking to determine if such tests are appropriate for future use in a new ESG.
- A more detailed breakout of attribution steps along with supporting commentary for isolated impact testing of key ESG elements would be preferred. The current attribution steps seem to adjust multiple things at once which makes it harder to quantify individual impacts from the new ESG mechanics.

Note:

There were many comments about attribution analysis relating to the comparability of the field test runs. This will be discussed in more detail when quantitative field test results are presented.

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IX.C. Other Field Test Considerations

- Allow extra time to vet the field test scenarios and design.
- What is the success factor for the new ESG? Is the goal to raise overall reserve/capital level, and does NAIC have an idea of how much increase would be appropriate?
- More information should be gathered to understand differences across companies
 - Hedging strategies and modeling
 - The nature of any dynamic policyholder behavior (e.g. to what extent does it depend on rates or equities)
 - Product and benefit guarantee composition of blocks within VM-20 reserve categories and potentially results at a more granular product level. For example, GUL and VUL results may move in opposite directions and only looking at the total may make results look as if they aren't changing much.

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IX.C. Other Field Test Considerations (cont.)

- Analysis of unfloored VA results is important since certain field test runs may result in flooring at the cash surrender value.
- To the extent that there are ways to analyze the impact of using the Direct Iteration Method vs. GPVAD method as part of this work, that would be helpful. We're not sure how possible this is given that companies will have selected their method already, but with the proposed changes to the methodology likely to result in diverging impacts between the two methods, it might be worth considering.

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X. ESG Statistics, Documentation, and Governance

ESG Statistics

- The Treasury summary file should include the mean reversion speed along with the mean reversion point.
- Realized volatility data should be a part of the standard scenario output. It had to be added separately in the field test.
- It would be helpful to have the ability to open the entire file in Excel or Notepad for viewing. Excel did not have enough rows so transposing the data may be a solution. Notepad crashed due to the file size.
- For reporting on gross wealth factors, a tabular format is typically most useful.
- Once ESG is set, ideally Conning will provide some sort of monthly/quarterly attribution and sensitivities on a monthly basis.

Documentation

- Details are needed on how long-term rates are generated in the Treasury model.
- It is unclear exactly how mean reversion of interest rates works in either of the interest rate models.
- It is unclear whether/how credit spreads in the bond indices are impacted by the current economic environment and what expectation is assumed longer term. The documentation says that corporate credit spreads are correlated to equity returns, but this relationship is not observed in the field test scenario sets. For example, comparing returns of the bond indices between field tests 1a and 5a, the equity model has changed, but corporate bond index returns have not).
- Full SERT scenario documentation is needed.

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Governance

- A control environment surrounding prescribed scenario generation should be considered/implemented. This would cover model changes (recalibrations and updating inputs), procedures for posting new files, version control and notification procedures if posted files must be replaced, etc.
- Develop a repeatable and verifiable calibration methodology (e.g., calibration to data with well defined adjustments vs. unexplained selection of parameters / picking parameters through trial and error)
- Scenario sets should be available for any economic sensitivities needed by companies to manage their business and should align with the scenarios that would be produced if such economic conditions actually evolved. We know that the 12/31/19+200bps shock included a recalibration of the equity generator in the field test, but it is not clear how such recalibrations would be conducted when the new generator is prescribed. It is very important that we understand exactly how that will work.

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Next Steps and Timeline

- As noted in this presentation, we will follow up with participants on items identified in the survey that may materially impact results (e.g. whether any modifications were made to scenarios, etc.)
- Quantitative results have been compiled for VM-21/C3P2 and VM-20 and are under review. C3P1 compilation is in progress. Prior to presenting results:
 - Questions will be sent to companies as needed regarding any template completion issues, outlier results, etc.
 - Participants will receive information showing how their results will be aggregated.
- VM-21/C3P2 quantitative results will likely be ready for discussion at a public LATF/Life RBC Working Group meeting first. Additional meetings will follow for VM-20 and C3P1.
- Meetings of the VM-20/VM-21 ESG Drafting Group and ESG Governance Drafting Group will kick off in January, 2023.
- Given the continued ESG development work and the need for a 2nd field test, implementation of the new ESG is expected no earlier than 2025.

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Agenda Item 17

Discuss Any Other Matters Brought Before the Task Force
(No Materials)