

CAPITAL ADEQUACY (E) TASK FORCE

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Draft: 12/11/23

Capital Adequacy (E) Task Force
Orlando, Florida
December 2, 2023

The Capital Adequacy (E) Task Force met Dec. 2, 2023, in Orlando, FL. The following Task Force members participated: Judith L. French, Chair, represented by Tom Botsko and Dale Bruggeman (OH); Grace Arnold, Vice Chair, represented by Fred Andersen (MN); Lori K. Wing-Heier represented by David Phifer (AK); Mark Fowler represented by Sheila Travis and Blase Abreo (AL); Ricardo Lara represented by Thomas Reedy (CA); Michael Conway represented by Rolf Kaumann (CO); Andrew N. Mais represented by Wanchin Chou (CT); Karima M. Woods represented by Philip Barlow (DC); Michael Yaworsky represented by Jane Nelson and Carolyn Morgan (FL); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Vincent Tsang (IL); Amy L. Beard represented by Roy Eft (IN); Vicki Schmidt represented by Tish Becker (KS); Sharon P. Clark represented by Vicki Lloyd (KY); Kathleen A. Birrane represented by Lynn Beckner (MD); Chlora Lindley-Myers represented by Shannon Schmoeger and Debbie Doggett (MO); Troy Downing represented by Kari Leonard (MT); Mike Causey represented by Jackie Obusek (NC); Jon Godfread represented by Matt Fischer (ND); Eric Dunning represented by Andrea Johnson and Lindsay Crawford (NE); D.J. Bettencourt represented by Jennifer Li (NH); Justin Zimmerman represented by David Wolf (NJ); Glen Mulready represented by Diane Carter and Eli Snowbarger (OK); Michael Wise represented by Ryan Basnett (SC); Cassie Brown represented by Jamie Walker and Rachel Hemphill (TX); Mike Kreidler represented by Steve Drutz (WA); and Nathan Houdek represented by Amy Malm (WI).

1. Adopted its Oct. 11 and Sept. 18 Minutes

Botsko said the Task Force met Oct. 1 and Sept 18. During its Oct. 11 meeting, the Task Force took the following action: 1) adopted its 2024 proposed charges, which the Task Force exposed for a 30-day public comment period that ended Sept. 13; 2) adopted its revised procedures document, which the Task Force exposed for a 30-day public comment period that ended Sept. 13; 3) received a status update from its Risk Evaluation Ad Hoc Subgroups; 4) discussed a referral from the Statutory Accounting Principles (E) Working Group regarding Schedule BA proposal for non-bond debt securities; 5) exposed proposal 2023-12-CA for a 33-day public comment period that ended Nov. 13; and 6) discussed the risk-based capital (RBC) charge for companies reported as blank affiliate types in the details for affiliated stock page.

During its Sept. 18 meeting, the Task Force took the following action: 1) adopted its Summer National Meeting minutes; 2) discussed editorial changes in the affiliated investments; and 3) adopted 2023 newsletters.

Chou made a motion, seconded by Andersen, to adopt the Task Force's Oct. 11 and Sept. 18 minutes (Attachments One and Two). The motion passed unanimously.

2. Adopted the Reports of its Working Groups

A. Health Risk-Based Capital (E) Working Group

Drutz said the Health Risk-Based Capital (E) Working Group met Nov. 8 and took the following action: 1) adopted its July 25 minutes and noted the Working Group met Oct. 2 in regulator-to-regulator session, pursuant to paragraph 3 (specific companies, entities, or individuals) of the NAIC Policy Statement on Open Meetings, which included the following action: a) adopted its May 17 and April 17 minutes; b) adopted its 2023 health RBC newsletter; c) adopted its 2022 health RBC statistics; d) exposed proposal 2023-11-H; e) referred the health test proposal to the Blanks (E) Working Group; f) heard an update from the American Academy of Actuaries (Academy) on the health care receivables and H2-underwriting risk review projects; g) adopted its updated working agenda;

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h) received an update on the Excessive Growth Charge Ad Hoc Group; and i) discussed pandemic risk; 2) adopted proposal 2023-11-H for page XR014 Fee for Service and Other Risk Revenue for Medicare and Medicaid; 3) heard an update from the Academy on the health care receivables and H2-underwriting risk review projects, and the Working Group agreed to expose the Academy's Health Care Receivable presentation for a 61-day public comment period ending Jan. 8, 2024; 4) discussed pandemic risk and heard a presentation from the Texas Department of Insurance (TDI); 5) received an overview of the Risk Evaluation Ad Hoc Group; and 6) discussed questions on the 2022 health RBC statistics.

B. Risk-Based Capital Investment Risk and Evaluation (E) Working Group

Barlow said the Risk-Based Capital Investment Risk and Evaluation (E) Working Group met Dec. 2 and took the following action: 1) adopted its Summer National Meeting minutes; 2) adopted its Oct. 17 minutes, which included the following action: a) continued discussion of the Academy candidate principles for structured securities risk-based capital; 3) received updates from the Valuation of Securities (E) Task Force and the Statutory Accounting Principles (E) Working Group; 4) heard a presentation from the Academy on updates to its candidate principles for structured securities RBC, and the Working Group agreed with the Academy to use these principles for developing the RBC methodology for collateralized loan obligation (CLO); and 5) discussed the process for revisions to the residual tranche factors.

C. Life Risk-Based Capital (E) Working Group

Barlow said the Life Risk-Based Capital (E) Working Group met Dec. 2 and took the following action: 1) adopted its Summer National Meeting minutes; 2) adopted its Oct. 4 minutes, which included the following action: a) discussed C-2 mortality risk; 3) discussed repurchase agreements; 4) exposed a C-2 mortality risk memorandum for a 10-day public comment period ending Dec. 15; and 5) discussed its subgroups, working agenda, and 2024 priorities.

D. Property and Casualty Risk-Based Capital (E) Working Group

Botsko said the Property and Casualty Risk-Based Capital (E) Working Group and the Catastrophe Risk (E) Subgroup met Dec. 2 and took the following action: 1) adopted their Nov. 16 minutes, which included the following action: a) exposed proposal 2023-16-CR for a seven-day public comment period that ended Nov. 23 and b) heard a presentation from the Academy on the report *Update to Property and Casualty Risk-Based Capital Underwriting Factors and Investment Income Adjustment Factors*; 2) adopted the Property and Casualty Risk-Based Capital (E) Working Group's July 27 minutes, which took the following action: a) adopted its June 26 and April 24 minutes, which included the following action: i) adopted its Spring National Meeting minutes; ii) adopted proposal 2023-02-P, which provided a routine annual update to the line 1 premium and reserve industry underwriting factors in the property/casualty (P/C) RBC formula; and iii) adopted proposal 2023-02-P-MOD, which updated the homeowners/farmowners multiple perils (H/F), workers' compensation, and commercial multiple peril (CMP) reserve factors due to an incorrect calculation; b) adopted the report of the Catastrophe Risk (E) Subgroup; c) adopted the 2023 P/C RBC newsletter; d) discussed 2022 RBC statistics; e) discussed its working agenda; f) discussed the possibility of reviewing and analyzing the P/C RBC charge that has not been reviewed since developed; g) heard updates on current P/C RBC projects from the Academy; 3) adopted the Catastrophe Risk (E) Subgroup's July 18 minutes, which included the following action: a) adopted Spring National Meeting minutes; b) discussed its working agenda; c) received an update from its Catastrophe Model Technical Review Ad Hoc Group; d) discussed wildfire peril impact analysis; e) heard a presentation from Verisk on a severe convective storms model update and technical review; and f) discussed the flood insurance market; 4) adopted proposal 2023-16-CR; 5) adopted the Property and Casualty Risk-Based Capital (E) Working Group and Catastrophe Risk (E) Subgroup's working agenda; 6) exposed proposal 2023-14-P for a 60-day public comment period ending Jan. 30; 7) exposed proposal 2023-15-CR for a 60-day public comment period ending Jan. 30; 8) discussed the wildfire peril

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impact analysis; 9) exposed proposal 2023-13-CR for a 60-day public comment period ending Jan. 30 ; 10) received updates from the Convective Storm Model Review Ad hoc Group on the convective storm technical review; 11) discussed the Academy's report *Update to Property and Casualty Risk-Based Capital Underwriting Factors and Investment Income Adjustment Factors*; and 12) discussed the Florida Commission on Hurricane Loss Projection Methodology.

Kaumann made a motion, seconded by Doggett, to adopt the reports of the Health Risk-Based Capital (E) Working Group (Attachment Three), the Life Risk-Based Capital (E) Working Group (Attachment Four), the Property and Casualty Risk-Based Capital (E) Working Group (Attachment Five), and the Risk-Based Capital Investment Risk and Evaluation (E) Working Group (Attachment Six). The motion passed unanimously.

3. Received Updates from its Subgroups

A. Risk-Based Capital Purposes and Guidelines Ad Hoc Subgroup

Hemphill said this subgroup has met a few times and has added several paragraphs to the Risk-Based Capital Preamble. These paragraphs, as well as some other edits, have clarified the intent of RBC as a tool to identify weakly capitalized companies and not as a rating system. In upcoming meetings, the plan is to finalize the wording and then share the document with the Task Force.

B. Asset Concentration Ad Hoc Subgroup

Clark said the subgroup has met three times and is working on developing a flow chart to help identify assets that are unique and may need additional research to assess their risk and, potentially, a separate RBC charge. This flowchart may also help to identify how these new risks may be separated into existing categories. In upcoming meetings, the plan is to continue work on the flow charts, as well as other ideas on new investment types. He also said the Ad Hoc Subgroup plans to schedule one more meeting in December.

C. Geographic Concentration Ad Hoc Subgroup

Chou said a conference call with Florida and Louisiana regulators was set up last month to gain a better understanding of how they monitor and manage the potential geographic concentration risk in their states. He stated that further discussion with these state regulators is necessary to collect more in-depth technical information on how to enhance the RBC charge to provide a proper early warning signal to the state regulators. Chou also said the Ad Hoc Subgroup will meet again on Dec. 13 to continue discussing this issue. In addition, the Ad Hoc Subgroup plans to talk with rating agency representatives to gain a better understanding of how they handle geographic concentration risk exposure.

4. Adopted Proposal 2023-11-H (Line 4 and 10 XR015 Medicare and Medicaid)

Drutz said this proposal was developed to include Medicare and Medicaid fee-for-service and other risk revenue amounts in column 1, lines 4 and 10 on pages XR013 and XR014. This change creates consistency across column 1, lines 2, 3, 4, 7, and 10 since Medicare and Medicaid premiums and claims are already included in column 1, lines 2, 3, and 7. He also stated that the proposal only impacts the health formula and was adopted at the Health Risk-Based Capital (E) Working Group's Nov. 7 meeting.

Drutz made a motion, seconded by Doggett, to adopt Proposal 2023-11-H (Attachment Seven). The motion passed unanimously.

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5. Adopted Proposal 2023-12-CA (Market Value Excess Affiliated Stock)

Botsko said the purpose of this proposal is to clarify that both common and preferred stock amounts should be included in column 13 of the “Calculation of Market Value in Excess of Stocks for the Affiliated Investments” detail page in both health and P/C RBC formulas. He said this proposal was exposed for a 33-day public comment period that ended Nov. 13, and there were no comments received during the exposure period.

Lloyd made a motion, seconded by Chou, to adopt Proposal 2023-12-CA (Attachment Eight). The motion passed unanimously.

6. Adopted Proposal 2023-16-CR (2023 Cat Event List)

Chou said proposal 2023-16-CR provides routine catastrophe events updates twice. This update adds Jan. 1 through Oct. 31, 2023, U.S. and non-U.S. catastrophe risk events to the catastrophe event list. He also stated that this proposal was exposed for a seven-day public comment period that ended Nov. 23, and no comments were received during the exposure period. He also indicated that the Working Group and Subgroup will re-expose this proposal in January 2024 for the events that will happen between Nov. 1 and Dec. 31, 2023. Chou also indicated that one of the members noted a typo in the date range of the Hurricane Lee item at the joint Working Group and Subgroup meeting. Also, Doggett pointed out the misspelling of “hurricane” in the Hurricane Hilary item.

Chou made a motion, seconded by Reedy, to adopt Proposal 2023-16-CR with both edits (Attachment Nine). The motion passed unanimously.

7. Adopted its Working Agenda

Botsko summarized the changes to the 2023 working agenda. He said there are no changes for Health Risk-Based Capital (E) Working Group, Life Risk-Based Capital (E) Working Group, and Risk-Based Capital Investment Risk and Evaluation (E) Working Group sections. Regarding the Property and Casualty Risk-Based Capital (E) Working Group section, he said the working agenda included the following substantial changes: 1) changing the expected completion date to the items P1 through P4 and P6 and 2) updating the comment column to the items P1, P4, and P8. Lastly, Botsko stated that the Task Force working agenda was updated as follows: 1) the comment for CA3 was updated and 2) items CA5 and CA6 were added to the “new items” section. Chou noted that the exposure period for P1 and P8 should be 60 days.

Chou made a motion, seconded by Andersen, to adopt the Task Force’s revised 2024 working agenda with the update of the exposure period (Attachment Ten). The motion passed unanimously.

8. Discussed a Referral from the Statutory Accounting Principles (E) Working Group Regarding Schedule BA Proposal for Non-Bond Debt Securities of Life Insurers

Botsko said at the Oct. 11 meeting, the Task Force exposed the referral for a 33-day public comment period that ended Nov. 13. He stated that the Task Force received one comment letter from the American Council of Life Insurers (ACLI) (Attachment Eleven) during the exposure period. He also indicated that the ACLI is supportive of the proposed categorizations but is concerned that without addressing RBC concurrently, there may be RBC impacts for insurance companies. Mike Reus (Northwestern Mutual) also said that as the ACLI recognizes the challenges of developing RBC factors, utilizing ratings and/or NAIC designations are worth considering. Botsko suggested referring this item to the Risk-Based Capital Investment Risk and Evaluation (E) Working Group to determine the appropriate RBC charges for these security categories.

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The Task Force agreed to forward the referral from the Statutory Accounting Principles (E) Working Group along with the ACLI comment to the Risk-Based Capital Investment Risk and Evaluation (E) Working Group.

9. Discussed the Possible Structure Changes in the Bond Page to Reflect the Split of the Annual Statement Schedule D, Part 1 into Two Sections

Botsko said proposal 2023-05BWG MOD was adopted at the Oct. 11 Blanks (E) Working Group meeting. The purpose of this proposal is to update the bond categories per the Statutory Accounting Principles (E) Working Group's bond project by splitting Schedule D, Part 1 into two sections—one for issuer credit obligations and the other for asset-backed securities (ABS). He also asked NAIC staff to update the RBC bond page structure for discussion in the next meeting. Bruggeman believes that the Risk-Based Capital Investment Risk and Evaluation (E) Working Group is currently working on the factors and structure for this project. Botsko recommended sending a referral to the Risk-Based Capital Investment Risk and Evaluation (E) Working Group to continue reviewing this project.

The Task Force agreed to send a referral to the Risk-Based Capital Investment Risk and Evaluation (E) Working Group.

10. Discussed the RBC Charge for Blank Affiliates Reported in the Details for Affiliated Stock Page

Botsko said that as discussed in the last meeting, the blank affiliate type should not be allowed if companies reported amounts in any of the numeric columns. He said one of the alternatives to address this issue is to consider asking NAIC staff to develop a crosscheck to ensure companies report affiliate type code in the affiliate type column. Botsko also encouraged RBC software vendors to spend time brainstorming on the appropriate feature in their software to prohibit the blank affiliates reported in the Details for Affiliated Stock page.

11. Discussed the "Framework for Regulation of Insurer Investments—A Holistic Review" Document

Botsko said that the Task Force is supportive of the document (Attachment Twelve) conceptually. He stated that the Task Force already works in the way that the document describes, meaning the Task Force works with other related Working Groups and Task Forces as it develops and exposes proposals that may impact other aspects of the annual statement reporting process. He encouraged members and interested parties to provide comments.

12. Discussed a Referral from the Statutory Accounting Principles (E) Working Group Regarding Negative Interest Maintenance Reserve

Botsko said that the Task Force discussed the issue of the negative interest maintenance reserve (IMR) at the Summer National Meeting. Bruggeman said the Statutory Accounting Principles (E) Working Group adopted the short-term interpretation project during its meeting at the Summer National Meeting. He stated that this project is good through year-end 2025 to give the industry, regulators, and other interested parties time to hash out a long-term approach. Botsko thought that this referral should be forwarded to the Life Risk-Based Capital (E) Working Group for further discussion since this issue will only impact the Life Risk-Based Capital formula.

The Task Force agreed to forward the referral from the Statutory Accounting Principles (E) Working Group to the Life Risk-Based (E) Working Group.

Having no further business, the Capital Adequacy (E) Task Force adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/E CMTE/CADTF/2023-3-Fall/Dec 2 CADTF minutes.docx

Draft: 10/20/23

Capital Adequacy (E) Task Force
Virtual Meeting
October 11, 2023

The Capital Adequacy (E) Task Force met Oct. 11, 2023. The following Task Force members participated: Judith L. French, Chair, represented by Tom Botsko and Dale Bruggeman (OH); Grace Arnold, Vice Chair, represented by Fred Andersen (MN); Mark Fowler represented by Charles Hale and Blase Abreo (AL); Lori K. Wing-Heier represented by David Phifer (AK); Ricardo Lara represented by Thomas Reedy (CA); Michael Conway represented by Carol Matthews (CO); Andrew N. Mais represented by Wanchin Chou and Philip Barrett (CT); Karima M. Woods represented by Philip Barlow (DC); Michael Yaworsky represented by Bradley Trim (FL); Dana Popish Severinghaus (IL); Doug Ommen represented by Mike Yanacheak, Kevin Clark, Kim Cross, and Carrie Mears (IA); Amy L. Beard represented by Roy Eft (IN); Vicki Schmidt represented by Sarah Smith (KS); Sharon P. Clark represented by Russell Coy (KY); Kathleen A. Birrane represented by Greg Ricci (MD); Chlora Lindley-Myers (MO); Troy Downing represented by Kari Leonard (MT); Eric Dunning represented by Lindsay Crawford and Michael Muldoon (NE); Mike Causey represented by Jackie Obusek (NC); Jon Godfread represented by Matt Fischer (ND); Eric Dunning represented by Lindsay Crawford (NE); D.J. Bettencourt represented by Jennifer Li and Sandra Barlow (NH); Justin Zimmerman represented by David Wolf (NJ); Glen Mulready represented by Andrew Schallhorn (OK); Michael Wise represented by Ryan Basnett (SC); Cassie Brown represented by Rachel Hemphill, Mei-Li Pitaktong, and Amy Garcia (TX); Mike Kreidler represented by Steve Drutz (WA); and Nathan Houdek (WI).

1. Adopted its 2024 Proposed Charges

Botsko said the Task Force’s 2024 proposed charges were exposed during the Summer National Meeting for a public comment period. The Task Force received no comments during the exposure period.

Andersen made a motion, seconded by Yanacheak, to adopt the Task Force’s 2024 proposed charges (Attachment One-A). The motion passed unanimously.

2. Adopted its Revised Procedure Document

Botsko said the revised procedure document was exposed during the Summer National Meeting for a 30-day public comment period. Brian Bayerle (American Council of Life Insurers—ACLI) said the ACLI submitted a comment letter (Attachment One-B) requesting removal of the phrase “unless a shorter exposure is approved by the Task Force or Working Groups,” as the interested parties require adequate time to review the proposal. Without hearing agreement from the Task Force on the ACLI proposed edits, Botsko announced that the phrase will stay in the revised procedure document.

Eft made a motion, seconded by Chou, to adopt the Task Force’s 2024 revised procedure document (Attachment One-C). The motion passed unanimously.

3. Received Updates from its Risk Evaluation Ad Hoc Subgroups

A. RBC Purposes & Guidelines Ad Hoc Subgroup

Hemphill said the RBC Purposes & Guidelines Ad Hoc Subgroup met twice since the Subgroup was established to discuss potential edits to the Risk-Based Capital Preamble. The purpose of the edits is to clarify and emphasize the purposes and the intended use of risk-based capital (RBC). She also stated that the group had some productive

discussions on the potential changes in different places such as the *Financial Condition Examiners Handbook* or the *Financial Analysis Handbook*.

B. Asset Concentration Ad Hoc Subgroup

Edward Toy (Risk & Regulatory Consulting—RRC) said the Asset Concentration Ad Hoc Subgroup met twice prior to this meeting. He stated that the two meetings primarily focused on: 1) discussing the concepts of asset concentrations; 2) brainstorming issues related to asset concentrations; and 3) reviewing whether there is adequate data at the NAIC for potential asset concentration considerations. Toy also stated that the Ad Hoc Subgroup members are tasked with reviewing the inventory further and provide feedback during the next meeting. In addition, he said Clark proposed developing a decision tree to help deliberate whether RBC is the right solution for any asset concentration risk identified.

C. Geographic Concentration Ad Hoc Subgroup

Chou said the Geographic Concentration Ad Hoc Subgroup met Sept. 13 to discuss the issues that caused Southeast Louisiana companies to become insolvent. He said a meeting to discuss this issue with Florida insurance regulators will be scheduled soon and findings will be reported back to the Ad Hoc Subgroup during its next meeting. In addition, Chou stated that the Subgroup will also brainstorm how applicable geographic concentration is to health and life insurers. Lastly, he said the Ad Hoc Subgroup agreed that it would meet monthly on the second Wednesday of the month.

Botsko said any discussions in the Ad Hoc Subgroups could potentially affect more than one line of business. Monthly meetings of the Risk Evaluation Ad Hoc Group to allow each Subgroup to report its monthly activities is necessary to ensure there is not any overlap of work between each Subgroup.

4. Discussed a Referral from the Statutory Accounting Principles (E) Working Group Regarding Schedule BA Proposal for Non-Bond Debt Securities

Bruggeman said the purpose of this referral (Attachment One-D) is to notify the Task Force of the Statutory Accounting Principles (E) Working Group's proposal to report debt securities that do not qualify as bonds on Schedule BA. He stated that the purpose of this memorandum is to highlight that the proposal uses existing annual statement Schedule BA reporting provisions for Securities Valuation Office (SVO)-assigned NAIC designations in determining RBC. Bruggeman also stated that the changes to the asset valuation reserves (AVRs) include instructions that specify the mapping from annual statement Schedule BA to the AVRs for life RBC purposes. Regarding the health and property/casualty (P/C) RBC formula, Botsko said adding an additional column on the RBC Bond page would be one of the alternatives to address this issue. He encouraged all interested parties to review this referral and said he welcomed any comments during the exposure period.

The Task Force agreed to expose the referral from the Statutory Accounting Principles (E) Working Group regarding the Schedule BA proposal for non-bond debt securities for a 33-day public comment period ending Nov. 13.

5. Exposed Proposal 2023-12-CA (Market Value Excess Affiliated Stock)

Botsko said the purpose of this proposal is to clarify that both common and preferred stock amounts should be included in column 13 of the "Calculation of Market Value in Excess of Stocks for the Affiliated Investments" detail page in both health and P/C RBC formulas. He also encouraged interested parties to review the revised instructions and blanks, and he said comments are welcomed during the exposure period.

The Task Force agreed to expose proposal 2023-12-CA for a 33-day public comment period ending Nov. 13.

6. Discussed the RBC Charge for Companies Reported as Blank Affiliate Types in the Details for Affiliated Stock Page

Botsko said that currently, companies reported as blank affiliate types receive the same treatment as affiliate type 9. Since the revised 2023 detail for affiliated stocks instructions did not clearly specify the appropriate treatment of the blank affiliate type, Botsko said he thought that the blank affiliate type should not be allowed if companies reported amounts in any of the numeric columns. He asked all interested parties to spend time brainstorming on the appropriate treatment for this situation and to submit comments to NAIC staff before discussion at the Fall National Meeting.

Having no further business, the Capital Adequacy (E) Task Force adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/E CMTE/CADTF/2023-2-Fall/Oct 11 CADTF minutes.docx

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Adopted by the Executive (EX) Committee and Plenary, Dec. xx, ~~2022~~2023

Adopted by the Financial Condition (E) Committee, Dec. xx, ~~2022~~2023

Adopted by the Capital Adequacy (E) Task Force, TBD

~~2023-2024~~ Proposed Charges

CAPITAL ADEQUACY (E) TASK FORCE

The mission of the Capital Adequacy (E) Task Force is to evaluate and recommend appropriate refinements to capital requirements for all types of insurers.

Ongoing Support of NAIC Programs, Products, or Services

1. The **Capital Adequacy (E) Task Force** will:
 - A. Evaluate emerging “risk” issues for referral to the risk-based capital (RBC) working groups/subgroups for certain issues involving more than one RBC formula. Monitor emerging and existing risks relative to their consistent or divergent treatment in the three RBC formulas.
 - B. Review and evaluate company submissions for the schedule and corresponding adjustment to total adjusted capital (TAC).
 - C. Evaluate relevant historical data and apply defined statistical safety levels over appropriate time horizons in developing recommendations for revisions to the current asset risk structure and factors in each of the RBC formulas.
2. The **Health Risk-Based Capital (E) Working Group, Life Risk-Based Capital (E) Working Group, and Property and Casualty Risk-Based Capital (E) Working Group** will:
 - A. Evaluate refinements to the existing NAIC RBC formulas implemented in [the](#) prior year. Forward the final version of the structure of the current year life and fraternal, property/casualty (P/C), and health RBC formulas to the Financial Condition (E) Committee by June.
 - B. Consider improvements and revisions to the various RBC blanks to: 1) conform the RBC blanks to changes made in other areas of the NAIC to promote uniformity; and 2) oversee the development of additional reporting formats within the existing RBC blanks as needs are identified. Any proposal that affects the RBC structure must be adopted no later than April 30 of the reporting year, and any proposal that affects the RBC factors and/or instructions must be adopted no later than June 30 of the reporting year. Adopted changes will be forwarded to the Financial Condition (E) Committee by the next scheduled meeting or conference call. Any adoptions made to the annual financial statement blanks or statutory accounting principles that affect an RBC change adopted by June 30 and result in an amended change may be considered and adopted by July 30, where the Capital Adequacy (E) Task Force votes to pursue by super-majority (two-thirds) consent of members.
 - C. Monitor changes in accounting and reporting requirements resulting from the adoption and continuing maintenance of the revised *Accounting Practices and Procedures Manual* (AP&P Manual) to ensure that model laws, publications, formulas, analysis tools, etc. supported by the Task Force continue to meet regulatory objectives.
 - D. Review the effectiveness of the NAIC’s RBC policies and procedures as they affect the accuracy, audit ability, timeliness of reporting access to RBC results, and comparability among the RBC formulas. Report on data quality problems in the prior year RBC filings at the summer and fall national meetings.
3. The **Variable Annuities Capital and Reserve (E/A) Subgroup** of the Life Risk-Based Capital (E) Working Group and the Life Actuarial (A) Task Force will:
 - A. Monitor the impact of the changes to the variable annuities (VA) reserve framework and RBC calculation

and determine if additional revisions need to be made.

- B. Develop and recommend appropriate changes, including those to improve the accuracy and clarity of VA capital and reserve requirements.
4. The **Longevity Risk (E/A) Subgroup** of the Life Risk-Based Capital (E) Working Group and the Life Actuarial (A) Task Force will:
 - A. Provide recommendations for the appropriate treatment of longevity risk transfers by the new longevity factors.
 5. The **Catastrophe Risk (E) Subgroup** of the Property and Casualty Risk-Based Capital (E) Working Group will:
 - A. Recalculate the premium risk factors on an ex-catastrophe basis, if needed.
 - B. Continue to update the U.S. and non-U.S. catastrophe event list.
 - C. Continue to evaluate the need for exemption criteria for insurers with minimal risk.
 - D. Evaluate the RBC results inclusive of a catastrophe risk charge.
 - E. Refine instructions for the catastrophe risk charge.
 - F. Continue to evaluate any necessary refinements to the catastrophe risk formula.
 - G. Evaluate other catastrophe risks for possible inclusion in the charge.
 6. The **RBC Investment Risk and Evaluation (E) Working Group** will:
 - A. Perform a comprehensive review of the RBC investment framework for all business types, which could include:
 - i. Identifying and acknowledging uses that extend beyond the purpose of the *Risk-Based Capital (RBC) for Insurers Model Act* (#312).
 - ii. Assessing the impact and effectiveness of potential changes in contributing to the identification of weakly capitalized companies; i.e., those companies at action levels.
 - iii. Documenting the modifications made over time to the formulas, including, but not limited to, an analysis of the costs in study and development, implementation (internal and external), assimilation, verification, analysis, and review of the desired change to the RBC formulas and facilitating the appropriate allocation of resources.
 7. The **Generator of Economic Scenarios (GOES) (E/A) Subgroup** of the Life Risk-Based Capital (E) Working Group and the Life Actuarial (A) Task Force will:
 - A. Monitor that the economic scenario governance framework is being appropriately followed by all relevant stakeholders involved in scenario delivery.
 - B. Review material economic scenario generator updates, either driven by periodic model maintenance or changes to the economic environment and provide recommendations.
 - C. Regularly review key economic conditions and metrics to evaluate the need for off-cycle or significant economic scenario generator updates and maintain a public timeline for economic scenario generator updates.
 - D. Support the implementation of an economic scenario generator for use in statutory reserve and capital calculations.
 - E. Develop and maintain acceptance criteria that reflect history as well as plausibly more extreme scenarios.

NAIC Support Staff: Eva Yeung

SharePoint/FRS-RBC/CADTF/Charges/2023/2023 Proposed Charges.docx



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September 12, 2023

Tom Botsko
Chair, NAIC Capital Adequacy (E) Task Force (CATF)

Re: 2023 NAIC Summer National Meeting Exposures

Dear Chair Botsko:

The American Council of Life Insurers (ACLI) appreciates the opportunity to submit feedback on CATF's 2024 proposed charges and updates to the RBC Procedures.

ACLI is supportive of the updated CATF charges.

Regarding the updates to the RBC Procedures, ACLI requests removal of "unless a shorter exposure is approved by the Task Force or Working Groups". As the rest of the updated language suggests, adequate time is required to review the proposal, which should apply to both structural and factor changes. Given this language only applies to initial exposure and not subsequent exposures, retaining the 30-day language without exception is appropriate. ACLI has no concerns with the rest of the proposed edits to the RBC Procedures.

Thank you for the consideration of our comments,

cc: Eva Yeung, NAIC

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.com

**PROCEDURES OF THE FINANCIAL CONDITION (E) COMMITTEE'S
CAPITAL ADEQUACY TASK FORCE IN CONNECTION WITH PROPOSED AMENDMENTS TO RISK-BASED CAPITAL
BLANKS AND INSTRUCTIONS**

The following establishes procedures and rules of the Financial Condition (E) Committee's Capital Adequacy Task Force (Task Force) and its Working Groups with respect to proposed amendments to the NAIC RBC Forecasting (blanks) and Instructions.

1. The Task Force may consider relevant proposals to change the RBC blanks and instructions at the national meeting or designated interim meeting as scheduled by the Task Force.
2. All proposals for suggested changes and amendments shall use NAIC Proposal Forms and shall be stated in a concise and complete manner and include the appropriate blank and instruction modifications. The Proposal Form and its instructions are available online under related documents and resources at https://content.naic.org/cmte_e_capad.htm, http://www.naic.org/committees_e_capad.htm and All interested party proposals should be emailed to the appropriate NAIC staff support with a completed proposal form and mocked-up changes.

The following guidelines apply:

- Any proposal that affects an RBC blank must be exposed by the Task Force or its Working Groups by January 31 of the effective year of the change. In only rare instances, where the structure change is urgent, may the exposure deadline be extended to March 15 for either the Task Force or Working Groups. The proposal must be adopted by the Task Force no later than April 30 of the effective year of the change.
- Any proposal that only affects the instructions or factors must be exposed by the Task Force / Working Group by April 30 and adopted by the Task Force by June 30 of the current year.
- Only the Task Force may extend the June 30th adoption deadline for previously considered proposals regarding instructions or factors upon a super majority (two-thirds) consent of the Task Force members present where such extension can be no later than July 30th of the current year. This would be considered only in rare circumstances where urgency of such adoption is high. The super majority consent applies only in the instance of a Task Force vote that is outside of the standard RBC adoption deadlines (April 30 and June 30).

An illustration of the proposed change to the RBC blank or instructions should accompany the Proposal Form. In addition, an impact analysis will be required for any factor change. If another NAIC Committee, Task Force or Working Group is known to have considered this proposal, that Committee, Task Force or Working Group should provide any relevant information.

The Task Force/Working Groups will review the proposal and determine whether to receive the proposal and expose for public comment (initial exposure of at least 30-days (to ensure adequate time to provide comment on any structural change), unless a shorter exposure is approved by the Task Force or Working Groups) or ~~whether~~ to reject the proposal. The comment period ends at least ~~10-3~~ business days prior to the next designated national or interim meeting of the Task Force/ Working Group. The Task Force/Working Group will consider comments received on each proposal at its next meeting. Proposals under consideration may be deferred by the Task Force/Working Group if there is general consensus among members that the proposal has merit but warrants additional work or input. However, the Task Force will limit the number of deferrals to two. The proposal must be acted upon upon by the third meeting after the second deferral, and-or absent action, the proposal is deemed to have been rejected and will be removed from the agenda. The Task Force may also refer proposals to other NAIC groups due to their technical expertise or for additional review. If a proposal has been referred to another NAIC group, the proposal will be reprioritized on the working agenda and will be considered again in the form of a modified or new proposal after comments/recommendations are received. The Task Force will review and adopt the- working agenda at each National Meeting, if necessary, to ensure all items designated as a priority 1 are being addressed, to add or delete items that have been addressed or to reprioritize the remaining items on the working agenda.

3. Interested Party Proposals filed with the appropriate NAIC staff support shall be considered at the next regularly scheduled meeting of the Task Force/Working Group if the proposal is filed at least ~~twenty~~ ten days prior to the meeting. ~~Items filed less than twenty days prior to a regularly scheduled meeting will be considered at the following regularly scheduled meeting.~~
4. The NAIC staff support shall prepare ~~the meeting an~~ materials including agenda of all suggested proposals. Interim meeting materials willThe agenda will be posted no later than one week~~three business days~~ prior to the scheduled meeting on the NAIC website. Initial national meeting materials will be posted ten business days before the first day of each National Meeting on the NAIC website.

5. At each meeting, the Task Force/Working Group will review comments that were received by the comment exposure due date for suggested proposals.
6. NAIC staff support will ~~present to the Task Force/ Working Group a list of necessary~~incorporate any non-substantive changes discovered in the ~~annual updates of the RBC formulas -process of implementing proposals,~~ e.g., reference changes due to new SSAPs or ~~required changes discovered in the process of implementing proposals~~annual statement references. These changes will be reflected in RBC newsletters that will be presented to T~~he~~Task Force/ Working Group will review these changes and may adopt the appropriate items at any regularly scheduled meeting. Such actions will be documented in the minutes of the Task Force/Working Group for adoption at the Summer National Meeting. -NAIC staff support may also request that the Task Force/Working Group reconsider items adopted, if these items contain substantial errors.
7. The Task Force/Working Group may, when deemed necessary, appoint an Ad Hoc Group to study proposals and/or certain issues.
- ~~8. The NAIC will publish each agenda approximately one week prior to each interim or national meeting (including proposals received for comment and comments received) on the NAIC Web site.~~
- ~~9. The NAIC will retain all current and subsequent adopted proposals on the Task Force website up to the publication date of November 1 for current and subsequent years.~~
8. The NAIC will publish the RBC Forecasting and Instructions for the next subsequent year on, or about November 1 each year. The following documentation will NAIC staff support will be posted to the NAIC Web site:
 - ~~• any subsequent corrections to these publications.~~
 - RBC Proposals adopted by the Task Force (after each interim and National Meeting)
 - Annual RBC Newsletters (after Summer National Meeting)
 - Annual RBC Statistics (after Summer National Meeting)
 - Working Agenda (after each National Meeting)
 - Any subsequent corrections to these publications (as needed)

Draft: 9/22/23

Capital Adequacy (E) Task Force
Virtual Meeting
September 18, 2023

The Capital Adequacy (E) Task Force met Sept. 18, 2023. The following Task Force members participated: Judith L. French, Chair, represented by Tom Botsko and Dale Bruggeman (OH); Grace Arnold, Vice Chair, represented by Fred Andersen (MN); Mark Fowler (AL); Ricardo Lara represented by Kim Hudson (CA); Michael Conway represented by Mitchell Bronson (CO); Andrew N. Mais represented by Wanchin Chou and Philip Barrett (CT); Karima M. Woods represented by Philip Barlow (DC); Michael Yaworsky represented by Bradley Trim (FL); Doug Ommen represented by Mike Yanacheak and Carrie Mears (IA); Amy L. Beard represented by Roy Eft (IN); Vicki Schmidt represented by Chut Tee (KS); Sharon P. Clark represented by Russell Coy (KY); Kathleen A. Birrane represented by Lynn Beckner (MD); Chlora Lindley-Myers represented by John Rehagen and Julie Lederer (MO); Troy Downing represented by Kari Leonard (MT); Mike Causey represented by Jackie Obusek (NC); Jon Godfread represented by Matt Fischer (ND); Eric Dunning represented by Lindsay Crawford (NE); D.J. Bettencourt represented by Jennifer Li (NH); Justin Zimmerman represented by David Wolf (NJ); Glen Mulready represented by Andrew Schallhorn (OK); Michael Wise represented by Ryan Basnett (SC); Cassie Brown represented by Rachel Hemphill, Endi Silva, and Amy Garcia (TX); Mike Kreidler represented by Steve Drutz (WA); and Nathan Houdek represented by Michael Erdman, Adrian Jaramillo, and Amy Malm (WI).

1. Adopted its Summer National Meeting Minutes

Chou made a motion, seconded by Eft, to adopt the Task Force's Aug. 14 minutes (*see NAIC Proceedings – Summer 2023, Capital Adequacy (E) Task Force*). The motion passed unanimously.

2. Discussed Editorial Changes in the Affiliated Investments

Botsko said one of the vendors notified NAIC staff of two items in the affiliated investments that require adjustments to the risk-based capital (RBC) formulas (Attachment Two-A). He stated that the first item, which applies to all lines of business, is that the formulas do not pull the RBC amounts from the details for affiliated schedules to the summary schedules when the affiliate code in the detailed schedule is left blank or zero. He said this change was made to include this missing amount in line 21 in the summary schedule for 2023 reporting. He indicated that the Task Force will consider further review for 2024 reporting in the upcoming meetings.

Botsko also said regarding the second item, which applies to only the life RBC formula, the carrying value of non-admitted insurance affiliates amount will be included in line 6 of the calculation of total adjusted capital page (LR033) to align with the adopted instructions under proposal 2022-09-CA. He stated that this is just a temporary fix for 2023 RBC reporting. The Life Risk-Based Capital (E) Working Group will discuss a proposal for year-end 2024 to add a separate line for the carrying value of the non-admitted insurance affiliates amount.

3. Adopted 2023 Newsletters

Botsko said the two affiliated investment items previously mentioned are included in the 2023 newsletters. He stated that re-adopting the newsletter to reflect the changes is necessary to ensure that all the Task Force members are in agreement with the updates in the newsletter.

Malm made a motion, seconded by Drutz, to adopt the Health, Life, and Property/Casualty (P/C) RBC newsletters (Attachment Two-B). The motion passed unanimously.

Having no further business, the Capital Adequacy (E) Task Force adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/E CMTE/CADTF/2023-2-Fall/Sept 18 CADTF minutes.docx

D27 =SUMIFS(LR044!\$F\$10:\$F\$110,LR044!\$C\$10:\$C\$110,"9c")+SUMIFS(LR044!\$H\$10:\$H\$110,LR044!\$C\$10:\$C\$110,"9c")+SUMIFS(LR044!\$I\$10:\$I\$110,LR044!\$C\$10:\$C\$110,"")+SUMIFS(LR044!\$J\$10:\$J\$110,LR044!\$C\$10:\$C\$110,"")

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
		Menu	Color Coding	SUMMARY FOR AFFILIATED/SUBSIDIARY STOCKS								Go to	Men		
		Company Name												Code: 0000	
		(18) Directly Owned Life Insurance Companies Not Subject to RBC	8c	\$0	XXX	XXX	X	0.300	=	\$0	0				
		(19) Non-Insurance Entities with a Capital Requirement Imposed by a Regulatory Body	9a	\$0	XXX	XXX	X	0.300	=	\$0	0				
		(20) Non-Insurance Other Financial Entities without Regulatory Capital Requirements	9b	\$0	XXX	XXX	X	0.300	=	\$0	0				
		(21) Other Non-financial Entities	9c	\$0	XXX	XXX	X	0.300	=	\$0	101				
		(22) Publicly Traded Insurance Affiliates	10	\$0	\$0	\$0	X	0.346	=	\$0	0				
		(23) Total (Sum of Lines (1) through (22))	XXX	\$0	XXX	XXX		XXX		\$0	101				

LR042, Line 21, Column 4

D27 =SUMIFS(LR044!\$F\$10:\$F\$110,LR044!\$C\$10:\$C\$110,"9c")+SUMIFS(LR044!\$H\$10:\$H\$110,LR044!\$C\$10:\$C\$110,"9c")+SUMIFS(LR044!\$I\$10:\$I\$110,LR044!\$C\$10:\$C\$110,"")+SUMIFS(LR044!\$J\$10:\$J\$110,LR044!\$C\$10:\$C\$110,"")

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
		Menu	Color Coding	SUMMARY FOR AFFILIATED/SUBSIDIARY STOCKS								Go to	Men	
		Company Name												Code: 0000
		(18) Directly Owned Life Insurance Companies Not Subject to RBC	8c	\$0	XXX	XXX	X	0.300	=	\$0	0			
		(19) Non-Insurance Entities with a Capital Requirement Imposed by a Regulatory Body	9a	\$0	XXX	XXX	X	0.300	=	\$0	0			
		(20) Non-Insurance Other Financial Entities without Regulatory Capital Requirements	9b	\$0	XXX	XXX	X	0.300	=	\$0	0			
		(21) Other Non-financial Entities	9c	\$0	XXX	XXX	X	0.300	=	\$0	101			
		(22) Publicly Traded Insurance Affiliates	10	\$0	\$0	\$0	X	0.346	=	\$0	0			
		(23) Total (Sum of Lines (1) through (22))	XXX	\$0	XXX	XXX		XXX		\$0	101			

LR042, Line 21, Number of Companies

I27 =COUNTIFS(LR044!\$C\$10:\$C\$110,"9c")+COUNTIFS(LR044!\$C\$10:\$C\$110,"")

	A	B	C	D	E	F	G	H	I	J	K		
		Menu	Color Coding	SUMMARY FOR AFFILIATED/SUBSIDIARY STOCKS								Go to	Men
		Company Name										Code: 0000	
		(18) Directly Owned Life Insurance Companies Not Subject to RBC	8c	\$0	XXX	XXX	X	0.300	=	\$0	0		
		(19) Non-Insurance Entities with a Capital Requirement Imposed by a Regulatory Body	9a	\$0	XXX	XXX	X	0.300	=	\$0	0		
		(20) Non-Insurance Other Financial Entities without Regulatory Capital Requirements	9b	\$0	XXX	XXX	X	0.300	=	\$0	0		
		(21) Other Non-financial Entities	9c	\$0	XXX	XXX	X	0.300	=	\$0	101		
		(22) Publicly Traded Insurance Affiliates	10	\$0	\$0	\$0	X	0.346	=	\$0	0		
		(23) Total (Sum of Lines (1) through (22))	XXX	\$0	XXX	XXX		XXX		\$0	101		

AFFILIATED/SUBSIDIARY STOCKS
LR042, LR043 and LR044

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Basis of Factors

There are ten categories of affiliated/subsidiary investments that are subject to Risk-Based Capital requirements for common stock and preferred stock holdings. Those ten categories are:

1. Directly Owned U.S. Insurance Affiliates/Subsidiaries Subject to a Risk-Based Capital (RBC)-Look-Through Calculation
 - a. Health Insurance Company or Health Entity
 - b. Property and Casualty Insurance Company
 - c. Life Insurance Company
2. Indirectly Owned U.S. Insurance Affiliates/Subsidiaries Subject to RBC-Look-Through Calculation
 - a. Health Insurance Company or Health Entity
 - b. Property and Casualty Insurance Company
 - c. Life Insurance Company
3. Holding Company Value in Excess of Indirectly Owned Insurance Affiliates/Subsidiaries
4. Investment Subsidiaries
5. Directly Owned Alien Insurance Affiliates/Subsidiaries
 - a. Health Insurance Company or Health Entity
 - b. Property and Casualty Insurance Company
 - c. Life Insurance Company
6. Indirectly Owned Alien Insurance Affiliates/Subsidiaries
 - a. Health Insurance Company or Health Entity
 - b. Property and Casualty Insurance Company
 - c. Life Insurance Company
7. Investments in Upstream Affiliate (Parent)
8. Directly Owned U.S. Insurance Affiliates/Subsidiaries Not Subject to RBC
 - a. Health Insurance Companies and Health Entities Not Subject to RBC
 - b. Property and Casualty Insurance Companies Not Subject to RBC
 - c. Life Insurance Companies Not Subject to RBC
9. Non-Insurance Affiliates/Subsidiaries Not Subject to RBC
 - a. Entities with a capital requirement imposed by a regulatory body
 - b. Other Financial Entities without regulatory capital requirements
 - c. Non-financial entities
10. Publicly Traded Insurance Affiliates/Subsidiaries Held at Market Value

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Enter applicable items for each affiliate/subsidiary in the Details for Affiliated/Subsidiary Stocks worksheet. The program will automatically calculate the risk-based capital charge for each affiliate/subsidiary. When the data is uploaded to the NAIC database, it will be cross-checked and the company will be required to correct any discrepancies and refile a corrected version with the NAIC and/or any state that requires the company to file RBC with its department. The RBC report will display the number of affiliates/subsidiaries. These numbers should be reviewed to ensure that all affiliates/subsidiaries are appropriately reported.

The total of all reported affiliate/subsidiary stock should equal the amounts reported on Schedule D, Part 2, Section 1, Line 4409999999 plus Schedule D, Part 2, Section 2, Line 5979999999 and should also equal Schedule D, Part 6, Section 1, Line 0999999 plus Line 1899999.

Affiliated/Subsidiary investments fall into two broad categories: (A) Insurance Affiliates/Subsidiaries that are Subject to risk-based capital; and (B) Affiliates/Subsidiaries that are Not Subject to risk-based capital. The risk-based capital for these two broad groups differs. Investment subsidiaries are a subset of category A in that they are subject to a risk-based capital charge that includes the life RBC risk factors applied only to the investments held by the investment subsidiary for its parent insurer. Publicly traded insurance affiliates/subsidiaries held at market value have characteristics of both broader categories. As a result, there is a two-part RBC calculation. The general treatment for each is explained below.

Directly owned insurance and health entity affiliates/subsidiaries are affiliates/subsidiaries in which the reporting company owns the stock of the affiliate/subsidiary. Indirectly owned insurance affiliates/subsidiaries and health entities are those where the reporting company owns stock in a holding company, which in turn owns the stock of the insurance affiliate/subsidiary or health entity. Note that there could be multiple holding companies that control the downstream insurance company.

Enter the book/adjusted carrying value of: the common stock in Column (5), the preferred stock in Column (7), the total outstanding common stock in Column (6) and the total outstanding preferred stock of that affiliate/subsidiary in Column (10) of the appropriate worksheet. The percentage of ownership is calculated by summing the book/adjusted carrying values of the owned preferred stock and common stock and dividing that amount by the sum of all outstanding preferred and common stock.

Insurance Affiliate/Subsidiaries that are Subject to RBC

1. Directly Owned U.S. Affiliates/Subsidiaries:

The risk-based capital requirement for the reporting company for those insurance affiliates/subsidiaries that are subject to a risk-based capital requirement is based on the Total Risk-Based Capital After Covariance of the affiliate/subsidiary, prorated for the percent of ownership of that affiliate/subsidiary.

For purposes of Subsidiary Risk all references to Total Risk-Based Capital After Covariance of the affiliate/subsidiary means:

- a. For a Health affiliate/subsidiary RBC filing, Total Risk-Based Capital After Covariance before Basic Operational Risk (XR024, Line (41));
- b. For a P/C affiliate/subsidiary RBC filing, Total Risk-Based Capital After Covariance before Basic Operational Risk (PR032, Line (60)); and
- c. For a Life affiliate/subsidiary RBC filing, the sum of
 - (a) Total Risk-Based Capital After Covariance before Basic Operational Risk (LR031, Line (69)); and
 - (b) Primary Security shortfalls for all cessions covered by Actuarial Guideline XLVIII (AG 48) multiplied by two (LR031, Line (73)).

For RBC purposes, the reporting insurer must determine the carrying value and the RBC requirement of directly owned RBC filing affiliate/subsidiary company, even if the RBC filing affiliate/subsidiary is non-admitted. The value reported in annual statement Schedule D, Part 6, Section 1 should be used for RBC purposes. In addition to RBC, the carrying value of the RBC filer must be reported in total adjusted carrying value for RBC purposes, in order to appropriately balance the numerator with the addition of the denominator value. Enter the carrying value of the insurer as an additional amount in line (6) of the Calculation of Total Adjusted Capital page to satisfy these instructions.

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Attachment Two-A
Capital Adequacy (E) Task Force
12/2/23

CALCULATION OF TOTAL ADJUSTED CAPITAL
(Including Total Adjusted Capital Tax Sensitivity Test)

	<u>Annual Statement Source</u>	(1)	(2)	
		<u>Statement Value</u>	<u>Factor</u>	<u>Adjusted Capital</u>
<u>Company Amounts</u>				
(1) Capital and Surplus	Page 3 Column 1 Line 38	_____	X 1.000	= _____
(2) Asset Valuation Reserve	Page 3 Column 1 Line 24.01 §	_____	X 1.000	= _____
(3) Dividends Apportioned for Payment	Page 3 Column 1 Line 6.1, in part	_____	X 0.500	= _____
(4) Dividends Not Yet Apportioned	Page 3 Column 1 Line 6.2, in part	_____	X 0.500	= _____
(5) Hedging Fair Value Adjustment	Company Records	_____	X -1.000	= _____
<u>Life Subsidiary Company Amounts†</u>				
(6) Asset Valuation Reserve / Carrying Value of Non-Admitted Insurance Affiliates	Subsidiaries' Annual Statement Page 3 Column 1 Line 24.01‡ § / Included in LR044 Columns 5 and 7	_____	X 1.000	= _____
(7) Dividend Liability	Subsidiaries' Annual Statement Page 3 Column 1 Line 6.1 + Line 6.2‡	_____	X 0.500	= _____
<u>Property and Casualty and Other Non-U.S. Affiliated Amounts</u>				
(8) Non-Tabular discount and/or Alien Insurance Subsidiaries: Other	Included in Subsidiaries' Annual Statement Page 3 Column 1 Line 1 + 3‡ and/or Schedule D Part 6, Section 1 Column 8 Line 0599999 and Line 1499999, in part	_____	X 1.000	= _____
(9) Total Adjusted Capital Before Capital Notes	Sum of Lines (1) through (7) less Line (8)	_____		= _____
<u>Credit for Capital Notes</u>				
(10.1) Surplus Notes	Page 3 Column 1 Line 32	_____		= _____
(10.2) Limitation on Capital Notes	0.5 x [Line (9) - Line (10.1)] - Line (10.1), but not less than 0	_____		= _____
(10.3) Capital Notes Before Limitation	LR032 Capital Notes Before Limitation Column (4) Line (18)	_____		= _____
(10.4) Credit for Capital Notes	Lesser of Column (1) Line (10.2) or Line (10.3)	_____		= _____
(11) XXX/AXXX Reinsurance RBC Shortfall	LR037 XXX/AXXX Captive Reinsurance Consolidated Exhibit Column (10) Line (10)	_____		= _____
(12) Total Adjusted Capital	Line (9) + Line (10.4) - Line (11)	_____		= _____
<u>Tax Sensitivity Test</u>				
<u>Company Amounts</u>				
(13) Deferred Tax Asset (DTA) Value	Page 2 Column 3 Line 18.2	_____	X -1.000	= _____
(14) Deferred Tax Liability (DTL) Value	Page 3 Column 1 Line 15.2	_____	X 1.000	= _____
<u>Subsidiary Amounts</u>				
(15) Deferred Tax Asset (DTA) Value	Company Records	_____	X -1.000	= _____
(16) Deferred Tax Liability (DTL) Value	Company Records	_____	X 1.000	= _____
(17) Tax Sensitivity Test: Total Adjusted Capital	Line (12)+(13)+(14)+(15)+(16)	_____		= _____
<u>Ex DTA ACL RBC Ratio Sensitivity Test</u>				
(18) Deferred Tax Asset-Company Amounts	Page 2 Column 3 Line 18.2	_____	X 1.000	= _____
(19) Total Adjusted Capital Less Deferred Tax Asset Amounts	Line (12) less Line (18)	_____		= _____
(20) Authorized Control Level RBC	LR034 Risk-Based Capital Level of Action Line (4)	_____	X 1.000	= _____
(21) Ex DTA ACL RBC Ratio	Line (19) / Line (20)			= <u>0.000%</u>

† Including subsidiaries owned by holding companies.

‡ Multiply statement value by percent of ownership.

§ The portion of the AVR that can be counted as capital is limited to the amount not utilized in asset adequacy testing in support of the Actuarial Opinion for reserves. **The amount on line (6) will also include the carrying value of non-admitted insurance affiliates.**

Denotes items that must be manually entered on the filing software.



Newsletter Items for Adoption for 2023 for Health RBC:

Date: September 2023

Volume: 25.1

Page 1: Intro Section:

What Risk-Based Capital Pages Should Be Submitted?

For the year-end 2023 health risk-based capital (RBC) filing, submit hard copies of pages **XR001 through XR027** to any state that requests a hard copy in addition to the electronic filing. Beginning with year-end 2007, a hard copy of the RBC filings was not required to be submitted to the NAIC. Other pages, outside of pages XR001 through XR027, do not need to be submitted. Those pages would need to be retained by the company as documentation.

Page 1+: Items Adopted for 2023:

Modification to the Affiliated Investment Structure and Instructions

The Capital Adequacy (E) Task Force adopted proposal 2022-09-CA during its March 23 meeting to revise the instructions and structure of the Affiliated Investment pages (pages XR002-XR004) to provide consistent treatment of affiliated investments between the Health, Life, and Property/Casualty (P/C) RBC formulas. The Task Force adopted proposal 2022-09-CA (MOD) during its June 30 call. The modified proposal clarified the examples provided for the Indirectly Owned Alien Insurance Affiliates/Subsidiaries section within the instructions and added a footnote for the "% Owned" column within the blank.

An editorial change was made to the formula used in the Subsidiary, Controlled, and Affiliated Investments page (XR003) by year-end 2023. The change will carry the RBC Required amount calculated on the Details for Affiliated Stocks page (XR002) into page XR003, Line (21) Other Non-Financial Entities when Column (2) Affil Type is null. The Task Force will consider further revisions for year-end 2024 or later.

Preferred Stock Instructions

Washington, DC 444 North Capitol Street NW, Suite 700, Washington, DC 20001-1509	p 202 471 3990	f 816 460 7493
Kansas City 1100 Walnut Street NW, Suite 1500, Kansas City, MO 64106-2197	p 816 842 3600	f 816 783 8175
New York One New York Plaza, Suite 4210, New York, NY 20004	p 212 398 9000	f 212 382 4207

www.naic.org

The Capital Adequacy (E) Task Force adopted proposal 2022-10-H during its Dec. 14, 2022, meeting to delete the reference to bond factors and revise for consistency with the P/C RBC preferred stock instructions.

Underwriting Risk - Annual Statement - Analysis of Operations References

The Capital Adequacy (E) Task Force adopted proposal 2022-11-H during its Dec. 14, 2022, meeting. The purpose of this proposal was to update the annual statement source descriptions and align the lines of business on pages XR013 and XR014 with the changes in the Annual Statement Analysis of Operations based on Blanks proposal 2021-17BWGMOD.

Trend Test Instructions

The Capital Adequacy (E) Task Force adopted proposal 2022-14-H during its March 23 meeting to remove the informational-only trend test instructions.

Renumbering of Page XR008

The Capital Adequacy (E) Task Force adopted proposal 2022-15-H during its March 23 meeting to renumber the lines on page XR008 so it starts with line number 1.

Underwriting Risk Factors - Investment Income Adjustment

The Capital Adequacy (E) Task Force adopted proposal 2022-16-CA during its June 30 meeting. This proposal updated the comprehensive medical, Medicare supplement, and dental and vision factors to include a 5% investment yield adjustment. The revised factors are:

	Comprehensive Medical	Medicare Supplement	Dental & Vision
\$0-\$3 Million	0.1434	0.0980	0.1148
\$3-\$25 Million	0.1434	0.0603	0.0711
Over \$25 Million	0.0838	0.0603	0.0711

Stop Loss Premiums

The Capital Adequacy (E) Task Force adopted proposal 2023-01-CA during its June 30 meeting. This proposal clarifies the instructions for stop loss premiums in the Underwriting Risk - Experience Fluctuation Risk, Other Underwriting Risk, and Stop Loss Interrogatories.

Page 2+: Editorial Changes:

1. An editorial change was made to the Annual Statement Source column on page XR014 for the following:
 - a. Column (1), Line (7) was updated to reference "Pg. 7, Col. 2+3+8+9, Line 17."
 - b. Column (7), Line (2) was updated to reference "Pg. 7, Col. 8, Lines 1+2."
 - c. Column (7), Line (3) was updated to reference "Pg. 7, Col. 9, Lines 1+2."
2. An editorial change was made to the instructions for Affiliated Investments to remove the reference "and Line 93999999" from the end of the following sentence: "The total of all reported affiliate/subsidiary stock should equal the amounts reported on Schedule D, Part

- 2, Section 1, Line 4409999999 plus Schedule D, Part 2, Section 2, Line 5979999999 and should also equal Schedule D, Part 6, Section 1, Line 09999999 plus Line 18999999.”
3. An editorial change was made to the Annual Statement Source on page XR023, Lines (5) and (13), to update the line reference to Line 7.
 4. An editorial change was made to remove the page number reference from the electronic-only stop loss tables on page XR015 of the forecasting file.

Last Page: RBC Forecasting & Warning:

Risk-Based Capital Forecasting and Instructions

The Health RBC forecasting spreadsheet calculates RBC using the same formula presented in the *2023 NAIC Health Risk-Based Capital Report Including Overview & Instructions for Companies*, and it can be downloaded from the NAIC Account Manager. The *2023 NAIC Health Risk-Based Capital Report Including Overview & Instructions for Companies* publication is available for purchase in an electronic format through the NAIC Publications Department. This publication is available for purchase on or about Nov. 1 each year. The User Guide is no longer included in the Forecasting & Instructions.

WARNING: The RBC forecasting spreadsheet CANNOT be used to meet the year-end RBC electronic filing requirement. RBC filing software from an annual statement software vendor should be used to create the electronic filing. If the forecasting worksheet is sent instead of an electronic filing, it will not be accepted, and the RBC will not have been filed.

Last Page: 2023 National Association of Insurance Commissioners:

2023 NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

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Newsletter Items for Adoption for 2023 for Life and Fraternal RBC:

Date: September 2023

Volume: 29

Page 1: Intro Section:

What Risk-Based Capital Pages Should Be Submitted?

For year-end 2023 life and fraternal risk-based capital (RBC), submit hard copies of pages LR001 through LR049 to any state that requests a hard copy in addition to the electronic filing. Starting with year-end 2007 RBC, a hard copy was not required to be submitted to the NAIC. However, a portable document format (PDF) file representing the hard copy filing is part of the electronic filing.

If any actuarial certifications are required per the RBC instructions, those should be included as part of the hard copy filing. Starting with year-end 2008 RBC, the actuarial certifications were also part of the electronic RBC filing as PDF files, similar to the financial annual statement actuarial opinion.

Other pages, such as the mortgage and real estate worksheets, do not need to be submitted. However, they still need to be retained by the company as documentation.

Page 1+: Items Adopted for 2023:

Removal of Dual Trend Test

The Capital Adequacy (E) Task Force adopted proposal 2023-05-L to remove the dual presentation of the trend test during its April 28 meeting. This proposal eliminates the presentation of the test at the former 2.5 threshold while member jurisdictions transitioned to the current 3.0 threshold. That transition is now complete, so the dual presentation is not needed.

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CM6 and CM7 Mortgages

The Capital Adequacy (E) Task Force adopted proposal 2023-07-L during its April 28 meeting. This proposal aligns the CM6 and CM7 factors for non-performing commercial and farm mortgages with the factors for Schedule A and Schedule BA investments in real estate, as those factors were adjusted in 2021. It also adopts the same formula for calculating RBC amounts for non-performing and performing residential, commercial, and farm mortgages.

Structure and Instruction Changes to Update the Treatment of C-2 Mortality Risk

The Capital Adequacy (E) Task Force adopted update 2 in proposal 2023-06-L during its April 28 meeting. This proposal makes structural changes and instructional changes for LR025, Life Insurance. The proposal assigns the same factors to group permanent life as individual permanent life for categories stating with and without pricing flexibility. The proposal also included a new financial statement note to develop the net amounts at risk in the categories needed for the Life C-2 schedule to create a direct link to a financial statement source. The new note was deferred for year-end 2023, which will necessitate the line references to the new note to be company records for 2023 and will be supplemented by guidance from the Life Risk-Based Capital (E) Working Group.

Residual Tranches

The Capital Adequacy (E) Task Force adopted proposals 2023-03-IRE and 2023-04-IRE during its April 28 meeting. These proposals added a line to isolate residual tranches reported on Schedule BA and the asset valuation reserve for a specific base factor and to add lines for residual tranches to the sensitivity testing exhibits, respectively. During its June 30 meeting, the Task Force adopted proposals 2023-09-IRE and 2023-10-IRE. The first proposal applies a base factor of 0.30 for year-end 2023 and a base factor for year-end 2024 of 0.45, which is subject to adjustment based on additional information. The second proposal applies a 0.15 factor for sensitivity testing for year-end 2023 to be adjusted for year-end 2024.

Modification to the Affiliated Investment Structure and Instructions

The Capital Adequacy (E) Task Force adopted proposal 2022-09-CA during its March 23 meeting to revise the instructions and structure of the Affiliated Investment pages to provide consistent treatment of affiliated investments between the Health, Life, and Property/Casualty (P/C) RBC formulas.

The following editorial changes were made to the Life formula in relation to proposal 2022-09-CA for year-end 2023:

- 1) Modified the formula used in the Summary for Affiliated/Subsidiary Stocks page LR042. The change will pull the RBC Required amount calculated on the Details for Affiliated/Subsidiary Stocks page (LR044) into page LR042, Line (21) Other Non-

Financial Entities when Column (2) Affiliate Code (1 to 10) is null. The Task Force will consider further revisions for year-end 2024 or later.

- 2) Incorporated the "Carrying Value of Non-Admitted Insurance Affiliates" into Line (6) of the Calculation of Total Adjusted Capital page (LR033) to align with the adopted instructions under proposal 2022-09-CA. The Life Risk-Based Capital (E) Working Group will discuss a proposal for year-end 2024 to add a separate line for the "Carrying Value of Non-Admitted Insurance Affiliates."

Underwriting Risk Factors - Investment Income Adjustment

The Capital Adequacy (E) Task Force adopted proposal 2022-16-CA during its June 30 meeting. This proposal updated the comprehensive medical, Medicare supplement, and dental and vision factors to include a 5% investment yield adjustment. The revised factors are:

	Comprehensive Medical	Medicare Supplement	Dental & Vision
\$0-\$3 Million	0.1434	0.0980	0.1148
\$3-\$25 Million	0.1434	0.0603	0.0711
Over \$25 Million	0.0838	0.0603	0.0711

Stop Loss Premiums

The Capital Adequacy (E) Task Force adopted proposal 2023-01-CA during its June 30 meeting. This proposal clarifies the instructions for stop loss premiums in the Underwriting Risk - Experience Fluctuation Risk, Other Underwriting Risk, and Stop Loss Interrogatories.

Last Page: RBC Forecasting & Warning:

Risk-Based Capital Forecasting and Instructions

The Life and Fraternal RBC forecasting spreadsheet calculates RBC using the same formula presented in the *2023 Life and Fraternal Risk-Based Capital Forecasting & Instructions for Companies*, and it is available to download from the NAIC Account Manager. The *2023 Life and Fraternal Risk-Based Capital Forecasting & Instructions for Companies* publication is available for purchase in electronic format through the NAIC Publications Department. This publication is available on or about Nov. 1 each year. The User Guide is no longer included in the Forecasting & Instructions.

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Last Page: 2023 National Association of Insurance Commissioners:

2023 NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

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Newsletter Items for Adoption for 2023 for Property and Casualty RBC:

Date: September 2023

Volume: 27.1

Page 1: Intro Section:

What Risk-Based Capital Pages Should Be Submitted?

For year-end 2023 property/casualty (P/C) risk-based capital (RBC), hard copies of pages PR001-PR035, as well as pages PR038 and PR039, should be submitted to any state that requests a hard copy. Beginning with year-end 2011 RBC, a hard copy was not required to be submitted to the NAIC, but a portable document format (PDF) file representing the hard copy filing is part of the electronic filing with the NAIC.

Page 1+: Items Adopted for 2023:

Underwriting Risk

Underwriting and Investment Exhibit - Premiums Written (PR035)

The Capital Adequacy (E) Task Force adopted proposal 2022-07-P to modify the lines of business categories in PR035 during its Dec. 14, 2022, meeting. The purpose of this proposal is to provide consistency in the granularity of the Property and Casualty Underwriting Investment Exhibit pages.

New Industry Average Risk Factors - Annual Update

During its April 25 meeting, the Capital Adequacy (E) Task Force adopted the annual update of industry average development factors. However, the Property and Casualty Risk-Based Capital (E) Working Group noticed the incorrect calculation of the reserve factors of H/F, WC, and CMP lines of business after the Task Force's adoption. The Working Group re-exposed the following updated

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factors for seven days. No comments were received during the exposure period. The Task Force re-adopted the modified proposal during its June 30 meeting.

PR017 Underwriting Risk - Reserves			
Line (1), Industry Development Factors			
Col.	Line of Business	2023 Factor	2022 Factor
(1)	H/F	0.999	1.001
(2)	PPA	1.047	1.022
(3)	CA	1.106	1.082
(4)	WC	0.873	0.906
(5)	CMP	1.026	1.037
(6)	MPL Occurrence	0.906	0.887
(7)	MPL Claims Made	0.984	0.983
(8)	SL	0.994	0.990
(9)	OL	0.969	0.995
(10)	Fidelity/Surety	0.852	0.842
(11)	Special Property	0.983	0.993
(12)	Auto Physical Damage	1.016	1.011
(13)	Other (Credit A&H)	0.946	0.955
(14)	Financial/Mortgage Guaranty	0.674	0.694
(15)	INTL	2.414	3.041
(16)	REIN. P&F Lines	0.924	0.917
(17)	REIN. Liability	1.024	1.008
(18)	PL	0.874	0.867
(19)	Warranty	0.995	0.998

PR018 Underwriting Risk - Net Written Premiums			
Line (1), Industry Average Loss and Expense Ratios			
Col.	Line of Business	2021 Factor	2022 Factor
(1)*	H/F	0.679	0.665
(2)	PPA	0.791	0.793
(3)	CA	0.777	0.761
(4)	WC	0.651	0.664
(5)*	CMP	0.671	0.661
(6)	MPL Occurrence	0.767	0.750
(7)	MPL Claims Made	0.815	0.829
(8)*	SL	0.578	0.585
(9)	OL	0.641	0.637
(10)	Fidelity/Surety	0.363	0.366
(11)*	Special Property	0.550	0.547
(12)	Auto Physical Damage	0.727	0.718
(13)	Other (Credit A&H)	0.702	0.698
(14)	Financial/Mortgage Guaranty	0.209	0.203
(15)*	INTL	1.136	1.166
(16)*	REIN. P&F Lines	0.578	0.566
(17)*	REIN. Liability	0.743	0.725
(18)	PL	0.597	0.601
(19)	Warranty	0.652	0.665

* Cat Lines

Catastrophe Risk

Modification to the Instructions of Obtaining Permission to Use the Own Model

As a result of the adoption of proposal 2022-08-CR by the Capital Adequacy (E) Task Force during its Dec. 14, 2022, meeting, the revised instructions to: 1) capture the spirit of the own model permission review; and 2) clarify the requirements expected from the company who submits its own model for permission are included in the PR027 instructions.

Affiliated Investments

Modification to the Affiliated Investment Structure and Instructions

The Capital Adequacy (E) Task Force adopted proposal 2022-09-CA during its March 23 meeting to revise the instructions and structure of the Affiliated Investment pages (pages PR003-PR005) to

provide consistent treatment of affiliated investments between the Health, Life, and P/C RBC formulas. The Task Force adopted proposal 2022-09-CA (MOD) during its June 30 call. The modified proposal clarified the examples provided for the Indirectly Owned Alien Insurance Affiliates/Subsidiaries section within the instructions and added a footnote for the “% Owned” column within the blank.

An editorial change was made to the formula used in the Subsidiary, Controlled, and Affiliated Investments page (PR004) by year-end 2023. The change will carry the RBC Required amount calculated on the Details for Affiliated Stocks page (PR003) into page PR004, Line (21) Other Non-Financial Entities when Column (2) Affil Type is null. The Task Force will consider further revisions for year-end 2024 or later.

Accident and Health Business

Health Premiums (PR019) and Health Underwriting Risk (PR020) References

As a result of the adoption of proposal 2022-13-CA by the Capital Adequacy (E) Task Force during its March 23 meeting, the Health Premiums (PR19) and the Health Underwriting Risk (PR020) references in the instructions and structure will be updated to provide consistent categories used in the Annual Statement, Schedule H, Part 1.

Underwriting Risk Factors

The Capital Adequacy (E) Task Force adopted proposal 2022-16-CA during its June 30 meeting. This proposal updated the comprehensive medical, Medicare supplement, and dental and vision factors to include a 5% investment yield adjustment. The revised factors are:

	Comprehensive Medical	Medicare Supplement	Dental & Vision
\$0-\$3 Million	0.1434	0.0980	0.1148
\$3-\$25 Million	0.1434	0.0603	0.0711
Over \$25 Million	0.0838	0.0603	0.0711

Stop Loss Premiums

The Capital Adequacy (E) Task Force adopted proposal 2023-01-CA to clarify the instructions to provide clarity on reporting stop loss premiums in the RBC formula during its June 30 meeting.



**Last Page: RBC Forecasting & Warning:
Risk-Based Capital Forecasting and Instructions**

The P/C RBC forecasting spreadsheet calculates RBC using the same formula presented in the 2023 *NAIC Property & Casualty Risk-Based Capital Report Including Overview & Instructions for Companies*. The entire RBC publication, including the forecasting spreadsheet, can be downloaded from the [NAIC Account Manager](#) through the NAIC Publications Department. The User Guide is no longer included in the RBC publications.

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**Last Page: 2023 National Association of Insurance Commissioners:
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Draft: 12/4/23

Health Risk-Based Capital (E) Working Group
Virtual Meeting
November 8, 2023

The Health Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Nov. 8, 2023. The following Working Group members participated: Steve Drutz, Chair (WA); Matthew Richard, Vice Chair, and Aaron Hodges (TX); Sarah Mu (CT); Tish Becker (KS); Danielle Smith (MO); Margaret Garrison (NE); and Tom Dudek (NY). Also participating was: Tom Botsko (OH).

1. Adopted its July 25 Minutes

Drutz said the Working Group met July 25. During this meeting, the Working Group took the following action: 1) adopted its May 17 and April 17 minutes; 2) adopted its 2023 health risk-based capital (RBC) newsletter; 3) adopted its 2022 health RBC statistics; 4) exposed proposal 2023-11-H for a 30-day public comment period that ended Aug. 24; 5) referred a health test proposal to the Blanks (E) Working Group; 6) heard an update from the American Academy of Actuaries (Academy) on its health care receivables project; 7) heard an update from the Academy on the H2-Underwriting Risk Review; 8) adopted its updated working agenda; 9) received an update on the Excessive Growth Charge Ad Hoc Group; and 10) discussed pandemic risk.

Drutz said the Working Group met Oct. 2 in regulator-to-regulator session, pursuant to paragraph 3 (specific companies, entities, or individuals) of the NAIC Policy Statement on Open Meetings, to meet with the Academy to address questions on data reported by specific companies related to the H2-Underwriting Risk Review.

Smith made a motion, seconded by Dudek, to adopt the Working Group's July 25 (see *NAIC Proceedings – Spring 2023, Capital Adequacy (E) Task Force*) minutes. The motion passed unanimously.

2. Adopted Proposal 2023-11-H

Drutz said proposal 2023-11-H (XR014 Fee-For-Service and Other Risk Revenue-Medicare and Medicaid) was developed to include Medicare and Medicaid fee-for-service and other risk revenue amounts in column (1), lines (4) and (10) on pages XR013 and XR014. This change creates consistency across Column (1), lines (2), (3), (4), (7), and (10) since Medicare and Medicaid premiums and claims are already included in Column (1), Line (2), (3), and (7). The proposal was exposed for a 30-day comment period, during which time no comments were received.

Dudek made a motion, seconded by Garrison, to adopt proposal 2023-11-H. The motion passed unanimously.

3. Exposed the Academy's Health Care Receivables Presentation

David Quinn (Academy) presented the "Health Care Receivables (HCR) Current and Proposed H3 Factors" (Attachment Three-A) to the Working Group. He said that the health care receivables are part of the H3 credit risk component, and this presentation will go over what the Academy has seen in recent years of reporting, what may happen if the factors were changed, and the effect it may have. He said there are various categories of health care receivables. For purposes of this presentation, the Academy grouped them into two main categories: Pharmaceutical Rebates (pharmacy) and Non-Pharmaceutical Rebates (non-pharmacy) which includes claim overpayment receivables, loans and advances to providers, capitation arrangement receivables, risk-sharing receivables, and other health care receivables. He said slide six represents the percentage that these health care receivable dollars make up, based primarily on Exhibit 3 and Exhibit 3a of the annual statement. He said in 2021,

certain blue blank companies began reporting these health care receivables. The X-axis represents time, and the Y-axis represents the percent of health care receivables dollars, with pharmaceutical rebates making up the majority of health care receivable dollars and the remaining making up all others. Slide seven looks at how well companies are collecting health care receivables. The collection ratio is a combination of surplus held plus what can be collected in the current year, then dividing that over the admitted health care receivable assets. He said the idea is that if a company is doing a good job of collecting what they believe they are owed, they would get to 100% or more because of the surplus. Using that collection ratio and data from 2018-2022, slide eight shows a count of companies that had these types of receivables and the percentage of those companies that had a collection ratio of 100% or more. He said the percentage of companies that are collecting should be high. He said it was fairly consistent across the years, including during the pandemic.

Quinn said slide nine is the antithesis of the additional research that the Academy performed, which looked at the breakout by company size, small being less than \$1 million in health care receivables, large being greater than or equal to \$10 million, and medium being in that \$1-\$10 million range. He said that, on average, the larger companies tend to do a better job collecting. Quinn said this led to the question of what would happen if the H3 factor was applied as a tier factor, similar to the H2 factor. He said currently, there is only one factor, and the Academy asked what would happen if two factors were applied with a threshold for the tier cut off in the middle. Slide 10 shows the proposed tiered factors, with the tier-one factors noticeably higher than the current factor. After the tier one cut-off, the factor is lower on average than the current factor. Quinn said the idea is that it would help target surplus holdings to smaller companies that seem to have collected less on average than larger companies and larger companies will benefit from their size and scale, thus having a lower factor on average since historical reporting indicates better collection based on the collection ratios.

Quinn said slide 11 reflects where the Academy has run these factors through by year, and the table shows the effect of the tiered factors. He said the middle column shows the percentage of companies that meet the collection ratio under the current factor, and the last column shows the percentage of companies that would meet the collection ratio using the tiered factors with the percentage point changes in the parentheses. He said that over the years, there has been a uniform increase, with a little bit more on the pharmacy than non-pharmacy in the bottom table. Quinn said slide 12 shows the same type of analysis but by company size instead of year. There is a noticeable increase in the collection of pharmacy rebates for small and medium companies. The results for the non-pharmacy rebates are mixed but still target improvement toward that medium size. He said part of the reason we see less of an improvement in the small size is reporting. Quinn said that, overall, changing to a two-tier structure shows that an increase to the factor for surplus held would result in a better coefficient. The idea is that if a tiered approach is used with two factors, those smaller companies that have collected less on average can be targeted.

Quinn said the Academy's initial proposal thus far comes from Monte Carlo simulations, with set parameters to reach somewhere in the 90%–100% collection ratio for companies. The Academy randomly selected different combinations from a range of factors and cut-offs, tested if goal was met, if so accept, if not reject that proposal. The result is a statistic, called sample space, that shows there are many combinations of factors and cut-offs that meet these criteria. He said that the Academy picked one of those and moved forward with it, but there is flexibility to adjust the factors in the cut-off. It is still getting to the same desired result if smaller companies can be helped to meet higher collection ratios. He said slide 15 shows an example of that simulation output. The black dots are accepted solutions, and those marked in purple are the proposed pharmacy factors in the tier where they fit in the sample space. Quinn said that if one moves around between factors and tiers within where there are black dots, those solutions meet the goal of bolstering the collection ratio. Slide 15 is for pharmacy rebates, and slide 16 is the same chart type but for the non-pharmacy rebates. These slides represent and document where the proposed factors are one of many acceptable proposals. He said the Academy did not see as large of an improvement on small, non-pharmacy rebate health care receivable collection, which was partly due to reporting.

This is an area where, on the non-pharmacy side, one will see health care receivables set up the prior year but then not collected. The expectation is that something is to be collected, but instead, zero is reported. This deflates the ratio of how well one thinks companies are collecting and appears like the company did not collect. However, it is possible they collected it through some other means. For example, if it is a provider overpayment, instead of having an explicit check back to collect on those overpayments, there could have been an agreement to reduce future payments until the difference is made up, but that agreement did not get reported. This makes it harder to know the true effect of holding more surplus for small companies on the non-pharmacy side, depending on the quality of the reporting.

Quinn said, as mentioned before, there are many combinations of the health care receivable size and therefore there will be different impacts depending on the company size, which will be discussed next. Essentially, small companies will be holding more surplus, which has its own financial and economic consequences. Larger companies, on average, will hold less. One can take advantage of those smaller proposed factors beyond the threshold. Holding less surplus on average will also have financial and economic consequences.

Quinn said slides 18 and 19 show some of the average effects on the 2022 data. The first column shows that if the proposed two factors were used, companies would see an increase in H3. For pharmacy rebates, 89% of companies would see an increase in their surplus holding, or 11% would see a decrease on average. For those that had an increase, the company would hold 240% more on average. For those larger companies with a decrease, on average, it would be a 19% decrease. The last two columns show the maximum and minimum a company would be affected by. Quinn said those same statistics are repeated for non-pharmacy on the bottom line, with a large number of companies that would hold more and few companies that would hold less. He said slide 19 shows what that would mean in total reported dollars. For the pharmacy rebate side, the increase one would see is \$197 million more. On the decreased side, one would see a \$245 million loss. Thus, the total is a net negative of \$48 million due to the significant number of smaller companies that would hold more, offset by a few large companies holding a little bit less. However, they are large, so a relatively small amount offsets the small companies' increase. Slide 20 shows the same thing as slide 19 but for non-pharmacy receivables with similar results. Again targeting smaller companies to bolster their collection ratio and then the scale of larger companies, can hold a little bit less surplus on average because they've been doing well collecting relative to small companies.

Quinn summarized that small companies do not collect as well on health care receivables as large companies, as a result, the Academy looked at what would happen if the charge was moved to a two-factor tiered approach. He said, on average, a two-factor tiered approach does help small- to medium-sized companies collect better and larger companies as a benefit of their size and relatively better collection rates can hold less surplus.

Jim Braue (UnitedHealth Group) asked if the collection ratio was calculated at the company action level because the Academy is just applying the unmodified factors to the prior years' receivables. Quinn said the factors are applied to the prior years' admitted health care receivable assets, which is the surplus component at the period T - 1, and then there are collections that are coming from Exhibit 3A and then normalizing that over the admitted healthcare receivable assets from the prior period. He said if this comes out to one or higher, it is counted as collecting. Braue asked if the surplus component is just the straight factor from RBC or if it was divided by two to adjust it to the authorized control level. Quinn said it has not gone through the rest of the larger formula, so it has not gone through the covariance. Braue said the surplus component then is effectively at the company action level, so all other things being equal, the Academy is saying the company action level amount is being used to determine whether they are covering the asset from the prior year. Braue asked if the collection ratio was calculated separately for the non-pharmacy portion for each of the five-line items or if those were added together before for the collection ratio. Quinn said he would have to go back and look because the Academy looked at things in different ways.

Braue said when the current factors were developed, the Academy thought that because non-pharmacy receivable amounts were so much smaller, there would not be much credibility to looking at them separately, and they were all pretty much lumped together in the analysis. He said the corollary to that is for the proposed factors with the \$10 million threshold. He asked whether that threshold would be applied to the five categories added together or be applied to them category by category. Quinn said the factors in the threshold were designed to be applied category by category and said that one looks at the results when they are summed together on the back end but apply it line by line. Braue asked if the Academy looked at how this might change if everything had been added together. Quinn said that for simplicity and presenting here, the Academy aggregated them, but he was fairly certain the Academy looked at and applied the factors line by line and then aggregated on the back end. Then the Academy designed the proposed factors to be the same way, targeting them as a bundle. He said the desired result is in aggregate for all non-pharmacy lines, but the math in between is line by line. Braue said that, presumably, one might get a different answer regarding what the factors should be if they were added together because there could be shortfalls in one of those subcategories offsetting excesses in another. Quinn said it would change it. Braue said he may still be concerned about that same credibility issue that the Academy raised regarding whether it makes sense to try to analyze them separately.

Braue said that some of the footnotes on these slides say that the data come from the orange blank filings, but it looked like, at least for some of them, that blue blank data is being included for years 2021 and 2022. He asked whether that was correct. Quinn said that it does include the blue blank data starting with 2021. Braue asked if the Academy looked to see if the results were materially different for blue blank versus orange blank companies. Quinn said that they did not. Braue said when looking at it year over year, it does not look like there was a big change when the blue blank was added. He said he would only be concerned that the same H3 factor is not in the life formula for the blue-blank companies. Thus, the Academy would potentially be applying something based on blue blank data to a subset of companies to which that does not apply. Braue said that, again, if the blue blank experience pretty much looks the same anyway, that would not matter, but he would just be concerned about making sure that is the case. Quinn said this is a nuance that he does not know enough about to comment on. Crystal Brown (NAIC) said there is not a charge for health care receivables in the life blank. Braue said his concern would be that the experience for a blue-blank company could be different from an orange-blank company. He said he would be concerned that if it is, that experience it might not apply to the subset of companies to which this formula is actually going to apply.

Braue said that with proposed factors and splitting the results by size, it still shows much lower success percentages for the smallest amounts, some of which may be due to some reporting issues. He asked if the Academy looked at possibly going to a three-tier factor to try and apply something even higher to the smallest amounts and then a mid-range factor to the next level of amounts and then the small factor to the very highest ones. Quinn said this is a good observation, and early on, the Academy did look at three factors (meaning two cut offs and three factors), and it came down a handful of companies where it saw there was a health care receivable established the prior year but looking at the next year's 3A, nothing has been collected. So, no matter what factor has been applied for the prior year to create a larger holding of surplus, it is not going to be enough to ever put those zero reporting companies over. Quinn said it is a variable to consider that is deflating the collection ratio stats looked at earlier. He said a good example of that is on slide 12. Even with the proposed factors, 85% is in the top right, the Academy was trying to target 90 over the years of data considered here. There are more than 400 small companies and over the four years, about 18 of them have this zero reported situation. Those then get into the denominator and lower the small company collection ratio. He said if they are excluded and then those who set up a receivable and a receivable is collected, they are at the 90 that gets diluted as these cases where the reporting does not seem to match what one would have expected given the prior year's established receivable.

Braue asked for a distribution of what the shortfalls look like when the collection ratio is under 100%. Some companies will always have a large percentage shortfall because they essentially collected zero. He asked if most

of them were fairly small once these proposed factors have been applied or if there is a pretty wide range other than those outliers. Quinn said the work group had some exploratory data analysis that looked at that distribution. Fortunately, most of them are close. He said that it is desirable if one is at one or higher when thinking of that collection ratio formula. He said the Academy saw that if a company missed, it was still fairly high at 0.9 or so, but there were definitely outliers.

Drutz said the non-pharmacy rebates on slide 12 were still shy of the 90% marker. He asked if that was based on some sort of conservatism in the opposite direction, whereby there is concern that there is not as much data available and that the data may have reporting issues. So, the charge was not increased as much as the data might suggest. He asked if that was correct. Quinn said there are a number of companies that have established a receivable, but zero dollars was collected on that receivable. No matter what kind of surplus is put on that, they will not move over. In those cases of 81%, 83%, and 86%, some companies in that denominator did not report what was suspected to be collected. This happens more frequently in the non-pharmacy rebate lines than on the pharmacy rebate side. On the pharmacy rebate side, it all felt clean and consistent. Quinn said it was more common to see these cases on the non-pharmacy rebate side, especially since there are more, smaller lines in cases where companies were not collecting where the Academy thought they went. That will deflate those numbers on the bottom right, even though the Academy is trying to target 90% or higher for those collecting.

The Working Group agreed to expose the presentation for a 61-day public comment period ending Jan. 8, 2024.

4. Received an Update from the Academy on the H2 – Underwriting Risk Review

Steve Guzski (Academy) summarized the letter on the H2 Underwriting Risk factors as being worked on by the track 2 work group (Attachment Three-B). He said the work group has increased its volunteer participation over the last few months, which has aided in developing more of the analysis of the factors. The group is meeting weekly to analyze the historical data that the NAIC has provided from the annual health filing. He said the work group is working through its analysis of the H2 Underwriting Risk factors by specifically reviewing the various splits in the lines of business, and then assigning volunteers that have a deeper knowledge of specific lines of business and analyzing data and loss ratios, to develop a draft analysis and findings by the end of the calendar year.

5. Discussed Pandemic Risk

Richard summarized his report on “Pandemic Risk and Insurer Solvency – A Review of Personal Consumption Expenditures (PCE) on Healthcare Before, During, and After the COVID-19 Pandemic” (Attachment Three-C). He said he has reviewed many different reports and analyses to help understand how things went during the COVID-19 pandemic and how they might go during the next pandemic. He said the Kaiser Family Foundation (KFF) reported on aggregate health services expenditures, meaning what people spent on health care, from January 2017 through June 2021. He said that prior to the pandemic, the thought was that health care costs would go up during a pandemic. However, the report indicates that in March 2020, there was actually a steep decline. Because hospitals canceled or deferred elective services, there were stay-at-home orders and other things of that nature. Then, in June 2021, there was a recovery, but it was not a complete recovery. He said at this point, it was not clear if there would be a gradual return to normal or if there would be a spike in spending due to services being performed that had been deferred during the pandemic. Richard said he could replicate the report and run it monthly to use it to monitor the recovery progress. This analysis is included on page 3 of the report. The graph on page 3 shows the gradual return to normal through August 2023 at a national level, with projected spending right about where it would have been expected before the pandemic. He said page 4 reflects this breakout by state based on the annual data released by the U.S. Bureau of Economic Analysis (BEA) a few weeks ago. Richard said he was then able to replicate this to show how much of a collapse there was in spending during the pandemic by

state, which is the orange lines in the table. The long-term trend is in blue, and then the increase over and above that long-term trend is in red. Richard said this indicates several things: 1) every state was affected by the pandemic, but each state was affected differently; 2) spending decreased in different ways; 3) it increased differently; and 4) different states had different policies and timing in those policies.

Richard said page 5 shows another way of looking at the data with just some box spots. From 2015 through 2019, the trend in the per capita spending was fairly tightly clustered together. Then, in 2020, during the crisis, there were significant negative trends. Still, these were also relatively widely dispersed. Then in the recovery period in 2021, there was a significant increase in trend, but these were again widely dispersed. He said from a solvency perspective, the crisis period itself is still important. He said it is unknown how things will happen next time, but the recovery and its timing also present interesting issues for state insurance regulators because if the insurance company assumes a two- or three-year return to normal when there is actually a one-year return to normal, that could have adverse impacts on the adequacy of their pricing.

Richard said pages 7–19 are additional reports that show the per capita spending amounts, as well as the trends from 2015 through 2022 for each region. There are additional tables for quality assurance purposes that also help to provide an idea of what happened in each state with respect to the levels and the trend. Drutz said that the report discusses scrutinizing health insurance pricing assumptions and forecasting more rigorously during and after the pandemic. He asked if this would be done by those reviewing rates. Richard agreed that it would be part of the rate review and the examinations. He said RBC is one tool to manage pandemic risk, but another tool might be our financial analysis teams so that when we are going through a pandemic, they can reach out to the insurance companies and ask for additional information about the pricing assumptions and their forecasts. He said then, from the actuarial side, when the statements of actuarial opinion are reviewed, it is important to make sure that for the adverse scenarios, a quick return to normal and the higher trends associated with that are considered.

Drutz asked Richard to discuss the suggested sensitivity testing of the experience fluctuation risk component. Richard said that from the pandemic in 2020, spending decreased significantly. He said low claims translate to a low capital requirement for the insurance companies. He said regarding RBC levels for each company, the report shows that from 2015 through 2019, there were fairly steady increases, and then in 2020, a small increase followed by a significant jump in 2021 because it was sensitive to the decrease in claims in 2020. He suggested looking at those companies 2019 loss ratio levels and ask would the capital still be sufficient.

Drutz said the Working Group will continue to look at and evaluate pandemic risk, if there is an effect on the health RBC formula, and the experience fluctuation risk component of RBC.

6. Discussed the Risk Evaluation Ad Hoc Group

Botsko said the Risk Evaluation Ad Hoc Group was under the Capital Adequacy (E) Task Force and established three additional ad hoc subgroups. He said the first is the RBC Purposes and Guidelines Ad Hoc Subgroup, led by Rachel Hemphill (TX). This group is evaluating the preamble, going through the ultimate purpose of RBC, and trying to clarify that through the guidelines and the purposes. The second ad hoc subgroup is the Asset Concentration Ad Hoc Subgroup, led by Kevin Clark (IA) and Ed Toy (Risk & Regulatory Consulting—RRC). This group is primarily focused on assets, but outside of the realm of collateralized loan obligations (CLOS), it is looking at other types of assets and other types of investments and trying to determine what needs time, money, and investment from the RBC working groups, as well as the Capital Adequacy (E) Task Force. The group is in the early stages of developing a flow chart for looking at new types of investments, how to categorize them, and whether the risk warrants further investigation. The third ad hoc subgroup is the Geographic Concentration Ad Hoc Subgroup, primarily a property and casualty (P/C) group led by Wanchin Chou (CT). This group is looking at companies that only write in

one or two states and only write one or two lines of business, as they can have a concentration risk as well. He said the topic of long-term care (LTC) has also come up for this group. Botsko said the Risk Evaluation Ad Hoc also discusses risks that have not been in the RBC formula and risks that have not been reviewed since the early '90s when these RBC formulas were implemented. Botsko said if anyone has any comments, they can bring them to himself or NAIC staff.

Drutz said that as the H2 Underwriting Risk process goes forward, the Working Group should consider whether a single line of business writer is a concern. He said the Geographic Concentration Ad Hoc Subgroup did ask if there are any areas of concentration to consider for health business. Drutz said he was not aware of any but asked Working Group members to reach out if they have any concerns.

7. Discussed Questions on the 2022 Health RBC Statistics

Drutz said the Working Group discussed the 2022 health RBC statistics during its July 25 meeting, and several questions were raised, including: 1) whether there was a significant reason for the companies to trigger an action level, given the number of companies in an action level increased from 12 to 28 in 2022; and 2) if any new companies trigger an action level. He said the statistics report is run in aggregate on a specific date. Therefore, the company-level detail for the companies in an action level as of the date the statistics were run is not available. When NAIC staff reran the data for the company-level detail, there were some differences in number counts that could be a result of amendments filed. He said NAIC staff were able to evaluate and identify key information that will be helpful in understanding the reasons for the action levels. However, this is confidential information that cannot be discussed in detail during this meeting. Drutz suggested a regulator-to-regulator meeting be held if the Working Group wanted to go through the results.

Drutz said from his analysis, he has looked at the number of companies that triggered an action in 2021 versus 2022. He said 23 companies were identified to be in an action level in 2022. He said that seven of those companies were either in their first or second year of operations and did not trigger the prior year. He said that the companies in an action level were primarily writing comprehensive business or Medicare business. Drutz recommended that going forward, the company-level detail also be run while the aggregate statistics reports are run so that the results can be evaluated better on a going-forward basis. Hearing no objections, he asked NAIC staff to include this request going forward.

Having no further business, the Health Risk-Based Capital (E) Working Group adjourned.

SharePoint/NAIC Support Staff Hub/Committees/E CMTE/CADTF/2023-2-Summer/HRBCWG/7-25-23 minutesTPR.docx

Health Care Receivables (HCR) Current and Proposed H3 Factors

David A. Quinn, MAAA, FSA
Member, Health Care Receivables Factors Work Group
American Academy of Actuaries

Presentation to the National Association of Insurance Commissioners (NAIC)
Health Risk-Based Capital (E) Working Group
November 8, 2023

About the Academy



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Setting the Context

- Authorized Control Level
 - National Association of Insurance Commissioners (NAIC) Risk-Based Capital Formula
- Health Care Receivables (HCR)
 - Part of the H3 Credit Risk
 - Factors applied to all HCR assets are a part of the H3 result

$$\text{\$Authorized Control Level} = 1.03 \times \frac{H0 + \sqrt{(H1^2 + H2^2 + \text{Credit Risk } H3^2 + H4^2)}}{2}$$

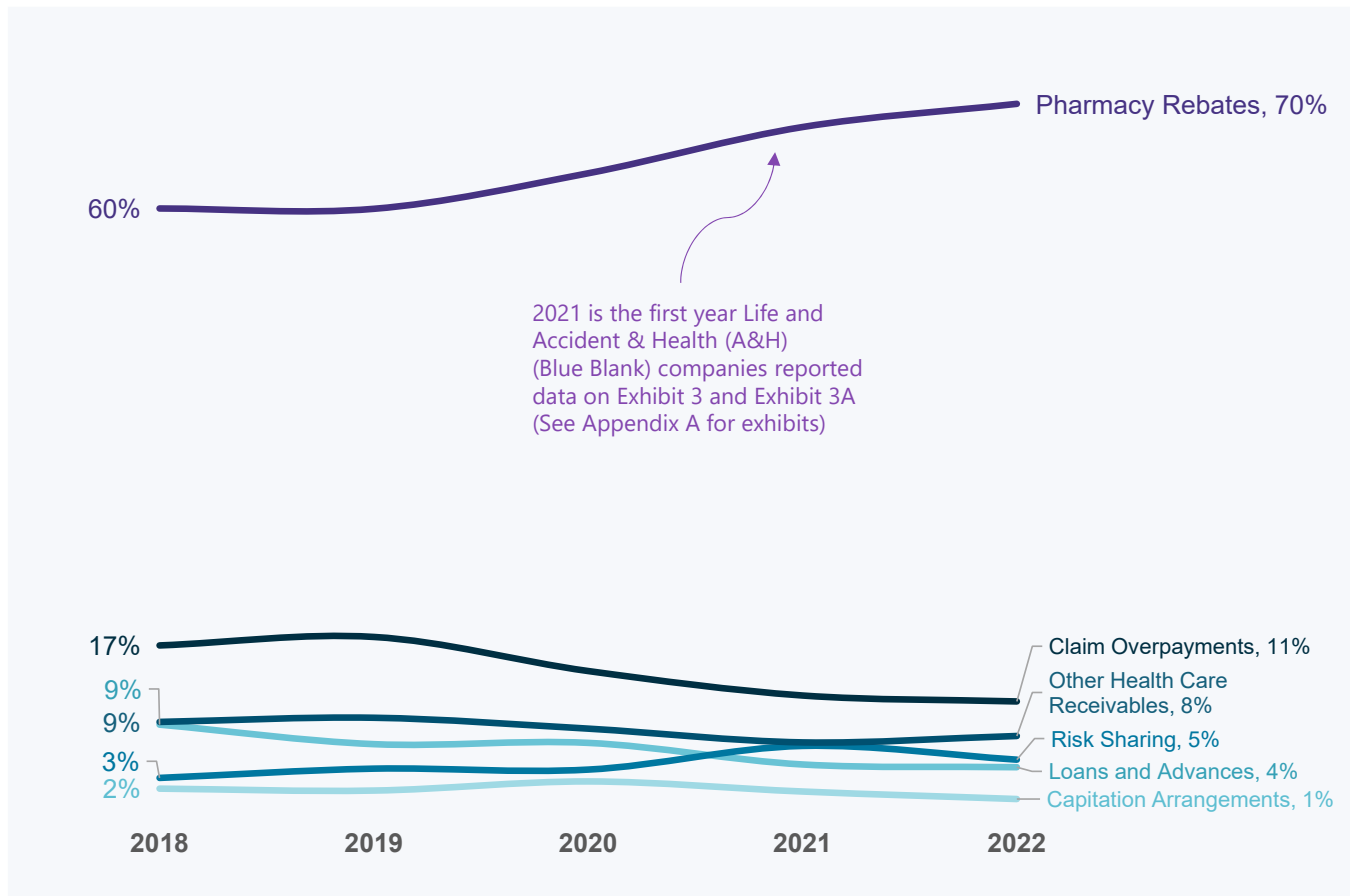
Applying HCR Factors

- HCR Factors
 - Vary by Pharmaceutical Rebates or Non-Pharmaceutical Rebates

HCR Type	Factor (Current)
Pharmaceutical (Rx) Rebate Receivables	0.05
Claim Overpayment Receivables	0.19
Loans and Advances to Providers	0.19
Capitation Arrangement Receivables	0.19
Risk Sharing Receivables	0.19
Other Health Care Receivables	0.19

} Non-Pharmaceutical
Rebates Receivables

HCR Dollar Distributions



Source: NAIC Annual Health Filings (Orange Blank) 2018–2022, for companies with established receivables

Collecting HCRs

$$\text{Collection Ratio} = \frac{\text{Surplus Component}_{t-1} + \text{Collections}_t}{\text{Admitted HCR Assets}_{t-1}}$$

- *Surplus Component*, prior year: Factors multiplied by admitted assets
- *Collections*, current year: Exhibit 3A Column 5 “Health Care Receivables in Prior Years (Columns 1 + 3)”
- *Admitted HCR Assets*, prior year: Exhibit 3 Column 7 “Admitted”
- *Collection Ratio*: Goal is for a company to collect $\geq 100\%$
- See Appendix A for exhibit layouts and column names

Collecting HCRs (Year)

- Data: NAIC Annual Health Filings (Orange Blank) 2018–2022, for companies with established receivables
- 2021 is the first year Life and A&H (Blue Blank) companies reported on the Health Care Receivables Supplement (Exhibits 3 and 3A)
- 2018 is prior year input for 2019 results, so the table begins with 2019

Year (Rx Rebates HCR)	Company Count	Collection Ratio \geq 100%
2019	519	87%
2020	559	83%
2021	621	86%
2022	674	83%

Year (Non-Rx Rebates HCR)	Company Count	Collection Ratio \geq 100%
2019	366	85%
2020	402	79%
2021	411	81%
2022	457	79%

Source: NAIC Annual Health Filings (Orange Blank) 2018–2022, for companies with established receivables

Collecting HCRs (Size)

- Each company has an HCR size by year for this analysis
- HCR size “Small” if total HCR <\$1 million, “Large” if ≥\$10 million, “Medium” otherwise
- HCR <\$0 were then excluded (rare) and =\$0 excluded (common)

Size (Rx Rebates HCR)	Company Count Four-year Avg.	Collection Ratio ≥100%
Small	112	79%
Medium	216	84%
Large	259	89%

Size (Non-Rx Rebates HCR)	Company Count Four-year Avg.	Collection Ratio ≥100%
Small	58	80%
Medium	137	79%
Large	206	84%

Source: NAIC Annual Health Filings (Orange Blank) 2018–2022, for companies with established receivables

Tiering HCR Factors

- Propose tiered HCR factors
 - Smaller HCR-sized companies hold more surplus component
 - Give larger HCR-sized companies credit for observed stability (higher counts of Collection Ratios $\geq 100\%$)

HCR Type	Current Factor	Tier 1 Factor	Tier Cutoff	Tier 2 Factor
Rx Rebate Receivables	0.05	0.20	\$5 Million	0.03
Claim Overpayment Receivables	0.19	0.40	\$10 Million	0.05
Loans and Advances to Providers	0.19	0.40	\$10 Million	0.05
Capitation Arrangement Receivables	0.19	0.40	\$10 Million	0.05
Risk Sharing Receivables	0.19	0.40	\$10 Million	0.05
Other Health Care Receivables	0.19	0.40	\$10 Million	0.05

Collecting HCRs (Year Revisited)

- Improved Collection Ratio (CR) by year

Year (Rx Rebates HCR)	CR \geq 100% (Current Factors)	CR \geq 100% (Proposed Factors)
2019	87%	91% (+4%)
2020	83%	87% (+4%)
2021	86%	89% (+3%)
2022	83%	88% (+5%)

Year (Non-Rx Rebates HCR)	CR \geq 100% (Current Factors)	CR \geq 100% (Proposed Factors)
2019	85%	87% (+2%)
2020	79%	81% (+2%)
2021	81%	84% (+3%)
2022	79%	82% (+3%)

Source: NAIC Annual Health Filings (Orange Blank) 2018–2022, for companies with established receivables

Collecting HCRs (Size Revisited)

- Improved collection by HCR size

Size (Rx Rebates HCR)	CR ≥ 100% (Current Factors)	CR ≥ 100% (Proposed Factors)
Small	79%	85% (+6%)
Medium	84%	90% (+6%)
Large	89%	90% (+1%)

Size (Non-Rx Rebates HCR)	CR ≥ 100% (Current Factors)	CR ≥ 100% (Proposed Factors)
Small	80%	81% (+1%)
Medium	79%	83% (+4%)
Large	84%	86% (+2%)

Source: NAIC Annual Health Filings (Orange Blank) 2018–2022, for companies with established receivables

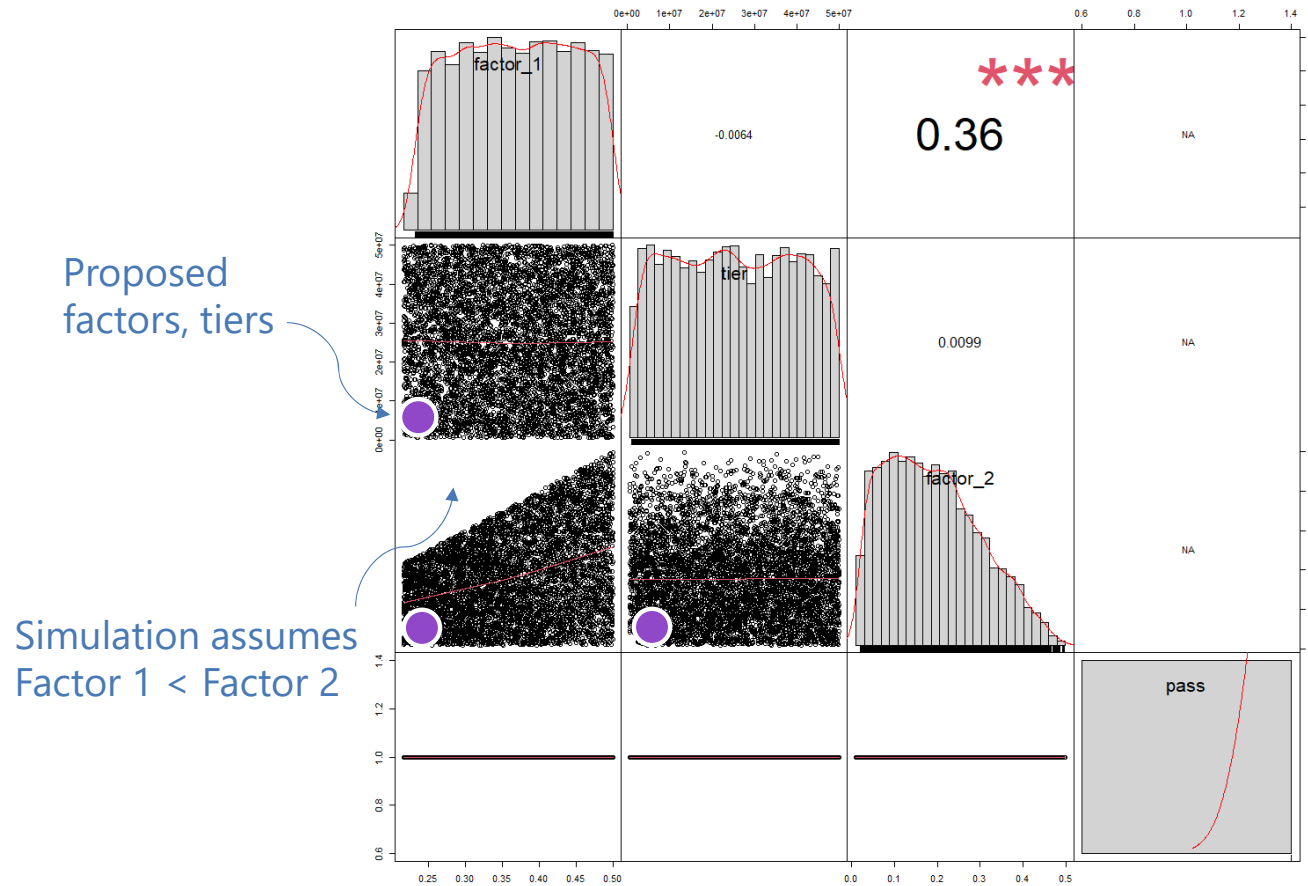
First Proposed Tier Factors

- Which combinations of factors and tier cutoffs work?
- Monte Carlo simulation

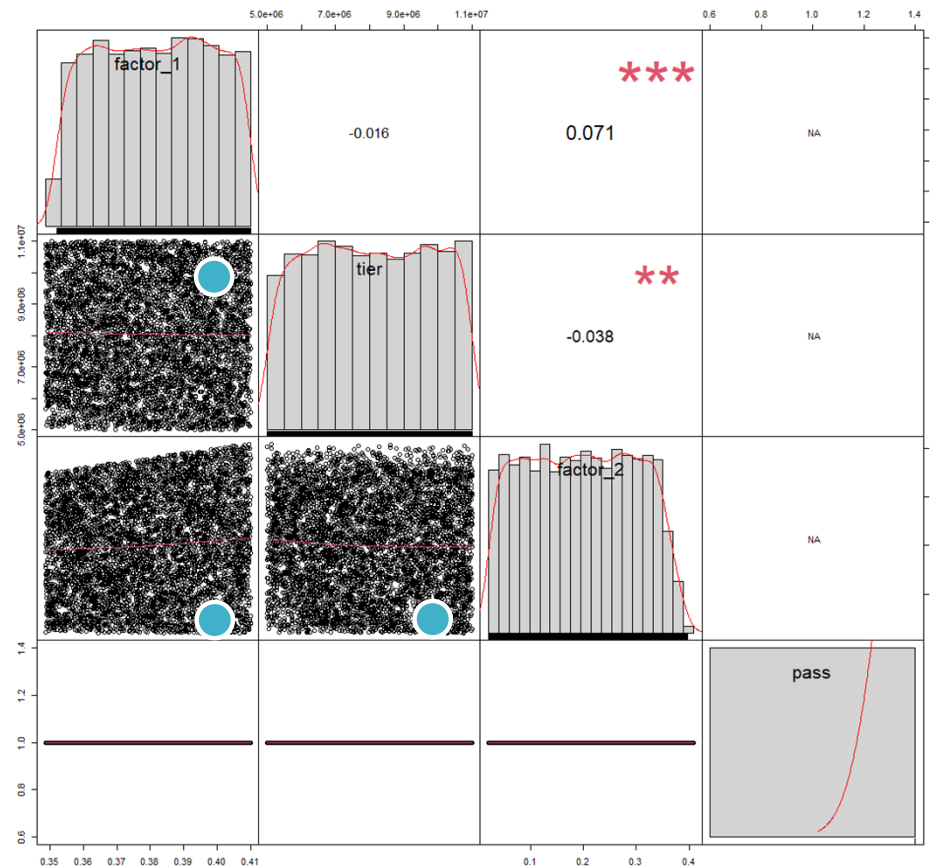
First Proposed Tier Factors

- Goal of percent of companies meeting Collection Ratios $\geq 100\%$
 - 90%–100% for Rx HCR
 - 90%–100% for Non-Rx HCR
 - For 10 or more of the 15 size and line combinations (3x sizes by 5x Non-Rx HCR types)
 - Acknowledge variance in reporting accuracy (more on this later)
- Many combinations of factors and tier cutoffs work
 - There's flexibility in the final factors and tier cutoff
 - Each black dot on the next charts is a possible solution

Proposed Factors and Tiers (Rx Rebate HCR)



Proposed Factors and Tiers (Non-Rx Rebates HCR)



Limitations and Considerations

- Recommendation subject to approval and comment
- Reporting Accuracy
 - Parity between prior year Exhibit 3 and current year Exhibit 3A
 - A company may establish a prior HCR but collect on it in a way not reported in Exhibit 3A
- HCR Size
 - Many combinations of tiers and tier cutoffs
 - Smaller tier threshold, higher factor
 - Proposed factors will have variable impacts on companies

Surplus Component Change in H3 (Proposal)

- 2022 Data

HCR Type	Co. with an <i>Increased</i> H3 Surplus (+)	Co. with a <i>Decreased</i> H3 Surplus (-)	Avg. Relative Change in H3 Surplus (+)	Avg. Relative Change in H3 Surplus (-)	Largest Magnitude Relative Change (+)	Largest Magnitude Relative Change (-)
Rx Rebate HCR	89%	11%	+240%	-19%	+300%	-39%
Non-Rx Rebates HCR	91%	9%	+105%	-14%	+111%	-69%

Source: NAIC Annual Health Filings (Orange Blank) 2018–2022, for companies with established receivables

Surplus Component Change in H3

- Rx Rebate HCR (2022)

Rx Rebate HCR (Millions)	H3 Surplus <i>Before Proposal</i>	H3 Surplus <i>After Proposal</i>	Difference
If an Increase (+)	\$188	\$385	+\$197
If a Decrease (-)	\$780	\$535	-\$245
Total	\$968	\$920	-\$48

Surplus Component Change in H3

- Non-Rx Rebate HCR (2022)

Non-Rx Rebate HCR (Millions)	H3 Surplus <i>Before Proposal</i>	H3 Surplus <i>After Proposal</i>	Difference
If an Increase (+)	\$326	\$551	+\$225
If a Decrease (-)	\$630	\$329	-\$301
Total	\$956	\$880	-\$76

Appendix A: Exhibit 3, Exhibit 3A Examples

EXHIBIT 3 – HEALTH CARE RECEIVABLES

ANNUAL STATEMENT FOR THE YEAR 2013

1 Name of Debtor	2 1 – 30 Days	3 31 – 60 Days	4 61 – 90 Days	5 Over 90 Days	6 Non-admitted	7 Admitted
Pharmaceutical rebate receivables						
Claim overpayment receivables						
Loans and advances to providers						
Capitation arrangement receivables						
Risk sharing receivables						
Other receivables						
Gross health care receivables					R6	R7

EXHIBIT 3A – ANALYSIS OF HEALTH CARE RECEIVABLES COLLECTED AND ACCRUED

Type of Health Care Receivable	Health Care Receivables Collected During the Year		Health Care Receivables Accrued as of December 31 of Current Year		5 Health Care Receivables in Prior Years (Columns 1 + 3)	6 Estimated Health Care Receivables Accrued as of December 31 of Prior Year
	1 On Amounts Accrued Prior to January 1 of Current Year	2 On Amounts Accrued During the Year	3 On Amounts Accrued December 31 of Prior Year	4 On Amounts Accrued During the Year		
1. Pharmaceutical rebate receivables						
2. Claim overpayment receivables						
3. Loans and advances to providers						
4. Capitation arrangement receivables						
5. Risk sharing receivables						
6. Other health care receivables						
7. Totals (Lines 1 through 6)						A6 = Prior Yr(R6+R7)

Questions?

Thank You

For more information, please contact

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Senior Policy Analyst, Health

American Academy of Actuaries

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October 31, 2023

Steve Drutz
Chair, Health Risk-Based Capital (E) Working Group
National Association of Insurance Commissioners (NAIC)

Re: Request for Comprehensive Review of the H2—Underwriting Risk Component and Managed Care Credit Calculation in the Health Risk-Based Capital Formula

Dear Chair Drutz:

On behalf of the Health Underwriting Risk Factors Analysis Work Group of the Health Solvency Subcommittee of the American Academy of Actuaries (the work group),¹ I appreciate the opportunity to provide these updates to the National Association of Insurance Commissioners (NAIC) Health Risk-Based Capital (E) Working Group in response to the request to comprehensively review the H2—Underwriting Risk Component and the Managed Care Credit Calculation in the Health Risk-Based Capital (HRBC) formula.

A subset of members within the work group now meets on a weekly basis to work on the tiered RBC Factor development (Track 2); volunteer participation has increased since the summer. Progress has been made getting new volunteers up to speed on the work track, providing access to collected data, and reviewing historical work products and reports from the Health Solvency Subcommittee.

Members of the work group have been assigned lines of business and are exploring the partitioned data and developing high-level statistics. The next steps of the work group include:

- Finalize data exploration and analysis and share additional questions with NAIC staff, as necessary;
- Share data findings and statistics with fellow work group members for review and discussion of methodology and results;
- Determine additional data and resources, if necessary, for completing the analysis;
- Share data and risk analysis insights and determine a consistent methodology across the applicable lines of business (e.g., consistent method of determining outlier data points);
- Generate premium tiers based on risk analysis and premium growth across lines of business;
- Develop premium risk factors for each applicable premium tier and line of business; and
- Document analysis and draft findings for review.

The goal of the work group continues to be to develop the draft analysis and findings by the end of this calendar year.

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.

If you have any questions or would like to discuss further, please contact Matthew Williams, the Academy's senior health policy analyst, at williams@actuary.org.

Sincerely,

Derek Skoog, MAAA, FSA
Chairperson, Health Solvency Subcommittee
Health Underwriting Risk Factors Analysis Work Group
American Academy of Actuaries

Cc: Crystal Brown, Senior Health RBC Specialist & Education Lead, Financial Regulatory Affairs, NAIC

NAIC Health Risk Based Capital (E) Working Group
Working Paper: Pandemic Risk and Insurer Solvency

A Review of Personal Consumption Expenditures (PCE) on Healthcare
Before, During, and After the COVID-19 Pandemic

Matthew Richard, ASA, MAAA, CEBS, ARe
Texas Department of Insurance
November 8, 2023



PO Box 12030 | Austin, TX 78711 | 800-578-4677 | tdi.texas.gov

Executive Summary

As the Health Risk-Based Capital (E) Working Group has been discussing Pandemic Risk, we noted an innovative analysis from August 2021, published by the Kaiser Family Foundation. This analysis used Personal Consumption Expenditures (PCE) data to explore the decline and recovery in aggregate healthcare spending in the United States due to the COVID-19 pandemic. In October 2023, actuaries at the Texas Department of Insurance updated this analysis with the latest data from the Bureau of Economic Analysis (BEA). We then performed additional analysis by state and by BEA region.

Our key finding is that although per capita healthcare expenditures fell dramatically during the pandemic and rose even more dramatically immediately afterwards, the magnitude of these changes varied significantly by state. During the crisis in 2020, spending fell by an average of 5.0% from 2019 levels, from a 0.2% decrease in Louisiana, to a 9.3% decrease in Alaska. Then during the recovery in 2021, per capita spending increased by an average of 11.5% from 2020 levels, ranging from a 7.6% increase in Maine, up to a 16.9% increase in North Carolina.

In 2022, we see a stabilization, and a return of both trends and levels to pre-pandemic projections.

The implication for solvency regulation is that although the crisis period is important, the recovery period also presents risks to insurer solvency. Trends are very high as expenditure levels return to historic norms, but they are also volatile, with widely dispersed trends across the states.

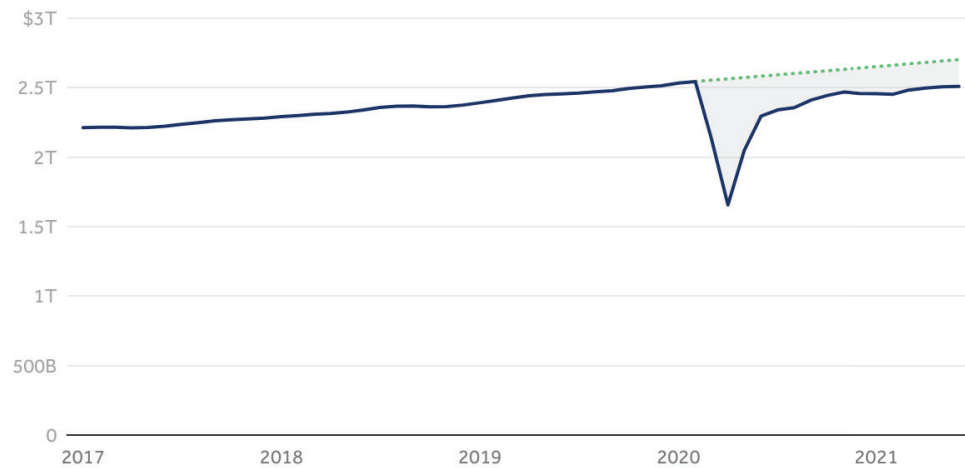
Introduction

On March 11, 2020, the World Health Organization declared COVID-19 a pandemic. Businesses, schools, and workplaces were shut down nationwide, and stay-at-home orders were declared to limit the spread of this illness. Non-essential healthcare treatments were delayed or canceled to focus medical resources on managing COVID-19.

In August 2021, the Kaiser Family Foundation (KFF) published their analysis of aggregate Personal Consumption Expenditures (PCE) on healthcare. This analysis showed a decrease in spending during the pandemic, and no significant rebound in health care utilization. Through June 2021, expenditure levels remained below long-term trends:

Health services expenditures (seasonally adjusted annual rates), Jan. 2017-June 2021

Select: **Health services** **Hospital**



Note: Projected health services expenditures are based on January 2017-January 2020 monthly average growth rate applied to February 2020-June 2021.

Source: KFF analysis of BEA data

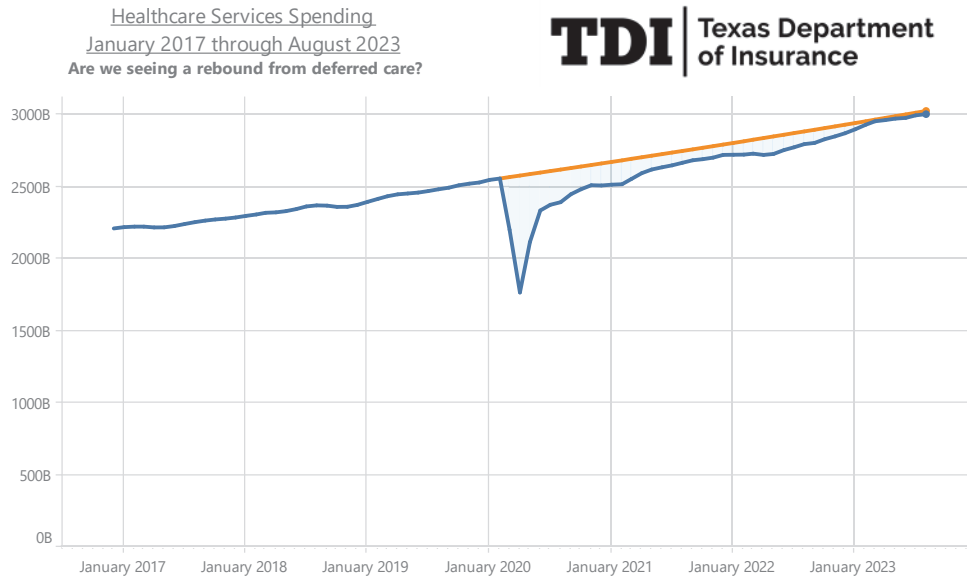
Peterson-KFF
Health System Tracker

The source data is produced by the Bureau of Economic Analysis (BEA) to support the official estimates of GDP. Per the BEA's documentation, "PCE also includes expenditures financed by third-payers on behalf of households, such as employer-paid health insurance and medical care financed through government programs."

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In October 2023, the Texas Department of Insurance refreshed this analysis with monthly data through August 2023. We see that aggregate healthcare spending remained below long-term projections for three years, with the gap finally closing in the middle of 2023:

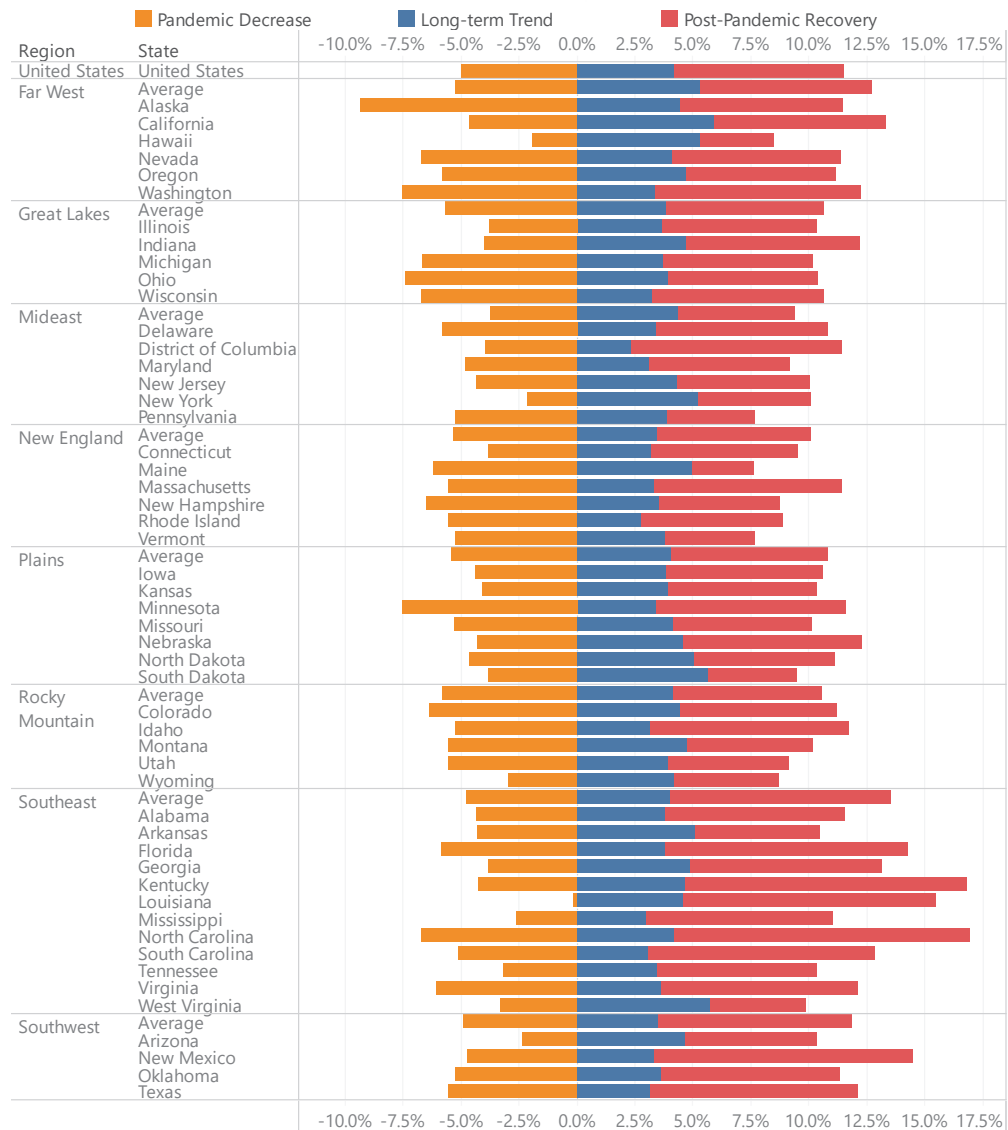


Documentation

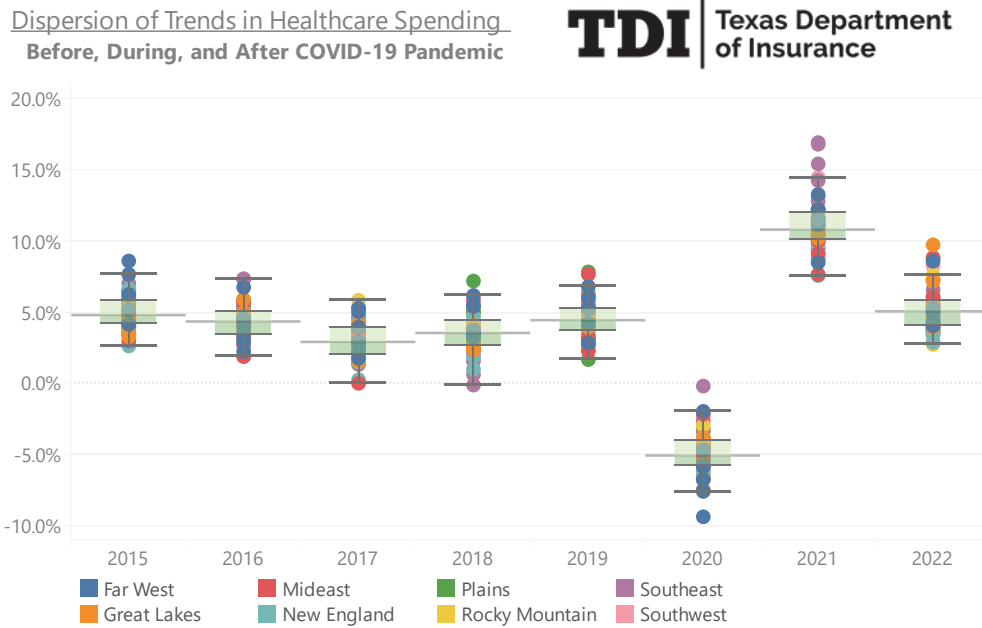
Data from Bureau of Economic Analysis, Table 2.3.5U:
Personal Consumption Expenditures by Major Type of Product and by Major Function
Modeled on 2021 analysis from Kaiser Family Foundation:
<https://www.healthsystemtracker.org/brief/early-2021-data-show-no-rebound-in-health-care-utilization/>

Our next step was to review healthcare expenditures data on a per capita basis, and by state. We compared historical trends from 2014-2019 to the crisis period in 2020, and then the recovery period in 2021. We see a reduction in expenditures during the crisis, followed by very high trends during the recovery. For example, the year-over-year trend in the United States was minus 5.0% in 2020. The long-term trend was 4.2%, and the 2021 trend was 11.5% (7.3% higher than the long-term trend).

Dispersion of Trends in Healthcare Spending
 Before, During, and After COVID-19 Pandemic



In both 2020 and 2021, healthcare expenditures trends were widely dispersed. By 2022, trends had largely returned to historic levels.



Documentation

Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product

We can conclude with the following recommendations:

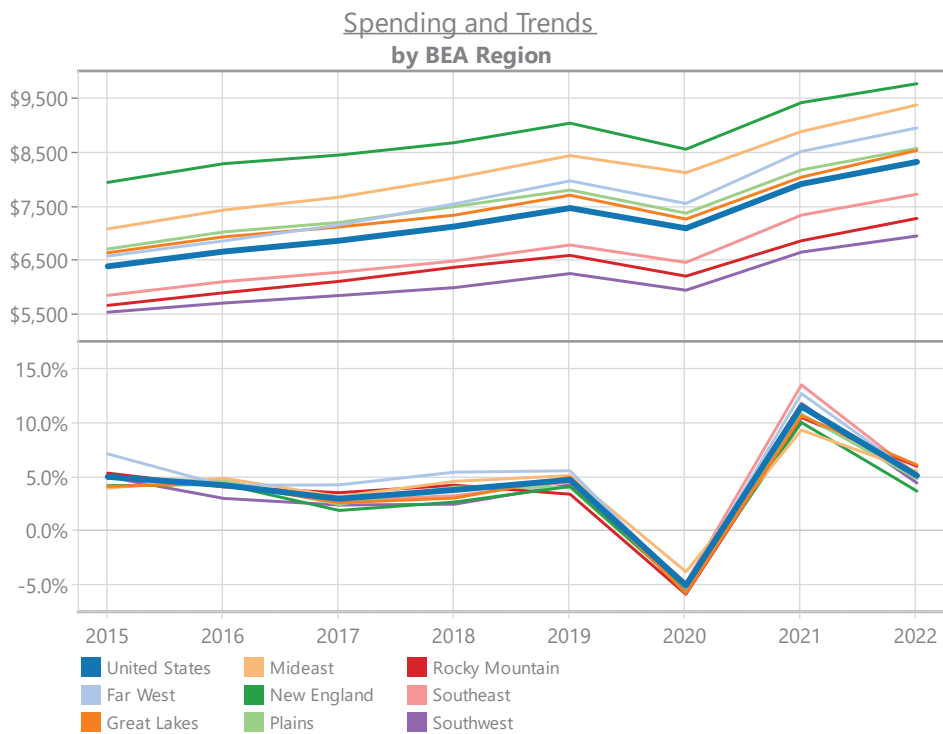
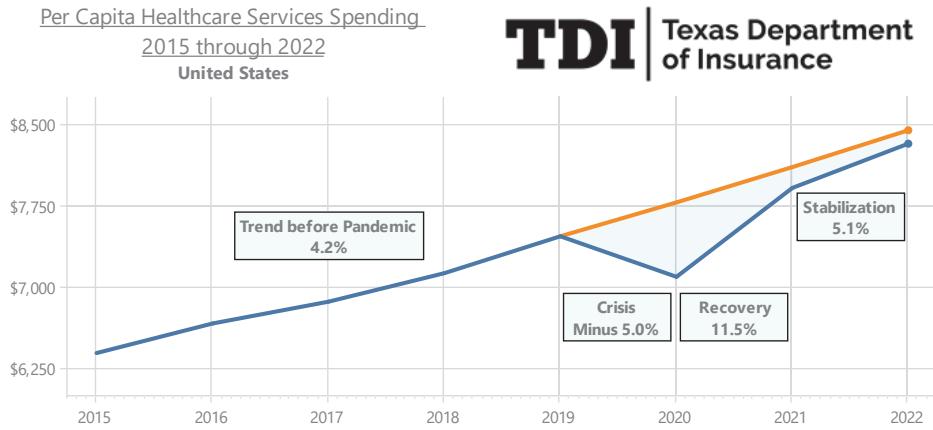
1. Regulators should scrutinize health insurers' pricing assumptions and forecasts more rigorously during and after a pandemic.
2. The Experience Fluctuation Risk component of RBC could be sensitivity-tested by recalculating it with the prior year's Underwriting Risk Claims Ratio.
3. The review of Statements of Actuarial opinion should ensure that the moderately adverse scenario used to develop the Premium Deficiency Reserve consider very high trends in a post-pandemic recovery period.

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Appendix A

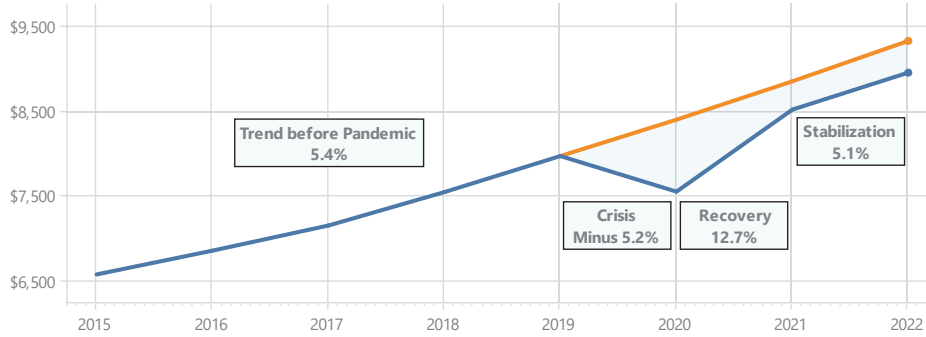
Summaries of Health Expenditure Trends by BEA Region



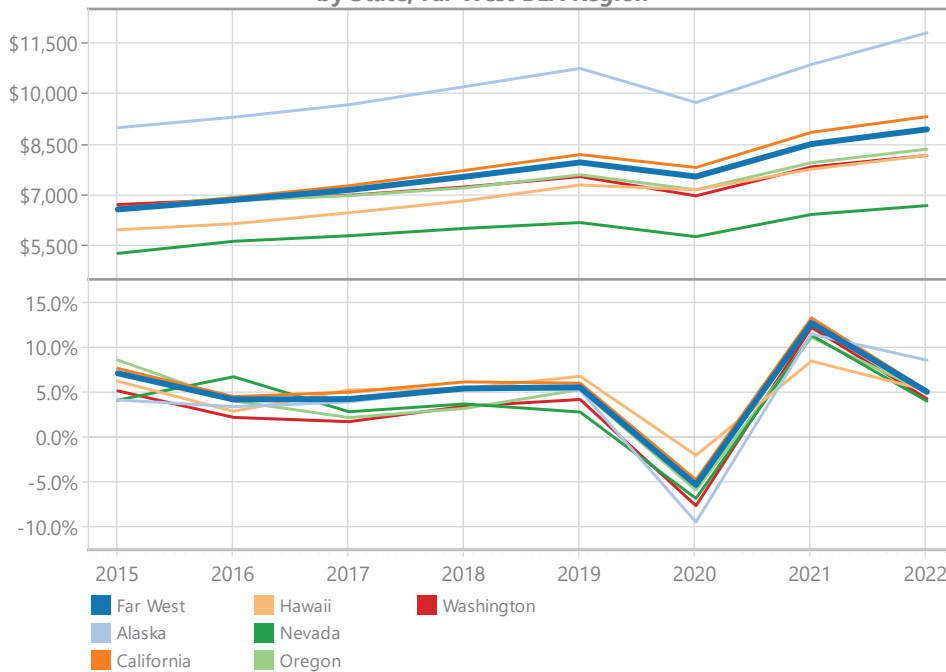
Documentation

Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product

Per Capita Healthcare Services Spending
 2015 through 2022
 BEA Region: Far West

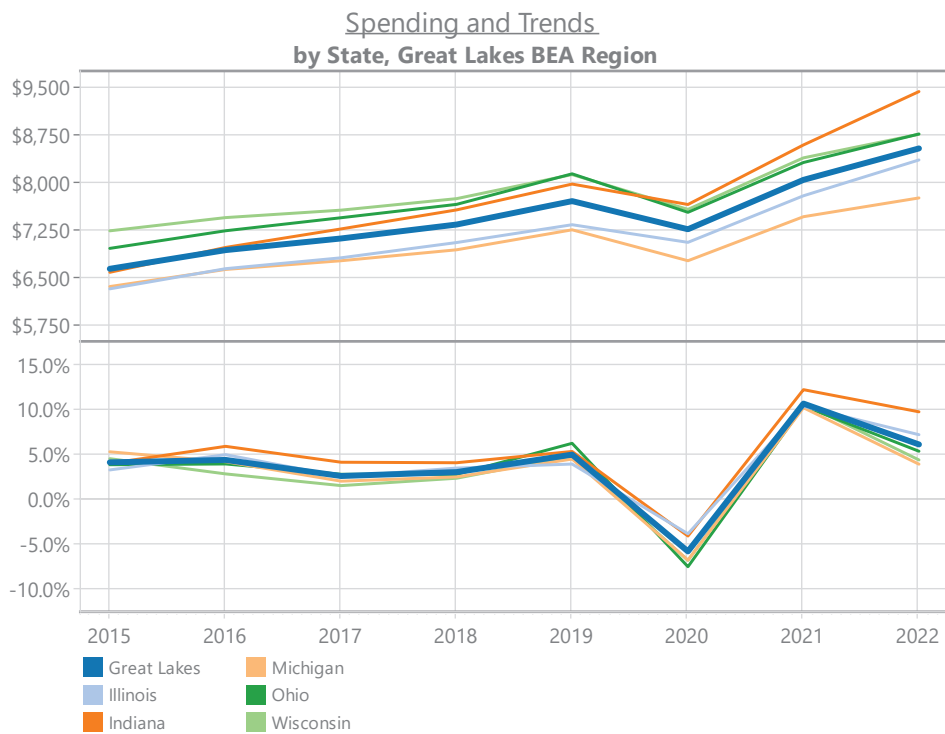
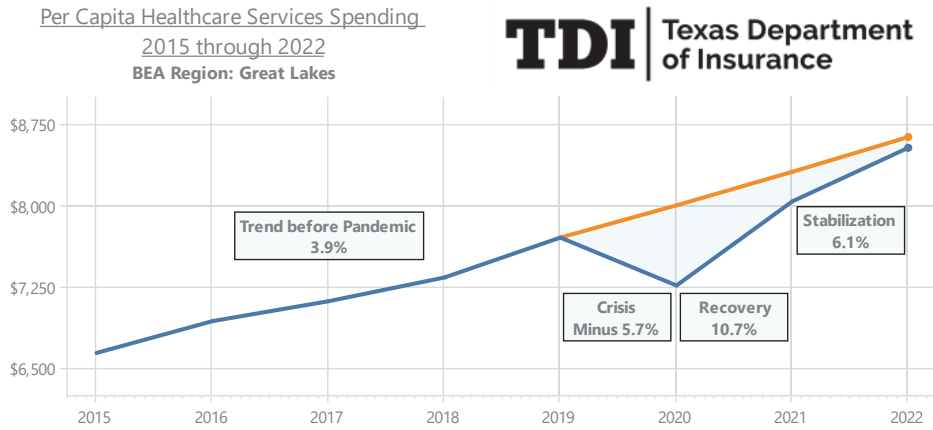


Spending and Trends
 by State, Far West BEA Region



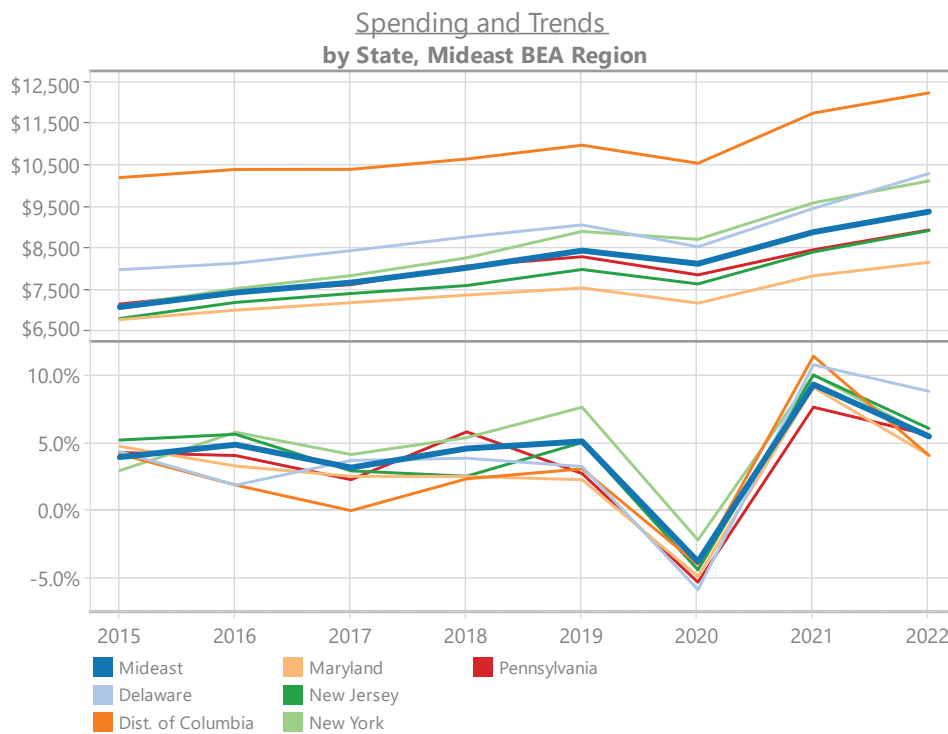
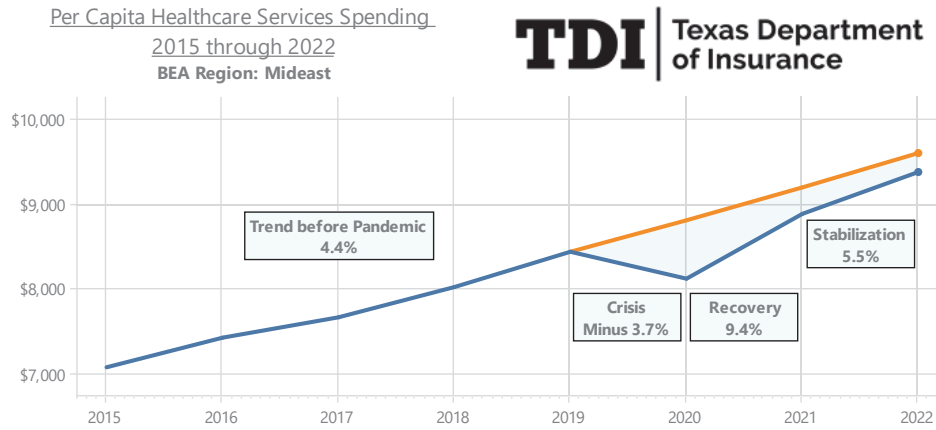
Documentation

Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product
 Far West includes Alaska, California, Hawaii, Nevada, Oregon, and Washington.



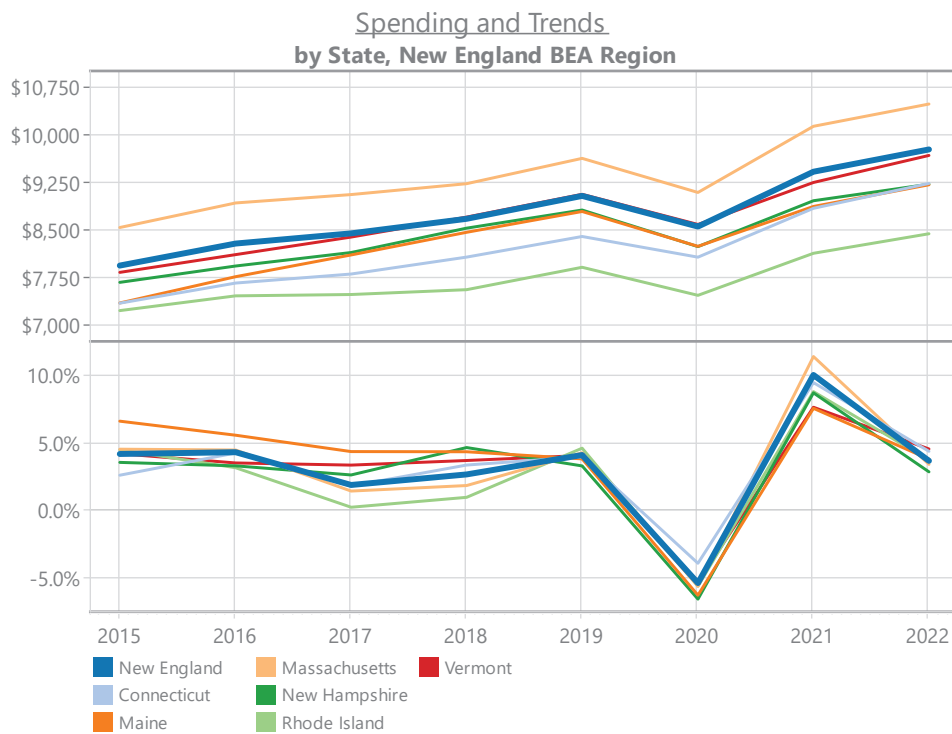
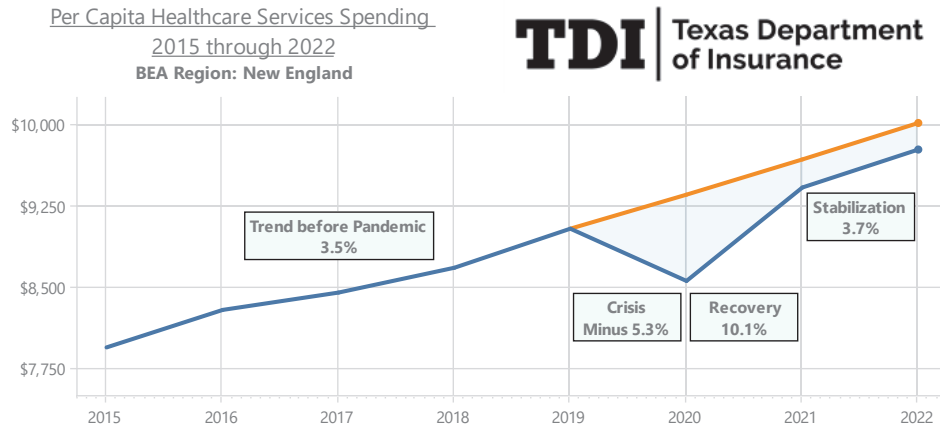
Documentation

Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product
 Great Lakes includes Illinois, Indiana, Michigan, Ohio, and Wisconsin.



Documentation

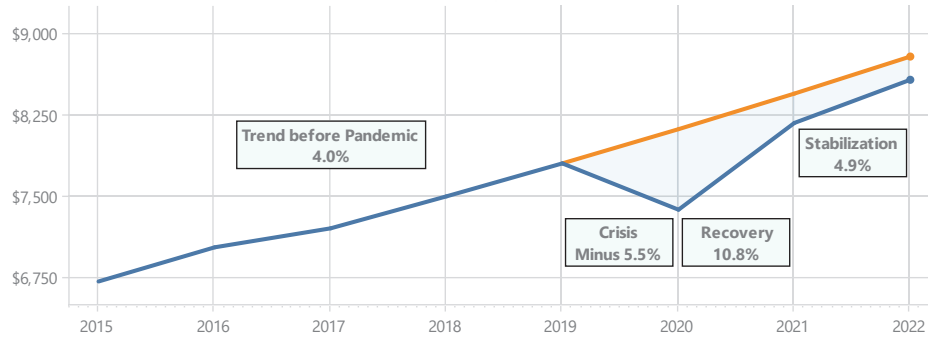
Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product
 Mideast includes Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.



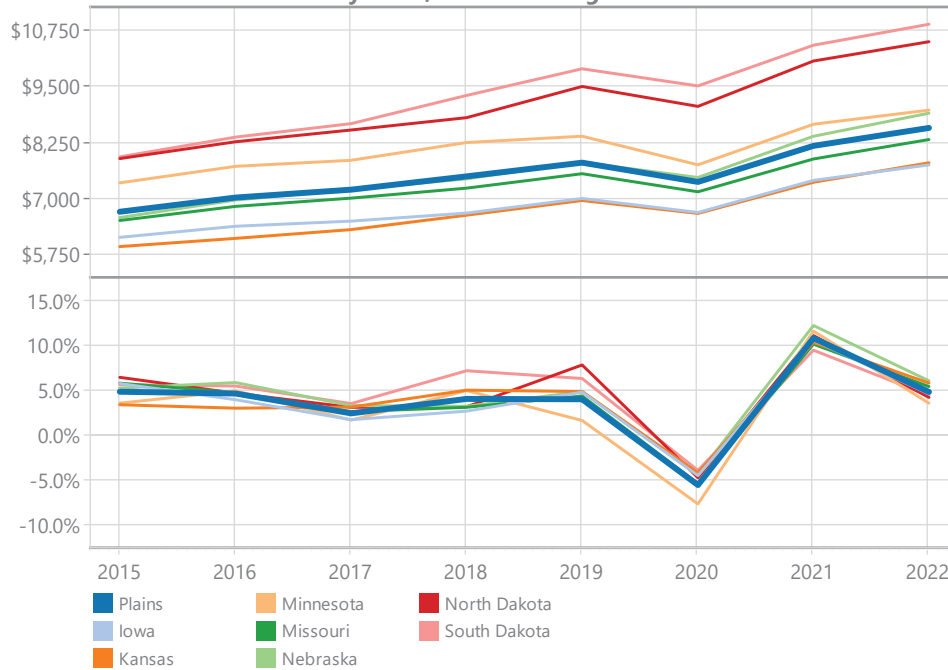
Documentation

Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product
 New England includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

Per Capita Healthcare Services Spending
 2015 through 2022
 BEA Region: Plains

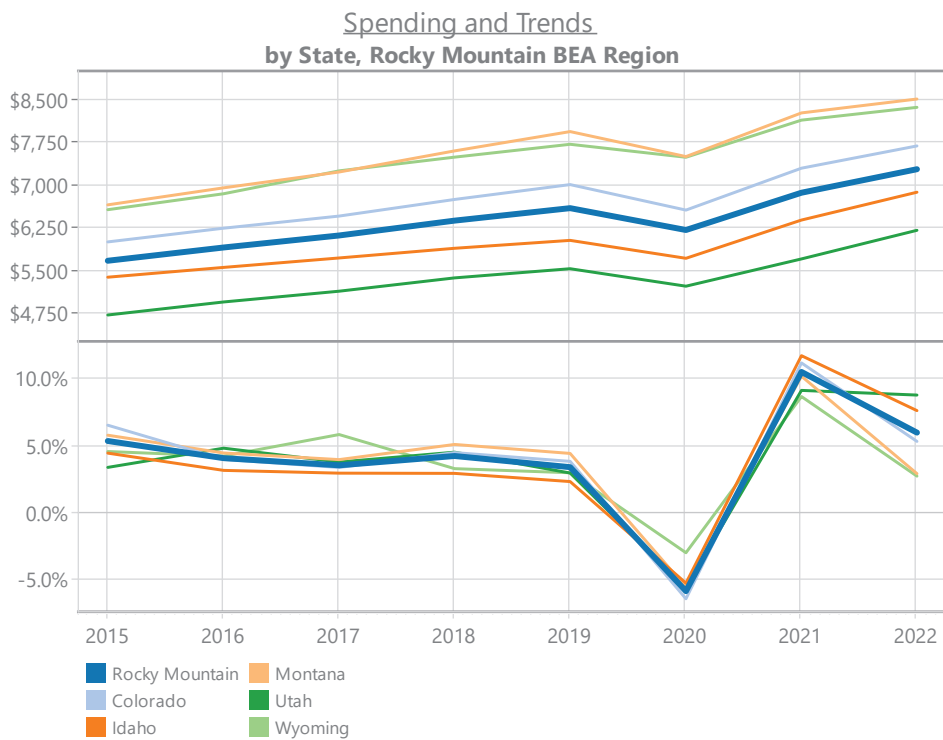
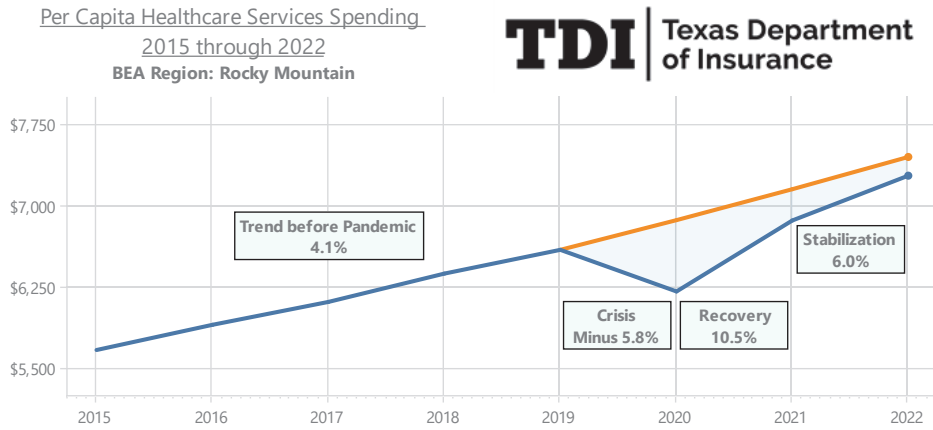


Spending and Trends
 by State, Plains BEA Region



Documentation

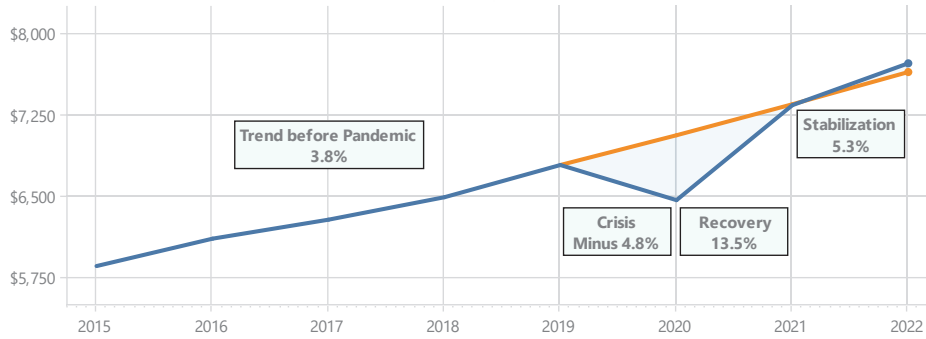
Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product
 Plains includes Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.



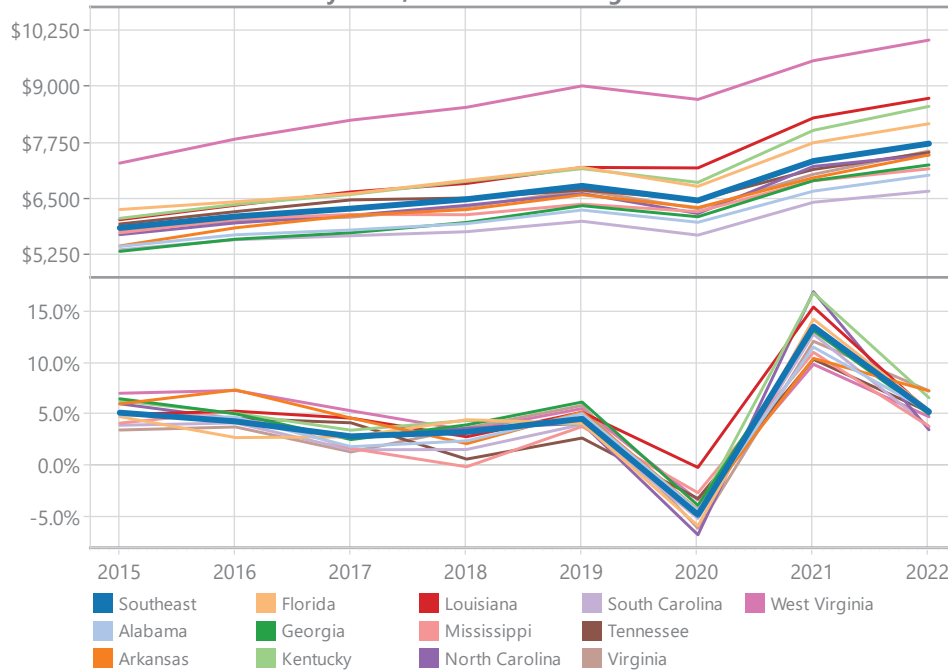
Documentation

Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product
 Rocky Mountain includes Colorado, Idaho, Montana, Utah, and Wyoming.

Per Capita Healthcare Services Spending
 2015 through 2022
 BEA Region: Southeast

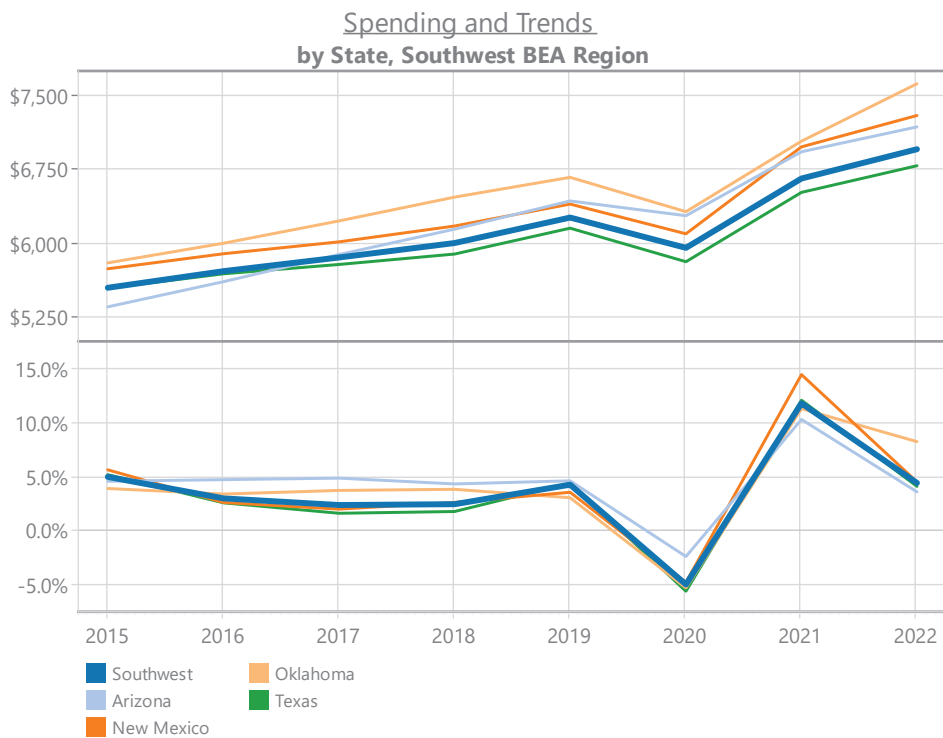
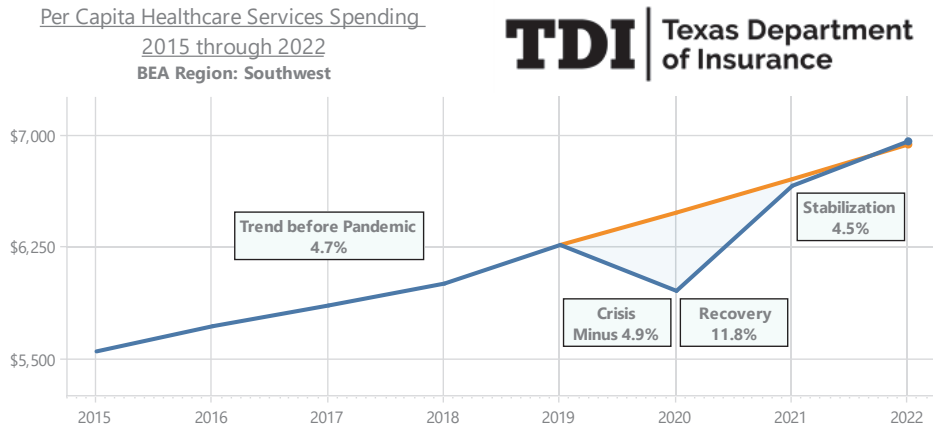


Spending and Trends
 by State, Southeast BEA Region



Documentation

Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product
 Southeast includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina
 Tennessee, Virginia, and West Virginia.



Documentation

Data from Bureau of Economic Analysis, Table SAPCE2:
 Per Capita Personal Consumption Expenditures by Major Type of Product
 Southwest includes Arizona, New Mexico, Oklahoma, and Texas.

Appendix B

Per Capita Expenditures on Healthcare Services, Levels and Annual Trends

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PER CAPITA EXPENDITURES ON HEALTHCARE SERVICES, LEVELS AND ANNUAL TRENDS

NATIONAL AVERAGE AND BUREAU OF ECONOMIC ANALYSIS REGIONS

Region	Group	Per Capita PCE, Healthcare Services										Annual Trend							
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2015	2016	2017	2018	2019	2020	2021	2022	
United States	United States	6,093	6,400	6,673	6,874	7,137	7,477	7,103	7,923	8,331	5.0%	4.3%	3.0%	3.8%	4.8%	-5.0%	11.5%	5.1%	
Far West	Far West	6,150	6,590	6,870	7,165	7,557	7,980	7,562	8,525	8,959	7.2%	4.2%	4.3%	5.5%	5.6%	-5.2%	12.7%	5.1%	
Great Lakes	Great Lakes	6,386	6,651	6,945	7,128	7,347	7,715	7,273	8,049	8,543	4.1%	4.4%	2.6%	3.1%	5.0%	-5.7%	10.7%	6.1%	
Midwest	Midwest	6,820	7,092	7,440	7,679	8,034	8,448	8,132	8,893	9,384	4.0%	4.9%	3.2%	4.6%	5.2%	-3.7%	9.4%	5.5%	
New England	New England	7,630	7,952	8,298	8,458	8,687	9,047	8,565	9,427	9,777	4.2%	4.4%	1.9%	2.7%	4.1%	-5.3%	10.1%	3.7%	
Plains	Plains	6,408	6,721	7,036	7,211	7,506	7,810	7,383	8,183	8,581	4.9%	4.7%	2.5%	4.1%	4.1%	-5.5%	10.8%	4.9%	
Rocky Mountain	Rocky Mountain	5,388	5,678	5,911	6,122	6,383	6,602	6,218	6,873	7,286	5.4%	4.1%	3.6%	4.3%	3.4%	-5.8%	10.5%	6.0%	
Southeast	Southeast	5,575	5,863	6,116	6,291	6,498	6,795	6,471	7,347	7,733	5.2%	4.3%	2.9%	3.3%	4.6%	-4.8%	13.5%	5.3%	
Southwest	Southwest	5,286	5,552	5,721	5,860	6,007	6,266	5,958	6,663	6,961	5.0%	3.0%	2.4%	2.5%	4.3%	-4.9%	11.8%	4.5%	

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PER CAPITA EXPENDITURES ON HEALTHCARE SERVICES, LEVELS AND ANNUAL TRENDS

FAR WEST, GREAT LAKES, MIDEAST, AND NEW ENGLAND

Region	Group	2014	2015	2016	2017	2018	2019	2020	2021	2022	2015	2016	2017	2018	2019	2020	2021	2022
Far West	Far West	6,150	6,590	6,870	7,165	7,557	7,980	7,562	8,525	8,959	7.2%	4.2%	4.3%	5.5%	5.6%	-5.2%	12.7%	5.1%
Alaska	Far West	8,644	9,007	9,318	9,688	10,222	10,761	9,755	10,877	11,813	4.2%	3.5%	4.0%	5.5%	5.3%	-9.3%	11.5%	8.6%
California	Far West	6,163	6,637	6,940	7,291	7,743	8,212	7,829	8,870	9,335	7.7%	4.6%	5.1%	6.2%	6.1%	-4.7%	13.3%	5.2%
Hawaii	Far West	5,635	5,988	6,164	6,491	6,845	7,312	7,170	7,780	8,189	6.3%	2.9%	5.3%	5.5%	6.8%	-1.9%	8.5%	5.3%
Nevada	Far West	5,077	5,289	5,647	5,810	6,028	6,200	5,783	6,441	6,703	4.2%	6.8%	2.9%	3.8%	2.9%	-6.7%	11.4%	4.1%
Oregon	Far West	6,055	6,577	6,846	6,999	7,227	7,613	7,171	7,971	8,372	8.6%	4.1%	2.2%	3.3%	5.3%	-5.8%	11.2%	5.0%
Washington	Far West	6,400	6,733	6,885	7,008	7,253	7,561	6,991	7,847	8,186	5.2%	2.3%	1.8%	3.5%	4.2%	-7.5%	12.2%	4.3%
Great Lakes	Great Lakes	6,386	6,651	6,945	7,128	7,347	7,715	7,273	8,049	8,543	4.1%	4.4%	2.6%	3.1%	5.0%	-5.7%	10.7%	6.1%
Illinois	Great Lakes	6,133	6,336	6,653	6,824	7,064	7,344	7,067	7,799	8,362	3.3%	5.0%	2.6%	3.5%	4.0%	-3.8%	10.4%	7.2%
Indiana	Great Lakes	6,340	6,596	6,987	7,278	7,577	7,983	7,662	8,598	9,437	4.0%	5.9%	4.2%	4.1%	5.4%	-4.0%	12.2%	9.8%
Michigan	Great Lakes	6,050	6,372	6,641	6,778	6,950	7,264	6,778	7,470	7,765	5.3%	4.2%	2.1%	2.5%	4.5%	-6.7%	10.2%	3.9%
Ohio	Great Lakes	6,711	6,972	7,249	7,454	7,664	8,144	7,539	8,322	8,770	3.9%	4.0%	2.8%	2.8%	6.3%	-7.4%	10.4%	5.4%
Wisconsin	Great Lakes	6,932	7,248	7,456	7,573	7,754	8,132	7,585	8,395	8,766	4.6%	2.9%	1.6%	2.4%	4.9%	-6.7%	10.7%	4.4%
Mideast	Mideast	6,820	7,092	7,440	7,679	8,034	8,448	8,132	8,893	9,384	4.0%	4.9%	3.2%	4.6%	5.2%	-3.7%	9.4%	5.5%
Delaware	Mideast	7,652	7,989	8,142	8,447	8,777	9,066	8,539	9,463	10,301	4.4%	1.9%	3.7%	3.9%	3.3%	-5.8%	10.8%	8.9%
District of Columbia	Mideast	9,791	10,203	10,399	10,402	10,650	10,982	10,547	11,755	12,239	4.2%	1.9%	0.0%	2.4%	3.1%	-4.0%	11.5%	4.1%
Maryland	Mideast	6,480	6,790	7,016	7,196	7,380	7,551	7,186	7,843	8,166	4.8%	3.3%	2.6%	2.6%	2.3%	-4.8%	9.1%	4.1%
New Jersey	Mideast	6,476	6,816	7,203	7,417	7,608	7,994	7,646	8,415	8,929	5.3%	5.7%	3.0%	2.6%	5.1%	-4.4%	10.1%	6.1%
New York	Mideast	6,911	7,118	7,533	7,848	8,274	8,909	8,718	9,597	10,124	3.0%	5.8%	4.2%	5.4%	7.7%	-2.1%	10.1%	5.5%
Pennsylvania	Mideast	6,866	7,163	7,457	7,630	8,077	8,301	7,864	8,468	8,944	4.3%	4.1%	2.3%	5.9%	2.8%	-5.3%	7.7%	5.6%
New England	New England	7,630	7,952	8,298	8,458	8,687	9,047	8,565	9,427	9,777	4.2%	4.4%	1.9%	2.7%	4.1%	-5.3%	10.1%	3.7%
Connecticut	New England	7,171	7,361	7,677	7,819	8,085	8,409	8,084	8,852	9,243	2.6%	4.3%	1.8%	3.4%	4.0%	-3.9%	9.5%	4.4%
Maine	New England	6,905	7,364	7,777	8,119	8,475	8,802	8,254	8,881	9,222	6.6%	5.6%	4.4%	4.4%	3.9%	-6.2%	7.6%	3.8%
Massachusetts	New England	8,176	8,550	8,936	9,068	9,239	9,637	9,101	10,141	10,491	4.6%	4.5%	1.5%	1.9%	4.3%	-5.6%	11.4%	3.5%
New Hampshire	New England	7,421	7,688	7,945	8,157	8,540	8,825	8,250	8,971	9,231	3.6%	3.3%	2.7%	4.7%	3.3%	-6.5%	8.7%	2.9%
Rhode Island	New England	6,930	7,244	7,476	7,497	7,573	7,925	7,484	8,145	8,452	4.5%	3.2%	0.3%	1.0%	4.6%	-5.6%	8.8%	3.8%
Vermont	New England	7,526	7,845	8,124	8,400	8,714	9,072	8,598	9,258	9,683	4.2%	3.6%	3.4%	3.7%	4.1%	-5.2%	7.7%	4.6%

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PER CAPITA EXPENDITURES ON HEALTHCARE SERVICES, LEVELS AND ANNUAL TRENDS

PLAINS, ROCKY MOUNTAIN, SOUTHEAST, AND SOUTHWEST

Region	Group	Per Capita PCE, Healthcare Services									Annual Trend							
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2015	2016	2017	2018	2019	2020	2021	2022
Plains	Plains	6,408	6,721	7,036	7,211	7,506	7,810	7,383	8,183	8,581	4.9%	4.7%	2.5%	4.1%	4.1%	-5.5%	10.8%	4.9%
Iowa	Plains	5,816	6,153	6,399	6,513	6,691	7,015	6,705	7,417	7,761	5.8%	4.0%	1.8%	2.7%	4.8%	-4.4%	10.6%	4.6%
Kansas	Plains	5,750	5,948	6,130	6,325	6,645	6,971	6,684	7,376	7,807	3.4%	3.1%	3.2%	5.1%	4.9%	-4.1%	10.4%	5.8%
Minnesota	Plains	7,105	7,362	7,729	7,863	8,257	8,397	7,762	8,663	8,976	3.6%	5.0%	1.7%	5.0%	1.7%	-7.6%	11.6%	3.6%
Missouri	Plains	6,167	6,527	6,840	7,023	7,245	7,565	7,164	7,892	8,323	5.8%	4.8%	2.7%	3.2%	4.4%	-5.3%	10.2%	5.5%
Nebraska	Plains	6,261	6,592	6,981	7,215	7,451	7,817	7,481	8,396	8,908	5.3%	5.9%	3.4%	3.3%	4.9%	-4.3%	12.2%	6.1%
North Dakota	Plains	7,420	7,901	8,274	8,535	8,809	9,501	9,059	10,066	10,494	6.5%	4.7%	3.2%	3.2%	7.9%	-4.7%	11.1%	4.3%
South Dakota	Plains	7,513	7,939	8,377	8,676	9,302	9,893	9,513	10,416	10,881	5.7%	5.5%	3.6%	7.2%	6.4%	-3.8%	9.5%	4.5%
Rocky Mountain	Rocky Mountain	5,388	5,678	5,911	6,122	6,383	6,602	6,218	6,873	7,286	5.4%	4.1%	3.6%	4.3%	3.4%	-5.8%	10.5%	6.0%
Colorado	Rocky Mountain	5,639	6,009	6,250	6,463	6,755	7,016	6,568	7,304	7,695	6.6%	4.0%	3.4%	4.5%	3.9%	-6.4%	11.2%	5.4%
Idaho	Rocky Mountain	5,158	5,389	5,561	5,727	5,897	6,036	5,721	6,393	6,882	4.5%	3.2%	3.0%	3.0%	2.4%	-5.2%	11.7%	7.6%
Montana	Rocky Mountain	6,294	6,660	6,959	7,237	7,608	7,947	7,508	8,275	8,519	5.8%	4.5%	4.0%	5.1%	4.5%	-5.5%	10.2%	2.9%
Utah	Rocky Mountain	4,569	4,725	4,954	5,143	5,377	5,538	5,231	5,710	6,213	3.4%	4.8%	3.8%	4.5%	3.0%	-5.5%	9.2%	8.8%
Wyoming	Rocky Mountain	6,286	6,575	6,855	7,257	7,498	7,724	7,496	8,148	8,373	4.6%	4.3%	5.9%	3.3%	3.0%	-3.0%	8.7%	2.8%
Southeast	Southeast	5,575	5,863	6,116	6,291	6,498	6,795	6,471	7,347	7,733	5.2%	4.3%	2.9%	3.3%	4.6%	-4.8%	13.5%	5.3%
Alabama	Southeast	5,195	5,452	5,710	5,816	5,957	6,259	5,987	6,678	7,032	4.9%	4.7%	1.9%	2.4%	5.1%	-4.3%	11.5%	5.3%
Arkansas	Southeast	5,152	5,462	5,865	6,137	6,269	6,597	6,314	6,974	7,482	6.0%	7.4%	4.6%	2.2%	5.2%	-4.3%	10.5%	7.3%
Florida	Southeast	5,984	6,270	6,442	6,623	6,920	7,206	6,785	7,753	8,174	4.8%	2.7%	2.8%	4.5%	4.1%	-5.8%	14.3%	5.4%
Georgia	Southeast	5,015	5,342	5,612	5,755	5,984	6,355	6,110	6,913	7,260	6.5%	5.1%	2.5%	4.0%	6.2%	-3.9%	13.1%	5.0%
Kentucky	Southeast	5,714	6,074	6,384	6,605	6,896	7,177	6,872	8,028	8,559	6.3%	5.1%	3.5%	4.4%	4.1%	-4.2%	16.8%	6.6%
Louisiana	Southeast	5,758	6,045	6,366	6,661	6,849	7,205	7,193	8,304	8,739	5.0%	5.3%	4.6%	2.8%	5.2%	-0.2%	15.4%	5.2%
Mississippi	Southeast	5,524	5,753	6,059	6,161	6,155	6,390	6,222	6,909	7,174	4.1%	5.3%	1.7%	-0.1%	3.8%	-2.6%	11.0%	3.8%
North Carolina	Southeast	5,388	5,713	5,973	6,140	6,364	6,626	6,181	7,228	7,481	6.0%	4.6%	2.8%	3.6%	4.1%	-6.7%	16.9%	3.5%
South Carolina	Southeast	5,173	5,377	5,601	5,688	5,778	6,010	5,702	6,432	6,677	3.9%	4.2%	1.6%	1.6%	4.0%	-5.1%	12.8%	3.8%
Tennessee	Southeast	5,656	5,949	6,224	6,484	6,526	6,702	6,488	7,160	7,535	5.2%	4.6%	4.2%	0.6%	2.7%	-3.2%	10.4%	5.2%
Virginia	Southeast	5,607	5,802	6,021	6,102	6,326	6,697	6,290	7,052	7,566	3.5%	3.8%	1.3%	3.7%	5.9%	-6.1%	12.1%	7.3%
West Virginia	Southeast	6,819	7,300	7,835	8,254	8,539	9,014	8,713	9,573	10,030	7.1%	7.3%	5.3%	3.5%	5.6%	-3.3%	9.9%	4.8%
Southwest	Southwest	5,286	5,552	5,721	5,860	6,007	6,266	5,958	6,663	6,961	5.0%	3.0%	2.4%	2.5%	4.3%	-4.9%	11.8%	4.5%
Arizona	Southwest	5,121	5,358	5,614	5,890	6,148	6,435	6,285	6,935	7,188	4.6%	4.8%	4.9%	4.4%	4.7%	-2.3%	10.3%	3.6%
New Mexico	Southwest	5,436	5,745	5,898	6,019	6,180	6,403	6,101	6,985	7,304	5.7%	2.7%	2.1%	2.7%	3.6%	-4.7%	14.5%	4.6%
Oklahoma	Southwest	5,584	5,805	6,005	6,232	6,474	6,675	6,326	7,043	7,627	4.0%	3.4%	3.8%	3.9%	3.1%	-5.2%	11.3%	8.3%
Texas	Southwest	5,272	5,548	5,694	5,789	5,895	6,158	5,817	6,522	6,793	5.2%	2.6%	1.7%	1.8%	4.5%	-5.5%	12.1%	4.2%

Draft: 12/12/23

Life Risk-Based Capital (E) Working Group
Orlando, Florida
December 2, 2023

The Life Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Dec. 2, 2023. The following Working Group members participated: Philip Barlow, Chair (DC); Sanjeev Chaudhuri (AL); Thomas Reedy (CA); Wanchin Chou (CT); Carolyn Morgan (FL); Mike Yanacheak (IA); Vincent Tsang (IL); Fred Andersen (MN); Michael Muldoon (NE); Jennifer Li (NH); Seong-min Eom (NJ); Bill Carmello (NY); Eli Snowbarger and Diane Carter (OK); Rachel Hemphill (TX); and Tomasz Serbinowski (UT). Also participating were: Tom Botsko and Peter Weber (OH).

1. Adopted its Oct. 4 and Summer National Meeting Minutes

The Working Group met Oct. 4 and took the following action: 1) discussed C-2 mortality risk.

Leung made a motion, seconded by Eom, to adopt the Working Group's Oct. 4 (Attachment Four-A) and Aug. 13 (see *NAIC Proceedings – Summer 2023, Capital Adequacy (E) Task Force, Attachment*) minutes. The motion passed unanimously.

2. Discussed Repurchase Agreements

Barlow said the American Council of Life Insurers (ACLI) presentation was exposed for comment, and the only comment received was a follow-up from ACLI. He said the ACLI has since provided an official proposal with the needed structural changes to the risk-based capital (RBC) blank and instructions. He said NAIC staff have discussed the proposal and believe some aspects merit referrals or requests for input from other NAIC groups, specifically the Statutory Accounting Principles (E) Working Group and the Blanks (E) Working Group for the accounting and reporting of repurchase transactions and the Capital Adequacy (E) Task Force for consideration of the application to the other RBC formulas. Barlow said a call to expose the actual proposal will be scheduled before the end of January with direction to staff to draft the suggested referrals.

3. Discussed C-2 Mortality Risk

Barlow said the memorandum on implementing the updated C-2 mortality risk is more explanation than guidance. The note to the financial statement that was part of the American Academy of Actuaries' (Academy's) proposal was to provide an annual statement source for the RBC calculation, but the proposal adopted was not contingent upon it as the RBC instructions provide the details for categorization. The data is now proposed to be captured for 2024 in a general interrogatory, which is currently exposed by the Blanks (E) Working Group. For 2023 reporting, this will be company records. The Working Group agreed to expose the memorandum for a 10-day public comment period ending Dec. 15.

4. Discussed the Status of its Subgroups

The work of the Longevity Risk (E/A) Subgroup and the Variable Annuities Capital and Reserves (E/A) Subgroup remains contingent upon the outcome of other work streams nearing completion. Yanacheak provided an update on the status of the Generator of Economic Scenarios (GOES) (E/A) Subgroup. He said there was extensive discussion of the NAIC's initiative to implement a new generator at the Life Actuarial (A) Task Force session of the Fall National Meeting and encouraged anyone interested in this project to review the materials and other items

from that meeting. As part of that meeting, he said comments were heard on an exposure that sought feedback on whether to utilize the Conning-developed corporate model or another model developed by the Academy. All of the commenters noted a preference for the model from the Academy, citing the full transparency of the model documentation provided by the Academy and the relative simplicity of the model. Some commenters noted that the Conning model could be appropriate for statutory reserves and capital but that more documentation would need to be released before they could support it. Comments were also received on a new set of acceptance criteria. Additionally, NAIC staff and Conning presented the results of a new calibration of the treasury and equity models.

Finally, an update was given on the project timeline. NAIC staff noted that the release of a new calibration of the corporate model and the model office testing had taken more time than expected but was not expected to delay the overall goal of exposing a new set of scenarios to use in an industry unaggregated field test in March 2024. Chris Conrad (Academy), chair of the Academy's Annuity Reserves & Capital Subcommittee, said the under-development principle-based framework for variable annuities (VAs), which includes indexed annuities, is expected to commence in July 2024. He said there is some dependency with the field test, which involves the Academy, the ACLI, and the NAIC, so, like other previous field tests, the parties plan to engage a consultant to assist in the field test. That consultant has been selected with the hope of finalizing that by the end of the year. The consultant will finalize the project plan, update the field test specification plans, and start engaging with industry soon. Conrad said what is relevant to this Working Group in that part of the field test is to perform tests relevant to capital, specifically tests to inform possible C-3 updates for non-VAs. In advance of the field test, he said the Academy would like to collaborate with this Working Group, but closer to when the field test will actually be conducted. He said the Academy has drafted some possible edits to C-3 language to accommodate VM-22 and to be more consistent with the approach of VM-21 and C-3, Phase II.

Having no further business, the Life Risk-Based Capital (E) Working Group adjourned.

SharePoint/NAIC Support Staff Hub/Committees/E CMTE/CADTF/2023-3-Fall/Life RBC 12-2-23 Minutes.docx

Draft: 11/13/23

Life Risk-Based Capital (E) Working Group
Virtual Meeting
October 4, 2023

The Life Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Oct. 4, 2023. The following Working Group members participated: Philip Barlow, Chair (DC); Thomas Reedy (CA); Manny Hildago (CT); Carrie Mears (IA); Vincent Tsang (IL); Fred Andersen and Ben Slutsker (MN); Michael Muldoon (NE); Jennifer Lee (NH); Seong-min Eom (NJ); Micheal Cebula (NY); Rachel Hemphill (TX); and Tomasz Serbinowski (UT).

1. Discussed C-2 Mortality Risk

Dave Fleming (NAIC) said the note to the financial statement that was part of the proposal to provide an annual statement source for the information included in the life risk-based capital mortality calculation was ultimately deferred for yearend 2023 due to concerns raised by interested parties with respect to audit implications and possible redundancy. He said an alternative presentation as a general interrogatory has been proposed for yearend 2024.

Chris Trost (American Academy of Actuaries—Academy), chair of the Academy’s C2 Mortality Risk Work Group, said the Academy is not concerned with moving the information from a note to an interrogatory. However, he noted that there could be some suggested modification to the proposed interrogatory and the Academy would be willing to assist with any needed changes. Tip Tipton (Thrivent) said the interested parties that put together the proposed interrogatory would be happy to work with Trost on suggested changes so they can be included in what will be exposed as part of the Nov. 7 Blanks (E) Working Group meeting with the further opportunity to comment on it and the expectation of adoption at the 2024 Spring National Meeting.

Barlow asked if the Working Group needed to take any action on this. Fleming said no action was needed but that it was for discussion only and, while the deferred note is the basis of any guidance from the Working Group, to ask for the Academy’s input on that. Brian Bayerle (American Council of Life Insurers—ACLI) expressed support for this approach but asked if the process would be for it to come back to the Working Group after the Blanks (E) Working Group exposure to work on instructions to align with the interrogatory. Fleming said he believes this could be done concurrently.

Having no further business, the Life Risk-Based Capital (E) Working Group adjourned.

SharePoint/NAIC Support Staff Hub/Committees/E CMTE/CADTF/2023-3-Fall/LRBCWG/Life RBC 10-4-23 Minutes

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Attachment Five
Capital Adequacy (E) Task Force
12/02/23

Draft: 12/05/23

Property and Casualty Risk-Based Capital (E) Working Group
and the Catastrophe Risk (E) Subgroup
Orlando, Florida
December 2, 2023

The Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met in Orlando, FL, Dec. 2, 2023, in joint session with the Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force. The following Working Group members participated: Tom Botsko, Chair (OH); Wanchin Chou, Vice Chair (CT); Charles Hales (AL); Rolf Kaumann (CO); Virginia Christy (FL); Sandra Darby (ME); Melissa Robertson (NM); and Miriam Fisk (TX). The following Subgroup members participated: Wanchin Chou, Chair (CT); Jane Nelson, Vice Chair (FL); Rolf Kaumann (CO); Travis Grassel (IA); Sandra Darby (ME); Melissa Robertson (NM); Tom Botsko (OH); Diane Carter (OK); and Miriam Fisk (TX). Also participating were: Kevin Dyke (MI); John Rehagen (MO).

1. Adopted the Working Group and Subgroup's Nov. 16, July 27, and July 18 Minutes

Botsko said the Working Group and Subgroup met Nov. 16. During this meeting, they took the following action: 1) exposed proposal 2023-16-CR for a seven-day public comment period that ended Nov. 23; and 2) heard a presentation from the American Academy of Actuaries (Academy) on the report *Update to Property and Casualty Risk-Based Capital Underwriting Factors and Investment Income Adjustment Factors*.

Botsko also said the Working Group met July 27. During this meeting, the Working Group took the following action: 1) adopted its June 26 and April 24 minutes, which included the following action: a) adopted its Spring National Meeting minutes; b) adopted proposal 2023-02-P, which provided a routine annual update to the line 1 premium and reserve industry underwriting factors in the property/casualty (P/C) risk-based capital (RBC) formula; and c) adopted proposal 2023-02-MOD, which updated the H/F, WC, and CMP reserve factors due to an incorrect calculation; 2) adopted the report of the Subgroup; 3) adopted the 2023 P/C RBC newsletter; 4) discussed 2022 RBC statistics; 5) discussed its working agenda; 6) discussed the possibility of reviewing and analyzing the P/C RBC charges that have not been reviewed since developed; and 7) heard updates on current P/C RBC projects from the Academy.

In addition, Botsko said the Subgroup met July 18. During this meeting, the Subgroup took the following action: 1) adopted its Spring National Meeting minutes; 2) discussed its working agenda; 3) received an update from its Catastrophe Model Technical Review Ad Hoc Group; 4) discussed wildfire peril impact analysis; 5) heard a presentation from Verisk on a severe convective storms model update and technical review; and 6) discussed the flood insurance market.

Darby made a motion, seconded by Grassel, to adopt the Working Group and Subgroup's Nov. 16 (Attachment Five-A), July 27, and July 18 minutes. The motion passed unanimously.

2. Adopted Proposal 2023-16-CR (2023 Cat Event List)

Chou said proposal 2023-16-CR provided routine catastrophe events updates two times. This time, the proposal includes Jan. 1 through Oct. 31, 2023, U.S. and non-U.S. catastrophe risk events to the catastrophe event list. He stated that the Working Group and Subgroup will re-expose this proposal for the events happening between

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Nov. 1 and Dec. 31, 2023, in Jan. 2024. Hales noted a typo in the Hurricane Lee item. The date range should be Sept. 14, 2023, through Sept. 17, 2023.

Darby made a motion with the update of the date range, seconded by Grassel, to adopt the proposal 2023-16-CR (Attachment Five-B). The motion passed unanimously.

3. Adopted the Working Group and Subgroup's Working Agenda

Botsko summarized the changes of the Subgroup's 2024 working agenda, which included the following substantial changes: 1) changing the expected completion date to the items P1 through P4 and P6; and 2) updating the comment column to the items P1, P4, and P8.

Kaumann made a motion, seconded by Darby, to adopt the Working Group and Subgroup's working agenda. The motion passed unanimously.

4. Exposed Proposal 2023-14-P (Pet Insurance)

Botsko said proposal 2023-14-P would remove pet insurance from inland marine line of business and add a new line of business to PR035, PR038, PR123, PR223, PR307, PR700, and PR701 to be consistent with the change in the annual statement. He indicated that the Working Group has no intent on changing the RBC charge for pet insurance at the present time. The RBC charges for R4 and R5 will remain the same as inland marine.

The Working Group and Subgroup agreed to expose proposal 2023-14-P for a 60-day public comment period ending Jan. 30, 2024.

5. Exposed Proposal 2023-15-CR (Convective Storm for Informational Purposes Only Structure)

Chou said proposal 2023-15-CR provides the structure change for adding severe convective storm as one of the catastrophe perils for informational purposes only in the Rcat component. He stated that while the Subgroup reviewed the possibility of expanding the current catastrophe framework to include other perils that may experience a greater tail risk under projected climate-related trends, the severe convective storm has been identified as catastrophe perils in the Rcat component. Chou also said the Subgroup will determine the appropriate factors for this peril after the completion of the impact analysis.

The Working Group and Subgroup agreed to expose proposal 2023-15-CR for a 60-day public comment period ending Jan. 30.

6. Discussed Wildfire Peril Impact Analysis

Chou said as discussed during the Summer National Meeting, the impact analysis for wildfire peril was only reviewed by a few regulators last year. The Subgroup plans to: 1) review the wildfire peril impact analysis again with those states that have signed the nondisclosure agreements (NDAs); and 2) work with vendor modelers to review and update their impact analysis by the 2024 Spring National Meeting. In addition, Chou said the Subgroup might consider adding the wildfire peril to RBC if the Subgroup is comfortable with the impact analysis results. He indicated that for those regulators who are interested in participating in the impact analysis but have not completed the NDAs, please contact the NAIC staff to obtain the NDA documents.

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7. Exposed Proposal 2023-13-CR (Disclosures for Catastrophe Reinsurance Program)

Rehagen said with the recent catastrophe-related insolvencies in the market and increasing cost of catastrophe reinsurance coverage, regulators have identified a need to collect additional detail from insurers on the structure of their catastrophe reinsurance program and any changes from the prior year on an annual basis. He stated that as such proprietary information could only be viewed as confidential and closely related to the PR027 Rcat component, the collection of additional information on an insurer's catastrophe reinsurance program is being proposed through a series of questions added to the PR027 interrogatories. Rehagen also said a referral letter from the Reinsurance (E) Task Force and a proposal including the latest version of disclosures, which was based on the comment letters received and recommendations from interested parties, was included in the meeting materials (Attachment Five-C). Lastly, he recommended the Subgroup consider moving forward with an exposure of the proposal. Botsko said he wanted to make sure the Subgroup is aware that the reinsurance information in this proposal is on a group level, not necessarily on an individual company level. Rehagen agreed.

Joseph Sieverling (Reinsurance Association of America—RAA) said the RAA filed a comment letter earlier on behalf of the American Property Casualty Insurance Association (APCIA) and the National Association of Mutual Insurance Companies (NAMIC) during the initial exposure at the Reinsurance (E) Task Force. He said the RAA appreciates and supports the NAIC staff and the RBC chairs working with the RAA to make some modification of the proposal. Sieverling also recommended that this proposal be exposed for a 60-day public comment period due to the holiday. Chou agreed and said this item will be discussed during the upcoming Catastrophe Risk (E) Subgroup meeting.

The Working Group and the Subgroup agreed to expose proposal 2023-13-CR for a 60-day public comment period ending Jan. 30, 2024.

8. Received Updates from the Convective Storm Model Review Ad Hoc Group Regarding the Convective Storm Technical Review

Chou said the Catastrophe Model Review Ad Hoc Group met Oct. 23. During this meeting, the Ad Hoc Group discussed whether the reviewing process follows *Actuarial Standard of Practice (ASOP) No. 38—Catastrophe Modeling (for All Practice Areas)*. He stated that based on ASOP No. 38, when selecting, using, reviewing, or evaluating a catastrophe model, the following steps should be taken: 1) determine the appropriate level of reliance on experts; 2) have a basic understanding of the catastrophe model; 3) evaluate whether the catastrophe model is appropriate for the intended purpose; 4) determine that appropriate validation of the catastrophe model and output has occurred; and 5) determine the appropriate use of the catastrophe model and output.

Chou said the first three items have been completed, and the Ad Hoc Group is currently working on the fourth item. He anticipated that the entire reviewing process should be completed in two months. Shaveta Gupta (NAIC) said the Ad Hoc Group invited Moody's RMS, CoreLogic, Karen Clark & Company (KCC), and Verisk to present on: 1) the different components of the model in terms of the input and output; and 2) how the vendors validate their models based on the historical footprints. She also stated that the Ad Hoc Group is currently based on ASOP No. 38 as its guiding principles, and three of them have been completed through the model vendor presentations. She expects that all the work will be completed next year.

9. Discussed the Report from the Academy on an Update to Property and Casualty Risk-Based Capital Underwriting Factors and Investment Income Adjustment Factors

Draft Pending Adoption

Attachment Five
Capital Adequacy (E) Task Force
12/02/23

Botsko said the Academy gave a presentation on this report on Nov. 16, and he provided some highlights of the report. In April 2021, the Academy issued the first report that described a calibration of the line 4 factors for premium and reserve risk. In August 2023, the Academy issued another report that covered the investment income adjustment (IIA) element of the RBC formula. It deals with line 7 or line 8 of the underwriting risk reserve and premium risk in RBC PR017 and PR018, respectively.

Sieverling said a comment letter (Attachment Five-D) that was submitted earlier stated that the RAA supports the overall approach the Academy proposes. However, there are certain policy options that have been presented for further consideration by regulators that can have significantly negative or even onerous impacts on the capital requirements for (re)insurers, depending on which options are chosen. He also indicated that the RAA encourages a careful and measured evaluation of these policy and implementation options and looks forward to providing future comments throughout the process. Botsko said he and NAIC staff will start an in-depth discussion with the Academy regarding the factors in January 2024. At the same time, he asked all the interested parties to brainstorm on whether: 1) the current factors should be changed if the working group decides to continue using the 87.5 percentile; and 2) the maximum changes: a) per year; and b) in total for some of those extreme volatile lines of business. He encouraged all interested parties to review the factors and provide comments in the upcoming meeting.

10. Discussed the Florida Commission on Hurricane Loss Projection Methodology

Donna Sirmons (Florida Commission on Hurricane Loss Projection Methodology) provided an overview of Florida Commission on Hurricane Loss Projection Methodology (FCHLPM) (Attachment Five-E), which includes the following topics: 1) commission standards; 2) hurricane and flood requirements; 3) model approval requirements; 4) current accepted hurricane models; 5) current work of the commission; and 6) commission process. Chou said this information will be able to help improve the model review process. Chou said he appreciates the FCHLPM providing a brief overview on how to review and approve the models. He said he anticipates that the Subgroup would work with the FCHLPM and get assistance in the future on: 1) how to evaluate the catastrophe models; and 2) how the model can be used properly.

Having no further business, the Property and Casualty Risk-Based Capital (E) Working Group and the Catastrophe Risk (E) Subgroup adjourned.

SharePoint/NAIC Support Staff Hub/ Member Meetings/E Cmte/CADTF/2023-3-Summer/PCRBWG

Draft: 11/21/23

Property and Casualty Risk-Based Capital (E) Working Group
and Catastrophe Risk (E) Subgroup
Virtual Meeting
November 16, 2023

The Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Nov 16, 2023, in joint session with the Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force. The following Working Group members participated: Tom Botsko, Chair (OH); Wanchin Chou, Vice Chair (CT); Charles Hale (AL); Mitchell Bronson (CO); Nicole Crockett (FL); Sandra Darby (ME); Alexander Vajda (NY); Miriam Fisk (TX); and Adrian Jaramillo (WI). The following Subgroup members participated: Wanchin Chou, Chair (CT); Nicole Crockett, Vice Chair (FL); Mitchell Bronson (CO); Sandra Darby (ME); Alexandra Vajda (NY); Tom Botsko (OH); and Miriam Fisk (TX).

1. Exposed Proposal 2023-16-CR (2023 Cat Event List)

Botsko said proposal 2023-16-CR (Attachment Five-C) provided routine catastrophe events updates two times. This exposure includes Jan. 1 through Oct. 31, 2023, U.S. and non-U.S. catastrophe risk events to the catastrophe event list. He stated that the Working Group and Subgroup will re-expose this proposal for the events happening between Nov. 1 and Dec. 31, 2023, in Jan. 2024.

The Working Group and Subgroup agreed to expose proposal 2023-16-CR for a seven-day public comment period ending Nov. 23.

2. Heard a Presentation from the Academy on the Update to Property and Casualty Risk-Based Capital Underwriting Factors and Investment Income Adjustment Factors Report

Ron Wilkins (American Academy of Actuaries—Academy) first provided a background for this report. He said that in May 2019, a letter from the Academy to this Working Group suggested three analyses related to the calibration of premium and reserve risk elements of the risk-based capital (RBC) formula. He also stated that the Academy issued the first of those reports that described a calibration of the Line 4 factors for premium and reserve risk. In August 2023, the second report was issued, covering the RBC formula's investment income adjustment (IIA) element. This report deals with Line 7 or 8 of the underwriting reserve and premium risk in RBC formula PR017 and PR018, respectively. Wilkins further explained that the IIAs are the factors that measure the extent to which future investment income might be available to provide for adverse development and/or inadequate premiums. The IIAs' effect is to reduce the premium and reserve risk charges. The IIA factors were last revised based on a 2010 Academy report that reflected updated payment pattern data but did not examine the payment pattern methodology or the 5% interest rate. The 5% interest rate has been in effect since the inception of the RBC formula, and the report considers all elements of the IIAs. Wilkins also mentioned that in evaluating the IIA factors in this report, the Academy reviewed the Line 4 line of business underwriting risk factors last revised for use in the 2019 RBC formula.

Wilkins said this presentation (Attachment Five-A1) would also cover the following key topics: 1) summary of results; 2) interest rates; 3) adjustment for catastrophe risk captured in Rcat; 4) safety level calculations; 5) minimum risk charges and year-over-year transition rules; and 6) calculation of indicated line 4 and investment income adjustment (IIA) Factors from the present value indicated risk charges. Botsko said the Working Group plans to discuss comments regarding this report at the Fall National Meeting.

Having no further business, the Property and Casualty Risk-Based Capital (E) Working Group and Catastrophe Risk (E) Subgroup adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/Summer 2023 National Meeting/Task Forces/CapAdequacy/PCRBC WG/11-16
Joint PCRBC Cat Risk Minutes.docx

Property and Casualty Risk-Based Capital Committee—Release of Recent Report

Ronald Wilkins, MAAA, FCAS
Chairperson
Property and Casualty Risk-Based Capital Committee

Highlights of Recently Issued Report to the NAIC on P&C Underwriting Factors and Investment Income Adjustment (IIA) Factors

November 16, 2023

About the Academy



- 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.
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Topics Covered Today - Key topics in the August 2023 Report except for payment patterns and the Present Value (PV) method, which were discussed in previous presentations.

- Summary of Results
- Interest Rates
- Adjustment for Catastrophe Risk Captured in R_{Cat}
- Safety Level Calculations
- Minimum Risk Charges and Year-Over-Year Transition Rules
- Calculation of indicated Line 4 and IIA factors from PV indicated risk charges.

Status of Final Report

- On August 30, 2023, the American Academy of Actuaries published on its website a report to the NAIC P&C RBC Working Group: [Update to P&C RBC Underwriting Factors and Investment Income Adjustment Factors](#)

Please refer to the final report for explanations of the methodology and implications of the analysis which produced the results presented here.

Indicated Changes in Risk Charges by Line

(1)	Premium Risk			Reserve Risk		
	(2)	(3)	(4)= (3)/(2)-1	(5)	(6)	(7)= (6)/(5)-1
LOB	Risk Charge		Change in Risk Chg	Risk Charge		in Risk Chg
	Current	Indicated		Current	Indicated	
A-HO	0.182	0.188	3.0%	0.138	0.166	20.4%
B-PPA	0.125	0.137	10.1%	0.094	0.129	37.2%
C-CA	0.185	0.201	9.1%	0.162	0.259	59.7%
D-WC	0.138	0.126	-8.8%	0.116	0.082	-28.9%
E-CMP	0.148	0.160	8.7%	0.309	0.325	5.1%
F1-MPL-O	0.534	0.363	-32.0%	0.196	0.094	-51.9%
F2-MPL-C	0.189	0.244	28.8%	0.127	0.050	-60.5%
G-SL	0.166	0.164	-1.1%	0.161	0.238	48.5%
H-OL	0.130	0.135	3.5%	0.304	0.293	-3.9%
I-SP	0.120	0.062	-48.5%	0.204	0.213	4.8%
J-APD	0.044	0.050	13.0%	0.127	0.112	-12.0%
K-Fid/Sur	0.272	0.105	-61.2%	0.289	0.440	52.4%
L-Other	0.142	0.143	1.2%	0.180	0.147	-18.4%
M-Intl	0.556	0.804	44.7%	0.188	0.852	353.6%
N-Re-Prop	0.312	0.162	-48.3%	0.275	0.204	-25.7%
O-Re-Liab	0.295	0.227	-23.2%	0.388	0.266	-31.5%
R-PL	0.307	0.286	-6.9%	0.515	1.013	96.6%
S-FG/MG	0.754	1.534	103.5%	0.092	0.050	-45.8%
T-Wrnty	0.030	0.215	617.5%	0.289	0.302	4.6%
Total/Avg	0.135	0.133	-1.7%	0.195	0.202	3.5%

Indicated Changes in ACL by Type of Company

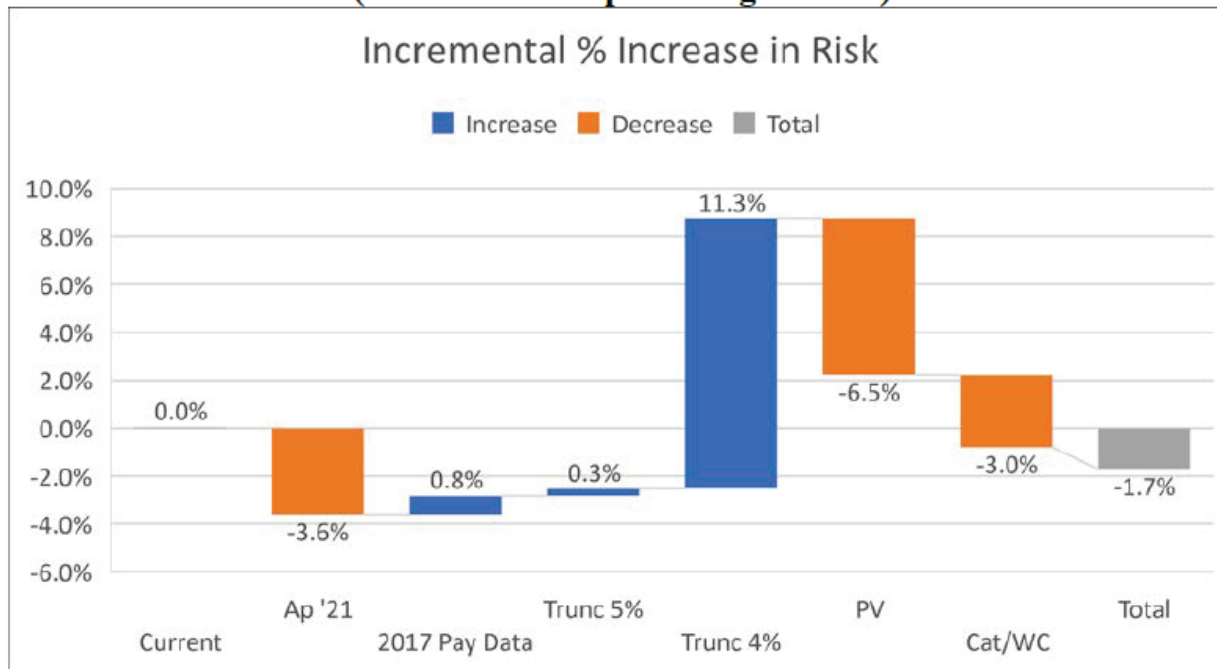
(1)	(2)	(3)	(4)	(5)	(6)
Row	Type of Company	ACL Value with 2019 Risk Charges (\$Billions)	% Change in:		
			Reserve Risk Charge	Premium Risk Charge	ACL
1	Commercial	64.9	4.8%	-4.5%	2.1%
2	Med Prof Liab	2.4	-52.2%	4.8%	-14.3%
3	NOC	0.9	21.3%	-17.6%	1.4%
4	Personal	84.3	12.4%	4.2%	1.6%
5	Reinsurance	8.2	-18.6%	-23.5%	-2.2%
6	Workers Comp	10.1	-9.7%	-2.9%	-4.8%
7	Total	170.6	3.4%	-0.8%	1.0%

Distribution of Number of Companies by Indicated Change in ACL Values

(1)	(2)	(3)
% Changes in ACL RBC	# companies	% companies
Less Than -50%	9	0%
-50% to -25%	96	5%
-25% to -15%	117	6%
-15% to -5%	194	11%
-5% to 5%	951	52%
5% to 15%	298	16%
15% to 25%	95	5%
25% to 50%	71	4%
Over 50%	6	0%
Total	1,837	100%

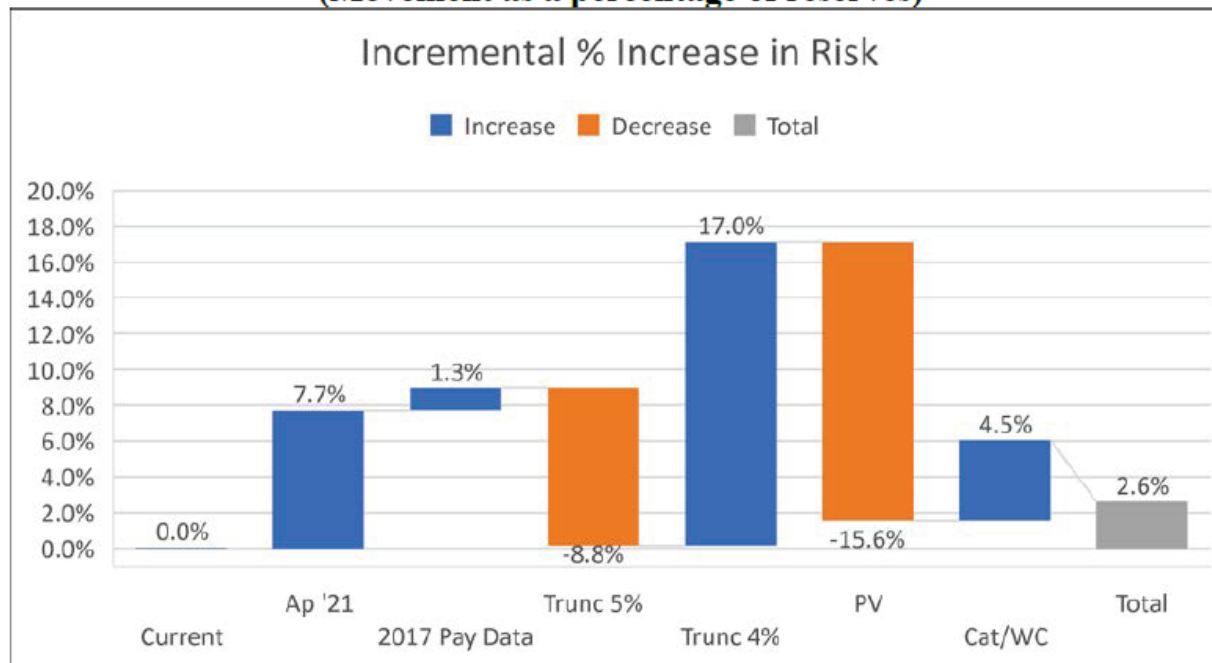
Summary of Movements in Indicated Risk Charges

Table 2.3A
Premium Risk: Movement in Indicated Risk Charge with
Assumption Changes Listed in Table 2.2
(Movement as a percentage of risk)



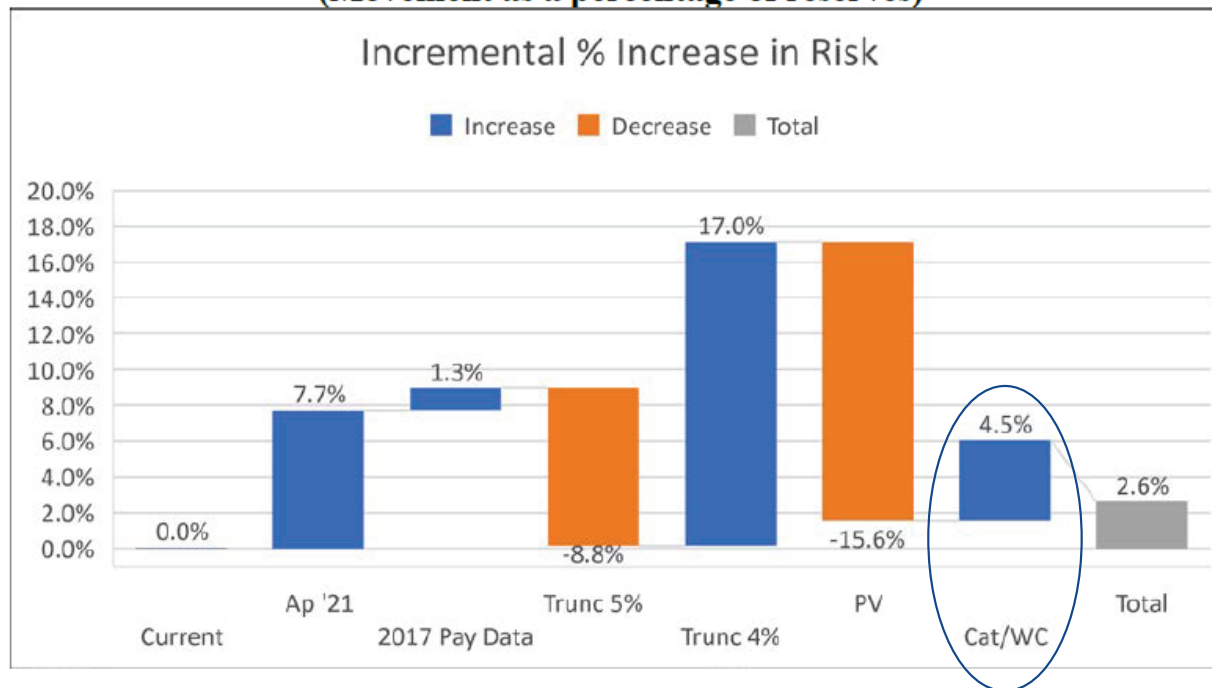
Summary of Movements in Indicated Risk Charges

Table 2.3B
Reserve Risk: Movement in Indicated Risk Charge
with Assumption Changes Listed in Table 2.2
(Movement as a percentage of reserves)



Summary of Movements in Indicated Risk Charges

Table 2.3B
Reserve Risk: Movement in Indicated Risk Charge
with Assumption Changes Listed in Table 2.2
(Movement as a percentage of reserves)



Notes on Workers' Compensation Tabular Reserve Adjustment

- Consider extending the scope of PR038, which includes certain medical tabular discount information, to all areas of discount.
- Review the variability of WC tabular discount among companies and the extent to which that affects the comparability of TAC among companies.
- We use this adjustment, but we note that it may not be correct for any company. For companies that do not discount, no adjustment is necessary, and the risk charge should be 4.6%, not 8.2%. For companies that do discount, the effect of the discount is likely to be more than 3.4%, so for them, the adjusted risk charge should be more than 8.2%.

Summary of Movements in Indicated Risk Charges

Table 2.4A
Premium: Indicated Risk Charges by LOB
 According to Movement in Indicated Risk Charge by Analysis Element Shown in Table 2.2
 Listed in Order of Decreasing Total Indicated Change

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LOB	Assumption Set							Tot Chg (8)/(2)- 100%
	Current	Ap '21	2017 Pay Data	Trunc 5%	Trunc 4%	PV	Cat/WC	
T-Wrnty	3.0%	13.9%	20.2%	20.0%	20.6%	21.6%	21.6%	619.0%
S-FG/MG	75.4%	162.9%	169.5%	162.1%	167.7%	153.4%	153.4%	103.5%
M-Intl	55.6%	98.8%	99.1%	100.4%	103.1%	94.3%	80.4%	44.7%
F2-MPL-C	18.9%	20.5%	21.7%	21.9%	25.2%	24.4%	24.4%	29.0%
J-APD	4.4%	4.5%	4.5%	4.8%	5.2%	5.4%	4.9%	10.6%
B-PPA	12.5%	13.0%	13.0%	12.8%	14.2%	13.7%	13.7%	10.3%
C-CA	18.5%	19.5%	19.3%	18.7%	20.9%	20.1%	20.1%	9.1%
E-CMP	14.8%	14.4%	15.0%	15.3%	16.8%	15.9%	16.1%	9.0%
H-OL	13.0%	13.1%	14.0%	13.0%	16.2%	13.5%	13.5%	3.8%
A-HO	18.2%	17.8%	18.0%	18.2%	18.9%	18.6%	18.8%	3.2%
L-Other	14.2%	14.0%	13.8%	14.1%	15.0%	14.3%	14.3%	1.2%
G-SL	16.6%	17.9%	19.3%	19.2%	20.7%	18.9%	16.4%	-1.4%
R-PL	30.7%	31.3%	32.1%	32.2%	37.0%	28.6%	28.6%	-6.8%
D-WC	13.8%	12.6%	11.9%	12.3%	15.2%	12.0%	12.5%	-9.1%
O-Re-Liab	29.5%	24.0%	26.4%	27.9%	32.0%	23.0%	22.7%	-23.0%
F1-MPL-O	53.4%	39.0%	37.3%	39.1%	45.0%	36.3%	36.3%	-32.1%
N-Re-Prop	31.2%	31.3%	30.6%	32.6%	34.6%	33.5%	16.1%	-48.4%
I-SP	12.0%	7.5%	7.2%	7.3%	8.2%	7.9%	6.2%	-48.4%
K-Fid/Sur	27.2%	10.2%	11.2%	10.3%	11.5%	10.6%	10.6%	-61.0%
Total/Avg	13.5%	13.0%	13.1%	13.2%	14.7%	13.7%	13.3%	-1.7%

Summary of Movements in Indicated Risk Charges

Table 2.4B
Reserves: Indicated Risk Charges by LOB
According to Movement in Indicated Risk Charge by
Analysis Element Shown in Table 2.2
Listed in Order of Decreasing Total Indicated Change

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LOB	Assumption Set							Tot Chg (8)/(2)- 100%
	Current	Ap '21	2017 Pay Data	Trunc 5%	Trunc 4%	PV	Cat/WC	
M-Intl	18.8%	78.7%	90.6%	81.6%	85.7%	85.1%	85.1%	353.5%
R-PL	51.5%	107.9%	104.7%	105.9%	113.1%	101.3%	101.3%	96.6%
C-CA	16.2%	24.0%	24.4%	24.1%	26.3%	25.9%	25.9%	59.5%
K-Fid/Sur	28.9%	50.4%	52.9%	42.5%	45.6%	44.0%	44.0%	52.5%
G-SL	16.1%	25.9%	27.9%	24.5%	27.5%	23.9%	23.9%	48.8%
B-PPA	9.4%	11.5%	11.2%	11.0%	12.7%	12.9%	12.9%	37.6%
A-HO	13.8%	14.7%	15.3%	15.1%	16.4%	16.6%	16.6%	20.4%
E-CMP	30.9%	31.3%	34.2%	32.7%	35.7%	32.5%	32.5%	5.2%
I-SP	20.4%	23.4%	23.5%	20.6%	21.9%	21.3%	21.3%	4.6%
T-Wrnty	28.9%	23.4%	28.1%	24.9%	26.1%	30.2%	30.2%	4.6%
H-OL	30.4%	30.1%	31.3%	29.8%	33.9%	29.2%	29.2%	-4.0%
J-APD	12.7%	10.5%	10.4%	10.2%	10.8%	11.2%	11.2%	-12.1%
L-Other	18.0%	18.5%	18.0%	13.0%	14.7%	14.7%	14.7%	-18.5%
N-Re-Prop	27.5%	21.0%	21.4%	21.2%	23.5%	20.4%	20.4%	-25.7%
D-WC	11.6%	10.8%	10.5%	6.7%	11.3%	4.6%	8.2%	-29.2%
O-Re-Liab	38.8%	37.1%	37.2%	31.3%	36.9%	26.5%	26.5%	-31.6%
F1-MPL-O	19.6%	9.4%	7.6%	6.9%	10.4%	9.4%	9.4%	-52.1%
F2-MPL-C	12.7%	-3.4%	-3.0%	-3.6%	-1.3%	-0.9%	-0.9%	-106.9%
S-FG/MG	9.2%	-7.3%	-4.2%	-10.0%	-8.2%	-5.0%	-5.0%	-154.9%
Total/Avg	19.5%	21.1%	21.3%	19.4%	22.7%	19.2%	20.1%	2.6%

Interest Rates

US Treasury average per annum interest rates

A. Date Range	3 Year	5 Year
2018	2.6%	2.7%
2019	1.9%	2.0%
2020	0.4%	0.5%
2021	0.5%	0.9%
2022	3.0%	3.0%
Jan - June 2023	4.0%	3.7%
Jan-Oct 2023	4.3%	4.0%
B. Monthly 2023	3 Year	5 Year
Jan-23	3.9%	3.6%
Feb-23	4.2%	3.9%
Mar-23	4.1%	3.8%
Apr-23	3.8%	3.5%
May-23	3.8%	3.6%
Jun-23	4.3%	3.9%
Jul-23	4.5%	4.1%
Aug-23	4.6%	4.3%
Sep-23	4.7%	4.5%
Oct-23	4.9%	4.8%

- To choose the updated IIA interest rate for this analysis, we might follow what appears to be the method used in the 1990s. As such, we would make a conservative selection considering current interest rates and longer-term trends.
- Looking at 2023 through October 31 a rate of 4% might be appropriate. However, if we had followed the same method at years ended 2018 through 2022, we would have indicated interest rates ranging from 0.5% to 3%.
- An alternative calibration method we use in this Report recognizes that risk factors tend to increase when interest rates increase and vice versa and selects a combined indicated risk charge rather than selecting separate risk factors and IIAs. When we apply the alternative method, our indicated risk charges are largely independent of interest rate forecasts.
- To separate the indicated risk charges into its risk factor and IIA elements, for all lines of business (LOBs), we use a 4% interest rate. The risk charges are not sensitive to the 4% interest rate choice.

Premium Risk—Catastrophe Adjustments

- Beginning with year-end 2017 reporting, the RBC Formula includes a new risk component, R_{CAT} , covering hurricane and earthquake components of the total premium risk.
- The Line 4 premium risk factors are based on data that includes hurricane and earthquake claims. Therefore, there is a potential duplication between the Line 4 risk factors and R_{CAT} . To remove that overlap, for the 2017 RBC Filings, the NAIC reduced the otherwise applicable Line 4 factor by an amount we call the catastrophe adjustment.
- The analysis documented in the August 2023 Report is the first Academy review of the catastrophe adjustment.
- Regulators provided us with summarized and blinded catastrophe and non-catastrophe data from confidential RBC Filings for this purpose.
- We evaluated the portion of risk charges related to catastrophes for the years where we have catastrophe data (AYs 2004-2017). We evaluated the extent to which those years are representative of the 1988-2017 experience period this Report uses to calibrate risk charges.
- We produced indicated catastrophe adjustments (see next slide).

Premium Risk—Catastrophe Adjustments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOB	Current Cat Adjustment	Data	Data	(3)-(4)	Selected Cat Adjustment	(3)+exp-100%	(6)/(7)
		87.5th Total LR	87.5th Non Cat LR	Indicated Cat Adjustment		87.5th Total Risk Charge	Cat Adj As % of Risk Charge
A-HO	2.8%	91.5%	88.9%	2.6%	2.6%	20.4%	12.7%
E-CMP	1.8%	83.3%	81.7%	1.6%	1.6%	18.9%	8.6%
G-SL	1.6%	96.0%	91.7%	4.3%	4.3%	29.8%	14.4%
I-SP	1.6%	82.8%	79.4%	3.4%	3.4%	12.9%	26.3%
J-APD	0.0%	84.8%	84.2%	0.6%	0.6%	8.0%	7.5%
M-Intl	0.0%	192.1%	159.3%	32.8%	15.0%	136.0%	11.0%
N-Re-Prop	6.9%	122.1%	96.2%	25.9%	25.9%	48.8%	53.0%
O-Re-Liab	0.0%	100.5%	100.2%	0.4%	0.4%	27.2%	1.3%
R-PL	0.0%	100.8%	100.6%	0.3%	0.0%	33.8%	0.0%

Premium Risk—Catastrophe Adjustments

- For J-APD, the Lines 1 to 3 calculations of PR018 (which compare the company historical loss ratio to the industry historical loss ratio) use total losses, including catastrophe losses. For other LOBs with catastrophe adjustments, the calculations in Lines 1 to 3 use losses excluding the company catastrophe losses. As the data shows catastrophe losses for J-APD, it might be appropriate to make the J-APD calculations for Lines 1 to 3 of PR018 the same as for the other LOBs with catastrophe exposure.
- A key assumption in our analysis is that the hurricane and earthquake modeling includes reasonable provisions for all losses of the types that are reported in the catastrophe experience. The NAIC should consider the extent to which the modeling is sufficiently comprehensive.
- We observed unexpected differences in indicated undiscounted risk charges between Annual Statement data and RBC data. That may be an issue related to the early-year use of the RBC forms PR101, etc., for reporting historical hurricane and earthquake loss experience. The NAIC should consider whether differences can be investigated.

Statistical Safety Level in RBC

- Setting the safety level for the P&C RBC formula is a policy decision for regulators.
- The indicated company action level risk charges in the August 2023 Report are based on the 87.5th percentile safety level.
- The August 2023 Report shows the impact of using various safety levels in RBC.
- Preliminary impacts of higher safety levels on indicated risk charges (compared to 87.5 percentile)
 - 90th percentile safety level increases premium risk charges about 25%, reserve risk charges about 40%.
 - 95th percentile safety level increases premium risk charges about 120% and reserve risk charges about 180%.
- Considerations for not changing the safety level:
 - Capital required for a loss development runoff time horizon of nine years is more than that required by some regulatory solvency formulas which utilize a one-year development horizon.
 - Past analysis has shown that larger companies, who cover most policyholders, have lower indicated risk charges than smaller and mid-sized companies, implying a higher safety level for most policyholders.
- Considerations for increasing the safety level
 - 87.5% is lower than the safety level in any other component of the RBC Formula or, to our knowledge, in regulatory capital formulas in other countries (e.g., Rcat=99%, Bond Factors=96%).
 - Risk charges have declined over time, concurrent with interest rates. But there is no reason to expect a continuation of the downward trend in risk.
 - Years prior to 1988, with poor experience, have been excluded from the analysis and deserve some consideration.
 - Captives and runoff companies may now rely on regulatory capital requirements more, making the setting of regulatory capital more important.

Indicated Risk Charges at Various Safety Levels

Table 9.1A
 Premiums: Indicated Risk Charges at Various Safety Levels

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOB	Current Risk Charge	PV Indicated risk Charges			(4)/(2)-1	(4)/(3)-1	(5)/(3)-1
		Premium			90 v current	90 v 87.5	95 v 87.5
		87.5th	90th	95th			
A-HO	18.2%	18.8%	21.9%	34.0%	20%	17%	81%
B-PPA	12.5%	13.7%	16.2%	24.6%	30%	18%	79%
C-CA	18.5%	20.1%	24.2%	38.3%	31%	20%	90%
D-WC	13.8%	12.5%	16.1%	27.2%	17%	29%	117%
E-CMP	14.8%	16.1%	19.1%	29.5%	29%	19%	84%
F1-MPL-O	53.4%	36.3%	42.9%	69.3%	-20%	18%	91%
F2-MPL-C	18.9%	24.4%	30.0%	46.4%	58%	23%	90%
G-SL	16.6%	16.4%	22.4%	30.1%	35%	37%	84%
H-OL	13.0%	13.5%	19.1%	39.0%	47%	41%	188%
I-SP	12.0%	6.2%	9.5%	23.3%	-21%	54%	275%
J-APD	4.4%	4.9%	7.3%	15.4%	66%	51%	217%
K-Fid/Sur	27.2%	10.6%	16.0%	35.8%	-41%	51%	238%
L-Other	14.2%	14.3%	18.8%	35.8%	33%	31%	150%
M-Intl	55.6%	80.4%	117.5%	184.4%	111%	46%	129%
N-Re-Prop	31.2%	16.1%	24.0%	57.0%	-23%	49%	254%
O-Re-Liab	29.5%	22.7%	31.0%	54.5%	5%	36%	140%
R-PL	30.7%	28.6%	40.4%	91.8%	31%	41%	221%
S-FG/MG	75.4%	153.4%	177.7%	374.0%	136%	16%	144%
T-Wrnty	3.0%	21.6%	28.9%	37.4%	862%	34%	73%
Avg	13.5%	13.3%	16.7%	28.8%	24%	26%	117%

- We can use Table 9.1 to assess how adequate/inadequate current risk charges are from an implied safety level perspective. In column 2, we mark LOBs where the current risk charges are above the 90th indicated percentile level (yellow and bold) or within 10% of the 90th percentile level (yellow but not bold). These are the LOBs where current risk charges are particularly high relative to an 87.5th percentile safety level.

Indicated Risk Charges at Various Safety Levels

Table 9.1B
 Reserves: Indicated Risk Charges at Various Safety Levels

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOB	Current Risk Charge	PV Indicated risk Charges			(4)/(2)-1	(4)/(3)-1	(5)/(3)-1
		Reserve			90 v current	90 v 87.5	95 v 87.5
		87.5th	90th	95th			
A-HO	13.8%	16.6%	22.6%	47.0%	64%	36%	184%
B-PPA	9.4%	12.9%	17.8%	35.7%	89%	37%	176%
C-CA	16.2%	25.9%	32.4%	60.0%	99%	25%	132%
D-WC	11.6%	8.2%	12.8%	28.4%	10%	56%	247%
E-CMP	30.9%	32.5%	39.9%	72.1%	29%	23%	122%
F1-MPL-O	19.6%	9.4%	16.2%	40.4%	-17%	72%	330%
F2-MPL-C	12.7%	-0.9%	4.6%	24.7%	-64%	NM	NM
G-SL	16.1%	23.9%	30.7%	60.3%	91%	29%	152%
H-OL	30.4%	29.2%	39.1%	73.1%	28%	34%	150%
I-SP	20.4%	21.3%	31.6%	66.9%	55%	48%	214%
J-APD	12.7%	11.2%	20.5%	59.3%	61%	84%	430%
K-Fid/Sur	28.9%	44.0%	69.8%	144.1%	142%	58%	227%
L-Other	18.0%	14.7%	22.5%	54.8%	25%	54%	274%
M-Intl	18.8%	85.1%	113.8%	423.1%	506%	34%	397%
N-Re-Prop	27.5%	20.4%	28.9%	59.8%	5%	42%	193%
O-Re-Liab	38.8%	26.5%	39.1%	88.2%	1%	47%	232%
R-PL	51.5%	101.3%	128.0%	231.3%	148%	26%	128%
S-FG/MG	9.2%	-5.0%	-1.5%	36.3%	-116%	NM	NM
T-Wrnty	28.9%	30.2%	46.2%	262.0%	60%	53%	768%
Avg	19.5%	20.1%	27.5%	55.2%	41%	37%	175%

- For F2-MPL-C and S-FG/MG, for reserve risk, comparisons of 90th and 95th percentile safety levels to the 87.5th percentile safety level are not meaningful (NM) because the 87.5th percentile indicated risk charge is negative.
- Negative indicated risk charges arise when the investment income projected by the IIA is larger than the undiscounted risk charge.
- In those cases, the risk charge would be increased to a minimum selected by the NAIC.

Minimum Risk Charges and Year-Over-Year Capping Approaches

- Imposing transition rules and a minimum risk charge are decisions for regulators. Calculations shown in the August 2023 Report related to transition rules and minimum risk charges are only illustrative.
- We have considered a minimum risk charge of 5%, consistent with the current lowest risk charge.
- We looked at various capping approaches to limit changes in risk charge over one year to +/- 10%, 20%, or 35%, values which the committee has reviewed in the past.
- These risk charge limits are calculated line by line assuming a company with LOB expense ratio equal to the industry expense ratios and assuming no company loss experience adjustment.
- The next three slides illustrate transition rules and minimum risk charges, while showing the calculation of indicated Line 4 and IIA factors from PV indicated risk charges.

Calculation of Line 4 and IIA Factors – Part A

Table 10.1
Sample Calculation of Line 4 and Line 7/8 Factors

Row	Step	LOB			
		Premium Risk		Reserve Risk	
		A-HO	F2-MPL-C	A-HO	F2-MPL-C
A. Indicated Line 4 and IIA Factors					
1	Indicated Risk Charge-PV Approach; Gross of Cat; Including risk development horizon and WC tabular adjustments (Appendix 5 Exhibit A5-1A, 1B, col 7).	21.3%	24.4%	16.6%	-0.9%
2	Expense Ratio (Table 1.1A, column 2)	28.9%	25.5%	NA	NA
3	IAs- 40-year runoff payment pattern; 4% interest; (Exhibit A2-5A and 5B; Also Table 1.1)	0.966	0.863	0.951	0.896
4	Indicated Line 4 Factor Gross of Cat Prem: (4) = $(1.0+(1)-(2))/(3)$ Reserve: (4) = $(1.0+(1))/(3)-1.0$	0.956	1.146	22.6%	10.6%
5	Indicated Catastrophe Adjustment (Table 7.1, column 6)	2.6%	NA	NA	NA
6	Indicated Line 4 Factor Net of Cat (6) = (4) - (5)	0.930	1.146	0.226	0.106

- The calibration method (PV method) used in the 2023 Report recognizes that risk factors tend to increase when interest rates increase and vice versa and selects a combined indicated risk charge rather than selecting separate risk factors and IAs. The purpose of Table 10.1 is to show the calculation of indicated Line 4 and IIA factors from PV indicated risk charges. This is necessary so that Line 4 and IIA factors will be available for the RBC formula template.
- Row 3: IAs based on the 40-year runoff payment pattern by LOB and a 4% interest rate. We use the 40-year runoff payment pattern rather than the 40-year truncated payment pattern. We use the 40-year truncated payment pattern to put the RDHA into the overall risk charge (see page 47 of Report). However, the runoff payment pattern better presents the actual investment income potential. Using the runoff payment pattern for IAs makes the risk factors higher than they would be with the truncated payment pattern. That is correct because the RDHA is an increase in the risk factor.
- The indicated risk charges in row 1 do not include any transition limitations. In the past, the NAIC limited the maximum change in any LOB risk factor in any year to a set amount. We believe that is a good practice. The maximum change per year is a policy matter for the NAIC. The August 2023 Report does not show the effect of limits, other than the 10% example in Table 10.1, Part C.
- Row 6 is the value to be used in the RBC Formula, absent the application of minimums and transition rules.

Calculation of Line 4 and IIA Factors – Part B

Table 10.1
Sample Calculation of Line 4 and Line 7/8 Factors

Row	Step	LOB			
		Premium Risk		Reserve Risk	
		A-HO	F2-MPL-C	A-HO	F2-MPL-C
A. Indicated Line 4 and IIA Factors					
1	Indicated Risk Charge-PV Approach; Gross of Cat; Including risk development horizon and WC tabular adjustments (Appendix 5 Exhibit A5-1A, 1B, col 7).	21.3%	24.4%	16.6%	-0.9%
2	Expense Ratio (Table 1.1A, column 2)	28.9%	25.5%	NA	NA
3	IAs- 40-year runoff payment pattern; 4% interest; (Exhibit A2-5A and 5B; Also Table 1.1)	0.966	0.863	0.951	0.896
4	Indicated Line 4 Factor Gross of Cat Prem: (4) = $(1.0+(1)-(2))/(3)$ Reserve: (4) = $(1.0+(1))/(3)-1.0$	0.956	1.146	22.6%	10.6%
5	Indicated Catastrophe Adjustment (Table 7.1, column 6)	2.6%	NA	NA	NA
6	Indicated Line 4 Factor Net of Cat (6)=(4)-(5)	0.930	1.146	0.226	0.106
B. Illustration of Minimum Risk Charges					
7	Indicated Risk Charge Net of Cat Prem: (6)*(3)+(2)-1.0 Reserve: $(1.0+(6))*(3)-1.0$	18.8%	24.4%	16.6%	-0.9%
8	Max of 5.0% and row (7)	18.8%	24.4%	16.6%	5.0%
9	Indicated Line 4 Factor Net of Cat, after minimum Prem: (9) = $(1.0+(8)-(2))/(3)$ Reserve: (9) = $(1.0+(8))/(3)-1.0$	0.930	1.146	22.6%	17.2%

- Rows 7-9 illustrate how we calculate the Line 4 factor when applying a 5% minimum risk charge. This is only illustrative - imposing a minimum risk charge is a decision for regulators.
- Row 7: Risk charge net of catastrophes. We calculate this by applying the risk charge formula to row 6, the indicated Line 4 risk factor net of the indicated catastrophe adjustment.
- Row 8: Indicated risk charge equals the maximum of the indicated risk charge from row 7, or the selected minimum, 5% in this example. The minimum applies to the risk charge after catastrophe adjustment.
- Row 9: Converts the risk charge in row 8 to the Line 4 risk factor. For any LOB with a risk charge already 5.0% or greater, row 9 = row 6.

Calculation of Line 4 and IIA Factors – Part C

Row	Step	LOB			
		Premium Risk		Reserve Risk	
		A-HO	F2-MPL-C	A-HO	F2-MPL-C
B. Illustration of Minimum Risk Charges					
7	Indicated Risk Charge Net of Cat Prem: $(6) \times (3) + (2) - 1.0$ Reserve: $(1.0 + (6)) \times (3) - 1.0$	18.8%	24.4%	16.6%	-0.9%
8	Max of 5.0% and row (7)	18.8%	24.4%	16.6%	5.0%
9	Indicated Line 4 Factor Net of Cat, after minimum Prem: $(9) = (1.0 + (8) - (2)) / (3)$ Reserve: $(9) = (1.0 + (8)) / (3) - 1.0$	0.930	1.146	22.6%	17.2%
C. Illustration of application of transition rules with maximum changes					
10	2022 Risk Factor, net of cats (Table 1.1 column 2)	0.936	1.130	0.213	0.276
11	2022 IIA (Table 1.1)	0.954	0.827	0.938	0.883
12	2022 Risk Charge (Net of Cats) Prem: $(10) \times (11) + (2) - 1.0$ Reserve: $(1.0 + (10)) \times (11) - 1.0$	18.2%	18.9%	13.8%	12.7%
13	Indicated change in risk charge (net of cats) $(12) / (7) - 100\%$	3.2%	29.0%	20.4%	-106.9%
14	Line 13 subject to Maximum increase 10.0% Maximum decrease -10.0%	3.2%	10.0%	10.0%	-10.0%
15	Indicated risk charge after transition limitations; subject to 5% minimum $\text{Max}((1.0 + (14)) \times (12), 5\%)$	18.8%	20.8%	15.2%	11.4%
16	Indicated Line 4 Factor Net of Cat After Transition Caps and Minimum Prem: $(1.0 + (15) - (2)) / (3)$ Reserve: $(1.0 + (15)) / (3) - 1.0$	0.930	1.105	0.211	0.243

- Rows 10-16 illustrate how we calculate the Line 4 factor when applying a maximum increase/decrease of 10% in risk charge. This is only illustrative - imposing transition rules is a decision for regulators.
- Rows 10, 11: Show the current (2022) RBC Formula Line 4 and IIA factors, respectively.
- Row 12: We calculate the risk charge implied by the 2022 Line 4 and IIA factors.
- Row 13: The change in risk charge from the 2022 risk charge to the indicated risk charge = $(\text{row 7}) / (\text{row 12}) - 1.0$.
- Row 14 = Row 13 but limited to reflect the selected transition maximum increase and decrease (+/-10% in this illustration).
- Row 15: Indicated risk charge after transition caps and minimum risk charge.
- Row 16: Line 4 factor after transition caps and minimum risk charge.

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**Report to the
National Association of Insurance Commissioners
Property and Casualty Risk-Based Capital (E) Working Group**

**Update to
Property and Casualty Risk-Based Capital
Underwriting Factors and
Investment Income Adjustment Factors**

Presented by the American Academy of Actuaries¹
Property and Casualty Risk-Based Capital Committee

August 30, 2023

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 policy makers 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.

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The analysis and conclusions in this Report reflect the opinions of the committee members and do not necessarily reflect the views of their employers or the actuarial organizations in which they are members.

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1. BACKGROUND & RESULTS

Background

The American Academy of Actuaries Property and Casualty Risk-Based Capital Committee (“Committee” or “We”) prepared this Report (“Report”) at the request of the National Association of Insurance Commissioners’ (“NAIC”) Property and Casualty (P&C) Risk-Based Capital (RBC) Working Group (“NAIC Working Group” or “Working Group”).

In this Report, we evaluate indicated Investment Income Adjustment (IIA) factors by Line of Business (“LOB”) for the Underwriting (UW) Risk elements of the P&C RBC Formula (“RBC Formula” or “Formula”), specifically, RBC Line 8 on page PR017 (R4 UW Risk—Reserves) and Line 7 on page PR018 (R5 UW Risk—Net Written Premium). We refer to these as the “IIA Factors,” “IIAs,” or “Line 7/8 Factors.”²

The IIAs were last revised for use in the 2013 RBC Formula. That revision reflected updated payment pattern data but did not examine the payment pattern methodology or the 5% interest rate in effect since the inception of the RBC Formula. This Report considers all elements of the IIAs.

In evaluating the IIA Factors in this Report, we also review the LOB UW risk factors, i.e., Line 4 on pages PR017 and PR018 for the RBC Formula. We refer to these as “Risk Factors” or “Line 4 Factors.” The Line 4 factors in the RBC Formula were last revised for use in the 2019 RBC Formula.

This Report is Report 2 in a series of three reports we described to the NAIC Working Group in May 2019:

- Report 1: Indicated risk factors. We provided Report 1 to the Working Group in March 2021 and revised it in April 2021 (“April 2021 Report”³).
- Report 2: Indicated IIA factors. In addition to developing indicated Line 7/8 IIA factors, in this Report, we revise the Line 4 factors presented in Report 1.
- Report 3: Loss Concentration Factor (“LCF”) and Premium Concentration Factor (“PCF”)—RBC Line 14 on pages PR017 and PR018, respectively, for which work is underway.

² “PR017” and “PR018” refer to pages in the 2022 NAIC P&C RBC Formula forms, which insurers file annually on a confidential basis.

³ American Academy of Actuaries Property and Casualty Risk-Based Capital Committee, “[Report to the National Association of Insurance Commissioners Property and Casualty Risk-Based Capital \(E\) Working Group Update to Property and Casualty Risk-Based Capital Underwriting Factors Experience Through December 31, 2017.](#)” Presented March 2021 (Revised April 21, 2021).

The analysis presented in this Report uses the same insurance industry data as Report 1, issued in April 2021, i.e., data evaluated through December 31, 2017.⁴ The Report uses economic data through June 30, 2023.

Indicated Risk Charges

Tables 1.1, 1.2, and 1.3 below show the results of our analysis.

Table 1.1: Current and Indicated Premium and Reserve Risk Charges

Tables 1.1A and 1.1B show the current and indicated⁵ Line 4 factors, the IIAs, and the risk charges by LOB and for all LOBs combined, for premium risk and reserve risk, respectively. The risk charges represent the combined effect of Line 4 factors and IIAs. We highlight the LOBs with the five largest increases and the five largest decreases.

The all-line average change in risk charge in the tables is -1.7% for premium risk and +3.5% for reserve risk, respectively. Those average indicated changes are small, but there are large changes for individual LOBs. Many of those large changes were identified in the April 2021 Report.

⁴ Substantial work is involved in data preparation for the three analyses in the May 2019 letter to the NAIC. Therefore, we planned to produce the three reports with the same data. While Reports 1 and 2 have taken longer than we anticipated, adding additional data was not clearly beneficial as (a) processing additional data would have delayed this report, (b) the data includes 38 AYS, 1980-2017, so the effect of adding a small number of years, unless they identify new trends, is likely to be low, and (c) additional data through 2020, for example, would include the initial COVID-affected years, but not the full cycle of COVID emergence in favorable and unfavorable impacts on loss ratio and reserve development.

⁵ Indicated risk charges mean the values produced with the methods and assumptions described in this Report. The NAIC is responsible for deciding the extent to which those are suitable for the RBC Formula.

Table 1.1A
Premium Risk: Current and Indicated RBC Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)= (9)/(8)-1
LOB	% NEP by LOB	Expense Ratio	Risk Factor (Line 4)		IIA (Line 7)		Risk Charge		Change in Risk Chg
			Current	Indicated	Current	Indicated	Current	Indicated	
A-HO	15.8%	0.289	0.936	0.930	0.954	0.966	0.182	0.188	3.0%
B-PPA	24.2%	0.228	0.969	0.970	0.925	0.937	0.125	0.137	10.1%
C-CA	4.1%	0.286	1.010	1.014	0.890	0.903	0.185	0.201	9.1%
D-WC	8.5%	0.262	1.044	1.037	0.839	0.833	0.138	0.126	-8.8%
E-CMP	6.3%	0.356	0.883	0.873	0.896	0.921	0.148	0.160	8.7%
F1-MPL-O	0.4%	0.255	1.668	1.394	0.767	0.795	0.534	0.363	-32.0%
F2-MPL-C	1.1%	0.255	1.130	1.146	0.827	0.863	0.189	0.244	28.8%
G-SL	0.9%	0.338	0.922	0.894	0.898	0.924	0.166	0.164	-1.1%
H-OL	8.3%	0.304	1.013	0.993	0.816	0.837	0.130	0.135	3.5%
I-SP	7.1%	0.301	0.863	0.795	0.949	0.957	0.120	0.062	-48.5%
J-APD	17.4%	0.232	0.836	0.835	0.971	0.979	0.044	0.050	13.0%
K-Fid/Sur	1.1%	0.500	0.854	0.657	0.904	0.922	0.272	0.105	-61.2%
L-Other	1.7%	0.256	0.935	0.926	0.947	0.958	0.142	0.143	1.2%
M-Intl	0.04%	0.439	1.234	1.476	0.905	0.925	0.556	0.804	44.7%
N-Re-Prop	1.4%	0.267	1.170	0.973	0.893	0.919	0.312	0.162	-48.3%
O-Re-Liab	1.0%	0.267	1.322	1.183	0.777	0.811	0.295	0.227	-23.0%
R-PL	0.5%	0.330	1.263	1.194	0.774	0.801	0.307	0.286	-6.9%
S-FG/MG	0.1%	0.341	1.598	2.431	0.884	0.902	0.754	1.534	103.5%
T-Wrnty	0.2%	0.258	0.854	0.985	0.904	0.972	0.030	0.215	617.5%
Total/Avg	100.0%	0.270	0.950	0.934	0.915	0.927	0.135	0.133	-1.7%

See notes after Table 1.1B

Table 1.1B
Reserve Risk: Current and Indicated RBC Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)= (8)/(7)-1
LOB	% Reserve by LOB	Risk Factor (Line 4)		IIA (Line 8)		Risk Charge		Change in Risk Chg
		Current	Indicated	Current	Indicated	Current	Indicated	
A-HO	4.6%	0.213	0.226	0.938	0.951	0.138	0.166	20.4%
B-PPA	19.3%	0.179	0.205	0.928	0.937	0.094	0.129	37.2%
C-CA	5.3%	0.276	0.360	0.911	0.926	0.162	0.259	59.7%
D-WC	24.5%	0.344	0.382	0.830	0.783	0.116	0.082	-28.9%
E-CMP	6.5%	0.494	0.475	0.876	0.898	0.309	0.325	5.1%
F1-MPL-O	1.7%	0.383	0.271	0.865	0.861	0.196	0.094	-51.9%
F2-MPL-C	2.7%	0.276	0.172	0.883	0.896	0.127	0.050	-60.5%
G-SL	0.8%	0.304	0.401	0.890	0.884	0.161	0.238	48.5%
H-OL	19.5%	0.531	0.496	0.852	0.864	0.304	0.293	-3.9%
I-SP	3.6%	0.246	0.272	0.966	0.954	0.204	0.213	4.8%
J-APD	1.2%	0.155	0.137	0.976	0.978	0.127	0.112	-12.0%
K-Fid/Sur	0.7%	0.371	0.586	0.940	0.908	0.289	0.440	52.4%
L-Other	1.2%	0.220	0.225	0.967	0.936	0.180	0.147	-18.4%
M-Intl	0.04%	0.359	1.083	0.874	0.889	0.188	0.852	353.6%
N-Re-Prop	1.9%	0.415	0.319	0.901	0.913	0.275	0.204	-25.7%
O-Re-Liab	4.3%	0.656	0.596	0.838	0.793	0.388	0.266	-31.5%
R-PL	2.4%	0.802	1.377	0.841	0.847	0.515	1.013	96.6%
S-FG/MG	0.04%	0.179	0.146	0.926	0.916	0.092	0.050	-45.8%
T-Wrnty	0.02%	0.371	0.355	0.940	0.961	0.289	0.302	4.6%
Total/Avg	100.0%	0.365	0.385	0.879	0.872	0.195	0.202	3.5%

See notes on the next page.

Notes to Tables 1.1A and 1.1B

Expense ratio = 2017 average industry expense ratio by LOB.

Premium Risk Charge: Column (8) = (4) * (6) + (3) -1.0; Column (9) = (5) * (7) + (3) -1.0

Reserve Risk Charge: Column (7) = ((1.0+(3)) * (5)) - 1.0; Column (8) = ((1.0+(4)) * (6)) - 1.0

The indicated risk charges reflect the application of a minimum risk charge of 5%. We believe a minimum is appropriate. The current smallest risk charge is approximately 5%. The level of the minimum is a policy matter for the NAIC. The LOBs affected by minimum risk charges and the risk charge before the minimum are S-FG/MG (-5.0%) and F2-MPL-C (-0.9%) for reserve risk and J-APD (4.9%) for premium risk. Negative risk charges arise if the projected future investment income exceeds the 87.5th percentile adverse development or underwriting loss. The average change in reserve risk charge would be +2.6% without the application of the 5% minimum.

The indicated risk charges do not include any transition limitations. In the past, the NAIC limited the maximum change in any LOB risk factor in any year to a set amount. We believe that is a good practice. The maximum change per year is a policy matter for the NAIC.

The risk charges in Table 1.1, columns 8 and 9 for premium risk and 7 and 8 for reserve risk are simplifications. They represent the risk charge for a monoline company with industry average expenses for its LOB, no own-company adjustment (RBC Formula Lines 1-3), no charge for excessive growth, and no loss sensitive business adjustment. The reserve risk charge also does not reflect the reserve discount adjustments or the reinsurance credit risk component that are part of the R4 reserve risk in the RBC Formula. These LOB risk charges are useful in understanding the line-by-line impact of the indicated changes in risk factors and IIAs.

The averages in Table 1.1 are weighted using the 2017 Schedule P Part 1 net earned premium or net loss and loss adjustment expense (LAE) reserves as weights, except that for S-FG/MG, we use S-FG/MG information from RBC Filings because many S-FG/MG companies are not required to make RBC Filings. We show the premium and reserve weights in column 2.

See Terminology (Section 2, first sub-section) and the Glossary at the end of this report for LOB descriptions.

Indicated risk charges are based on the 87.5th percentile safety level used in past Academy Line 4 calibration reports. The safety level is a policy matter for the NAIC.

We show risk charges in columns 8 and 9 for premium and 7 and 8 for reserves, rounded to three decimal places. We calculate the risk charge changes in columns 10 and 9, for premium and reserves, respectively, from the unrounded risk charge values. Because of that rounding, calculating values in those columns from the rounded values may produce values different than those shown.

The “current factors in Table 1.1 differ slightly from the “current factors” in the April 2021 Report, Table 1a, page 7, for two reasons. First, for the LOBs with catastrophe adjustments (see Section 7), the current and indicated factors in Table 1.1A are net of those catastrophe adjustments, while the factors in the April 2021 report are before those adjustments. Second, for all-line averages in this report, the premium and reserve weights for S-FG/MG are from the RBC Filings, as some monoline S-FG/MG companies are not required to make RBC Filings. The weights in the April 2021 Report are from the Annual Statement. The LOB is small but has some large, indicated changes in factors. These two features do not affect the NAIC impact analyses in Tables 1.2 and 1.3.

Table 1.2: NAIC Impact Estimates

To provide a more complete summary of the effect of the revised risk factors by company, NAIC staff applies the 2019 RBC Formula with alternative premium and reserve risk factors and IIAs to each company.⁶ The NAIC aggregates and blinds that information and provides it to this Committee.

**Table 1.2
Indicated Changes in RBC Values by Type of Company**

(1)	(2)	(3)	(4)	(5)	(6)
Row	Type of Company	ACL Value with 2019 Risk Charges (\$Billions)	% Change in:		
			Reserve Risk Charge	Premium Risk Charge	ACL
1	Commercial	64.9	4.8%	-4.5%	2.1%
2	Med Prof Liab	2.4	-52.2%	4.8%	-14.3%
3	NOC	0.9	21.3%	-17.6%	1.4%
4	Personal	84.3	12.4%	4.2%	1.6%
5	Reinsurance	8.2	-18.6%	-23.5%	-2.2%
6	Workers Comp	10.1	-9.7%	-2.9%	-4.8%
7	Total	170.6	3.4%	-0.8%	1.0%

Using 2019 RBC Formula with 2022 Line 4 and Line 7/8 factors.

NOC = "Not otherwise classified" Type of Company.⁷

The NAIC calculation includes the own-company adjustment, premium and loss concentration factors, and the interaction of reinsurance credit risk with reserve risk. The NAIC calculations use the company's total expense ratio rather than industry expense ratios by LOB. Therefore, the NAIC impact assessment for R4 and R5 differs from the all-line average for premium and reserve risk we show in Table 1.1.

Table 1.2 shows the composite industry effect on RBC values using Table 1.1 indicated factors, in total and by Type of Company.⁸ On this NAIC basis, the change in R4 reserve risk is +3.4% compared to the all-line average of 3.5% from Table 1.1. The change in R5 premium risk is -0.8% compared to the all-line average of -1.7% from Table 1.1.

⁶ Including only companies with RBC Filings in 2019 and non-zero net written premium plus loss reserves. The RBC Formula in 2019 has some differences from the current RBC Formula. For example, it does not include the recent change in asset categories and asset risk factors.

⁷ "NOC," standing for Not Otherwise Classified, means companies for which the portion of net written premium plus loss reserves is greatest for the sum of the following LOBs: G-SL, K-Fid/Sur, L-Other, M-Intl, or S-FG/MG.

⁸ As described in the April 2021 Report, each LOB is categorized as typical of a particular Type of Company, e.g., B-PPA is typical of Personal Lines companies. For each company, the category with the largest amount of net written premium (NWP) + reserves determines the Type for that company. For example, a company with more of its premium in B-PPA, Homeowners A-HO and J-APD than in any of the other groups of LOBs is categorized as Personal. Appendix 8 provides more details.

The Authorized Control Level (ACL), Table 1.2, column 6, reflects the combination of all RBC risk elements.⁹ Column 6 shows that the indicated factors and IIAs produce large decreases for the Medical Professional Liability Type of Company. The effect on ACL for other Types of Company is within $\pm 5\%$. The ACL impact on Reinsurance is low, despite the large decreases in premium risk and reserve risk charges because, on average, reinsurer RBC has a larger than average share of other risks, notably the RBC risk types called R0 and R2.^{10,11}

Table 1.3: Distribution of Changes in Risk Charge

Individual companies have distinct characteristics, including distributions of premium and reserves by LOB, so the average risk charge and change in risk charge will not reflect the situation for all companies. To provide a measure of company variability, Table 1.3 shows the distribution of percentage changes in ACL value, comparing the ACL value based on 2022 RBC factors and IIAs to the ACL value based on the indicated risk factors and IIAs.

The change in ACL is within $\pm 5\%$ for about half of the companies and within $\pm 15\%$ for over 75% of companies. It is beyond our scope to review the effects on individual companies, particularly whether the increases move any companies into an RBC action level or decreases move any companies out of an RBC action level.

⁹ The indicated risk factors and IIAs in Table 1.1 would be used to calculate the premium and reserve risk charges that become part of the Company Action Level (CAL) RBC. The ACL is 50.0% of the CAL. We describe ACL and CAL further in Section 2, Terminology.

¹⁰ The 2019 RBC Instructions, 8/16/19, page 48, describe R0 and R2 as follows: R0 – Affiliated Insurance Companies and Misc. Other Amounts RBC, and R2 – Equity Assets RBC.

¹¹ There are a small number of large companies with unusually high proportions of stocks. This can reduce the extent to which the average represents typical companies.

Table 1.3
Distribution of Number of Companies by Change in ACL Values

(1)	(2)	(3)
% Changes in ACL RBC	# companies	% companies
Less Than -50%	9	0%
-50% to -25%	96	5%
-25% to -15%	117	6%
-15% to -5%	194	11%
-5% to 5%	951	52%
5% to 15%	298	16%
15% to 25%	95	5%
25% to 50%	71	4%
Over 50%	6	0%
Total	1,837	100%

2. SUMMARY

In this Report, we assume the reader is familiar with the methods, data, and conclusions presented in the Committee’s April 2021 Report.

In this summary, we outline our key calibration methods and assumptions. Tables 2.2-2.4, at the end of this section, show the marginal effect of each method or assumption change. Note that the calculated marginal impacts depend on the order in which we present them in those Tables.

1. Terminology

The Glossary at the end of this Report contains a list of acronyms and key terms. This section presents several of the terms we use routinely.

First, Table 2.1 below shows 19 short-form names for the LOBs used in the RBC Formula. We generally refer to LOBs using the letter and short label combined, i.e., A-HO. The Glossary describes the LOBs in more detail.

Table 2.1
LOB Descriptions

(1)	(2)	(3)	(1)	(2)	(3)
RBC LOB Name (PR017 and PR018)	Schedule P Letter Code	Short Label	RBC LOB Name (PR017 and PR018)	Schedule P Letter Code	Short Label
H/F	A	HO	AUTO PHYSICAL DAMAGE	J	APD
PPA	B	PPA	FIDELITY/SURETY	K	Fid/Sur
CA	C	CA	OTHER (INCLUDE CREDIT, A&H)	L	Other
WC	D	WC	INTL	M	Intl
CMP	E	CMP	REIN PROPERTY & FINANCIAL LINES	N	Re-Prop
MPL OCCURRENCE	F1	MPL-O	REIN LIABILITY	O	Re-Liab
MPL CLMS MADE	F2	MPL-C	PL	R	PL
SL	G	SL	FINANCIAL/MORTGAGE GUARANTY	S	FG/MG
OL	H	OL	WARRANTY	T	Wrnty
SPECIAL PROPERTY	I	SP			

This Report refers to **risk factors**, **IAs**, and **risk charges**.

The **risk factors** are the Line 4 factors in the RBC Formula for both reserve risk (PR017) and premium risk (PR018).

The **IAs** are the factors on Line 8 (PR017 for reserve risk) or Line 7 (PR018 for premium risks). These measure the extent to which future investment income on assets corresponding to future premium and loss reserves is expected to be available to provide for adverse loss reserve development and/or inadequate premiums. The effect of the IAs is to reduce the premium and reserve risk charges by the amount of such investment income.¹²

The **risk charge** is the combined effect of the risk factor, the IIA, and, for premium, the expense ratio. The notes in Table 1.1 show the formulas for calculating risk charges by LOB.

When the context is clear, we use the term risk charge to refer to either the percentage risk charge or the dollar amount of the risk charge. When the distinction is significant, we refer to the dollar value as the risk charge value and the percentage as the risk charge %.

¹² In some regulatory capital formulas, e.g., Solvency II, the effect of the future investment income is reflected in discounted loss reserves rather than as a reduction of risk charges.

We use the term **undiscounted risk charge** to mean the risk charge before applying the IIAs, calculated as follows:

$$\text{Undiscounted Premium Risk Charge}_{\text{LOB}} = \text{Premium Risk Factor}_{\text{LOB}} + \text{Industry Average Expense Ratio}_{\text{LOB}} - 100\%$$

$$\text{Undiscounted Reserve Risk Charge}_{\text{LOB}} = \text{Reserve Risk Factor}_{\text{LOB}}$$

We use the term **Present Value (PV) Method** to describe the calibration of risk charges directly rather than calibrating the risk factor and IIA separately.

The term **all-line average**, applied to risk charges, risk factors, etc., means the weighted average of LOB values using the 2017 Schedule P Part 1¹³ net earned premium or December 31, 2017, net loss and loss adjustment expense (LAE) reserves.

Interest rates, e.g., 5%, are per annum.

RBC Terminology

Unless otherwise specified, references to the **RBC Formula** and **current factors** relate to the 2022 RBC Formula.

The **Authorized Control Level (ACL)** capital is 50% of the **Company Action Level (CAL)** capital value from the RBC Formula.¹⁴ The factors we discuss are used to produce the CAL level RBC.

R4 and **R5** are the RBC Formula's reserve risk and premium risk elements, respectively.

Age/Development

We use the term “**age**,” referring to the development age of losses.

For an Accident Year (AY), age 1 refers to payments, reserves, or incurred amounts as of the end of the AY. The most mature AY data point from Schedule P is at age 10.

¹³ Using RBC values for LOB S-FG/MG, as discussed in Notes to Tables 1.1A and 1.1B.

¹⁴ If the company's Total Adjusted Capital is below the Company Action Level (CAL) value from the RBC Formula, then, according to the RBC Instructions, subject to state laws and regulations, “. . .the company [is required] to prepare and submit an RBC Plan to the commissioner of their state of domicile. The RBC Plan is to be submitted within 45 days. After review, the commissioner will notify the company if the plan is satisfactory.” The value produced by the RBC Formula on PR032, Line 71, is the CAL value.

The Authorized Control Level (ACL) for capital is 50% of the CAL value. “Authorized Control Level authorizes the commissioner to take whatever regulatory actions are considered necessary to protect the best interest of the policyholders and creditors of the insurer, which may include the actions necessary to cause the insurer to be placed under regulatory control (i.e., rehabilitation or liquidation).”

For reserves, the **initial reserve year** is the year ending at the selected valuation date. This is usually the year of the least mature AY in the reserve, i.e., the initial reserve year for the reserves as of December 31, 1995, is 1995.

For reserves, age 1 means the **initial reserve**, i.e., the reserve at the selected valuation date. Age 10 refers to the reserve after nine development years.

2. Interest Rates (Section 3)

The interest rate used in the RBC Formula IIA is 5%, selected in the original RBC calibration in the early 1990s. To our knowledge, there is no written documentation for the 5% interest rate. We understand that the 5% interest rate was selected considering U.S. Treasury interest rates. The U.S. Treasury rates in the early 1990s averaged over 6%.

To choose an updated IIA interest rate for this analysis, we might follow what appears to be the method in the 1990s. As such, we would make a conservative selection considering current interest rates and longer-term trends.

For example, based on 2023 three- and five-year¹⁵ U.S. Treasury interest rates through June 30, 2023, a rate of 4% might be the highest appropriate value.¹⁶ (Table 3.3)

This method would need to be applied carefully. Following the same method for years ending 2018 through 2022 would indicate interest rates ranging from 0.4% to 3.0%. (See Table 3.3). In the current method, the risk charges are sensitive to interest rate changes. Table 2.2, row 5, later in this section, shows that the effect of the change in interest rates from 5% to 4% is an increase in risk charges of 11.3% for premium risk and 17.0% for reserve risk.

The alternative calibration method we use in this Report recognizes that risk factors tend to increase when interest rates increase and vice versa and selects a combined indicated risk charge rather than selecting separate risk factors and IIAs. We call this the present value method, or PV Method. Section 5 explores that method in detail.

When we apply the PV Method, our indicated risk charges are largely independent of interest rate forecasts:

- We use historical interest rates by year to calculate the present values of loss ratios (LRs) and reserve runoff ratios (RRRs)¹⁷ by LOB, company and year.¹⁸

¹⁵ We show three- and five-year U.S. Treasury interest rates because the durations of those securities reflect the duration of payment patterns for many LOBs.

¹⁶ We use 4% in the interest rate and payment patterns sections of this report to illustrate the effect of a decrease in interest rates in the current method. If we used a lower interest rate, e.g., 3% or 3.5%, with the current method, the indicated risk charges would be larger.

¹⁷ Defined in the April 2021 Report.

¹⁸ As we describe in Section 5, for each LOB, for each year in the 1980-2017 experience period, we use U.S. Treasury interest rates, with durations matching the individual LOB premium or reserve payment patterns. We call these 'duration-matched' interest rates.

- To separate the indicated risk charge into its risk factor and IIA elements, for all LOBs, we use a 4% interest rate, based on current interest rates. The risk charges in the PV Method are not sensitive to the 4% interest rate choice.¹⁹

3. Payment Patterns (Section 4)

Next, we consider payment pattern data and methods.

3.1: Updated Data

The payment pattern underlying the current IIAs (“2010 Method”) was last updated in 2010 using data through 2008. That method uses 10-year payment patterns for most LOBs and up to 15 years for some LOBs. We first update the LOB payment patterns using the same method but with data through 2017. The all-line average effect on risk charges due to the data updated through 2017, with the 5% interest rate, is small, 0.8% for premium risk and 1.3% for reserve risk (Table 2.2, row 3).²⁰

3.2: 40-Year Runoff Payment Pattern

For this Report, we use a different method to determine payment patterns. The 2010 Method allows payment patterns to extend up to 15 years. This maximum is realistic for most, but not all,²¹ LOBs. Among other features, our revised method allows for payment patterns extending to as many as 40 years of loss payments, as indicated by the data. We refer to the revised method as the “40-year runoff payment pattern” method.

In Section 4, we describe our payment pattern method. Appendix 2, Exhibits A2-5A and A2-5B, show the 40-year runoff payment patterns for premium and reserve risk, respectively.

3.3: Risk Development Horizon & 40-Year Truncated Payment Pattern

Recognizing the potentially long payment patterns for some LOBs highlights that the premium and reserve risk calibration data in this analysis is limited to the 10-year “window” in the Schedule P and RBC data.

Our analysis indicates that risk continues to develop beyond the risk development horizon available in the Schedule P and RBC data. We use the term “reported risk development horizon” or “risk development horizon” to describe the window of available data and the term “risk development horizon adjustment” (“RDHA”) to describe how we address the data limitation.

¹⁹ As we discuss in the sections below, with the PV Method, when interest rates change, risk factors also change in a way that produces the same combined risk charge. From that perspective, a change in interest rate does not affect the risk charge produced by Lines 4 and 7/8. However, for reserve risk, but not for premium risk, for a company with experience that differs from the industry average, calculated with Lines 1-3, the offset is not complete. Higher interest rates make the company experience adjustment somewhat larger and vice versa.

²⁰ Comparing the risk charges using the indicated risk factors in the April 2021 Report and the current IIAs to risk charges and IIAs in the RBC Formula.,

²¹ For payment patterns for premium risk, five LOBs have payments of more than 10% at ages 10 and beyond, D-WC, F1-MPL-O, H-OL, O-Re-Liab, and R-PL.

For reserves, seven LOBs have reserve payments of more than 10% at ages 10 and beyond. The same five LOBs as premium plus G-SL and M-Intl. (Exhibits A3-2A and B).

A complete analysis of the premium and reserve risk beyond year 10 is outside the scope of this Report; however, providing investment income credit for the extended payment periods without considering the full extent of risk development would not be a balanced treatment of risk and financial capacity.

Therefore, we construct LOB payment patterns based on the 40-year runoff payment pattern but limited to 10 years, the AY plus nine years of development, for premium risk and limited to 10 years, the initial reserve year plus nine years of development, for reserve risk. We refer to those as “40-year truncated payment patterns.” In using those patterns, we are assuming that the additional risk development is an amount equal to the effect of the difference between the 40-year truncated payment pattern.

Compared to using the IIAs based on the 2010 payment pattern with updated data, the all-line average change in risk charges due to the 40-year truncated payment pattern with a 5% interest rate is +0.3% for premium risk and -8.8% for reserves.²² (Tables 2.2, row 4)

Appendix 3, Exhibits A3-2A and A3-2B show the 40-year truncated payment patterns for premium and reserve risk, respectively.

4. Present Value (PV) Method (Sections 5 and 6)

All else being equal, we would calibrate risk factors using the longest available period of history and independently establish IIAs based on current or forecasted interest rates and selected payment patterns. However, that is appropriate only to the extent that (a) the history is relevant to the projection of future experience and (b) LRs and RRRs in the history are independent of historical interest rates.

Section 5 examines the relationship between undiscounted risk charges and interest rates. We calculate discounted and undiscounted risk charges on a year-by-year basis from 1980-2017. We observe the following:

- Undiscounted indicated risk charges are correlated with interest rates, higher when interest rates are higher and vice versa.
- There is a downward trend in undiscounted indicated risk charges.²³
- Discounted risk charges, combining risk factors and interest rates on a year-by-year basis, show a lower correlation with interest rates and a trend closer to zero.

Given the observed correlation and downward trend in risk charges, and given current interest rates, we conclude that separately calibrating risk factors and interest rates would result in

²² See Section 4 for a discussion of why the 40-year truncated payment pattern for reserves implies a longer payment pattern than the 2010 Method.

²³ This decline over time is closely related to the correlation between declining interest rates and undiscounted risk charges.

inappropriately high risk charges. Therefore, we conclude that calibrating the combined interest rate and risk factor, the PV Method, yields more appropriate risk charges.²⁴

In the PV Method, we use year-by-year LRs/RRRs, discounted using the 40-year runoff payment pattern and year-by-year interest rates equal to the rates on U.S. Treasury securities with maturities matching the premium and reserve LOB payment patterns. The indicated risk charges are the 87.5th percentile of these discounted LRs/RRRs over the selected experience period, plus the RDHA, plus, for premium, expenses minus 1.0.²⁵

In Section 6, we show the risk charges and changes in risk charges that result from applying the PV Method including the RDHA.

5. Catastrophe adjustments (Section 7)

Beginning with year-end 2017 reporting, the RBC Formula includes a new risk component, R_{CAT}, covering hurricane²⁶ and earthquake components of the total premium risk. The Line 4 premium risk factors are based on data that includes hurricane and earthquake losses. Therefore, there is a potential duplication between the Line 4 risk factors and R_{CAT}. To remove that duplication, for each affected LOB, beginning with the 2017 RBC Filings, the NAIC reduced the otherwise applicable Line 4 factor by an amount we call the catastrophe adjustment.

This Report contains the first Academy review of the catastrophe adjustment. Regulators provided us with summarized and blinded catastrophe and non-catastrophe data from confidential RBC Filings for this purpose. We evaluate the portion of risk charges related to catastrophes for the years where we have catastrophe data. We evaluate the extent to which those years are representative of the 1988-2017 experience period this Report uses to calibrate risk charges. We produce indicated revised catastrophe adjustments.

Compared to the current catastrophe adjustments, the revised catastrophe adjustments are slightly lower for A-HO and E-CMP, slightly higher for J-APD and O-Re-Liab, moderately higher for I-SP and G-SL, and significantly higher for M-Intl and N-Re-Prop. Higher catastrophe adjustments mean lower Line 4 Factors and vice versa.

Table 7.1 shows the current and indicated catastrophe adjustments by LOB.

²⁴ The relationship between interest rate and risk charges is plausible, but it is a matter for future research to examine the extent to which the pattern continues.

²⁵ The RDHA equals the difference between the risk charges using the 40-year truncated payment pattern and risk charges using the 40-year runoff payment pattern using a 4% interest rate, as shown in Appendix 5, Exhibit A5. The 4% interest rate is the all-line average duration-matched interest rate from 1988 through 2017, the range of our calibration data from Schedule P. This 4% interest rate happens to be the same as the current interest rates that we discuss in Section 3, but we have derived it differently. The RDHA interest rate reflects the interest rate during the 1988-2017 experience period. The interest rate to separate the risk charge into Line 4 and IIA factors is based on current/forecasted interest rates.

²⁶ Including NAIC-designated tropical storms.

6. WC Tabular Reserve Adjustment (Section 8)

Generally, for Annual Statement purposes, P&C insurance companies report reserves on an undiscounted basis, but there are some exceptions. Most importantly for our analysis, companies are permitted to report D-WC reserves discounted to reflect tabular reserves for lifetime annuity claims (tabular discount).²⁷ Some companies report WC reserves with tabular discount, and others report on an undiscounted basis. On average, the tabular discount at December 31, 2017, is 3.4% of reported reserves. On average, the LR for 2008, the most mature AY in the 2017 Annual Statement, has a tabular discount equal to 0.6% of premium.

The tabular discount in the data affects the calibration and the application of the RBC Formula. To adjust for this, we calibrate risk charges based on the average company, assuming all companies have the average tabular discount. We increase the D-WC premium risk factor by 0.6% of premium, and we increase the D- WC reserve risk charge by 3.4% of reserves plus 3.4% of the risk charge. Section 8 describes our analysis.

While those adjustments correct the RBC value on average, it remains the case that:

- After the WC tabular adjustment, the risk charge is relatively high for companies that do not discount and relatively low for some companies that do discount, and
- For otherwise identical companies, the RBC Total Adjusted Capital (TAC) for companies that discount will be higher than TAC for companies that do not discount.

Our analysis does not address the lack of comparability.

7. Safety Levels (Section 9)

Following past practice, the indicated risk factors are based on the 87.5th percentile safety level for the RBC CAL.

There have been Working Group discussions about the appropriate safety level to use in various components of the RBC formula. To support potential future discussion about safety levels to use for the reserve and premium risk charges, but not to take a position on the need, if any, for changing the safety level, we compare indicated risk charges using the current safety level of 87.5% to two higher safety levels, 90%, and 95%.²⁸

The all-lines average effects on risk charges of using the 90th percentile safety level rather than the 87.5th percentile safety level are increases of 26% and 37% on premium and reserve risk, respectively. The corresponding effects at the 95th percentile safety level are increases of 117% and 175% on premium and reserve risk, respectively (Tables 9.1A and 9.1B, respectively).

Setting the safety level is a policy decision for regulators.

²⁷ There may be tabular discounts in other LOBs, for example, for excess WC that is reported in the H-OL LOB. We do not make adjustments on those LOBs.

²⁸ The safety level is intended to apply to the risk over the time required to fully pay AY losses for premium risk and unpaid losses at the valuation date (runoff time horizon) for reserve risk.

8. Summary of Movements Described Above

This sub-section discusses the all-lines combined movement and the LOB-by-LOB movements in risk charges indicated by our analysis.

All-Lines Combined Movement

Table 2.2 shows the indicated all-line average change in risk charges based on the assumptions and methods used in this Report and outlined in sub-sections 2.1-2.6 above.

Table 2.2
Change in All-Lines Average Indicated Risk Charge with Assumption Changes

(1)	(2)	(3)	(4)	(5)	(6)
Assumptions	Short Label for Tables 2.3 and 2.4	Risk charges		Incremental % Increase in Risk	
		Prem	Rsv	Prem	Rsv
(1) Current	Current	13.5%	19.5%	0.0%	0.0%
(2) Ap '21/ Current IIA	Ap '21	13.0%	21.1%	-3.6%	7.7%
(3) Ap '21/5% Interest; 2010 method updated data	2017 Pay Data	13.1%	21.3%	0.8%	1.3%
(4) Ap '21/5% Interest; 40-year truncated pay pattern	Trunc 5%	13.2%	19.4%	0.3%	-8.8%
(5) Ap '21/4% Interest; 40-year truncated	Trunc 4%	14.7%	22.7%	11.3%	17.0%
(6) PV Approach	PV	13.7%	19.2%	-6.5%	-15.6%
(7) Revised Cat Adjustments/ WC Tabular Adjustment	Cat/WC	13.3%	20.1%	-3.0%	4.5%
(8) Total Change (7)/(1)-1.0%	Total	13.3%	20.1%	-1.7%	2.6%

Values in columns 5 and 6 show the percentage change from the prior row to the row with the percentage, e.g., row 3, column 5 shows 0.8% = 13.1 / 13.0-1.0 as %.

Note: We show risk charges in columns 3 and 4, rounded to three decimal places. We calculate the risk charge changes in columns 5 and 6 from the unrounded risk charge values. Because of that rounding, calculating column 5 or 6 from the rounded values in columns 3 and 4 may produce values different than those shown. This rounding effect is particularly noticeable with small changes. For example, in row 3, $0.213 / 0.211 = 0.9\%$, but $0.21315 / 0.21051 = 1.3\%$, as shown.

We believe the unrounded percentages better reflect the effect on the RBC values than the rounded values. This rounding issue applies to all tables in this report.

The 2.6% average increase in reserve risk charges is lower than the 3.5% average increase in reserve risk charges in Table 1.1 because Table 1.1 includes the effect of the 5% minimum risk charge. **We apply the minimum risk charge as a final step, and it is not reflected in any Table in the report other than the Tables in Section 1.**

Columns 3 and 4 show the all-lines average risk charges for premium and reserve risk, respectively. Columns 5 and 6 show the incremental percentage change in risk charge from one set of assumptions to the next. The assumption sets are as follows:

- Row 1: The current all-lines average risk charges.
- Row 2: The risk charges using the indicated risk factors in the April 2021 Report and the current IIAs.

- Rows 3, 4, and 5 show the risk charges with the April 2021 indicated risk factors and IIAs based on each of the following:
 - Row 3: 5% interest, updating the payment pattern data but using the 2010 payment pattern method.
 - Row 4: 5% interest with the 40-year truncated payment pattern.
 - Row 5: 4% interest with the 40-year truncated payment pattern.
- Row 6: “PV”—Risk Charges using the PV Method.
- Row 7: Row 6 with revised catastrophe adjustments and the WC tabular adjustment. Note that catastrophe adjustments apply to premium risk only.

Tables 2.3A and 2.3B below show these incremental movements graphically for premium and reserve risk, respectively. The horizontal labels use the abbreviations from column 2 in Table 2.2.

Table 2.3A
Premium Risk: Movement in Indicated Risk Charge with
Assumption Changes Listed in Table 2.2
(Movement as a percentage of risk)

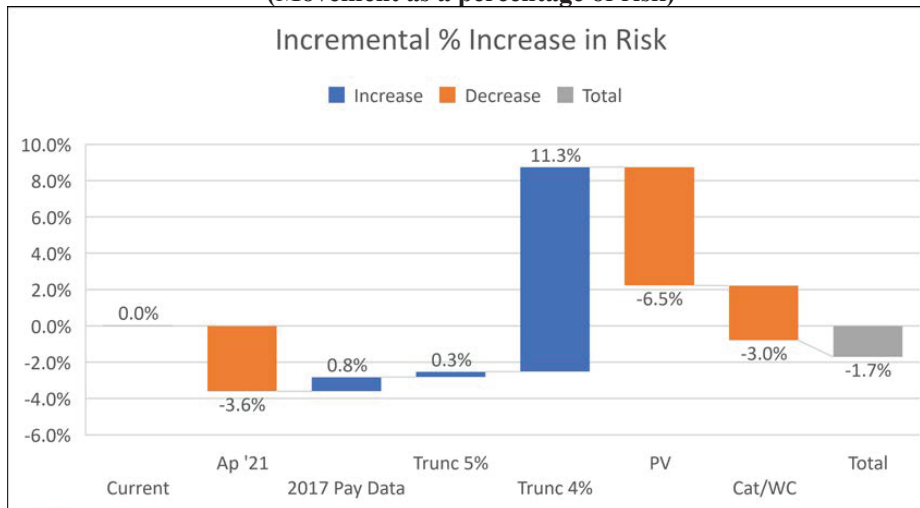
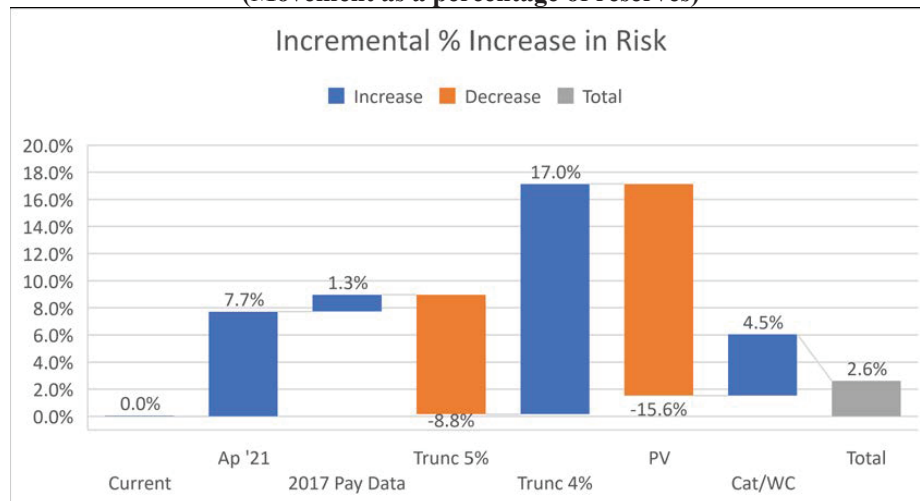


Table 2.3B
Reserve Risk: Movement in Indicated Risk Charge
with Assumption Changes Listed in Table 2.2
(Movement as a percentage of reserves)



The all-lines average indicated changes based on the April 2021 analysis, the “Ap ‘21” bar, are -3.6% for premium risk and +7.7% for reserve risk.

Based on this review, the all-lines average indicated changes are -1.7% for premium risk and +2.6% for reserve risk. Thus, overall, the indicated risk charges from this analysis are for smaller changes (closer to zero) than in the April 2021 review.

However, there are offsetting effects in this analysis. The change to a 4% interest rate would have increased the premium and reserve risk charges. For premium risk, this increase is almost entirely offset using the PV approach and the revised catastrophe adjustment. For reserve risk, the increase due to a change to a 4% interest rate is almost fully offset using the PV Method.

Movement by LOB

Tables 2.4A and 2.4B show the indicated risk charges by LOB with the assumptions listed in Table 2.2.

Column 9 shows the percentage change in the risk charge reflecting all elements of change in indicated risk charges. We list the LOBs from the largest increase to the largest decrease.

Table 2.4A
Premium: Indicated Risk Charges by LOB
According to Movement in Indicated Risk Charge by Analysis Element Shown in Table 2.2
Listed in Order of Decreasing Total Indicated Change

(1) LOB	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) Tot Chg (8)/(2)- 100%
	Assumption Set							
	Current	Ap '21	2017 Pay Data	Trunc 5%	Trunc 4%	PV	Cat/WC	
T-Wrnty	3.0%	13.9%	20.2%	20.0%	20.6%	21.6%	21.6%	619.0%
S-FG/MG	75.4%	162.9%	169.5%	162.1%	167.7%	153.4%	153.4%	103.5%
M-Intl	55.6%	98.8%	99.1%	100.4%	103.1%	94.3%	80.4%	44.7%
F2-MPL-C	18.9%	20.5%	21.7%	21.9%	25.2%	24.4%	24.4%	29.0%
J-APD	4.4%	4.5%	4.5%	4.8%	5.2%	5.4%	4.9%	10.6%
B-PPA	12.5%	13.0%	13.0%	12.8%	14.2%	13.7%	13.7%	10.3%
C-CA	18.5%	19.5%	19.3%	18.7%	20.9%	20.1%	20.1%	9.1%
E-CMP	14.8%	14.4%	15.0%	15.3%	16.8%	15.9%	16.1%	9.0%
H-OL	13.0%	13.1%	14.0%	13.0%	16.2%	13.5%	13.5%	3.8%
A-HO	18.2%	17.8%	18.0%	18.2%	18.9%	18.6%	18.8%	3.2%
L-Other	14.2%	14.0%	13.8%	14.1%	15.0%	14.3%	14.3%	1.2%
G-SL	16.6%	17.9%	19.3%	19.2%	20.7%	18.9%	16.4%	-1.4%
R-PL	30.7%	31.3%	32.1%	32.2%	37.0%	28.6%	28.6%	-6.8%
D-WC	13.8%	12.6%	11.9%	12.3%	15.2%	12.0%	12.5%	-9.1%
O-Re-Liab	29.5%	24.0%	26.4%	27.9%	32.0%	23.0%	22.7%	-23.0%
F1-MPL-O	53.4%	39.0%	37.3%	39.1%	45.0%	36.3%	36.3%	-32.1%
N-Re-Prop	31.2%	31.3%	30.6%	32.6%	34.6%	33.5%	16.1%	-48.4%
I-SP	12.0%	7.5%	7.2%	7.3%	8.2%	7.9%	6.2%	-48.4%
K-Fid/Sur	27.2%	10.2%	11.2%	10.3%	11.5%	10.6%	10.6%	-61.0%
Total/Avg	13.5%	13.0%	13.1%	13.2%	14.7%	13.7%	13.3%	-1.7%

Main driving assumptions by LOB for premium risk—Table 2.4A

For each LOB, we highlight the column with the largest absolute change in risk charge (increases or decreases) between columns. For example, the largest increase in T-Wrnty risk charge is from using the April 2021 factors (column 3). The 10.9% increase in risk charge as a percentage of premium, from 3.0% to 13.9%, is larger than any of the other changes between columns for this LOB.

Column 3 shows that six of the eight LOBs with the largest risk charge increases and decreases were identified in the April 2021 report.

Column 6 of Table 2.4A highlights the large number of LOBs where the change in interest rate from 5% to 4% is the largest driver for premium risk. In many cases, however, the increase from column 5 to column 6 is significantly offset by a decrease from column 6 to column 7, as the PV Method offsets a portion of the risk charge increase following from the reduced interest rate.

Column 7 shows that application of the PV Method is the largest driver for three long-tail LOBs: D-WC, O-Re-Liab, and R-PL.

In column 8, we see three LOBs where the largest source of change is the revision to the catastrophe adjustment. These are J-APD, G-SL, and N-Re-Prop.

Table 2.4B
Reserves: Indicated Risk Charges by LOB
According to Movement in Indicated Risk Charge by
Analysis Element Shown in Table 2.2
Listed in Order of Decreasing Total Indicated Change

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LOB	Assumption Set							Tot Chg (8)/(2)- 100%
	Current	Ap '21	2017 Pay Data	Trunc 5%	Trunc 4%	PV	Cat/WC	
M-Intl	18.8%	78.7%	90.6%	81.6%	85.7%	85.1%	85.1%	353.5%
R-PL	51.5%	107.9%	104.7%	105.9%	113.1%	101.3%	101.3%	96.6%
C-CA	16.2%	24.0%	24.4%	24.1%	26.3%	25.9%	25.9%	59.5%
K-Fid/Sur	28.9%	50.4%	52.9%	42.5%	45.6%	44.0%	44.0%	52.5%
G-SL	16.1%	25.9%	27.9%	24.5%	27.5%	23.9%	23.9%	48.8%
B-PPA	9.4%	11.5%	11.2%	11.0%	12.7%	12.9%	12.9%	37.6%
A-HO	13.8%	14.7%	15.3%	15.1%	16.4%	16.6%	16.6%	20.4%
E-CMP	30.9%	31.3%	34.2%	32.7%	35.7%	32.5%	32.5%	5.2%
I-SP	20.4%	23.4%	23.5%	20.6%	21.9%	21.3%	21.3%	4.6%
T-Wrnty	28.9%	23.4%	28.1%	24.9%	26.1%	30.2%	30.2%	4.6%
H-OL	30.4%	30.1%	31.3%	29.8%	33.9%	29.2%	29.2%	-4.0%
J-APD	12.7%	10.5%	10.4%	10.2%	10.8%	11.2%	11.2%	-12.1%
L-Other	18.0%	18.5%	18.0%	13.0%	14.7%	14.7%	14.7%	-18.5%
N-Re-Prop	27.5%	21.0%	21.4%	21.2%	23.5%	20.4%	20.4%	-25.7%
D-WC	11.6%	10.8%	10.5%	6.7%	11.3%	4.6%	8.2%	-29.2%
O-Re-Liab	38.8%	37.1%	37.2%	31.3%	36.9%	26.5%	26.5%	-31.6%
F1-MPL-O	19.6%	9.4%	7.6%	6.9%	10.4%	9.4%	9.4%	-52.1%
F2-MPL-C	12.7%	3.4%	-3.0%	-3.6%	-1.3%	-0.9%	-0.9%	-106.9%
S-FG/MG	9.2%	7.3%	-4.2%	-10.0%	-8.2%	-5.0%	-5.0%	-154.9%
Total/Avg	19.5%	21.1%	21.3%	19.4%	22.7%	19.2%	20.1%	2.6%

Main driving assumption by LOB for reserve risk—Table 2.4B

Column 3 shows that for 13 of 19 LOBs, the largest increases and decreases were identified in the April 2021 report.

In column 7, we see four LOBs where the PV Method is the largest source of movement. Three of these are the long tail LOBs, D-WC, O-Re-Liab, and H-OL.

9. Calculation of Indicated Risk Factors and IIAs (Section 10)

Section 10 shows how we use indicated risk charges to develop separate indicated Line 4 and Line 7/8 factors.

10. Future Research

Section 11 lists potentially useful future research areas related to underwriting risk.

3. INTEREST RATES

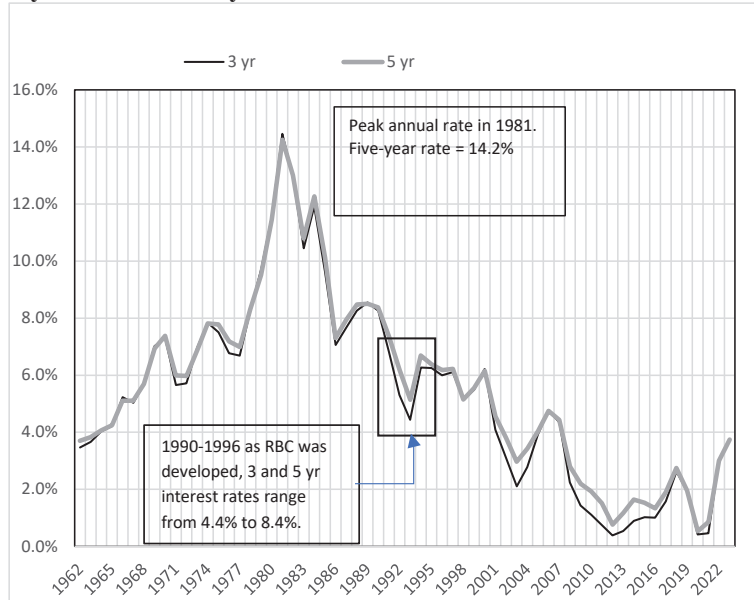
The IIAs measure the extent to which future investment income on assets corresponding to future premium and loss reserves is expected to be available to provide for adverse loss reserve development and/or inadequate premiums. The effect of the IIAs is to reduce the premium and reserve risk charges by the amount of such investment income.

The IIAs depend on selected interest rates, which we discuss in this section, and payment patterns, which we discuss in the next section.

History of U.S. Treasury Rates

Table 3.1 below shows three- and five-year U.S. Treasury interest rates since 1962. We show those durations as those reflect the duration of payment patterns for many LOBs.

Table 3.1
History of U.S. Treasury Interest Rates—Three- and Five-Year Maturities



Notes: Data through June 30, 2023.

Annual averages of daily interest rates at constant maturity from Federal Reserve History.²⁹
 In the 1990-1996 period, the 4.4% minimum interest rate is the 1993 three-year rate, and the 8.4% maximum interest rate is the 1990 five-year rate.

In Table 3.1, we see the following:

- Interest rates increased from 3-4% in 1962 to 14-15% in 1981 and then generally declined from that high point, and
- Within that pattern, there are smaller but still significant variations.

Indicated Interest Rates

The interest rate used in the current RBC Formula IIA is 5%, selected in the original RBC calibration in the early 1990s. To our knowledge, there is no written documentation for the 5% interest rate. We understand that the 5% interest rate was selected considering U.S. Treasury

²⁹ Board Of Governors of The Federal Reserve System, "[Data Download Program](#)."

interest rates. The U.S. Treasury rates in the early 1990s averaged over 6%^{30,31} as summarized in Table 3.2 below.

Table 3.2
U.S. Treasury Interest Rates
Average Annual Interest Rates: 1990-1996

	1990-1996	
	3 Year	5 Year
Max	8.3%	8.4%
Min	4.4%	5.1%
Average	6.2%	6.6%

Maximum interest rates were in 1990,
 Minimum interest rates were in 1993.

Table 3.3 below shows the average annual interest rates for 2018-2022 and 2023 through June 30, 2023. Table 3.4 shows the monthly average interest rates in 2023. Table 3.5 shows some longer-term interest rate averages.

Table 3.3
U.S. Treasury Interest Rates—Annual

A. Date Range	3 Year	5 Year
2018	2.6%	2.7%
2019	1.9%	2.0%
2020	0.4%	0.5%
2021	0.5%	0.9%
2022	3.0%	3.0%
Jan - June 2023	4.0%	3.7%

³⁰ Feldblum notes that 5% was selected, and he contrasts the 5% NAIC selection to the then current IRS Federal Income Tax methodology that used a moving average of Federal Midterm Rates, which have remaining terms of 3-9 years. Feldblum, Sholom, “[NAIC Property/Casualty Risk-Based Capital Requirements](#),” *Proceedings of the Casualty Actuarial Society*, 1996, pp. 297-435.

³¹ In one earlier contemporaneous source, Allan Kaufman and Elise C. Liebers, in “[NAIC Risk Based Capital Efforts in 1990-91](#),” *Insurer Financial Solvency, Casualty Actuarial Society Insurer solvency Discussion Paper Program*, 1992, Vol I, pp. 123–178, observed the following about the investment income treatment in RBC UW risk (page 149), *Before applying this [risk charge] percentage to the company's held undiscounted reserves, adjustments are made to reflect each company's historical experience in establishing adequate reserves. The percentage is further modified to reflect a conservative estimate of investment income* [emphasis added].

And, Pages 160-161 read:

For both reserve and pricing risk purposes the RBC Draft uses the mid-1980's loss experience in combination with a 5% interest rate. Since the actual mid-1980's interest rates exceeded 10%, the process might be viewed as assuming a 1980's loss and LAE ratio and reserve deficiency at a time when interest rates are only 5%. The combined effect might be viewed as a high standard for RBC. [emphasis added]

Table 3.4
U.S. Treasury Interest Rates—2023 Monthly

B. Monthly 2023	3 Year	5 Year
Jan-23	3.9%	3.6%
Feb-23	4.2%	3.9%
Mar-23	4.1%	3.8%
Apr-23	3.8%	3.5%
May-23	3.8%	3.6%
Jun-23	4.3%	3.9%

Table 3.5
U.S. Treasury Interest Rates—Longer-Term Averages

C. Other Time Periods	3 Year	5 Year
Avg 1988-2017	4.0%	4.4%
Avg 2017-2019	2.0%	2.2%
Annualized Daily Max since 2010	4.7%	4.5%
Annualized Daily Min since 2010	0.1%	0.2%
Average since 2010	1.3%	1.7%

To choose the updated IIA interest rate for this analysis, we might follow what appears to be the method used in the 1990s. As such, we would make a conservative selection considering current interest rates and longer-term trends, e.g., Table 3.5. The results of the method are not stable, as follows:

- Looking at 2023 through June 30, from Table 3.3, a rate of 4% might be the highest appropriate interest rate for IIAs. However, if we had followed the same method at years ended 2018 through 2022, we would have indicated interest rates ranging from 0.5% to 3%.
- A longer-term view, looking at 1988-2017, would indicate that an interest rate of 4% might be the highest appropriate value, but a more recent post-financial crisis/pre-pandemic view based on 2017-2019 might support a 2% interest rate.
- The difference in all-line average risk charges between a 4% interest rate and a 2% interest rate is over 20% for premium risk and nearly 30% for reserve risk.³²

Given the variability, applying this method and avoiding undesirable and unnecessary interest rate changes over short time frames would be challenging.

³² Based on current Line 4 factors and the 2010 payment pattern method updated with 2017 data, discussed in Section 4.

An alternative calibration method we use in this Report recognizes that risk factors tend to increase when interest rates increase and vice versa and selects a combined indicated risk charge rather than selecting separate risk factors and IIAs. Section 5 explores that method in detail.

When we apply the alternative method, our indicated risk charges are largely independent of interest rate forecasts:

- We use historical interest rates by year to calculate the present values of LRs and RRRs by company, year, and LOB.
- To separate the indicated risk charges into its risk factor and IIA elements, for all LOBs, we use a 4% interest rate to separate the risk factor and IIA elements of the indicated risk charge. The risk charges are not sensitive to the 4% interest rate choice.³³

Use of U.S. Treasury Interest Rates

Insurance companies invest in a variety of asset types. Table 3.6, below, shows the industry total asset distribution from 2021 RBC Filings.

³³ See footnote 19.

Table 3.6
Distribution of Assets by Rating Class
Industry Total from RBC Filings at December 31, 2021

(1)	(2)	(3)	(4)	(5)
NAIC Designation	Rating	2021 \$ Billions	% Bonds	Cum % Reserves
U.S. Gov't	Risk Free	258.2	20.6%	34%
1.A, Other	AAA	274.2	21.9%	70%
1.B	AA+	64.6	5.2%	78%
1.C	AA	78.2	6.2%	88%
1.D	AA-	68.3	5.5%	97%
1.E	A+	54.1	4.3%	104%
1.F	A	97.2	7.8%	117%
1.G	A-	73.1	5.8%	127%
2	BBB	218.8	17.5%	155%
3	BB	34.2	2.7%	160%
4	B	26.5	2.1%	163%
5	CCC	4.8	0.4%	164%
6	CC,C,D	0.9	0.1%	164%
Total		1,253.1	100.0%	
Carried Loss and LAE Reserves- RBC Filings				764.1

2021 assets are total of long-term (Schedule D), short-term (Schedule DA), and cash equivalents (Schedule E) from RBC Filings. Long term Schedule D bonds are \$161.4 billion of the total \$258.2 billion in the U.S. Government category above.

At December 31, 1998, RBC Filings show Schedule D U.S. Gov't bonds were 43% of loss and LAE reserves (\$144.9 billion compared to \$339.9 billion), compared to 21% of loss and LAE reserves in 2021 (\$161.4 billion compared to \$764.1 billion).³⁴

Our calibration uses U.S. Treasury rates for reasons including the following:

- Using U.S. Treasury interest rates is consistent with our understanding of the original calibration.
- U.S. Treasury securities and closely related low-risk assets are a core P&C insurance industry asset category. Table 3.6 above shows that in 2021, U.S. Government securities constitute 34% of the P&C industry loss and LAE reserve amount, and those plus AAA securities constitute 70% of the P&C industry loss and LAE reserve amount.

³⁴ RBC had more asset detail in 2021 than in 1998, so the comparison is limited to long-term U.S. Treasury bonds (reported on Schedule D).

- We use 1988-2017 U.S. Treasury interest rates to discount the LRs and RRRs by year. The mix of insurance company assets in that period was even more heavily weighted towards U.S. Treasuries than is currently the case.
- To the extent that companies invest in a variety of assets, the lowest-risk securities can be viewed as supporting reserves plus the portion of capital equal to the required RBC value.
- The IRS used U.S. Treasuries for tax purposes in the past. The tax law now uses interest rates based on a corporate bond yield curve.³⁵ We understand that this index is calibrated to a "...market-weighted average (MWA) quality of the AAA, AA, and A bonds used to compute it."³⁶ The bonds in the 2010 tax law calibration are 77% A, 16% AA, and 6% AAA,³⁷ i.e., heavily weighted to bonds with A rating. P&C insurer bond assets with a rating of AA and higher make up 88% of the loss and LAE reserve amount. Hence the corporate bond index rate is not consistent with P&C insurer portfolios, particularly given our objective of matching the safest assets with the reserves and RBC amounts.
- Companies with capital near the RBC Action Levels might tend to hold higher-rated securities than the average company.

4. PAYMENT PATTERNS

2010 and Revised Methods

The LOB payment patterns used to calculate the IIAs in the RBC Formula were last calibrated in 2010 ("2010 Method") using 2008 data. We describe this method in Appendix 1.

For this Report, we use a different method, which, among other features, allows for up to 40 years of loss payments, although nearly all LOBs have much shorter patterns. We refer to this method as the 40-year runoff payment pattern. We describe this method in Appendix 2.

The main differences between the two methods and our reasons for choosing the revised method are the following:

³⁵ "Specifically, the new interest rates will be based on corporate bonds with varying maturities for the preceding 60-months that are in the top 3 quality levels available." In Arlene M. Richardson, FCAS, MAAA, and Joel S. Chansky, FCAS, MAAA, "[Federal Income Taxes—Provisions Affecting Property and Casualty Insurers: An Update to the Almagro/Ghezzi Paper of 1988 and the Feldblum Paper Of 2007](#)," Casualty Actuarial Society, 2021, p25.

³⁶ James A. Girola, "Introduction to the HQM [High Quality Market] Yield Curve," PowerPoint presentation, U.S. Department of the Treasury, April 12, 2010, p9.

³⁷ Ibid., p44.

For AY Patterns

1. The 2010 Method uses data solely from Schedule P Part 1, which contains payment data at a single point in time. Therefore, the payment pattern for ages 1-10 is based cumulative paid loss and LAE at that point in time. As such, there may be random year-to-year variations, especially for smaller LOBs and LOBs subject to catastrophe events that are not uniformly distributed by AY.

The revised method uses Schedule P Part 3, which contains payment data at up to 10 calendar year-ends. As such, the revised method's payment pattern is based on the average of multiple calendar years of payments, and it is less subject to undesirable variability and more likely to represent the expected future payment pattern.

2. In the 2010 Method, the loss and LAE paid each year after age 10 is assumed to be paid at a uniform percentage of expected ultimate payments.

In the revised method, we assume that the unpaid at age 10 is paid at a rate that declines exponentially over time.

In our experience, a declining percentage payment rate by year is more realistic than a uniform percentage payment rate by year.

3. In the 2010 Method, payment percentages for ages 11 and over require subjective judgments when AY payment percentages are negative, e.g., subrogation, or do not decline monotonically, or have particularly large unpaid percentages at age 10, e.g., D-WC.

Those features do not distort the revised method.

Reserve Payment Patterns

4. Reserve year patterns are derived from the AY payment patterns. In addition, they depend on the treatment of reserves for AYs at ages 10 and over, called "prior" in Schedule P.

The 2010 Method does not use prior year reserves in its payment pattern or discounting calculations. That feature has the effect of assuming that the discount factor for prior year reserves equals the average of the discount factors for reserves for AYs with ages 1-10, or up to 15 for certain LOBs. Actually, the discount factor for prior year reserves should be lower (more discount) since reserves for more developed AYs that make up the prior year reserve tend to be paid more slowly than those for less developed AYs.

The revised method uses the prior year reserves and explicitly models the payments for AYs at ages 10 and over. These differences imply a longer reserve payment pattern than the 2010 Method.

5. In the 2010 Method, for those LOBs for which Schedule P contains information on only the most recent two AYs (Two-Year LOBs), only two years of paid development data are available.

In the revised method, we use 10 years of paid development data for Two-Year LOBs³⁸ from the RBC Filings to produce a more realistic estimate of payments beyond age two. This has a greater effect on reserve payment patterns than on premium payment patterns.

One weakness of the revised method compared to the 2010 Method is that the revised method assumes the payment pattern for Adjusting and Other Expenses (A&O) is the same as the payment pattern for losses, A&O, and Defense and Cost Containment Expense (DCCE). The 2010 Method assumes adjusting and other payments are made at the rate they are recorded in the Annual Statement.

RDHA & 40-Year Truncated Payment Pattern

While LOB payment patterns can extend for decades, the premium and reserve risk calibration data in this analysis is limited to 10 years because that is the limit on development shown in Schedule P. Our analysis in Appendix 3, Exhibit A3-1 indicates that risk continues to develop beyond the risk development horizon available to us in the Schedule P and RBC data.

A complete analysis of the premium and reserve risk beyond age ten is outside the scope of this Report; however, providing investment income credit for the extended payment periods without considering the full extent of risk development would not be a balanced treatment of risk and financial capacity.

Therefore, we construct LOB payment patterns based on the 40-year runoff payment pattern but limited to 10 years, the AY plus nine years of development, for premium risk and limited to 10 years, the initial reserve year plus nine years of development, for reserve risk. We refer to those as “40-year truncated payment patterns.” In using those patterns, we are assuming that the additional risk development is an amount equal to the effect of the difference between the 40-year truncated payment pattern and the 40-year runoff payment pattern.

The advantages of this RDHA method include the following:

- The method explicitly recognizes that payment patterns and risk development extend longer than Schedule P data.
- The RDHAs are larger for longer tail LOBs, as should be generally expected.
- The RDHA is qualitatively correct in that the degree of risk development will depend on the timing of loss payments over time.
- The method maintains the “status quo” of truncated payment patterns and risk development largely limited to Schedule P’s ten years of data.

Appendix 3, Exhibits A3-2A and 2B show the premium and reserve 40-year truncated payment patterns, respectively.

³⁸ Except for T-Wrnty, where RBC data at 2017 is not sufficiently reliable. The revised method uses Schedule P Part 2 and Part 3 data for T-Wrnty.

Effect of Updated Data, Revised Method, and Change in Interest Rates

This section discusses the all-line average and line-by-line effects of the updated data and revised method. Appendix 4 provides further details.

All-Lines Average Effect

Tables 4.1A and 4.1B below show the all-lines average premium and reserve IIAs and indicated risk charges with three payment pattern scenarios: the 2022 RBC Formula (i.e., based on the 2010 Method using 2008 data), the 2010 payment pattern method with 2017 data, and the 40-year truncated payment pattern. We consider the last of these at the current 5% interest rate in the RBC Formula and the 4% interest rate based on recent experience.

Table 4.1A
Premium: Effect on Risk Charges of Revised Payment Pattern Methods and Interest Rates

Row	(1)	(2)	(3)	(4)	(5)	(6)		(7)
	Payment Pattern Method	Interest Rate	Short Label for Table 4.2	IIA	Risk Chg	% Change vs Prior Row		
						% Risk	% Prem	
1	2022 IIA	5.0%	Current	0.915	13.5%	base		base
2	2010 method/2017 data	5.0%	2017 Pay Data	0.916	13.6%	0.8%		0.1%
3	40--Year/Truncated	5.0%	Trunc 5%	0.917	13.7%	0.3%		0.0%
4	40--Year/Truncated	4.0%	Trunc 4%	0.932	15.2%	10.9%		1.5%
5	Indicated vs. 2022				15.2%	12.1%		1.6%

Risk charges using Line 4 Factors from the 2022 RBC Formula. Values in columns 6 and 7 show the percentage change from the prior row to the current row in column 5. We use the unrounded values underlying column 5 to calculate columns 6 and 7, so using rounded values in column 5 might not always reproduce columns 6 and 7. Rounding differences are particularly noticeable with small changes. For example, column 6, row 3, shows 0.3%. This is based on $0.136606 / 0.136195$, the unrounded column 5 values. Looking at the rounded values in column 5, we see $.137 / .136 - 1.0 = 0.7\%$ rather than 0.3%.

The value shown, based on the unrounded column 5, better represents the impact on RBC.

The values in column 5 differ from the corresponding values in Table 2.2. Table 2.2 is based on April 2021 indicated Line 4 factors, while this Table is based on the Line 4 factors in the 2022 RBC Formula.

Table 4.1B
Reserves: Effect on Risk Charges of Revised Payment Pattern Methods and Interest Rates

Row	(1)	(2)	(3)	(4)	(5)	(6)		(7)
	Payment Pattern Method	Interest Rate	Short Label for Table 4.2	IIA	Risk Chg	% Change vs Prior Row		
						% Risk	% Rsv	
1	2022 IIA	5.0%	Current	0.879	19.5%	base		base
2	2010 method/2017 data	5.0%	2017 Pay Data	0.881	19.8%	1.4%		0.3%
3	40--Year/Truncated	5.0%	Trunc 5%	0.867	17.9%	-9.5%		-1.9%
4	40--Year/Truncated	4.0%	Trunc 4%	0.890	21.2%	18.2%		3.3%
5	Indicated vs. 2022				21.2%	8.5%		1.7%

See notes to Table 4.1A.

We observe the following about the all-lines average risk charges:

▪ Both Premium and Reserve Risk

Row 2 vs. Row 1: IIAs from the 2010 Method with 2017 data are not materially different from the current IIAs, i.e., row 2 shows that the effects on risk charges are only 0.8% and 1.4% for premium and reserve risk, respectively.

Row 4 vs. Row 3: A 100 basis point change in interest rate, from 5% to 4%, significantly affects the all-lines average risk charges, +10.9% and 18.2% for premium and reserve risk, respectively.

▪ Premium Risk: Table 4.1A—Rows 2 and 3

Using the 40-year truncated payment pattern does not materially affect the all-lines premium risk charge, compared to the current risk charge, +0.3% (column 6, row 3).

▪ Reserve Risk: Table 4.1B—Rows 2 and 3

The reserve risk charge with the 40-truncated payment pattern is lower than the risk charge with IIAs based on the 2010 Method with 2017 data, -9.5%³⁹ (column 6, row 3).

Effect by LOB

Tables 4.2A and 4.2B below show the percentage change in risk charge, corresponding to Table 4.1 for each of the payment pattern/interest rate combinations in Table 4.1 for each LOB.

We list the LOBs from largest increase to largest decrease as a percentage of risk charge. Appendix 4 shows the indicated IIAs and risk charges underlying these Tables.

For each LOB, we highlight the column with the largest absolute change in risk charge (increases or decreases) between columns.

³⁹ The 40-year truncated payment pattern is longer (implying more investment income and lower risk charges) than the 2010 Method for reserve risk for reasons that include the following: (a) the differences in the treatment of the prior year reserves and (b) the use of 10-year payment pattern data for Two-Year LOBs in the 40-year payment pattern methods.

Table 4.2A
Premium: Indicated Risk Charge by LOB
Listed in Order of Decreasing Indicated Change—Column 6
According to Movement in Indicated Risk Charge by Analysis Element Listed in Table 4.1

(1)	(2)	(3)	(4)	(5)	(6)	(7)
LOB	Premium Risk Charges				Change in Risk Charge	
	Current	2017 Pay Data	Trunc 5%	Trunc 4%	% Risk (5)/(2)-100%	% Premium (5)-(2)
T-Wrnty	3.0%	8.5%	8.3%	8.9%	194.8%	5.8%
O-Re-Liab	29.5%	31.9%	33.5%	37.9%	28.5%	8.4%
F2-MPL-C	18.9%	20.0%	20.3%	23.5%	24.3%	4.6%
H-OL	13.0%	13.9%	12.9%	16.2%	24.0%	3.1%
D-WC	13.8%	13.1%	13.5%	16.4%	19.3%	2.7%
R-PL	30.7%	31.5%	31.7%	36.4%	18.5%	5.7%
G-SL	16.6%	18.0%	17.9%	19.4%	16.5%	2.7%
E-CMP	14.8%	15.3%	15.7%	17.2%	16.4%	2.4%
J-APD	4.4%	4.4%	4.7%	5.1%	16.1%	0.7%
F1-MPL-O	53.4%	51.5%	53.5%	60.2%	12.7%	6.8%
N-Re-Prop	31.2%	30.5%	32.6%	34.6%	10.8%	3.4%
B-PPA	12.5%	12.4%	12.3%	13.6%	9.4%	1.2%
C-CA	18.5%	18.2%	17.7%	19.8%	7.4%	1.4%
L-Other	14.2%	13.9%	14.3%	15.2%	7.4%	1.0%
K-Fid/Sur	27.2%	28.5%	27.4%	28.8%	6.1%	1.7%
A-HO	18.2%	18.4%	18.6%	19.3%	6.1%	1.1%
I-SP	12.0%	11.7%	11.9%	12.7%	6.0%	0.7%
M-Intl	55.6%	55.8%	56.7%	58.7%	5.5%	3.1%
S-FG/MG	75.4%	79.5%	74.9%	78.3%	3.9%	2.9%
Avg	13.5%	13.6%	13.7%	15.2%	12.1%	1.6%

Risk charges in columns (2)-(5) use Line 4 factors from the 2022 RBC Formula.
 The average row equals the corresponding values in Table 4.1A

For premium risk, generally, the change in interest rate from 5% to 4%, column 5, produces the largest change from column to column.

For T-Wrnty, this would be the first change in risk charges based on T-Wrnty experience. In the RBC Formula, T-Wrnty IIAs are set equal to IIAs for K-Fid/Sur, which contained T-Wrnty business before 2008. Experience shows that the T-Wrnty payment pattern is much shorter than the K-Fid/Sur payment pattern.

Table 4.2B
Reserves: Indicated Risk Charge by LOB
Listed in Order of Decreasing Indicated Change—Column 6
According to Movement in Indicated Risk Charge by Analysis Element Listed in Table 4.1

(1)	(2)	(3)	(4)	(5)	(6)	(7)
LOB	Reserve Risk Charges				Change in Risk Charge	
	Current	2017 Pay Data	Trunc 5%	Trunc 4%	% Risk (5)/(2)-100%	% Reserve (5)-(2)
M-Intl	18.8%	26.7%	20.7%	23.4%	24.7%	4.6%
F2-MPL-C	12.7%	13.2%	12.5%	15.2%	19.7%	2.5%
E-CMP	30.9%	33.7%	32.2%	35.3%	14.2%	4.4%
C-CA	16.2%	16.6%	16.3%	18.4%	13.3%	2.2%
A-HO	13.8%	14.4%	14.2%	15.5%	12.5%	1.7%
B-PPA	9.4%	9.1%	8.9%	10.6%	12.4%	1.2%
H-OL	30.4%	31.6%	30.2%	34.2%	12.3%	3.8%
T-Wrnty	28.9%	33.8%	30.5%	31.8%	10.0%	2.9%
N-Re-Prop	27.5%	27.9%	27.6%	30.1%	9.5%	2.6%
G-SL	16.1%	17.9%	14.8%	17.5%	9.2%	1.5%
R-PL	51.5%	49.2%	50.1%	55.3%	7.4%	3.8%
F1-MPL-O	19.6%	17.6%	16.9%	20.6%	5.1%	1.0%
D-WC	11.6%	11.2%	7.4%	12.0%	4.2%	0.5%
J-APD	12.7%	12.6%	12.4%	13.0%	2.1%	0.3%
O-Re-Liab	38.8%	38.9%	32.9%	38.5%	-0.6%	-0.2%
I-SP	20.4%	20.4%	17.6%	18.9%	-7.3%	-1.5%
S-FG/MG	9.2%	12.9%	6.0%	8.2%	-11.1%	-1.0%
K-Fid/Sur	28.9%	31.0%	22.1%	24.8%	-14.2%	-4.1%
L-Other	18.0%	17.5%	12.5%	14.3%	-20.7%	-3.7%
Avg	19.5%	19.8%	17.9%	21.2%	8.5%	1.7%

Risk charges in columns (2)-(5) use Line 4 factors from the 2022 RBC Formula.
 The average row equals the corresponding values in Table 4.1B

For reserve risk, the change in interest rate from 5% to 4%, column 5, often produces the largest change, from column to column.

The change from the 2010 method to the 40-year truncated payment patterns, column 4, is also important. For the Two-Year LOBs, the 40-year truncated method uses the RBC payment pattern information and therefore recognizes that the payment patterns extend beyond two years.⁴⁰ The 2010 method uses Annual Statement data and therefore has a shorter payment pattern for those LOBs. We see this effect for Two-Year LOBs I-SP, S-FG/MG, K-Fid/Sur, and L-Other.

⁴⁰ Except for T-Wrnty, where RBC data at 2017 is not sufficiently reliable. The revised method uses Schedule P Part 2 and Part 3 data for T-Wrnty.

5. RISK FACTORS AND INTEREST RATES—PV METHOD

All else being equal, we would calibrate risk factors using the longest available period of history and independently establish IIAs based on current or forecasted interest rates and selected payment patterns. However, that is appropriate only to the extent that (a) the history is relevant to the projection of future experience and (b) LRs and RRRs in the history are independent of historical interest rates.

This section examines the variation in experience over time.

We find that movements in risk charges by LOB over time are volatile. To understand the large-scale patterns more readily, we construct indices representing the multi-line average indicated undiscounted risk charge by year for the eight (premium risk) or seven (reserve risk) LOBs with experience from 1980 to the present.⁴¹

Tables 5.1A and 5.1B show the year-by-year average of the indicated undiscounted premium and reserve risk charges, respectively.

⁴¹ The LOBs included in the index are A-HO, B-PPA, C-CA, D-WC, E-CMP, G-SL and H-OL for both premium risk and reserve risk, plus O-Re-Liab for premium risk. For O-Re-Liab, for premium risk, data for AYs 2014-2017 is removed by the maturity filter, but for purposes of this index, we extrapolate O-Re-Liab LRs for 2014-2017 using H-OL experience in 2014-2017 and the relationship between H-OL and O-Re-Liab for AYs 2008-2013.

The LOBs in these indices constitute 69% of all-lines 2017 premium and 80% of all-lines 2017 reserves.

Table 5.1A
Premium—Indicated Undiscounted Risk Charge by Year (Eight LOBs)

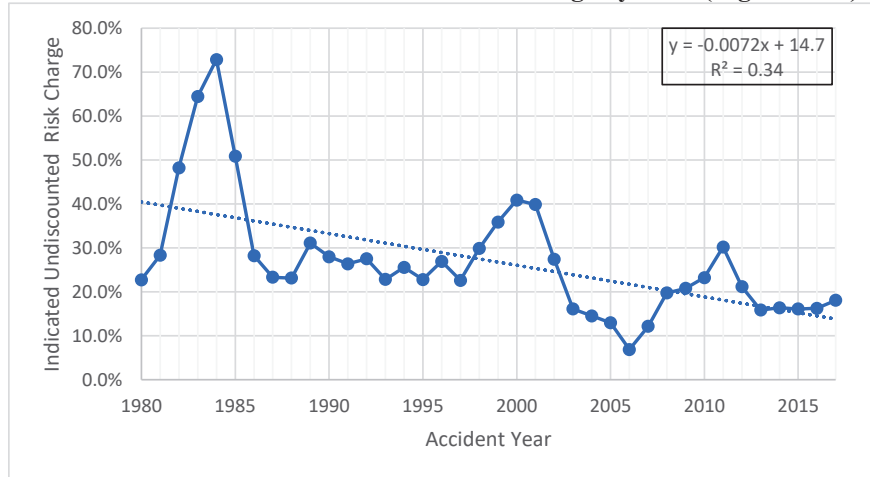


Table 5.1B
Reserves: Indicated Undiscounted Risk Charge by Year (Seven LOBs)

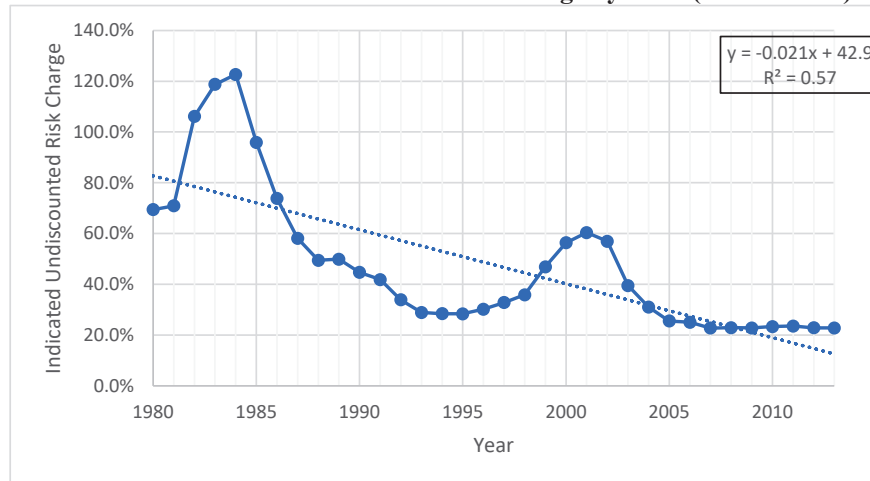


Table 5.1A shows the following for premium risk:

- The year-by-year eight-line average indicated undiscounted risk charge varies widely, ranging from over 70% to under 10%;
- A long-term downward trend, 0.72% of premium per year, with an R-squared value of 34%; and

- There are local maximum values, i.e., values above the trend line, in 1982-1985, 1998-2002, and again in 2009-2012.

Similarly, Table 5.1B shows the following for reserve risk:

- The year-by-year seven-line average indicated undiscounted risk charge varies widely, ranging from over 120% to about 20%;
- A long-term downward trend, 2.1% of reserve per year, with an R-squared value of 57%; and
- There are local maximum values, i.e., values above the trend line, in 1982-1986, 1999-2003, and again in 2010-2013.

Interest Rates and Risk Charges

Section 3 shows that interest rates have declined in recent decades. Therefore, we consider the extent, if at all, to which indicated undiscounted risk charges and interest rates are related.

Tables 5.2A and 5.2B show interest rates and indicated undiscounted risk charges over time. For each LOB, the interest rates are the historical U.S. Treasury interest rates, with durations matched to the LOB payment pattern.⁴² The interest rate for the eight/seven multi-line composite is the premium or reserve-weighted average of the separate LOB interest rates. The indicated undiscounted risk charges are the values in Tables 5.1A and 5.1B for premium and reserve risk, respectively.

The horizontal axis shows the AYs and initial reserve years. The left vertical axis shows the indicated undiscounted premium/reserve risk charges. The right vertical axis shows the duration-matched U.S. Treasury interest rate described above.

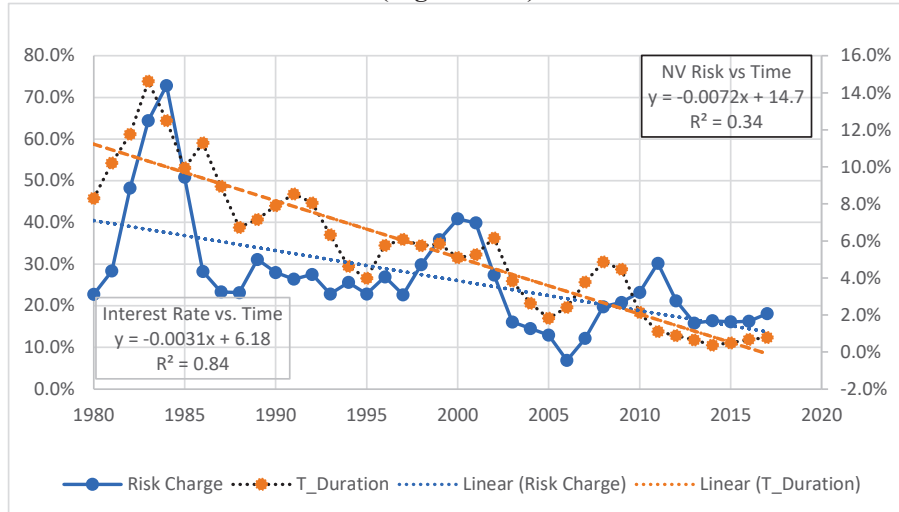
The references “NV Risk” or “Nominal Risk Charge” in the labels refer to undiscounted risk charges.

⁴² For each LOB, for each AY or initial reserve year, we calculate the average U.S. Treasury security interest rates for durations that match the payment pattern for the LOB. Different LOBs have different duration-matched interest rates for each year because the longer-tailed LOBs include longer-duration securities, often, but not always, with higher interest rates. Appendix 5 gives an example of the duration matching calculation. The interest rate we use here is the average of the interest rates, by year, for the LOBs in the analysis.

The U.S. Treasury interest rate that we use for a given year is the average of rates during the year two years before the AY/initial reserve year (we refer to that as a two-year lag). For premium risk, this might be interpreted as the average rate during the year before the first policy was written, assuming one-year policies.

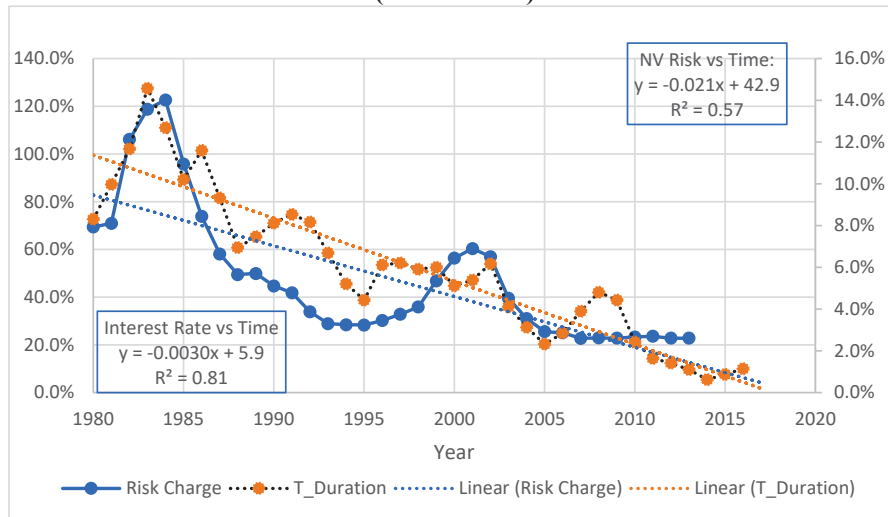
In Appendix 5, we test the extent to which using shorter or longer “lags” and the possibility of multi-year averages affects (a) the relationship between interest rates and indicated undiscounted risk charges and (b) the sensitivity of the indicated risk charges using the Present Value method. For reserve risk, interest rates might, alternatively, have been selected based on the average of the interest rates for the AY components of each year-end reserve. That method would be more complicated to apply, and we did not explore it.

Table 5.2A
Premium: Indicated Undiscounted Risk Charge vs. U.S. Treasury Interest Rates by Year
(Eight LOBs)



“NV Risk” in legend = Undiscounted Risk Charge
 “T_Duration” in legend = U.S. Treasury interest rates with duration matched by LOB

Table 5.2B
Reserve: Indicated Undiscounted Risk Charge vs. U.S. Treasury Interest Rates by Year
(Seven LOBs)



NV Risk in legend = Undiscounted Risk Charge
 T_Duration in legend = U.S. Treasury interest rates with duration matched by LOB

In Tables 5.2A and 5.2B, we observe that the shape of the interest rate pattern is similar to that of the risk charge pattern, with an overall decrease over time and ups and downs over the experience period.

Tables 5.3A and 5.3B examine that relationship further.

Table 5.3A
Premium: U.S. Treasury Rates vs. Indicated Undiscounted Risk Charges (Eight LOBs)

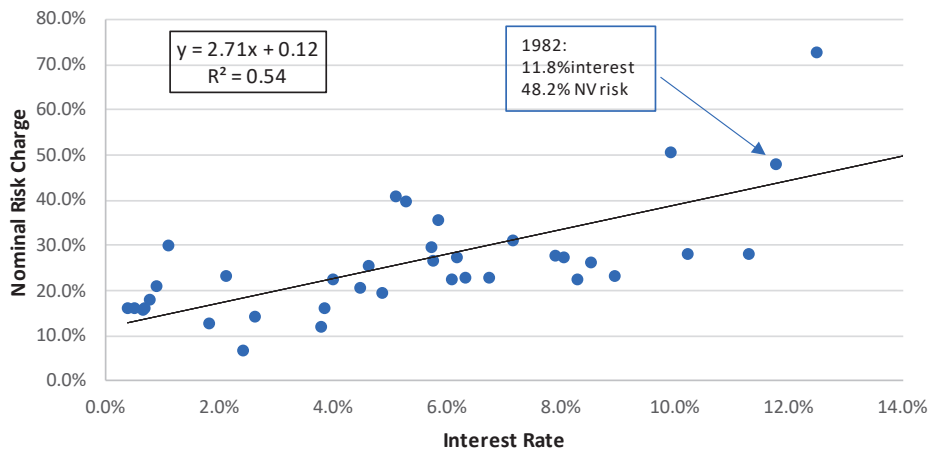
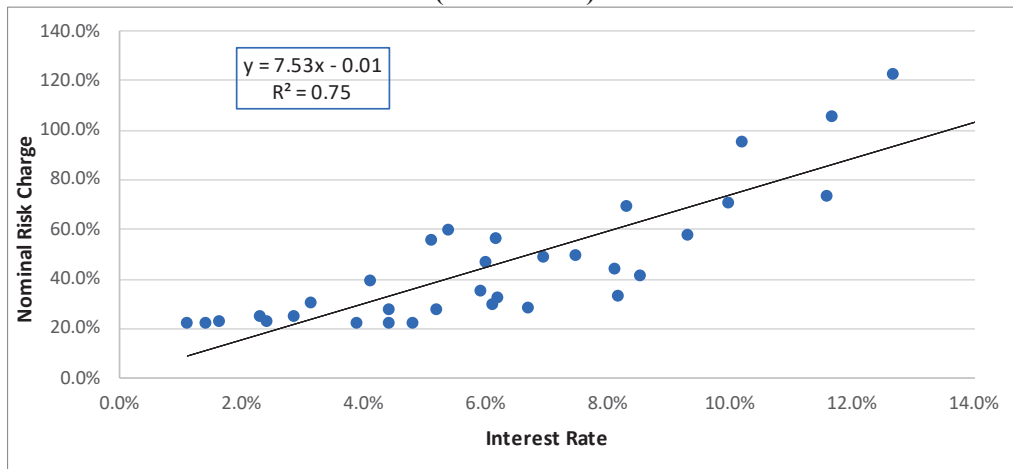


Table 5.3B
Reserves: U.S. Treasury Rates vs. Indicated Undiscounted Risk Charges (Seven LOBs)



Tables 5.3A and 5.3B above show undiscounted risk charges versus U.S. Treasury rates rather than showing each of the two variables separately relative to time. The horizontal axis shows interest rates. The vertical axis shows indicated undiscounted premium and reserve risk charges. Each point in the scatter chart is a year. For each year, we show the indicated undiscounted risk charge on the Y-axis and the U.S. Treasury duration-matched interest rate on the X-axis. For example, Table 5.3A shows the AY 1982 data point with an interest rate, x value, 11.8%, and an indicated undiscounted risk charge, y value, 48.2%.

The data shows an upward trend, i.e., undiscounted risk charges tend to be higher when interest rates are higher, and vice versa. For premium risk, the R-squared is 54%. For reserve risk, R-squared is 75%.

PV Method

To the extent that interest rates and risk factors are closely related, we might calibrate the combined risk factors and IIAs rather than calibrate the two RBC Formula elements separately. We refer to the calibration of risk factors and interest rates combined as the PV Method. We refer to the resulting indicated risk charge as the PV indicated risk charge.

To calibrate the combined risk charges, we use the 87.5th percentile of the present value of LRs/RRRs, calculated as follows:

- We begin with the filtered LRs/RRRs by company/pool used in the April 2021 Report.
- We calculate the discounted LRs/RRRs.
 - The discounted LR is the present value of the losses in the LR, discounted to the beginning of the AY, divided by the premium.
 - The discounted RRR is the present value of the developed reserves, discounted to the end of the initial reserve year, divided by the undiscounted initial reserve.
 - We use the premium and reserve 40-year runoff payment patterns for the discounting.
 - We use year-by-year interest rates equal to the rates on U.S. Treasury securities with maturities matching the premium and reserve payment patterns by LOB. Appendix 5 includes an example of the duration matching calculation.
- We calculate the year-by-year indicated PV risk charges using the 87.5th percentile of year-by-year discounted LRs/RRRs.⁴³

Table 5.4 below shows the variation in year-to-year indicated undiscounted risk charges and PV indicated risk charges.

⁴³ The PV indicated premium risk charge is the 87.5th percentile discounted loss ratio plus expenses minus 1.0. The PV indicated reserve risk charge is the 87.5th percentile of the discounted RRRs.

Table 5.4A
Premium: Discounted (PV) and Undiscounted (NV) Indicated Risk Charges (Eight LOBs)

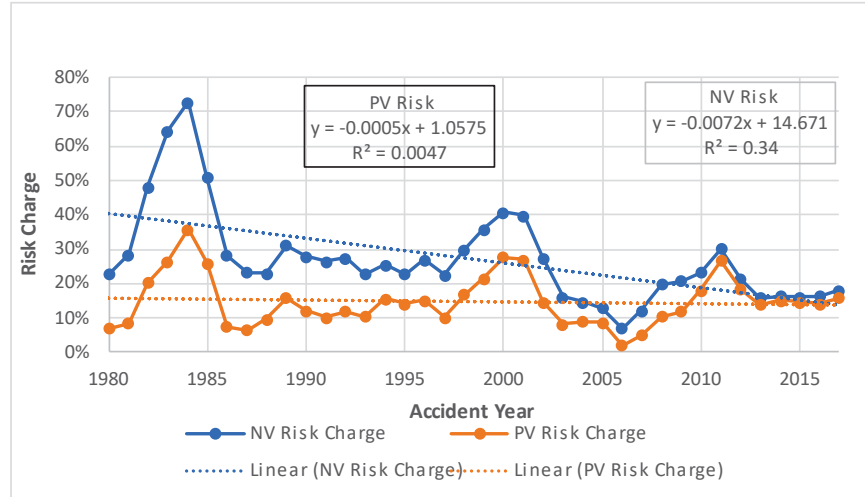
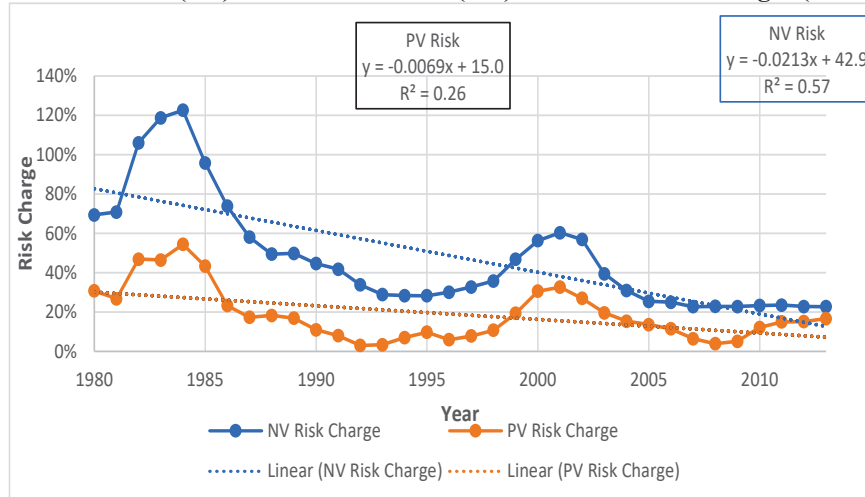


Table 5.4B
Reserves: Discounted (PV) and Undiscounted (NV) Indicated Risk Charges (Seven LOBs)



The PV indicated risk charge pattern shows trend closer to zero over time than the indicated undiscounted risk charge pattern.^{44, 45} This pattern suggests that the combined risk factor/IIA

⁴⁴ The PV risk charges, being discounted, are lower than the undiscounted risk charges. See Appendix 5, Exhibit A5-3, showing the slopes adjusting for that difference. The slope of PV risk charges remains closer to zero than the slope of the undiscounted risk charges, after adjusting for that difference.

⁴⁵ See footnote 44

calibration might have more value in predicting future risk charges than a separate calibration of each element.

Premium Risk

For premium risk, in Table 5.4A, the indicated undiscounted risk charge pattern that we showed in Table 5.1A has a downward slope of 0.72% of premium per year. In contrast, the trend line for the discounted risk charge patterns is downward by only .05% of premium per year.

Reserve Risk

For reserve risk, in Table 5.4B, the indicated undiscounted risk charge pattern we showed in Table 5.1B has a downward slope of 2.1% of reserves per year. In contrast, the trend line for the discounted risk charge patterns is downward by only 0.69% per year.⁴⁶

1980-1987 Experience

We also observe that both the undiscounted indicated and PV indicated risk charges from the earliest years, e.g., 1980-1987, are higher than for later years. In the April 2021 Report,⁴⁷ we identified reasons why the experience for those years might not be appropriate for projecting risk levels. Therefore, the indicated risk charges in this report are based on experience from 1988 and subsequent.

Appendix 6 shows LOB data and other information regarding our decision to exclude 1987 and prior years from our analysis.

Conclusion—PV Method

The relationship between interest rates and LRs/RRRs may be specific to the 1980-2017 years and may not be a permanent feature. Nonetheless, the downward trend in indicated undiscounted risk charges is so large that we believe it is necessary to address that through the PV Method or otherwise.

In addition to the data analysis earlier in this section, we observe that the PV Method is plausible in that, particularly over the experience period:

- Target underwriting results may vary inversely with the investment income available. If interest rates are higher, more investment income is available, and insurers might increase their undiscounted target Loss Ratios (LRs). If LRs are higher, the indicated risk charges will tend to be higher.
- Adverse reserve development may have varied with investment income, as reduced underwriting profitability may correlate with lower reserves and/or intentional or unintentional reserve discount, especially in the 1980s and early 1990s.
- High (low) interest rates may imply actual or anticipated high (low) inflation rates that might affect LRs or reserve development.

⁴⁶ See footnote 44,

⁴⁷ April 2021 Report, pages 17-18 (copied in Appendix 6 to this report) and 27-29.

Moreover, using the PV Method helps address the difficulty we observed in selecting an interest rate for the IIAs.

Therefore, we use the PV indicated risk charges based on 1988 and subsequent years. Future analysis will need to monitor this pattern.

Applying RDHA to PV Indicated Risk Charges

The final PV indicated risk charge is the 87.5th percentile of the discounted LRs/RRRs across all years, plus the RDHA, plus, for premium risk only, expenses minus 1.0. To include the RDHA, we “replace” the effect of present value calculations using the 40-year runoff payment pattern with the effect of present values based on the 40-year truncated payment pattern by LOB. We make that transition using a 4% interest rate, where 4% is the all-line average duration-matched interest rate for 1988 through 2017, the year range of our selected calibration data.⁴⁸ We show the RDHA calculations in Appendix 5, Exhibits A5-1A and 1B.

6. PRESENT VALUE INDICATED RISK CHARGES BY LOB

This section examines the indicated LOB risk charges based on the PV Method we discuss in Section 5. Note that the indicated risk charges shown in Section 6 differ from the indicated risk charges shown in Tables 1.1A and 1.1B because the risk charges shown in Section 6 do not reflect the revised catastrophe adjustments, the D-WC tabular adjustments, or the effect of the 5% minimum risk charge.

Analysis of Change—All-Lines Average

We calculate the PV indicated risk charges directly from the raw data, using the 87.5th percentile discounted LRs/RRRs across all years from 1988-2017.

Still, conceptually, we can examine the change in risk charges compared to the current risk charges, as follows:

- Step 1: Change due to loss experience shown in the April 2021 Report, using IIAs in the current RBC Formula.
- Step 2: Step 1 using IIAs based on the 40-year truncated payment patterns retaining the 5% interest rate.
- Step 3: Step 2 with a 4% interest rate.
- Step 4: Apply the PV Method, including the RDHA.

⁴⁸ This 4% interest rate happens to be the same as the current interest rate that we discuss in Section 3, but we have derived it differently. The RDHA interest rate is the all-line average duration-matched interest rate from 1988-2017, the range of our calibration data from Schedule P. The current interest rate we use to separate the risk charge into Line 4 and IIA factors is based on current/forecasted interest rates.

In Table 6.1 below, columns 3-5 show the Line 4 risk factor, IIA, and interest rate assumptions that characterize each step.

Table 6.1
Alternative Assumptions Underlying Indicated Risk Charges

(1)	(2)	(3)	(4)	(5)
Risk Factor Assumptions				
	Description	Line 4	IAs	Interest rate
Base	Base Risk Factors	Factor in the RBC Formula	Factor in the RBC Formula	5.0%
Step 1	April '21 Risk Experience Change	April 2021 Report	Factor in the RBC Formula	5.0%
Step 2	Revised Payment Pattern	April 2021 Report	40-year truncated payment pattern	5.0%
Step 3	4% Interest Rate	April 2021 Report	40-year truncated payment pattern	4.0%
Step 4	PV Method	Calibrates Risk Factors and IAs combined. Uses the 40-year runoff payment pattern and then applies the “difference” between runoff and truncated payment patterns to implement the RDHA. Uses historical U.S. Treasury interest rates with matching durations by LOB.		

Note: Steps 2-4 reflect the RDHA. All steps include current catastrophe adjustment for premium risk.

Table 6.2 below shows the all-line average indicated risk charge at each step.

Table 6.2
All-Lines Average Effect

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Row	Assumptions	Short Label for Table 6.3	Risk Charge		Incremental % Increase in Risk	
			Prem	Rsv	Prem	Rsv
1	Current	Current	13.5%	19.5%	0.0%	0.0%
2	Ap '21/ Current IIA	Ap '21	13.0%	21.1%	-3.6%	7.7%
3	Ap '21/5% Interest; 40-year truncated pay pattern	Trunc 5%	13.2%	19.4%	1.1%	-7.7%
4	Ap '21/4% Interest; 40-year truncated	Trunc 4%	14.7%	22.7%	11.3%	17.0%
5	PV Approach	PV	13.7%	19.2%	-6.5%	-15.6%
6	Total Change (5)/(1)-1.0%	Total	13.7%	19.2%	1.4%	-1.8%

Premium risk charge includes current catastrophe adjustments. Labels in column 3 are the same as in Table 2.2.

Rows 3 and 4 use the 40-year truncated payment pattern and, therefore, include the RDHA. The PV indicated risk charge in row 5 includes the RDHA based on the calculations we show in Appendix 5.

Row 6 shows that the overall change, applying the PV Method, is a small increase in premium risk and a small decrease in reserve risk, as follows:

- An increase equal to 1.4% in the premium risk charge, and
- A decrease equal to 1.8% in the reserve risk charge.

For premium risk, column 6, rows 2, 3, and 4 show that the incremental percentage changes are -3.6% due to the risk experience observed in the April 2021 report, +1.1% from updating the payment patterns, +11.3% in using a 4% interest rate rather than 5% interest rate,⁴⁹ and -6.5% in moving to the PV Method. Thus, the PV Method offsets more than half of the increase due to the interest rate change.

For reserve risk, column 7, rows 2, 3, and 4 show that the incremental changes are +7.7% due to risk experience observed in the April 2021 report, -7.7% due to updating the payment pattern, +17.0% in using a 4% interest rate rather than a 5% interest rate, and -15.6% in moving to the PV Method. Thus, using the PV Method largely offsets the increase due to the interest rate change.

Analysis of Change—Risk Charges by LOB

Tables 6.3A and 6.3B provide the same analysis as Table 6.2 by LOB. Columns 2-6 in Tables 6.3A and 6.3B correspond to rows 1-5 in Table 6.2.

For each LOB, we highlight the column with the largest change in risk charges as a percentage of premium or reserves.

⁴⁹ The “effect of using a 4% interest rate” means the “effect if we used a 4% interest rate and did not apply the PV Method.” When we use the PV Method, the current interest rate is not a significant element of the risk charge.

Table 6.3A
Premium: Indicated Risk Charges by LOB
Listed in Order of Decreasing Indicated Change—Column 7

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOB	Indicated Premium Risk Charge					Change in Risk Charge	
	Current	Ap '21	Trunc 5%	Trunc 4%	PV	% Risk (6)/(2)-100%	% Prem (6)-(2)
T-Wrnty	3.0%	13.9%	20.0%	20.6%	21.6%	619.0%	18.6%
S-FG/MG	75.4%	162.9%	162.1%	167.7%	153.4%	103.5%	78.0%
M-Intl	55.6%	98.8%	100.4%	103.1%	94.3%	69.7%	38.7%
F2-MPL-C	18.9%	20.5%	21.9%	25.2%	24.4%	29.0%	5.5%
J-APD	4.4%	4.5%	4.8%	5.2%	5.4%	23.9%	1.1%
G-SL	16.6%	17.9%	19.2%	20.7%	18.9%	13.6%	2.3%
B-PPA	12.5%	13.0%	12.8%	14.2%	13.7%	10.3%	1.3%
C-CA	18.5%	19.5%	18.7%	20.9%	20.1%	9.1%	1.7%
E-CMP	14.8%	14.4%	15.3%	16.8%	15.9%	7.8%	1.1%
N-Re-Prop	31.2%	31.3%	32.6%	34.6%	33.5%	7.4%	2.3%
H-OL	13.0%	13.1%	13.0%	16.2%	13.5%	3.8%	0.5%
A-HO	18.2%	17.8%	18.2%	18.9%	18.6%	2.0%	0.4%
L-Other	14.2%	14.0%	14.1%	15.0%	14.3%	1.2%	0.2%
R-PL	30.7%	31.3%	32.2%	37.0%	28.6%	-6.8%	-2.1%
D-WC	13.8%	12.6%	12.3%	15.2%	12.0%	-12.6%	-1.7%
O-Re-Liab	29.5%	24.0%	27.9%	32.0%	23.0%	-21.8%	-6.4%
F1-MPL-O	53.4%	39.0%	39.1%	45.0%	36.3%	-32.1%	-17.1%
I-SP	12.0%	7.5%	7.3%	8.2%	7.9%	-33.8%	-4.1%
K-Fid/Sur	27.2%	10.2%	10.3%	11.5%	10.6%	-61.0%	-16.6%
Avg	13.5%	13.0%	13.2%	14.7%	13.7%	1.4%	0.2%

Premium risk includes current catastrophe adjustment.

Columns 4-6 include RDHA.

For premium risk, we see that the experience change (column 3) is responsible for the three largest decreases and the three largest increases by LOB. The change in interest rate from 5% to 4% (column 5) has the greatest effect on 9 of the 19 LOBs.

Table 6.3B
Reserves: Indicated Risk Charges by LOB
Listed in Order of Decreasing Indicated Change—Column 7

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOB	Indicated Reserve Risk Charge					Change in Risk Charge	
	Current	Ap '21	Trunc 5%	Trunc 4%	PV	% Risk (6)/(2)-100%	% Rsv (6)-(2)
M-Intl	18.8%	78.7%	81.6%	85.7%	85.1%	353.5%	66.4%
R-PL	51.5%	107.9%	105.9%	113.1%	101.3%	96.6%	49.8%
C-CA	16.2%	24.0%	24.1%	26.3%	25.9%	59.5%	9.7%
K-Fid/Sur	28.9%	50.4%	42.5%	45.6%	44.0%	52.5%	15.2%
G-SL	16.1%	25.9%	24.5%	27.5%	23.9%	48.8%	7.8%
B-PPA	9.4%	11.5%	11.0%	12.7%	12.9%	37.6%	3.5%
A-HO	13.8%	14.7%	15.1%	16.4%	16.6%	20.4%	2.8%
E-CMP	30.9%	31.3%	32.7%	35.7%	32.5%	5.2%	1.6%
I-SP	20.4%	23.4%	20.6%	21.9%	21.3%	4.6%	0.9%
T-Wrnty	28.9%	23.4%	24.9%	26.1%	30.2%	4.6%	1.3%
H-OL	30.4%	30.1%	29.8%	33.9%	29.2%	-4.0%	-1.2%
J-APD	12.7%	10.5%	10.2%	10.8%	11.2%	-12.1%	-1.5%
L-Other	18.0%	18.5%	13.0%	14.7%	14.7%	-18.5%	-3.3%
N-Re-Prop	27.5%	21.0%	21.2%	23.5%	20.4%	-25.7%	-7.1%
O-Re-Liab	38.8%	37.1%	31.3%	36.9%	26.5%	-31.6%	-12.2%
F1-MPL-O	19.6%	9.4%	6.9%	10.4%	9.4%	-52.1%	-10.2%
D-WC	11.6%	10.8%	6.7%	11.3%	4.6%	-60.0%	-6.9%
F2-MPL-C	12.7%	-3.4%	-3.6%	-1.3%	-0.9%	-106.9%	-13.5%
S-FG/MG	9.2%	-7.3%	-10.0%	-8.2%	-5.0%	-154.9%	-14.2%
Avg	19.5%	21.1%	19.4%	22.7%	19.2%	-1.8%	-0.4%

Columns 4-6 include RDHA.

For reserve risk, we see that the experience change (column 2) has the largest effect on 13 of the 19 LOBs, including the six LOBs with the largest increases and the two LOBs with the largest reductions.

The indicated risk charges for S-FG/MG and F2-MPL-C are more than 100% lower than the current risk charges. This is possible because the PV indicated risk charges for those LOBs are negative.⁵⁰

⁵⁰ Negative risk charges arise when the amount of investment income implied by the IIAs is larger than the 87.5th percentile UW loss or adverse development.

7. ADJUSTMENT FOR CATASTROPHE RISK REFLECTED IN R_{CAT}

Beginning with year-end 2017 reporting, the RBC Formula includes a new risk component, R_{CAT} , covering earthquake and hurricane components of the total premium risk.⁵¹

As in prior Academy reports, we determine the indicated premium risk factors with data that includes earthquake and hurricane losses (“catastrophe losses”).⁵² Therefore, we reduce the otherwise applicable premium risk factors for the catastrophe-affected LOBs to avoid double-counting catastrophe risk. We refer to this reduction as the catastrophe adjustment. There is no catastrophe adjustment for reserve risk factors because R_{CAT} applies to premium risk (the modeled risk of future earthquakes and hurricanes) and not to reserve risk (the risk of adverse development on losses from earthquakes and hurricanes that have already occurred).

The R_{CAT} instructions in RBC provide that “...the company's own insured **property** [emphasis added] exposure information should be used as inputs to the model(s).”⁵³ We understand that this means that the modeling for R_{CAT} should include all property damage related to hurricane and earthquake events and that reported hurricane and earthquake losses should do the same. As a practical matter, some elements of catastrophe modeling are less sophisticated than other elements, e.g., hurricane exposures from storm surge, loss to movable property in marine and other LOBs, and automobile physical damage. A key assumption in our analysis is that the modeling includes reasonable provisions for all losses of the types that are reported in the catastrophe experience.

For our review, using the confidential RBC Filings, regulators first collected total LRs, catastrophe only LRs, and LRs excluding catastrophe losses (non-catastrophe losses). This information was collected by individual company, LOB, and AY for AYs 2004-2017. They then edited this information to remove suspected erroneous entries.⁵⁴ Following instructions from this Committee, regulators consolidated the company data into company-pools, as appropriate, and filtered the remaining records to match the filtering used by the Committee in its Line 4 calibration for premium risk.⁵⁵ The regulators provided blinded aggregated data to this Committee, summarized by LOB and AY and by LOB overall for AYs 2004-2017, for the LOBs for which companies report hurricane or earthquake property claims in the confidential RBC Filings in RBC Forms PR 100-122.

Table 7.1 below summarizes our analysis.

⁵¹ The NAIC P&C RBC Committee Catastrophe Risk (E) Subgroup annually publishes a catastrophe event list on its website to guide companies as to which events from the most recent 10 years should be included in their catastrophe experience disclosed in PR101, etc. These events include US and non-U.S. earthquakes, hurricanes, and tropical storms, consistent with the perils modeled for R_{CAT} (August 2017 CIPR Newsletter).

⁵² The data to allow separation of losses from relevant catastrophe events from all losses is available only in the insurer’s confidential RBC Filings, and, therefore, it is not available to the Academy on the company-by-company basis the Academy uses in its calibration.

⁵³ Refer to 2022 NAIC P&C RBC Instructions for forms PR027A and PR027B, see pages 99 and 100 of the pdf.

⁵⁴ Erroneous entries are a particular issue in this data because the R_{CAT} element of the RBC Formula was new to companies, and for the earliest AYs (2004-2007), the R_{CAT} data was collected on an “informational” basis only.

⁵⁵ Based on the filtering rules we described in the Committee’s April 2021 Report.

**Table 7.1
Premium Risk: Current and Indicated Catastrophe Adjustments
Based on AY 2004-2017 Data from Confidential RBC Filings**

(1)	(2)	(3)	(4)	(5)=(3)-(4)	(6)	(7)=(3)+Exp-100%	(8)=(6)/(7)
LOB	Current Cat Adjustment	87.5th Total LR	87.5th Non Cat LR	Indicated Cat Adjustment	Selected Cat Adjustment	87.5th Total Risk Charge	Cat Adj As % of Risk Charge
A-HO	2.8%	91.5%	88.9%	2.6%	2.6%	20.4%	12.7%
E-CMP	1.8%	83.3%	81.7%	1.6%	1.6%	18.9%	8.6%
G-SL	1.6%	96.0%	91.7%	4.3%	4.3%	29.8%	14.4%
I-SP	1.6%	82.8%	79.4%	3.4%	3.4%	12.9%	26.3%
J-APD	0.0%	84.8%	84.2%	0.6%	0.6%	8.0%	7.5%
M-Intl	0.0%	192.1%	159.3%	32.8%	15.0%	136.0%	11.0%
N-Re-Prop	6.9%	122.1%	96.2%	25.9%	25.9%	48.8%	53.0%
O-Re-Liab	0.0%	100.5%	100.2%	0.4%	0.4%	27.2%	1.3%
R-PL	0.0%	100.8%	100.6%	0.3%	0.0%	33.8%	0.0%

Source: AYs 2004-2017 from RBC Filings 2013-2017

The columns in Table 7.1 are as follows:

- Column 2 shows the current (i.e., incumbent) catastrophe adjustment, expressed as a percentage of premium, to be subtracted from otherwise indicated premium risk factors.⁵⁶
- Column 3 shows the 87.5th percentile of company/year total (catastrophe + non-catastrophe) LRs by LOB for premium risk data points from AYs 2004-2017 that satisfy the Line 4 calibration filters.
- Column 4 shows the 87.5th percentile of company/year non-catastrophe LRs by LOB for company years from AYs 2004-2017 that satisfy the Line 4 calibration filters.
- Column 5 is the raw indicated catastrophe adjustment. This column equals the difference between the 87.5th percentile LR, including catastrophes (column 3), and the 87.5th percentile LR excluding catastrophes (column 4), both from the filtered data set.
- Column 6 shows the catastrophe adjustments selected by the Committee, selected as follows:
 - For most LOBs, we selected the indicated adjustments from column 5: A-HO, E-CMP, G-SL, I-SP, J-APD, N-Re-Prop, and O-Re-Liab.
 - For M-Intl, we selected 15%, only about half of the indicated catastrophe adjustment because the indicated adjustment is based on a small number of data points and other features of the M-Intl data that we describe in Appendix 7.

⁵⁶ In past reviews, the Academy expressed the adjustment as a multiplicative adjustment to the risk factor. The factor reductions are A-HO=0.971, E-CMP=0.980, G-SL=0.983, I-SP=0.982, and N-Re-Prop=0.944. Table 7.1 shows the reduction as an equivalent amount to subtract from the Line 4 risk factor.

- For R-PL, we select a 0% adjustment because R-PL has a small indicated catastrophe adjustment and is not expected to be exposed to property catastrophes.⁵⁷

The largest impact of the catastrophe adjustments as a percent of premium is for M-Intl and N-Re-Prop.

- Column 7 shows the indicated undiscounted risk charge for AYs 2004-2017 based on column 3. Column 7 equals column 3 plus the 2017 LOB industry average expense ratio (Table 1.1A column 3) minus 100%.
- Column 8 equals column 6 divided by column 7 and is the proportion of the risk charge driven by catastrophe losses. The column 8 ratio is highest for N-Re-Prop, which is unsurprising.

The analysis in this Report is the first review of the catastrophe adjustments by the Academy, and the documentation for the current (i.e., incumbent) catastrophe adjustments is limited. Therefore, we do not evaluate the reasons for the differences between the current adjustments in column 2 and the indicated adjustments in column 5.

In Appendix 7, we describe our analysis and important limitations that relate to the data we use.

Appendix 9 shows our instructions to the Regulators to collect blinded data for Ten-Year LOBs from the confidential RBC Filings for catastrophe adjustment purposes.

8. WC TABULAR RESERVE ADJUSTMENT

Generally, for Annual Statement purposes, P&C insurance companies report reserves on an undiscounted basis, but there are some exceptions. Most importantly for our analysis, companies are permitted to report D-WC reserves discounted to reflect tabular reserves for lifetime annuity claims (tabular discount).⁵⁸ This section discusses the effect of discounting on calibration of RBC factors and on the operation of the RBC Formula.

Background

In our calibration, we intend that:

- The IIA reflects all potential investment income.
- Risk factors reflect adverse loss ratios and adverse reserve development gross of any discount.

⁵⁷ O-Re-Liab, on the other hand, can include catastrophe-exposed business on reinsurance contracts that cover both property and liability exposures therefore the small but non-zero indicated cat adjustment is reasonable for O-Re-Liab.

⁵⁸ There may be tabular discounts in other LOBs, for example, for excess WC that is reported in the OL LOB. We do not make adjustments on those LOBs.

We use Schedule P Part 2 incurred losses⁵⁹ to calibrate reserve risk charges. We use Schedule P Part 1 loss ratios to calibrate premium risk charges.

The RBC Formula uses Schedule P Part 1 net written premium and net loss and LAE reserves as the base against which the risk charges are applied.

Non-Tabular Discount

Some companies are allowed to reflect non-tabular reserve in their statutory financial statements. This does not affect our calibration or the operation of the RBC Formula because:

- Schedule P, Part 2, which we use to calibrate reserve risk charges, is gross of non-tabular discount for all companies. Therefore, the RRRs in our calibration are gross of discount, as intended.
- Schedule P, Part 1, includes data both net and gross of non-tabular discount. The calibration data and key RBC Formulas use the data gross of non-tabular discount, so neither is affected by any such discount.

Thus, in our work, there is no need for adjustments related to non-tabular reserves.

Tabular Reserve

Some companies report WC reserves with tabular discount, and others report on an undiscounted basis. On average, the tabular discount is 3.4% of reserves at December 31, 2017, and 0.6% of premium for the 2008 LR, the most mature AY at 2017.

The tabular discount is reflected in Schedule P as follows:

1. As is the situation for non-tabular reserve discounting, Schedule P, Part 2, which we use to calibrate reserve risk factors, is gross of discount for all companies.
2. Unlike the situation with non-tabular reserve discounting, Schedule P, Part 1, reserves and LRs, are lower, all else being equal, for companies that reflect tabular discount in their reserves. The discount amount is not provided in Schedule P Part 1.

Item 1 means that our calibration of reserve risk factors is based on undiscounted data, as we intend.

Item 2 has two effects on our calibration:

- For premium risk calibration: The mature LRs we use in our calibration are reduced by the non-tabular discount remaining at year 10. We intend to produce an 87.5th percentile LR that is undiscounted. Based on the average difference between the discounted and undiscounted LRs at 10 years, we increase the indicated premium risk factor by 0.6% of premium.

⁵⁹ We also use Schedule P Part 2, paid losses, but the paid losses are not affected by reserve discounting.

- For reserve risk calibration: In the RBC Formula, the reserve risk factors are applied to loss and LAE from Schedule P, Part 1.⁶⁰

We calibrate the reserve risk charge assuming it will be applied to reserves gross of discount. Since this is not the case, we adjust the risk factor to offset the lower reserves.

Table 8.1 shows how we determine the adjustment.

Table 8.1
Risk Factor Adjustment for Tabular Reserves

Row	Item	Am't	Discussion
<u>A. Data and Parameters</u>			
1	Carried Reserve \$	\$ 96.71	Selected base
2	Undiscounted Reserve \$	\$ 100.00	Assuming tabular discount is 3.4% of carried reserve; (2) = (1) * 1.034
3	Indicated Risk Charge %	4.6%	PV Indicated WC reserve risk charge, with RDHA. Calibrated to be applied to undiscounted reserves
<u>B. Calculation of adjusted risk charge</u>			
4	Total assets required for reserve runoff including 87.th percentile adverse development \$	\$ 104.60	(4) = (1+ (3))* (2)
5	Reserve RBC \$ above carried reserve	\$ 7.89	(5) = (4) - (1)
6	Risk Charge applied to carried reserve %	8.2%	(6) = (5) / (1)
7	Alternate calculation %	8.2%	(7) = [(1+ (3)) * (2)/(1)] - 1.0 i.e., (1+ .046) * 1.034 -1.0

In row 1 we assume the carried reserve is \$96.71, reduced from \$100 by the tabular reserve discount. Then, in row 3, we assume that our calibration based on Schedule P data that produced a PV indicated risk charge of 4.6%. The 4.6% charge means that \$104.60 is the asset level required such that \$104.60 plus the investment income on the \$104.60 would cover the expected payout plus the 87.5th percentile adverse development.

The risk charge is applied to the Schedule P reserve, \$97.61. To produce the \$104.60 indicated level, the risk charge is $\$104.60 / 97.61 - 1.0 = .082$, or 8.2%, shown in row 6.

We use this adjustment, but we note that it may not be correct for any company. For companies that do not discount, no adjustment is necessary, and the risk charge should be 4.6%, not 8.2%. For companies that do discount, the effect of the discount is likely to be more the 3.4%, so for them, the adjusted risk charge should be more than 8.2%.

⁶⁰ Adjusted for certain medical tabular reserves (Lines 6 and 7 of the PR017). The adjustment accounts for under 0.01% of the observed tabular reserve discount.

Tabular Reserve—Effect of Total Adjusted Capital

The base case is that there is no discounting, tabular or non-tabular.

Compared to the base case, if a company is allowed to discount reserve, tabular or otherwise, the balance sheet reserve is lower and reported capital is higher.

If a company has a non-tabular discount, the RBC Formula reduces TAC by the amount of that discount. So, a company RBC value and TAC are not affected by whether the company has a non-tabular discount in its reserves.

On the other hand, if a company has a tabular discount, the RBC Formula has no reduction in TAC. Two RBC implications of that are the following:

- For otherwise identical companies, the RBC position of companies that discount is more favorable than the RBC position of companies that do discount.
- The potential future investment income in the tabular reserve is double counted. It is counted once in capital and TAC, which have been increased by the tabular reserve amount, 3.4% of reserves on average. It is counted a second time because the IIA is intended to incorporate all future investment income.⁶¹

Alternative RBC Treatment of Tabular Discount

If the RBC treatment of tabular discount were the same as the treatment of non-tabular discount, then:

- The RBC positions of companies would not be affected by whether they included a tabular discount in their reserves.
- The double counting of investment income would be eliminated in TAC and IIAs.

This is a policy matter for the NAIC.

9. SAFETY LEVEL CALCULATIONS

We use the 87.5th percentile safety level to determine the indicated risk charges at the CAL. Using the 87.5th percentile safety level means that, for each LOB, looking across LRs or RRR data points, by year and by company (or pool), the risk charges are set at the point where 12.5% of the data points are above the premium risk factor or reserve runoff ratio, and 87.5% of the data points are below. The 87.5% safety level can also be called a one-in-eight safety level. The 87.5th percentile safety level is consistent with prior calibrations by this Committee.

⁶¹ Note that we use the truncated payment pattern, so it might appear that we have limited the investment income to less than the full potential. That is not the case. The difference between the full runoff investment income and the truncated investment income is an increase in risk factors indicated because of the expected upward development of the risk factors observed within the 10-year window available from Schedule P.

The 2007 Committee Report⁶² describes the origin of the 87.5th percentile safety level. We understand that in the initial stages of development, the NAIC targeted a 90th percentile (1 in 10) safety level⁶³ but used various rules of thumb to select the factors. When the Committee first played a role in recalibrating the premium and reserve risk factors in 2007, the Committee found that an 87.5% safety level reproduced the overall level of the risk factors.⁶⁴

There have been Working Group discussions about the appropriate safety level to use in various components of the RBC formula. To support potential future discussion about safety levels to use for the reserve and premium risk charges, but not to take a position on changing the safety level, within this section we compare indicated risk charges using the current safety level of 87.5% to two higher safety levels, 90%, and 95%. These results should not be used as the basis for increasing the safety level. Increasing the safety level is a policy decision for regulators. After the results, we also provide considerations for keeping or changing the 87.5% safety level, which we determined as an outcome of this analysis. These may be useful to regulators in future discussions about safety levels.

Tables 9.1A and 9.1B below show indicated premium and reserve risk charges at the 87.5th, 90th, and 95th percentile safety levels. On average, the effects on risk charges of using the indicated 90th percentile safety level rather than the 87.5th percentile safety levels are increases of 26% and 37% of the risk charge for premium and reserve risk, respectively. The corresponding effects at the 95th percentile safety level are increases of 117% and 175% for premium and reserve risk, respectively. In columns 6– 8, we highlight the LOBs with the three largest (red and bold) and three smallest (green and not bold) increases due to safety level changes.

⁶² [“An Update to P/C Risk-Based Capital Underwriting Factors: September 2007 Report To The National Association of Insurance Commissioners P/C Risk-Based Capital Working Group,”](#) P/C Risk-Based Capital Committee (PCRBC), American Academy of Actuaries, Sept. 2007, pp2-6.

⁶³ Using the one in 10 safety level may have been in part because Schedule P, used for calibration purposes, had only 10 years of experience for LRs and RRRs. See Kaufman and Liebers, [“NAIC RBC Efforts 1990-91,”](#) pp152 and 159.

⁶⁴ On p6 of its [2007 Report](#), the PCRBC stated: “The 87.5 percentile was selected because it presents a conservative view of the risk in each line but is also broadly consistent with the existing factors.”

Table 9.1A
Premiums: Indicated Risk Charges at Various Safety Levels

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOB	Current Risk Charge	PV Indicated risk Charges			(4)/(2)-1	(4)/(3)-1	(5)/(3)-1
		Premium			90 v current	90 v 87.5	95 v 87.5
		87.5th	90th	95th			
A-HO	18.2%	18.8%	21.9%	34.0%	20%	17%	81%
B-PPA	12.5%	13.7%	16.2%	24.6%	30%	18%	79%
C-CA	18.5%	20.1%	24.2%	38.3%	31%	20%	90%
D-WC	13.8%	12.5%	16.1%	27.2%	17%	29%	117%
E-CMP	14.8%	16.1%	19.1%	29.5%	29%	19%	84%
F1-MPL-O	53.4%	36.3%	42.9%	69.3%	-20%	18%	91%
F2-MPL-C	18.9%	24.4%	30.0%	46.4%	58%	23%	90%
G-SL	16.6%	16.4%	22.4%	30.1%	35%	37%	84%
H-OL	13.0%	13.5%	19.1%	39.0%	47%	41%	188%
I-SP	12.0%	6.2%	9.5%	23.3%	-21%	54%	275%
J-APD	4.4%	4.9%	7.3%	15.4%	66%	51%	217%
K-Fid/Sur	27.2%	10.6%	16.0%	35.8%	-41%	51%	238%
L-Other	14.2%	14.3%	18.8%	35.8%	33%	31%	150%
M-Intl	55.6%	80.4%	117.5%	184.4%	111%	46%	129%
N-Re-Prop	31.2%	16.1%	24.0%	57.0%	-23%	49%	254%
O-Re-Liab	29.5%	22.7%	31.0%	54.5%	5%	36%	140%
R-PL	30.7%	28.6%	40.4%	91.8%	31%	41%	221%
S-FG/MG	75.4%	153.4%	177.7%	374.0%	136%	16%	144%
T-Wrnty	3.0%	21.6%	28.9%	37.4%	862%	34%	73%
Avg	13.5%	13.3%	16.7%	28.8%	24%	26%	117%

Including RDHA. Before the application of minimum risk charges. Net of indicated catastrophe adjustment developed in Section 8. Including D-WC Tabular reserve adjustment.

Note that as the safety level increases, the data for some LOBs may not be adequate to make the “empirical approach” sufficiently stable. We have not explored that issue.

Table 9.1B
Reserves: Indicated Risk Charges at Various Safety Levels

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOB	Current Risk Charge	PV Indicated risk Charges			(4)/(2)-1	(4)/(3)-1	(5)/(3)-1
		Reserve			90 v current	90 v 87.5	95 v 87.5
		87.5th	90th	95th			
A-HO	13.8%	16.6%	22.6%	47.0%	64%	36%	184%
B-PPA	9.4%	12.9%	17.8%	35.7%	89%	37%	176%
C-CA	16.2%	25.9%	32.4%	60.0%	99%	25%	132%
D-WC	11.6%	8.2%	12.8%	28.4%	10%	56%	247%
E-CMP	30.9%	32.5%	39.9%	72.1%	29%	23%	122%
F1-MPL-O	19.6%	9.4%	16.2%	40.4%	-17%	72%	330%
F2-MPL-C	12.7%	-0.9%	4.6%	24.7%	-64%	NM	NM
G-SL	16.1%	23.9%	30.7%	60.3%	91%	29%	152%
H-OL	30.4%	29.2%	39.1%	73.1%	28%	34%	150%
I-SP	20.4%	21.3%	31.6%	66.9%	55%	48%	214%
J-APD	12.7%	11.2%	20.5%	59.3%	61%	84%	430%
K-Fid/Sur	28.9%	44.0%	69.8%	144.1%	142%	58%	227%
L-Other	18.0%	14.7%	22.5%	54.8%	25%	54%	274%
M-Intl	18.8%	85.1%	113.8%	423.1%	506%	34%	397%
N-Re-Prop	27.5%	20.4%	28.9%	59.8%	5%	42%	193%
O-Re-Liab	38.8%	26.5%	39.1%	88.2%	1%	47%	232%
R-PL	51.5%	101.3%	128.0%	231.3%	148%	26%	128%
S-FG/MG	9.2%	-5.0%	-1.5%	36.3%	-116%	NM	NM
T-Wrnty	28.9%	30.2%	46.2%	262.0%	60%	53%	768%
Avg	19.5%	20.1%	27.5%	55.2%	41%	37%	175%

Including RDHA. Before the application of minimum risk charges. Net of indicated catastrophe adjustment developed in Section 8. Including D-WC Tabular reserve adjustment.

Note that as the safety level increases, the data for some LOBs may not be adequate to make the “empirical approach” sufficiently stable. We have not explored that issue.

For F2-MPL-C and S-FG/MG, for reserve risk, comparisons of 90th and 95th percentile safety levels to the 87.5th percentile safety level are not meaningful (NM) because the 87.5th percentile indicated risk charge is negative. Negative indicated risk charges arise when the investment income projected by the IIA is larger than the undiscounted risk charge. In those cases, the risk charge would be increased to a minimum selected by the NAIC.

We can use Table 9.1 to assess how adequate/inadequate risk charges are from an implied safety level perspective. In column 2, we mark LOBs where the current risk charges are above the 90th indicated percentile level (yellow and bold) or within 10% of the 90th percentile level (yellow but not bold). These are the LOBs where risk charges are particularly high relative to an 87.5th percentile safety level.

Table 9.2 shows the NAIC calculation of the change in indicated risk charges by Type of Company⁶⁵ produced by the changes in safety levels. The highlighted cells mark the two Types of Company that have the largest changes. The row “Current to 90” shows the percentage increase in indicated risk charge from the current risk charges to the 90th percentile. The row “87.5 to 90” shows the percentage increase in indicated risk charge from the 87.5th percentile to the 90th percentile. The “90 to 95” row shows the percentage increase in indicated risk charge from the 90th percentile to the 95th percentile. The row “87.5 to 95” shows the percentage increase in indicated risk charge from the 87.5th percentile to the 95th percentile.

Examining the lower section, “ACL,” and the row “87.5 to 90,” we see that the greatest impact of increasing safety levels is on the WC and NOC Types of Company. Considering reserve risk alone, in the top section, the greatest impact from increasing safety levels is also on WC and NOC Types of Company. Considering premium risk alone, the greatest impact from increasing safety levels is on NOC and Reinsurance Types of Company.

Table 9.2
From NAIC Impact Analysis
% Increase in Premium, Reserve, and ACL Amount with Increasing Safety Level

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Risk	Change	Commercial	Med Prof Liab	NOC	Personal	Re	WC	Total
Reserve	87.5- \$B	78.3	2.3	0.6	26.8	3.1	12.3	123.4
	Current to 90	35.6%	-38.8%	76.2%	51.9%	14.8%	9.6%	34.8%
	87.5 to 90	32.5%	27.2%	45.3%	36.1%	41.5%	47.8%	34.7%
	90 to 95	91.3%	220.7%	104.6%	101.8%	125.3%	118.9%	98.0%
	87.5 to 95	153.4%	308.0%	197.3%	174.6%	218.8%	223.4%	166.7%
Prem	87.5- \$	33.9	1.5	0.7	32.1	0.7	5.5	74.4
	Current to 90	19.2%	25.6%	5.9%	27.6%	10.4%	15.9%	22.5%
	87.5 to 90	25.0%	19.6%	28.6%	22.5%	44.4%	21.5%	23.7%
	90 to 95	73.4%	52.4%	68.9%	67.4%	100.7%	58.1%	69.4%
	87.5 to 95	116.8%	82.2%	117.2%	105.0%	189.8%	92.1%	109.5%
ACL	87.5- \$	64.9	2.4	0.9	84.3	8.2	10.1	170.6
	Current to 90	20.6%	-6.5%	22.7%	6.4%	1.5%	7.0%	11.5%
	87.5 to 90	19.6%	8.8%	21.0%	4.8%	3.8%	21.6%	11.4%
	90 to 95	64.1%	61.4%	56.1%	20.1%	20.0%	72.2%	41.8%
	87.5 to 95	96.2%	75.7%	88.9%	25.9%	24.6%	109.4%	58.0%

Using a 5% minimum risk charge and indicated catastrophe adjustments.

⁶⁵ Defined in Section 1 and Appendix 8.

Potential Considerations for Keeping the Safety Level at 87.5%:

1. The effective safety level is higher than the explicit 87.5th percentile target because:
 - Some regulatory solvency formulas are calibrated to achieve their target safety level using a one-year time horizon for reserve risk and a one-year time horizon for underwriting profitability. All else being equal, the capital required for a safety level on a one-year time horizon will be lower than the capital required for a safety level, nominally the same, on a runoff basis. RBC uses the more stringent runoff time horizon for reserve risk.⁶⁶
 - Collectively, larger companies have lower indicated risk charges than smaller and mid-sized companies because indicated risk charges by LOB are lower for companies with higher volume in that LOB.⁶⁷ The larger companies constitute a disproportionately larger number of policyholders. Therefore, most policyholders are insured with companies whose RBC level implies a higher than targeted safety level.
2. An important purpose of the RBC Formula is to allow regulators to identify and act on weakly capitalized companies. Regulators may believe the current level of RBC is adequate for that purpose.
3. Another purpose of RBC, expressed in the past, is that RBC should provide enough to fund the runoff of losses on companies identified as too troubled to continue operations, and regulators may believe that the current level of RBC has been adequate for that purpose.
4. Most companies operate with capital that is multiples of RBC levels. That may relate to management assessment of risk, capital required to support rating agency opinions, capital assessment of policyholders, and the like. Increasing RBC may trigger unintended increases in the required capital assessment by those other stakeholders.

Potential Considerations for Increasing the Safety Level from 87.5%

1. The original targeted risk level was 90%, higher than 87.5%, which is now in place.
2. The risk level in the past was effectively higher than the 87.5%, the intended calibration target, because of calibration features, including:

⁶⁶ We have not evaluated the equivalent one-year safety levels in this Report.

⁶⁷ Casualty Actuarial Society (CAS) Risk-Based Capital Dependencies and Calibration Working Party: Report 6: "[Risk-Based Capital \(RBC\) Premium Risk Charges—Improvements to Current Calibration Method](#)," CAS E-Forum Fall 2013; Report 7: "[Risk-Based Capital \(RBC\) Reserve Risk Charges—Improvements to Current Calibration Method](#)," CAS E-Forum Winter 2014; Report 11: "[Risk-Based Capital \(RBC\) Underwriting Risk Factor Safety](#)," CAS E-Forum Winter 2016.

- For reserve risk, payment patterns on LOBs with substantial unpaid losses at 10 years may have been conservative, i.e., underestimating the reduction due to investment income and therefore overestimating the risk charges.
 - There was a downward trend in indicated undiscounted risk factors. This downward trend may not continue.
3. The calibration in this Report does not include the years before 1988. Using those years in our calibration might over-represent the risk of a similar eight-year period in the total 38-year experience period. However, those may deserve some recognition. Using a higher overall safety level would acknowledge that experience and the possibility of its reoccurrence, albeit for different reasons.

10. CALCULATION OF LINE 4 AND IIA RISK FACTORS

Table 10.1 shows the calculation of indicated Line 4 and IIA factors from PV indicated risk charges. We use A-HO and F2-MPL-C as examples.

Table 10.1
Sample Calculation of Line 4 and Line 7/8 Factors

Row	Step	LOB			
		Premium Risk		Reserve Risk	
		A-HO	F2-MPL-C	A-HO	F2-MPL-C
A. Indicated Line 4 and IIA Factors					
1	Indicated Risk Charge-PV Approach; Gross of Cat; Including risk development horizon and WC tabular adjustments (Appendix 5 Exhibit A5-1A, 1B, col 7).	21.3%	24.4%	16.6%	-0.9%
2	Expense Ratio (Table 1.1A, column 2)	28.9%	25.5%	NA	NA
3	IAs- 40-year runoff payment pattern; 4% interest; (Exhibit A2-5A and 5B; Also Table 1.1)	0.966	0.863	0.951	0.896
4	Indicated Line 4 Factor Gross of Cat Prem: (4) = (1.0+(1)-(2))/(3) Reserve: (4)=(1.0+(1))/(3)-1.0	0.956	1.146	22.6%	10.6%
5	Indicated Catastrophe Adjustment (Table 7.1, column 6)	2.6%	NA	NA	NA
6	Indicated Line 4 Factor Net of Cat (6)=(4)-(5)	0.930	1.146	0.226	0.106
B. Illustration of Minimum Risk Charges					
7	Indicated Risk Charge Net of Cat Prem: (6)*(3)+(2)-1.0 Reserve: (1.0+(6))*(3)-1.0	18.8%	24.4%	16.6%	-0.9%
8	Max of 5.0% and row (7)	18.8%	24.4%	16.6%	5.0%
9	Indicated Line 4 Factor Net of Cat, after minimum Prem: (9) = (1.0+(8)-(2))/(3) Reserve: (9)=(1.0+(8))/(3)-1.0	0.930	1.146	22.6%	17.2%
C. Illustration of application of transition rules with maximum changes					
10	2022 Risk Factor, net of cats (Table 1.1 column 2)	0.936	1.130	0.213	0.276
11	2022 IIA (Table 1.1)	0.954	0.827	0.938	0.883
12	2022 Risk Charge (Net of Cats) Prem: (10)*(11)+(2)-1.0 Reserve: (1.0+(10))*(11)-1.0	18.2%	18.9%	13.8%	12.7%
13	Indicated change in risk charge (net of cats) (12)/(7)-100%	3.2%	29.0%	20.4%	-106.9%
14	Line 13 subject to Maximum increase 10.0% Maximum decrease -10.0%	3.2%	10.0%	10.0%	-10.0%
15	Indicated risk charge after transition limitations; subject to 5% minimum Max((1.0+(14))*(12), 5%)	18.8%	20.8%	15.2%	11.4%
16	Indicated Line 4 Factor Net of Cat After Transition Caps and Minimum Prem: (1.0+(15)-(2))/(3) Reserve: (1.0+(15))/(3)-1.0	0.930	1.105	0.211	0.243

The calculations in Table 10.1 are as follows:

Part A—Indicated Line 4 and IIA Factors

Row 1: Indicated risk charge from Appendix 5, Exhibit A5-1A and 1B, column 7, for premium risk and reserve risk, respectively. These are the PV indicated risk charges, gross of catastrophe adjustments, based on an 87.5th percentile safety level, including the RDHA.

Row 2: Expense Ratio—The industry 2017 average expense ratio by LOB. We use row 2 to convert the premium risk charge to a premium risk factor in row 4.⁶⁸

Row 3: Investment Income Adjustments—Indicated Line 7/8 factors, from Appendix 2, Exhibit A2-5A and 5B, row labeled “Disc at 4.0%,” based on the 40-year runoff payment pattern⁶⁹ by LOB and a 4% interest rate. These are also the indicated IIAs in Table 1.1.

Row 4: Indicated Line 4 factors before catastrophe adjustment and before applying minimum risk charges or caps due to transition rules. We calculate row 4 with the formulas shown. These formulas reverse how we calculate risk charges, shown in the notes to Table 1.1.

The PV indicated risk charges in row 1 are independent of the interest rate used to calculate IIAs. If the interest were higher, the IIAs would be lower, but the indicated risk factors would be higher by an offsetting amount.

Row 5: Indicated catastrophe adjustment from Table 7.1, column 6.

Row 6: Indicated Line 4 Factor net of catastrophe adjustment. Row 6 is the value to be used in the RBC Formula, absent the application of minimums and transition rules.

Part B: Minimum Risk Charges

The NAIC Working Group generally applies a minimum risk charge. Rows 7-9 illustrate how we calculate the Line 4 factor when applying a 5% minimum risk charge.

Row 7: Risk charge net of catastrophes. The minimum applies to the risk charge after catastrophe adjustment. In row 7, we express the indicated Line 4 factor net of catastrophe adjustment (row 6) as a risk charge. We do this by applying the risk charge formula we show the Notes to Table 1.1 to row 6, the indicated Line 4 risk factor net of the indicated catastrophe adjustment.

For a LOB with no catastrophe adjustment, row 7 = row 1.

⁶⁸ The LOB expense ratio in this step must be consistent with the expense ratio we use to develop indicated risk charges.

⁶⁹ We use the 40-year runoff payment pattern rather than the 40-year truncated payment pattern. We use the 40-year truncated payment pattern to put the RDHA into the overall risk charge. However, the runoff payment pattern better presents the actual investment income potential. Using the runoff payment pattern for IIAs makes the risk factors higher than they would be with the truncated payment pattern. That is correct because the RDHA is an increase in the risk factor.

Row 8: Indicated risk charge equals the maximum of the indicated risk charge from row 7, or the selected minimum, 5% in this example.

Row 9: Converts the risk charge in row 8 to the Line 4 risk factor using the formulas in row 4, starting from row 8 rather than row 1. For any LOB with a risk charge already 5.0% or greater, row 9 = row 6.

Part C: Transition rules (Maximum and Minimum Changes in Risk Charges)

The Working Group has generally applied maximum increases/decreases to annual changes in risk charges. Rows 10-16 illustrate how we calculate the Line 4 factor when applying a maximum increase/decrease in risk charge.

Row 10, 11: The maximum/minimum change in risk charge is measured against the current risk charge. Rows 10 and 11 show the RBC Formula Line 4 and Line 7/8 IIA factors, respectively.

Row 12: We calculate the risk charge implied by the 2022 Line 4 and Line 7/8 IIA factors. The formula is the same as row 7, using rows 10 and 11 instead of rows 6 and 3, respectively.

Row 13: The change in risk charge from the 2022 risk charge (row 12) to the indicated risk charge (row 7) = (row 12) / (row 7) -100%.

Row 14: Row 13 limited to reflect the selected transition maximum increase (10% in this example) and the selected maximum decrease (-10% in this example).

Row 15: Indicated risk charge after transition caps and minimum risk charge. Row 15 equals 1.0 + row 14, times row 12, but at least as large as the minimum risk charge, 5% in the example.

Row 16: Line 4 factor after transition caps and minimum risk charge. We calculate this using the formula on row 4, using row 15 instead of row 1.⁷⁰

For the 90th and 95th percentile safety levels, Line 1 would be the 90th or 95th percentile PV indicated risk charge, and Line 5 would be the indicated catastrophe adjustment at the corresponding safety level. In other respects, the calculations are the same.

⁷⁰ We thereby apply the limit via the risk factor rather than the IIA.

11. AREAS OF FUTURE RESEARCH RELATED TO UNDERWRITING RISK

This Report analyzes a variety of key parameters in the RBC Formula. We observe the following underwriting risk areas that might warrant review in future work.

General P&C RBC UW Research Areas

- Examine premium and reserve risk variation with LOB diversification. The Academy is preparing a review of the diversification formula (PR017/018, Line 14).
- Analyze the correlation between premium risk and reserve risk. The RBC Formula assumes those two risks are independent.
- Examine the performance of catastrophe models against catastrophe experience.
- Assess the growth charge. The current growth risk charge was calibrated in the 1990s, and the calibration has not been reviewed.
- Review the variation in indicated risk factors by company size or LOB size. When RBC was developed, an Academy Committee developed a method to consider company size. The NAIC did not adopt the proposal.
- From time to time, examine the extent to which LOBs currently consolidated in the RBC Formula should be examined separately, e.g., the occurrence and claims made LOBs for OL and PL, and property non-proportional reinsurance and financial non-proportional reinsurance.
- Examine the extent to which the own-company adjustment calculation (Lines 1-3) is supported by experience. This calculation has not been evaluated since it was implemented in the original RBC Formula.
- Review the variability of WC tabular discount among companies and the extent to which that affects the comparability of TAC among companies. Consider extending the scope of PR038, which includes certain medical tabular discount information, to all areas of discount.
- Assess the extent of the tabular reserve impact on RBC for LOBs other than D-WC.

Research Areas Related to Calibration in This Report

- Monitor the extent to which the relationship between risk factors and interest rates continues, i.e., the validity of the PV Method.
- Examine the extent to which risk charges vary based on changes in interest rates rather than the current level of interest rates.
- Assess possibilities for better quantification of the RDHA.
- Assess possibilities for using data excluding catastrophes to examine risk factors, dependency, payment patterns, etc. That is only possible through RBC data, which is logistically challenging because of data confidentiality.
- Reserve IIAs are sensitive to the proportion of reserves by AY. Particularly for LOBs with a large amount of long-tail business, reserve IIAs for both new and runoff

companies may imply too much investment income, producing understated risk charges. Assess the extent to which that might be significant.

- Explore the stability of the “empirical” risk charge calibration for such safety levels if safety levels as high as the 95th percentile were to be used.
- Analyze payment pattern risk.
- Evaluate the extent to which variation in LRs/RRRs over time can be associated with particular historical events, economic conditions, etc., to better provide a basis for risk charge calibration.
- Evaluate the impact of having excluded A&O payments for selected payment patterns.

12. APPENDIX 1—2010 Payment Pattern Method

In this Appendix, we describe the method of determining IIAs that we refer to as the 2010 Method. This discussion assumes the reader is familiar with the construction of payment patterns from Annual Statement data.

Exhibit A1-1 shows the calibration with the 2010 Method using 2017 data and H-OL coverage as an example. The calculations in Exhibit A1-1 are as follows:

- Columns 3 and 4 are the incurred loss and LAE and the cumulative paid loss and LAE from the industry total 2017 Annual Statement Schedule P Part 1.
- Column 5 shows the AY cumulative paid loss and LAE as a percentage of the company incurred loss and LAE for that AY, column 4 divided by column 3.
- Column 6, for ages 1-10, shows the year-to-year differences between the values in column 5. Column 6 is the payment pattern through age 10; e.g., the age 6 value in column 6 is 7.16% which equals 77.92%-70.76%.
- For column 6, ages 11 and over:
 - Column 5 shows that at age 10, AY 2008, only 92.17% of the ultimate loss has been paid.
 - Thus, the unpaid portion is 7.83%, i.e., 100% minus 92.17% =7.83%.
 - The method assumes that the year 10 value, 1.83%, will be the paid percentage for years 11 and over until the total unpaid is exhausted.

For many LOBs, determining the loss percentages in column 6 for ages 11 and over is straightforward, as is the case for H-OL. For some LOBs, judgment is required to constrain the pattern to 15 years and remain consistent with payment rates for years leading to year 10.

- Column 7 shows the discount factors at 5% per year. The discounting time period for age 1 is 0.5 years, the discounting time period for age 2 is 1.5 years, etc.

Column 7, row “Prem IIA,” shows the indicated premium IIA, 0.825. That value is the weighted average of column 7 discount factors and column 6 incremental paid percentages.

- Column 8 shows reserve discount factors for AY reserves at the ages in column 2.
For each age in column 8, e.g., age n, the calculation is (a) the column 6 payment percentages by age for ages n+1 and higher, times (b) the AY discount factors from column 7 for ages 1 through 15-n,⁷¹ divided by (c) the sum of column 5 payment percentages for ages n+1 and higher.

The column 8 calculation takes the unpaid portion of losses from each AY for each age and discounts that back to the initial age.

- Column 9 shows the 2017 reserve by AY. The reserve IIA, 0.860, is the weighted average of the reserve discount factors in column 8 using weights in column 9, the 2017 reserve by AY.

Note that column 9 does not include the prior year reserve, \$23.8 million,⁷² that is not used in calculating premium or reserve IIAs.

For Two-Year LOBs, the method is the same, using only ages 1 and 2.

⁷¹ For example, the age 8 reserve discount factor, .866, is as follows:

$$\frac{(0.0237*0.976+0.0183*0.929+0.0183*0.885+0.0183*0.843+0.0183*0.803+0.0183*0.765+0.0052*0.728)}{(.0237+.0183+.0183+.0183+.0183+.0183+.0052)}$$

⁷² Exhibit A2-3.

Exhibit A1-1
2010 Payment Pattern Method—2017 Experience: LOB H-OL

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
AY	Age (Yrs)	Total Incurred (\$millions)	Cumulative Paid (\$millions)	Cumulative Paid % (4)/(3)	Incremental Paid % (4)n+1-(4)n	Discount Factor (1.05)^(2)-.5	Reserve Discount Factor	Outstanding Reserve (\$millions)
2003	15				0.52%	49.3%		
2004	14				1.83%	51.8%		
2005	13				1.83%	54.3%		
2006	12				1.83%	57.1%		
2007	11				1.83%	59.9%	92.2%	
2008	10	27,868	25,687	92.17%	1.83%	62.9%	90.1%	2,181
2009	9	27,375	24,732	90.35%	2.37%	66.1%	88.1%	2,643
2010	8	26,344	23,177	87.98%	3.49%	69.4%	86.6%	3,167
2011	7	27,557	23,283	84.49%	6.57%	72.8%	85.9%	4,275
2012	6	28,160	21,941	77.92%	7.16%	76.5%	86.5%	6,219
2013	5	28,172	19,934	70.76%	10.53%	80.3%	86.1%	8,238
2014	4	30,132	18,149	60.23%	15.45%	84.3%	86.1%	11,984
2015	3	31,130	13,941	44.78%	18.10%	88.5%	86.4%	17,189
2016	2	32,200	8,591	26.68%	17.11%	92.9%	86.0%	23,609
2017	1	31,697	3,035	9.57%	9.57%	97.6%	84.9%	28,662
Total		290,636	182,470		100.00%			108,166
					Prem IIA=	82.5%		
					Res IIA =		86.0%	

The 2010 Method is like the method used by the NAIC in calibrating the IIAs in the original RBC Formula in 1996. To our knowledge, this method has been used in Academy reviews before 2010.

13.APPENDIX 2—40-year Runoff Payment Pattern Methods

This Appendix describes how we calculate the 40-year runoff payment pattern. This discussion assumes the reader is familiar with the construction of payment patterns from Annual Statement data. In this discussion, the terms ‘loss,’ ‘paid,’ ‘unpaid,’ and ‘reserves’ refer to amounts of loss and DCCE combined. Exhibits A2-1 through A2-4 show our calculations. Exhibits A2-5A and A2-5B show the resulting payment patterns by LOB for premium and reserves, respectively.

Overview

In summary, our method is as follows:

1. Determine AY Payment Patterns

For Ten-Year LOBs:

- Construct a paid loss development “triangle” and paid loss development factors (LDFs) for Loss and DCCE from the industry total 2017 Annual Statement Schedule P Part 3. The development triangle contains up to 10 calendar years of paid loss development for each AY and LOB. (Exhibit A2-1)
- Calculate the ratio equal to paid loss at age 10 divided by reported ultimate incurred loss at age 10, using the 2013-2017 Annual Statement Parts 2 and 3. This ratio is our estimate of the expected payments beyond 10 years. Exhibit A2-2A column 2 shows the expected payments beyond 10 years by LOB.
- Assume an exponential decay of remaining unpaid losses beyond year 10. Select the decay rate for ages 10 and over, using the decay rate observed from age 9 to age 10. Allow payments to extend to year 40. Exhibit A2-2A, column 3 shows the selected decay rate by LOB.

Exhibit A2-2B shows the application of the decay ratio method to D-WC and A-HO. D-WC has the longest payment pattern, and A-HO has a much shorter payment pattern.

For Two-Year LOBs:

- For Two-Year LOBs other than T-Wrnty, apply the method outlined above but use payment triangles and reported ultimate incurred loss from RBC Filings. The RBC data gives paid and incurred loss development extending to 10 years.⁷³

⁷³ For Two-Year LOBs, the Annual Statement information provides only two years of paid development. The 10-year payment triangles for Two-Year LOBs were prepared by regulators who constructed aggregated blinded summary data for use by this Committee. As a quality control feature, we also had the regulators exclude data when there were any “gaps” in paid or incurred loss data triangle. We also had the regulators exclude data from companies with unexpectedly large year-to-year movements in paid losses within an AY, as that might relate to data issues.

- For T-Wrnty, use the two years of payments available from the Annual Statements, as the RBC data is not sufficiently reliable.⁷⁴
- 2. Calculate Reserves by AY (Exhibit A2-3 and A2-4)
 - The 2017 Annual Statements provides the reserves by AY for AY ages 1-10, separately, and the prior reserves, AY ages 11-ultimate, for all AYs combined.
 - For ages 11-40, we estimate the proportion of the prior reserves in each AY at ages 11-40, assuming equal levels of incurred loss by AY⁷⁵ and reducing the incurred by the paid portion estimated using the AY payment pattern.
- 3. Project Payments by Calendar Year (Exhibit A2-3 and A2-4)
 - For each AY within the reserve, ages 2⁷⁶ and over, project future payments by calendar year using the year-by-year portions of each AY's payment pattern.
 - Combine the calendar year payments by AY into the overall reserve payment pattern.

Sample Calculations

We use D-WC in the attached Exhibits to illustrate the method. The method is the same for all Ten-Year LOBs.

We first discuss the AY payment patterns we use for premium IIAs. Then we discuss reserve year payment patterns used for reserve IIAs.

Exhibit A2-1: AY Payment Pattern for Premium IIAs—Ages 1-10

The upper portion of this Exhibit shows the P&C industry total December 31, 2017, Schedule P Part 3, for D-WC.

The middle portion shows the age-to-age paid LDFs for ages 1:2 to 9:10. Below those factors, we show five types of average paid LDFs. The bottom section of the Exhibit shows the selected age-to-age LDFs. When three years of data are available, we select the three-year-weighted average age-to-age LDF. We use shorter-term averages when three years are not available. Note that this

⁷⁴ T-Wrnty was included in K-Fid/Sur for RBC purposes until 2008. The transition from K-Fid/Sur to a standalone T-Wrnty was implemented by AY, so the 2017 RBC Filing was the first to include a complete set of AYs. However, we conclude that the 2017 RBC data was not sufficiently reliable, and we use the Schedule P data instead.

⁷⁵ If we assume that incurred losses in later years were lower, then there would be more reserves for “younger” AYs (say, with ages 11-20) and less reserves for “older” AYs (say with ages 30-40). The investment income credit for years near age 11 is larger than the investment income credit for later. Therefore, assuming constant incurred loss in past years yields somewhat higher IIAs, i.e., less investment income, than assuming incurred losses in later years are smaller.

New companies and runoff companies will have reserves for a limited number of AYs. Depending on the ages of the reserves for those companies, they will tend to have less future investment income than an ongoing company with a full set of AYs.

⁷⁶ Payments in year 1 have occurred prior to the initial reserve evaluation date, e.g., paid in 1988 for reserve date December 31, 1988. Hence, year 1 payments do not affect the reserve IIAs.

revised method uses data from multiple calendar years, i.e., multiple diagonals. In contrast, the 2010 Method, in effect, uses only one diagonal of data, to select age-to-age factors.

Schedule P does not contain year-to-year development for ages 10 and over. Therefore, for the total development from age 10-to-ultimate, we use the ratio of reported ultimate incurred to the paid-to-date at age 10. We select the average 10:ultimate ratio from five Annual Statements, 2013-2017.

In the bottom-most section of the Exhibit, we use the age-to-age factors 1:2 through 9:10 and the 10:ultimate LDFs and calculate the cumulative LDF (“Selected Cumulative”). The cumulative percentage paid-to-date is the reciprocal of the cumulative development factor (“Cumulative % Paid”). The annual percentages paid (“Incremental %Paid” and “Selected Incr % Paid”) are the differences between the cumulative percentages paid from age to age. For ages 1 through 10, the row Selected Incr % Paid is the percentage paid by year in Exhibit A2-5A.

Exhibit A2-2A and 2B: AY Payment Pattern for Premium IIAs—Ages 11-40

Most LOBs have some reserves at age 10. The amount is substantial for lines with longer payment patterns, particularly D-WC. Exhibit A2-2A column 2 shows the expected percentage of AY losses unpaid at age 10 based on the selected payment pattern, for each LOB. D-WC, O-Re-Liab, and R-PL are the LOBs with the largest proportion of expected unpaid loss at age 10.

We use a “decay ratio” to estimate annual payments on reserve amounts after age 10. For D-WC, we select a decay ratio of 90%. The 90% decay ratio means that at any age, 90% of the prior year reserve remains unpaid at the subsequent year-end, and 10% will be paid in the subsequent year. For example, if there were \$1000 in reserves at age 10, we would project \$100 paid in year 11—leaving \$900 unpaid; \$90 paid in year 12—leaving \$810, \$81 paid in year 13—leaving \$729 unpaid, etc. Exhibit A2-2A column 3 shows the decay ratios by LOB.⁷⁷ Exhibit A2-2B shows the application of the decay ratio method to D-WC and A-HO. D-WC has the longest payment pattern, and HO has a much shorter payment pattern.

To select the decay ratio in this Exhibit, we examine the decay ratios at ages 7, 8, and 9, i.e., the paid in year 8 divided by reserves at age 7, the paid in year 9 divided by the reserves at year 8, and the paid in year 10 divided by the reserves at year 9. The decay ratios are generally higher (less paid in the next year) as age increases from 7 to 8 and 9. Therefore we selected the decay ratio based on the observed decay ratio from 9 to 10,⁷⁸ the most mature AY.

⁷⁷ Because RBC Filings do not contain prior-year reserves, for the Two-Year LOBs where we use RBC data, we assume that the unpaid at year 10 is zero for those LOBs.

⁷⁸ The decay ratio significantly affects the resulting payment patterns and IIAs, particularly for longer tail LOBs. We do not believe we have overstated that discount for two reasons. First, we use the decay ratio for ages 9 to 10. The decay ratio for 9 to 10 is higher (implying longer payment patterns) than the decay ratio for ages 8 to 9 and 7 to 8. We take that to mean the decay ratios for 11 and older will more likely be higher still (implying longer payment patterns) than the decay ratio we used. Also, the exponential decay that we use is one pattern sometimes used for payment patterns, but other commonly used methods are slower than exponential.

We limit the payment period to 40 years. For most LOBs, although not D-WC, there is essentially zero expected paid by 40 years. To the extent that there are expected payments beyond 40 years, we normalize the payment pattern so that the total paid within 40 years is 100%.

Exhibit A2-5A shows the AY payment patterns for ages 1-40 by LOB. For our D-WC example, for ages 1 through 10, the values equal the row “Selected Incr % Paid.” For ages 11 and over, the values equal Exhibit A2-2B, column 3.

Exhibits A2-3 and A2-4: Reserve Year Payment Pattern for Reserve IIAs

In Exhibits A2-3 and A2-4, we determine the payment pattern for reserve IIAs. We use the AY payment patterns determined above and the distribution of December 31, 2017, reserves by AY.

The upper portion of Exhibit A2-3 shows the reserves by AY for the latest 10 AYs and for all prior AYs combined, for Ten-Year LOBs. The lower portion of Exhibit A2-3 shows the same information for Two-Year LOBs.

For the Ten-Year LOBs, we obtain the data by AY from the December 31, 2017, industry total Schedule P, Part 1. For these Two-Year LOBs, we obtain the data for AYs 2017 and 2016 from the industry Schedule P, and we use RBC data to allocate the prior year annual statement reserve to the oldest eight AYs.

The top of Exhibit A2-4, on the row called “Remaining Reserve,” shows the reserves by AY. For ages 1-10, the values by AY are from Schedule P Part 1, as shown in Exhibit A2-3. For ages 11 and over, we allocate the total prior reserve, from Exhibit A2-3, into the reserves by AY. To do so, we assume that each AY, for ages 11 and over, has the same incurred loss amount, and we use the AY payment patterns to determine the expected reserves for each AY at ages 11 and over.⁷⁹ Finally, we normalize the sum of those values to match the observed total reserve for ages 11 and over.

For each AY component of the reserve, i.e., each column in Exhibit A2-4, we use the AY payment pattern to project the payment of that reserve by calendar year, i.e., down the rows of Exhibit A2-4. For example, we project that the reserves at age 1 will have payments that follow the portion of the expected AY payments from year 2 to year 40. The AY expected payment is from Exhibit A2-5A. For age 2, we project that the reserves at age 2 will have calendar year payments that follow the expected AY payments from year 3 to year 40, etc.

Using the payments by age and by AY, the right side of Exhibit A2-4 shows the total paid amount by calendar year and the percentage paid by calendar year. That column, labeled “% of Total,” is the indicated reserve year payment pattern shown in Exhibit A2-5B.

⁷⁹ See footnote 75 for a discussion of this assumption.

Two-Year LOBs

We apply the method outlined above for Two-Year LOBs other than T-Wrnty, but we use paid and incurred loss data from RBC Filings. The RBC data gives paid and incurred loss development extending to 10 years.⁸⁰

RBC data has situations where companies do not complete the entire data triangle (zero-interior triangles). Therefore, we include only companies with complete non-zero triangles. We also exclude companies with unexpectedly high development factors, as such development factors might relate to data issues.

There is no prior year reserve for Two-Year LOBs in the RBC data, so we assume these are zero for AYs after age 10. For reserve payment patterns, we determine reserves by AY using Annual Statement Part 1 loss and LAE reserves for ages 1 and 2 and allocating the prior row (ages 3 and over) in proportion to the RBC reserves by AY.⁸¹

For T-Wrnty, we use the 2-years available from Annual Statements, as there is insufficient RBC data.

Exhibits A2-5A and 5B: Payment Patterns by LOB

Exhibits A2-5A and 5B show the resulting payment patterns, by LOB, for premium risk and reserve risk, respectively.

The last rows in these exhibits show the IIA based on the payment patterns and interest rates of 3%, 4%, and 5%.

⁸⁰ This data is confidential, so regulators aggregated and blinded the information before providing it to us.

⁸¹ With judgmental adjustments for S-FG/MG and T-Wrnty.

Exhibit A2-1
Premium—D-WC: Payment Pattern by LOB—40-Year Runoff Method

ANNUAL STATEMENT FOR THE December 31, 2017 OF THE P&C Industry												
SCHEDULE P - PART 3 - Workers' Compensation												
Years	1	2	3	4	5	6	7	8	9	10	11	12
in Which Losses Were Incurred	CUMULATIVE PAID NET LOSSES AND DEFENSE AND COST CONTAINMENT EXPENSES REPORTED AT YEAR END (\$000 OMITTED)										Number of	Number of
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Claims Closed With Loss	Claims Closed Without Loss
											Payment	Payment
1 Prior	0	16,338,485	25,717,362	33,284,563	39,837,469	46,285,914	50,957,924	55,285,931	58,998,074	62,804,847	12,058,134	2,247,696
2 2008	5,767,240	12,476,354	16,421,458	18,939,529	20,684,967	21,951,372	22,888,114	23,554,426	24,144,736	24,696,145	3,111,523	855,943
3 2009	XXX	5,239,687	11,364,656	14,929,131	17,199,433	18,872,313	20,032,134	20,798,322	21,456,335	22,076,041	2,714,959	756,653
4 2010	XXX	XXX	5,366,813	11,690,663	15,434,313	17,856,036	19,509,235	20,505,120	21,375,253	22,137,598	2,747,481	749,259
5 2011	XXX	XXX	XXX	5,537,365	11,926,436	15,750,451	18,150,554	19,733,210	20,932,857	21,930,217	2,760,213	765,604
6 2012	XXX	XXX	XXX	XXX	5,416,142	11,769,257	15,324,766	17,552,686	19,172,205	20,350,437	2,696,612	754,795
7 2013	XXX	XXX	XXX	XXX	XXX	5,263,081	11,510,043	15,100,434	17,482,509	19,074,499	2,613,024	718,071
8 2014	XXX	XXX	XXX	XXX	XXX	XXX	5,304,264	11,580,530	15,360,325	17,740,648	2,593,134	722,560
9 2015	XXX	XXX	XXX	XXX	XXX	XXX	XXX	5,149,257	11,675,824	15,490,331	2,505,148	725,937
10 2016	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	5,183,318	11,314,727	2,264,318	702,493
11 2017	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	5,146,959	1,409,364	557,803
	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-ult		
2008	2.163	1.316	1.153	1.092	1.061	1.043	1.029	1.025	1.023			
2009	2.169	1.314	1.152	1.097	1.061	1.038	1.032	1.029				
2010	2.178	1.320	1.157	1.093	1.051	1.042	1.036					
2011	2.154	1.321	1.152	1.087	1.061	1.048						
2012	2.173	1.302	1.145	1.092	1.061							
2013	2.187	1.312	1.158	1.091								
2014	2.183	1.326	1.155									
2015	2.267	1.327										
2016	2.183											
Average	2.184	1.317	1.153	1.092	1.059	1.043	1.032	1.027	1.023			
5-yr avg	2.199	1.318	1.153	1.092	1.059							
3-yr avg	2.211	1.322	1.153	1.090	1.058	1.043	1.032					
Wtd Avg	2.184	1.317	1.153	1.092	1.059							
5-yr wtd	2.198	1.318	1.153	1.092	1.059							
3-yr wtd	2.211	1.322	1.153	1.090	1.058	1.043	1.032					
	1	2	3	4	5	6	7	8	9	10	11-40	
Selected age to age	2.211	1.322	1.153	1.090	1.058	1.043	1.032	1.027	1.023	1.207		
Selected Cumulative	5.298	2.396	1.813	1.573	1.443	1.364	1.308	1.267	1.234	1.207		
Cumulative % Paid	18.9%	41.7%	55.2%	63.6%	69.3%	73.3%	76.4%	78.9%	81.0%	82.9%	100.0%	
Incremental % Paid	18.9%	22.9%	13.4%	8.4%	5.7%	4.0%	3.1%	2.5%	2.1%	1.9%	17.1%	
Selected Incr % Paid	18.87%	22.86%	13.42%	8.42%	5.73%	4.00%	3.14%	2.45%	2.13%	1.85%	17.13%	

Exhibit A2-2A
Inputs To Calculation of Payment Patterns 10 to Ultimate

(1)	(2)	(3)
LOB	Unpaid at	Decay Ratio
	Year 10	
A-HO	0.16%	80%
B-PPA	0.43%	80%
C-CA	0.79%	80%
D-WC	17.13%	90%
E-CMP	2.43%	80%
F1-MPL-O	11.05%	80%
F2-MPL-C	3.79%	80%
G-SL	1.90%	90%
H-OL	9.12%	80%
M-Intl	2.98%	90%
N-Re-Prop	2.38%	80%
O-Re-Liab	16.49%	90%
R-PL	15.49%	80%

Exhibit A2-2B
Example Calculation of Payment Pattern from Decay Ratio

(1)	WC		HO	
	(2)	(3) = 17.13%* [(2) / TOTAL(2)]	(4)	(5) = 0.16%* [(4) / TOTAL(4)]
<u>Year</u>	<u>% Unpaid</u>	<u>% Paid</u>	<u>% Unpaid</u>	<u>% Paid</u>
11	90%	1.79%	80%	0.04%
12	81%	1.61%	64%	0.03%
13	73%	1.45%	51%	0.02%
14	66%	1.30%	41%	0.02%
15	59%	1.17%	33%	0.01%
16	53%	1.06%	26%	0.01%
17	48%	0.95%	21%	0.01%
18	43%	0.86%	17%	0.01%
19	39%	0.77%	13%	0.01%
20	35%	0.69%	11%	0.00%
21	31%	0.62%		
⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮
31	11%	0.22%	0%	0.00%
32	10%	0.20%	0%	0.00%
33	9%	0.18%	0%	0.00%
34	8%	0.16%	0%	0.00%
35	7%	0.14%	0%	0.00%
36	6%	0.13%	0%	0.00%
37	6%	0.12%	0%	0.00%
38	5%	0.10%	0%	0.00%
39	5%	0.09%	0%	0.00%
40	4%	0.08%	0%	0.00%
		17.13%		0.16%

*From Exhibit A2-2A

**Exhibit A2-3
 Reserves by AY for Reserve Payment Pattern Calculations**

Ten-Year LOBs													
Years in Which Losses Were Incurred	A	B	C	D	E	F1	F2	G	H	M	N+P	O	R
	Prior	462,087	3,607,422	683,450	46,730,063	3,338,253	601,136	458,858	632,594	23,819,514	58,699	441,965	13,056,924
2008	57,901	403,379	73,892	4,754,173	393,723	164,663	126,414	91,423	2,181,441	714	43,723	593,636	262,508
2009	82,916	530,069	114,661	4,531,090	468,160	264,503	195,055	66,837	2,643,004	1,928	51,133	760,703	263,732
2010	120,288	756,211	171,662	4,945,290	650,450	364,234	323,950	54,827	3,166,627	465	115,678	805,282	337,233
2011	179,958	1,055,332	334,403	5,801,023	973,796	579,190	510,435	112,357	4,274,613	1,440	254,281	1,184,837	399,283
2012	289,091	1,708,858	677,925	6,863,969	1,366,738	780,770	794,028	179,480	6,218,933	1,011	326,089	1,515,897	506,616
2013	481,557	3,145,374	1,381,432	8,319,155	2,339,715	1,092,576	1,269,826	300,193	8,237,914	3,508	438,722	1,587,338	648,556
2014	962,878	6,776,965	2,838,543	10,398,702	3,571,969	1,439,589	1,977,657	404,812	11,983,609	5,138	514,554	1,919,723	928,651
2015	1,899,624	14,017,102	5,387,328	13,552,363	5,484,267	1,682,944	2,824,304	623,797	17,188,553	7,510	1,168,659	2,149,401	1,270,343
2016	3,932,790	28,008,470	8,755,111	18,689,579	7,950,397	1,836,257	3,891,886	1,007,692	23,608,705	23,356	2,169,086	2,570,879	1,466,552
2017	19,002,341	63,021,207	13,198,633	26,379,724	14,634,965	1,911,060	4,713,886	2,051,554	28,662,366	172,808	6,246,671	4,318,944	1,691,732
Total	27,471,431	123,030,389	33,617,040	150,965,131	41,172,433	10,716,922	17,086,299	5,525,566	131,985,279	276,577	11,770,561	30,463,564	15,011,161
Prior + 2008 as % Total	1.7%	2.9%	2.0%	31.0%	8.1%	5.6%	2.7%	11.4%	18.0%	21.2%	3.8%	42.9%	48.2%

Two-Year LOBs						
Years in Which Losses Were Incurred	I	J	K	L	S	T
	Prior	0	0	0	0	0
2008	72,567	18,418	42,549	75,945	12	847
2009	28,784	9,436	139,278	86,392	37	1,129
2010	126,946	11,784	99,728	131,855	10	1,505
2011	425,657	7,795	90,521	230,058	60	2,007
2012	180,656	20,266	48,598	249,092	378	2,676
2013	166,490	5,480	297,562	351,683	443	3,568
2014	462,770	68,432	381,397	551,038	12,477	4,757
2015	1,227,880	226,315	775,154	899,054	22,499	6,343
2016	2,792,048	217,882	955,883	1,224,401	72,591	7,287
2017	17,185,871	7,148,311	1,424,068	3,696,189	127,353	82,252
Total	22,669,669	7,734,119	4,254,739	7,495,707	235,860	112,369

Notes:

For Two-Year LOBs, I-SP, J-APD, K-Fid/Sur, and L-Other, Total AY 2016 and AY 2017 reserves are from the Annual Statement. For AYs 2015 and earlier, we distributed the AY 2015 and prior year total reserve from the Annual Statement to AY based on RBC data.

For S-FG/MG: Used RBC data for AY 2016 and prior; AY 2017 judgmentally selected.

For T-Wrnty: Total reserve is from the 2017 Annual Statement; AY 2015 and prior year reserve is judgmentally spread to AY.

**Exhibit A2-4
 D-WC: Reserve Risk Payment Pattern
 (Amounts in Millions)**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)							
Row #	Year	Pattern Pattern	Discount Factor @5.0%	Reserve for Year at the maturity (month): Amounts in Millions																																													
1	Remaining Reserve:			26,380	18,690	13,552	10,399	8,319	6,864	5,801	4,945	4,531	4,754	...	505	427	356	292	235	185	139	96	60	28																									
2	Maturity (yrs):			1	2	3	4	5	6	7	8	9	10	...	30	31	32	33	34	35	36	37	38	39	TOTAL	% of Total																							
3.1	1	18.87%												...											28	25,304	16.8%																						
3.2	2	22.86%	0.976	7,433	4,304	2,544	1,636	1,084	807	603	499	442	497	...	78	71	64	57	50	46	43	36	32	28		18,133	12.0%																						
3.3	3	13.42%	0.929	4,364	2,701	1,731	1,142	851	630	524	433	427	447	...	71	64	57	50	46	43	36	32	28		13,921	9.2%																							
3.4	4	8.42%	0.885	2,738	1,838	1,209	896	664	548	456	419	384	402	...	64	57	50	46	43	36	32	28			11,276	7.5%																							
3.5	5	5.73%	0.843	1,863	1,283	949	699	577	476	441	377	346	361	...	57	50	46	43	36	32	28				9,477	6.3%																							
3.6	6	4.00%	0.803	1,301	1,007	740	608	501	460	396	340	310	325	...	50	46	43	36	32	28						8,224	5.5%																						
3.7	7	3.14%	0.765	1,021	786	644	528	485	414	357	305	279	294	...	46	43	36	32	28							7,243	4.8%																						
3.8	8	2.45%	0.728	797	683	559	511	436	373	320	274	253	264	...	43	36	32	28								6,483	4.3%																						
3.9	9	2.13%	0.694	693	593	541	460	393	334	288	248	227	239	...	36	32	28									5,826	3.9%																						
3.10	10	1.85%	0.661	602	574	486	414	352	301	261	223	205	214	...	32	28																																	
.																					
3.30	30	0.24%	0.249	78	71	60	51	43	36	32	28	24	25												477	0.3%																							
3.31	31	0.22%	0.237	72	64	54	46	38	33	30	23	21	22												404	0.3%																							
3.32	32	0.20%	0.226	65	58	48	40	35	31	25	21	19													342	0.2%																							
3.33	33	0.18%	0.215	59	51	42	37	33	26	22	19														288	0.2%																							
3.34	34	0.16%	0.205	52	45	39	34	27	23	20															240	0.2%																							
3.35	35	0.14%	0.195	46	42	36	29	24	21																197	0.1%																							
3.36	36	0.13%	0.186	42	38	30	26	22																	158	0.1%																							
3.37	37	0.12%	0.177	39	32	27	23																		121	0.1%																							
3.38	38	0.10%	0.168	33	29	24																			86	0.1%																							
3.39	39	0.09%	0.160	29	26																				55	0.0%																							
3.40	40	0.08%	0.153	26																					26	0.0%																							
4	Disc Total 100.0%			21,122	14,364	10,054	7,510	5,894	4,818	4,053	3,461	3,182	3,358	...	417	358	303	252	207	166	127	90	58	28	150,965	100.0%																							
5	Total Undiscounted			150,965																																													
6	Total Discounted			112,297																																													
7	Discount Factor			0.744																																													

Exhibit A2-5A
Premium: Payment Pattern by LOB—40-Year Runoff Method

Year	A-HO	B-PPA	C-CA	D-WC	E-CMP	F1-MPL-O	F2-MPL-C	G-SL	H-OL	I-SP	J-APD	K-Fid/Sur	L-Other	M-Intl	N-Re-Prop	O-Re-Liab	R-PL	S-FG/MG	T-Wrnty
1	73.14%	41.13%	18.94%	18.87%	41.63%	0.65%	4.66%	37.04%	6.81%	57.92%	96.50%	28.36%	61.07%	33.51%	27.10%	11.21%	4.77%	18.13%	84.13%
2	20.31%	30.07%	23.63%	22.86%	22.37%	3.74%	18.74%	32.60%	13.85%	31.94%	3.84%	39.86%	29.46%	35.05%	37.83%	11.63%	10.47%	32.22%	12.91%
3	3.53%	13.30%	20.88%	13.42%	11.09%	10.46%	23.82%	11.74%	16.69%	5.79%	-0.29%	15.94%	4.87%	14.91%	16.16%	16.50%	12.22%	19.97%	1.46%
4	1.44%	7.55%	16.64%	8.42%	9.61%	15.08%	17.71%	5.96%	15.89%	1.87%	-0.01%	3.63%	1.81%	8.19%	6.85%	12.11%	13.41%	8.03%	0.73%
5	0.67%	3.97%	10.27%	5.73%	5.62%	16.13%	12.53%	4.75%	12.43%	0.67%	0.02%	2.73%	0.74%	3.17%	3.25%	9.69%	12.70%	7.57%	0.37%
6	0.35%	1.79%	4.76%	4.00%	3.16%	15.23%	7.29%	2.15%	9.06%	0.61%	0.00%	2.28%	0.72%	1.50%	2.65%	8.20%	7.69%	5.73%	0.19%
7	0.19%	0.88%	2.22%	3.14%	1.85%	11.35%	4.14%	1.43%	5.82%	0.54%	-0.02%	1.50%	0.18%	0.26%	1.53%	5.32%	6.88%	1.09%	0.10%
8	0.11%	0.47%	1.05%	2.45%	1.08%	6.74%	3.54%	0.85%	4.66%	0.19%	-0.01%	1.65%	0.39%	0.27%	1.32%	3.45%	5.47%	1.95%	0.05%
9	0.06%	0.28%	0.60%	2.13%	0.70%	5.40%	2.09%	1.13%	2.98%	0.14%	-0.01%	0.61%	0.23%	0.06%	0.63%	2.88%	5.11%	2.19%	0.03%
10	0.05%	0.14%	0.24%	1.85%	0.47%	4.16%	1.69%	0.44%	2.67%	0.04%	-0.01%	0.61%	0.06%	0.11%	0.31%	2.52%	5.78%	1.55%	0.02%
11	0.03%	0.09%	0.16%	1.79%	0.49%	2.21%	0.76%	0.20%	1.83%	0.15%	-0.01%	1.42%	0.24%	0.31%	0.48%	1.72%	3.10%	0.79%	0.01%
12	0.03%	0.07%	0.13%	1.61%	0.39%	1.77%	0.61%	0.18%	1.46%	0.07%		0.71%	0.12%	0.28%	0.38%	1.55%	2.48%	0.39%	
13	0.02%	0.06%	0.10%	1.45%	0.31%	1.42%	0.49%	0.16%	1.17%	0.04%		0.35%	0.06%	0.25%	0.31%	1.39%	1.99%	0.20%	
14	0.02%	0.04%	0.08%	1.30%	0.25%	1.13%	0.39%	0.14%	0.94%	0.02%		0.18%	0.03%	0.23%	0.24%	1.26%	1.59%	0.10%	
15	0.01%	0.04%	0.06%	1.17%	0.20%	0.91%	0.31%	0.13%	0.75%	0.01%		0.09%	0.01%	0.20%	0.20%	1.13%	1.27%	0.05%	
16	0.01%	0.03%	0.05%	1.06%	0.16%	0.73%	0.25%	0.12%	0.60%			0.04%	0.01%	0.18%	0.16%	1.02%	1.02%	0.02%	
17	0.01%	0.02%	0.04%	0.95%	0.13%	0.58%	0.20%	0.11%	0.48%			0.02%		0.17%	0.12%	0.92%	0.81%	0.01%	
18	0.01%	0.02%	0.03%	0.86%	0.10%	0.46%	0.16%	0.09%	0.38%			0.01%		0.15%	0.10%	0.82%	0.65%	0.01%	
19	0.01%	0.01%	0.03%	0.77%	0.08%	0.37%	0.13%	0.09%	0.31%			0.01%		0.13%	0.08%	0.74%	0.52%		
20		0.01%	0.02%	0.69%	0.07%	0.30%	0.10%	0.08%	0.25%					0.12%	0.06%	0.67%	0.42%		
21		0.01%	0.02%	0.62%	0.05%	0.24%	0.08%	0.07%	0.20%					0.11%	0.05%	0.60%	0.33%		
22		0.01%	0.01%	0.56%	0.04%	0.19%	0.07%	0.06%	0.16%					0.10%	0.04%	0.54%	0.27%		
23		0.01%	0.01%	0.51%	0.03%	0.15%	0.05%	0.06%	0.13%					0.09%	0.03%	0.49%	0.21%		
24			0.01%	0.45%	0.03%	0.12%	0.04%	0.05%	0.10%					0.08%	0.03%	0.44%	0.17%		
25			0.01%	0.41%	0.02%	0.10%	0.03%	0.05%	0.08%					0.07%	0.02%	0.39%	0.14%		
26			0.01%	0.37%	0.02%	0.08%	0.03%	0.04%	0.06%					0.06%	0.02%	0.35%	0.11%		
27				0.33%	0.01%	0.06%	0.02%	0.04%	0.05%					0.06%	0.01%	0.32%	0.09%		
28				0.30%	0.01%	0.05%	0.02%	0.03%	0.04%					0.05%	0.01%	0.29%	0.07%		
29				0.27%	0.01%	0.04%	0.01%	0.03%	0.03%					0.05%	0.01%	0.26%	0.06%		
30				0.24%	0.01%	0.03%	0.01%	0.03%	0.03%					0.04%	0.01%	0.23%	0.04%		
31				0.22%	0.01%	0.03%	0.01%	0.02%	0.02%					0.04%	0.01%	0.21%	0.04%		
32				0.20%		0.02%	0.01%	0.02%	0.02%					0.03%		0.19%	0.03%		
33				0.18%		0.02%	0.01%	0.02%	0.01%					0.03%		0.17%	0.02%		
34				0.16%		0.01%		0.02%	0.01%					0.03%		0.15%	0.02%		
35				0.14%		0.01%		0.02%	0.01%					0.02%		0.14%	0.01%		
36				0.13%		0.01%		0.01%	0.01%					0.02%		0.12%	0.01%		
37				0.12%		0.01%		0.01%	0.01%					0.02%		0.11%	0.01%		
38				0.10%		0.01%		0.01%						0.02%		0.10%	0.01%		
39				0.09%				0.01%						0.02%		0.09%	0.01%		
40				0.08%				0.01%						0.01%		0.08%			
41																			
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Disc. at 3.0%	97.4%	95.2%	92.5%	86.8%	93.9%	84.0%	89.4%	94.2%	87.2%	96.7%	98.4%	94.0%	96.8%	94.2%	93.8%	85.0%	84.4%	92.4%	97.9%
Disc. at 4.0%	96.6%	93.7%	90.3%	83.3%	92.1%	79.5%	86.3%	92.4%	83.7%	95.7%	97.9%	92.2%	95.8%	92.5%	91.9%	81.1%	80.1%	90.2%	97.2%
Disc. at 5.0%	95.8%	92.2%	88.1%	80.3%	90.3%	75.4%	83.4%	90.8%	80.3%	94.7%	97.5%	90.5%	94.8%	90.8%	90.2%	77.5%	76.2%	88.0%	96.6%
Avg Time to Pmt (Years)	0.9	1.7	2.7	5.4	2.2	6.1	3.9	2.1	4.8	1.1	0.5	2.2	1.1	2.2	2.3	6.0	6.0	2.7	0.7

Exhibit A2-5B
Reserves: Payment Pattern by LOB—40-Year Runoff Method

Year	A-HO	B-PPA	C-CA	D-WC	E-CMP	F1-MPL-O	F2-MPL-C	G-SL	H-OL	I-SP	J-APD	K-Fid/Sur	L-Other	M-Intl	N-Re-Prop	O-Re-Liab	R-PL	S-FG/MG	T-Wrnty	
1																				
2	66.70%	48.06%	36.69%	16.74%	33.61%	17.73%	28.36%	37.38%	21.12%	68.94%	104.41%	40.04%	56.71%	41.96%	44.31%	14.71%	18.28%	38.18%	73.07%	
3	15.75%	23.52%	26.30%	12.01%	20.59%	17.15%	22.64%	18.20%	18.17%	14.96%	-8.54%	18.38%	16.04%	19.49%	20.42%	13.06%	15.63%	22.05%	13.40%	
4	7.21%	12.80%	16.93%	9.22%	14.40%	15.27%	15.52%	11.29%	14.46%	5.92%	0.14%	10.51%	8.49%	11.03%	10.38%	10.54%	13.02%	12.17%	6.73%	
5	3.74%	6.64%	9.28%	7.47%	8.87%	12.51%	10.28%	7.79%	10.87%	3.41%	2.00%	7.71%	5.47%	5.43%	6.27%	8.67%	10.53%	9.43%	3.40%	
6	2.14%	3.35%	4.50%	6.28%	5.61%	9.60%	6.58%	4.89%	8.02%	2.49%	1.03%	5.82%	4.13%	3.31%	4.66%	7.19%	8.31%	5.65%	1.72%	
7	1.31%	1.86%	2.27%	5.45%	3.78%	6.87%	4.42%	3.59%	5.93%	1.66%	0.37%	4.51%	2.78%	1.99%	3.15%	5.86%	6.85%	3.03%	0.87%	
8	0.85%	1.12%	1.24%	4.80%	2.71%	4.84%	3.19%	2.72%	4.57%	0.81%	0.63%	3.69%	2.23%	1.81%	2.34%	4.93%	5.60%	3.34%	0.43%	
9	0.58%	0.72%	0.75%	4.29%	2.07%	3.64%	2.16%	2.19%	3.48%	0.60%	0.40%	3.24%	1.60%	1.50%	1.58%	4.31%	4.58%	2.76%	0.22%	
10	0.43%	0.48%	0.46%	3.86%	1.66%	2.68%	1.56%	1.50%	2.78%	0.39%	-0.18%	2.55%	1.08%	1.45%	1.24%	3.78%	3.69%	1.69%	0.11%	
11	0.32%	0.36%	0.35%	3.48%	1.39%	1.94%	1.07%	1.23%	2.15%	0.43%	-0.26%	1.80%	0.79%	1.49%	1.16%	3.29%	2.77%	0.85%	0.05%	
12	0.26%	0.28%	0.28%	3.12%	1.11%	1.56%	0.86%	1.10%	1.72%	0.21%		0.89%	0.38%	1.33%	0.93%	2.94%	2.21%	0.43%		
13	0.20%	0.21%	0.22%	2.79%	0.89%	1.25%	0.69%	0.98%	1.37%	0.11%		0.44%	0.18%	1.18%	0.74%	2.62%	1.77%	0.22%		
14	0.16%	0.15%	0.17%	2.49%	0.71%	1.00%	0.55%	0.88%	1.10%	0.05%		0.22%	0.08%	1.05%	0.59%	2.33%	1.41%	0.11%		
15	0.11%	0.12%	0.13%	2.22%	0.56%	0.80%	0.44%	0.79%	0.88%	0.02%		0.11%	0.03%	0.92%	0.47%	2.07%	1.13%	0.05%		
16	0.09%	0.09%	0.11%	1.98%	0.45%	0.64%	0.35%	0.70%	0.70%			0.05%	0.01%	0.82%	0.37%	1.84%	0.90%	0.02%		
17	0.07%	0.07%	0.08%	1.77%	0.35%	0.51%	0.28%	0.62%	0.56%			0.03%		0.74%	0.29%	1.63%	0.71%	0.01%		
18	0.05%	0.05%	0.06%	1.57%	0.28%	0.41%	0.22%	0.55%	0.45%			0.01%		0.64%	0.24%	1.44%	0.57%	0.01%		
19	0.03%	0.04%	0.05%	1.40%	0.22%	0.33%	0.18%	0.49%	0.36%					0.57%	0.19%	1.27%	0.45%			
20		0.03%	0.04%	1.24%	0.18%	0.26%	0.14%	0.44%	0.29%					0.50%	0.15%	1.12%	0.36%			
21		0.02%	0.03%	1.10%	0.13%	0.21%	0.11%	0.39%	0.23%					0.44%	0.12%	0.98%	0.28%			
22		0.02%	0.02%	0.97%	0.10%	0.17%	0.09%	0.34%	0.18%					0.38%	0.09%	0.86%	0.22%			
23		0.01%	0.02%	0.86%	0.08%	0.13%	0.07%	0.30%	0.14%					0.33%	0.07%	0.75%	0.17%			
24			0.01%	0.75%	0.07%	0.11%	0.06%	0.26%	0.11%					0.28%	0.06%	0.65%	0.14%			
25			0.01%	0.66%	0.05%	0.09%	0.04%	0.23%	0.09%					0.24%	0.05%	0.56%	0.11%			
26				0.58%	0.04%	0.07%	0.04%	0.20%	0.07%					0.20%	0.04%	0.48%	0.08%			
27				0.50%	0.03%	0.05%	0.03%	0.17%	0.05%					0.18%	0.03%	0.41%	0.07%			
28				0.43%	0.02%	0.04%	0.02%	0.14%	0.04%					0.14%	0.02%	0.34%	0.05%			
29				0.37%	0.02%	0.03%	0.02%	0.13%	0.03%					0.12%	0.02%	0.28%	0.03%			
30				0.32%	0.01%	0.03%	0.01%	0.11%	0.02%					0.09%	0.01%	0.23%	0.02%			
31				0.27%	0.01%	0.02%	0.01%	0.09%	0.02%					0.07%	0.01%	0.18%	0.02%			
32				0.23%		0.02%	0.01%	0.07%	0.01%					0.06%		0.16%	0.01%			
33				0.19%		0.01%		0.06%	0.01%					0.05%		0.13%	0.01%			
34				0.16%		0.01%		0.05%	0.01%					0.05%		0.11%	0.01%			
35				0.13%		0.01%		0.04%	0.01%					0.04%		0.09%	0.01%			
36				0.10%		0.01%		0.03%						0.03%		0.07%				
37				0.08%				0.02%						0.03%		0.05%				
38				0.06%				0.02%						0.03%		0.04%				
39				0.04%				0.01%						0.02%		0.02%				
40				0.02%				0.01%						0.01%		0.01%				
41																				
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Disc. at 3.0%	96.3%	95.1%	94.3%	82.7%	92.1%	89.2%	92.0%	90.9%	89.4%	96.5%	98.4%	92.9%	95.1%	91.2%	93.3%	83.5%	88.0%	93.6%	97.0%	
Disc. at 4.0%	95.1%	93.7%	92.6%	78.3%	89.8%	86.1%	89.6%	88.4%	86.4%	95.4%	97.8%	90.8%	93.6%	88.9%	91.3%	79.3%	84.7%	91.6%	96.1%	
Disc. at 5.0%	94.0%	92.2%	91.0%	74.4%	87.7%	83.2%	87.5%	86.1%	83.7%	94.3%	97.3%	88.8%	92.2%	86.7%	89.5%	75.5%	81.6%	89.8%	95.2%	
Avg Time to Pmt (Years)	2.3	2.7	3.0	8.1	4.0	5.1	4.0	4.6	5.0	2.3	1.6	3.6	2.8	4.5	3.5	7.7	5.6	3.3	2.0	

14. APPENDIX 3—RDHA and 40-Year Truncated Payment Pattern

Risk Development with Age

Many lines of business have AY payments extending beyond 10 years. For example, Exhibit A2-3 shows that unpaid losses from AYs of ages 10 and over at December 31, 2017, are 1.7% for A-HO, 31% for D-WC, and 42.9% for O-Re-Liab.

Exhibit A3-1 below shows how RRRs develop as the length of the risk development horizon increases from the end of year one to the end of year 10 for three LOBs.⁸² The reserve risk ratio at each age is the 87.5th percentile of RRRs at that age. The numerator of the RRR at age “N” is the change in the reported ultimate net incurred losses from year 1 to year N. The ratio’s denominator is the unpaid losses at the end of year 1.

Looking at the ratios, we see that the ratio increases with increasing age. For example, looking at O-Re-Liab, scanning across the columns, the one-year 87.5th percentile adverse development begins at 25.3% of initial reserves, shown in the ‘2 yrs’ column, and increases to 187.3% at year ten. Moreover, even for the most mature data, e.g., years 8-10, the ratio increases from 152.6% to 187.3%.

Exhibit A3-1
Development of 87.5th Percentile Reserve Risk Ratio as Risk Development Horizon
Expands from Year 1 to Year 10

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
87.5 percentile incurred loss change as a percentage of reserves at year 1									
LOB	2 yrs	3 yrs	4 yrs	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs
A-HO	18.8%	22.2%	23.7%	23.6%	25.2%	25.8%	25.8%	26.1%	26.6%
change		3.5%	1.5%	-0.1%	1.7%	0.6%	0.0%	0.3%	0.5%
WC	15.6%	22.5%	30.4%	34.5%	37.9%	38.2%	45.0%	46.0%	49.1%
D-Change		6.9%	7.9%	4.1%	3.3%	0.4%	6.8%	0.9%	3.1%
O-Re-Liab	25.3%	43.8%	65.4%	96.5%	110.8%	126.2%	152.6%	171.3%	187.3%
Change		18.5%	21.7%	31.0%	14.4%	15.4%	26.4%	18.7%	16.1%

The most mature data point in our analysis is at age 10. It is reasonable to expect additional adverse development in years 10 and over.

Developing the tools to quantify premium and reserve risk beyond year ten is outside the scope of this analysis. Instead, we limit the investment income credit in the IIA by using the 40-year truncated payment pattern.

⁸² The data used for this chart is at the company-level for statement years 1997, 2007, and 2017 only. Data is not consolidated into pools and no filters have been applied (e.g., for company size). We believe the findings from this simpler dataset also apply to the filtered data set we use to calculate risk factors for this analysis.

40-Year Truncated Payment Patterns

Exhibits A3-2A and 2B below show the 40-year truncated payment patterns. For payment periods 1-9, these equal the 40-year runoff payment patterns we show in Exhibit A2-5A and A2-5B for premium and reserve risk, respectively. Payment period 10+ is the sum of all payments in year 10 and beyond.

Exhibit A3-2A
Premium: 40-Year Truncated Payment Pattern by LOB

Year	A-HO	B-PPA	C-CA	D-WC	E-CMP	F1-MPL-O	F2-MPL-C	G-SL	H-OL	I-SP	J-APD	K-Fid/Sur	L-Other	M-Intl	N-Re-Prop	O-Re-Liab	R-PL	S-FG/MG	T-Wrnty
1	73.14%	41.13%	18.94%	18.87%	41.63%	0.65%	4.66%	37.04%	6.81%	57.92%	96.50%	28.36%	61.07%	33.51%	27.10%	11.21%	4.77%	18.13%	84.13%
2	20.31%	30.07%	23.63%	22.86%	22.37%	3.74%	18.74%	32.60%	13.85%	31.94%	3.84%	39.86%	29.46%	35.05%	37.83%	11.63%	10.47%	32.22%	12.91%
3	3.53%	13.30%	20.88%	13.42%	11.09%	10.46%	23.82%	11.74%	16.69%	5.79%	-0.29%	15.94%	4.87%	14.91%	16.16%	16.50%	12.22%	19.97%	1.46%
4	1.44%	7.55%	16.64%	8.42%	9.61%	15.08%	17.71%	5.96%	15.89%	1.87%	-0.01%	3.63%	1.81%	8.19%	6.85%	12.11%	13.41%	8.03%	0.73%
5	0.67%	3.97%	10.27%	5.73%	5.62%	16.13%	12.53%	4.75%	12.43%	0.67%	0.02%	2.73%	0.74%	3.17%	3.25%	9.69%	12.70%	7.57%	0.37%
6	0.35%	1.79%	4.76%	4.00%	3.16%	15.23%	7.29%	2.15%	9.06%	0.61%	0.00%	2.28%	0.72%	1.50%	2.65%	8.20%	7.69%	5.73%	0.19%
7	0.19%	0.88%	2.22%	3.14%	1.85%	11.35%	4.14%	1.43%	5.82%	0.54%	-0.02%	1.50%	0.18%	0.26%	1.53%	5.32%	6.88%	1.09%	0.10%
8	0.11%	0.47%	1.05%	2.45%	1.08%	6.74%	3.54%	0.85%	4.66%	0.19%	-0.01%	1.65%	0.39%	0.27%	1.32%	3.45%	5.47%	1.95%	0.05%
9	0.06%	0.28%	0.60%	2.13%	0.70%	5.40%	2.09%	1.13%	2.98%	0.14%	-0.01%	0.61%	0.23%	0.06%	0.63%	2.88%	5.11%	2.19%	0.03%
10+	0.20%	0.56%	1.01%	18.98%	2.89%	15.22%	5.48%	2.35%	11.81%	0.33%	-0.02%	3.44%	0.53%	3.08%	2.68%	19.01%	21.28%	3.12%	0.03%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Disc. at 3.0%	97.4%	95.2%	92.6%	89.5%	94.1%	85.1%	89.8%	94.5%	88.1%	96.7%	98.4%	94.1%	96.8%	94.6%	94.0%	87.6%	85.9%	92.5%	97.9%
Disc. at 4.0%	96.6%	93.7%	90.4%	86.5%	92.3%	80.8%	86.8%	92.8%	84.7%	95.7%	97.9%	92.3%	95.8%	93.0%	92.2%	84.1%	81.9%	90.2%	97.2%
Disc. at 5.0%	95.8%	92.3%	88.2%	83.6%	90.6%	76.8%	83.9%	91.2%	81.5%	94.7%	97.5%	90.6%	94.8%	91.4%	90.5%	80.7%	78.2%	88.1%	96.6%

Exhibit A3-2B
Reserves: 40-Year Truncated Payment Pattern by LOB

Year	A	B	C	D	E	F1	F2	G	H	I	J	K	L	M	N+P	O	R	S	T
0	A-HO	B-PPA	C-CA	D-WC	E-CMP	F1-MPL-O	F2-MPL-C	G-SL	H-OL	I-SP	J-APD	K-Fid/Sur	L-Other	M-Intl	N-Re-Prop	O-Re-Liab	R-PL	S-FG/MG	T-Wrnty
1																			
2	66.70%	48.06%	36.69%	16.74%	33.61%	17.73%	28.36%	37.38%	21.12%	68.94%	104.41%	40.04%	56.71%	41.96%	44.31%	14.71%	18.28%	38.18%	73.07%
3	15.75%	23.52%	26.30%	12.01%	20.59%	17.15%	22.64%	18.20%	18.17%	14.96%	-8.54%	18.38%	16.04%	19.49%	20.42%	13.06%	15.63%	22.05%	13.40%
4	7.21%	12.80%	16.93%	9.22%	14.40%	15.27%	15.52%	11.29%	14.46%	5.92%	0.14%	10.51%	8.49%	11.03%	10.38%	10.54%	13.02%	12.17%	6.73%
5	3.74%	6.64%	9.28%	7.47%	8.87%	12.51%	10.28%	7.79%	10.87%	3.41%	2.00%	7.71%	5.47%	5.43%	6.27%	8.67%	10.53%	9.43%	3.40%
6	2.14%	3.35%	4.50%	6.28%	5.61%	9.60%	6.58%	4.89%	8.02%	2.49%	1.03%	5.82%	4.13%	3.31%	4.66%	7.19%	8.31%	5.65%	1.72%
7	1.31%	1.86%	2.27%	5.45%	3.78%	6.87%	4.42%	3.59%	5.93%	1.66%	0.37%	4.51%	2.78%	1.99%	3.15%	5.86%	6.85%	3.03%	0.87%
8	0.85%	1.12%	1.24%	4.80%	2.71%	4.84%	3.19%	2.72%	4.57%	0.81%	0.63%	3.69%	2.23%	1.81%	2.34%	4.93%	5.60%	3.34%	0.43%
9	0.58%	0.72%	0.75%	4.29%	2.07%	3.64%	2.16%	2.19%	3.48%	0.60%	0.40%	3.24%	1.60%	1.50%	1.58%	4.31%	4.58%	2.76%	0.22%
10+	1.72%	1.93%	2.04%	33.74%	8.36%	12.39%	6.85%	11.95%	13.38%	1.21%	-0.44%	6.10%	2.55%	13.48%	6.89%	30.73%	17.20%	3.39%	0.16%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Disc. at 3.0%	96.3%	95.2%	94.5%	87.1%	92.7%	90.1%	92.5%	92.4%	90.5%	96.5%	98.4%	93.1%	95.1%	92.9%	93.8%	87.3%	89.3%	93.6%	97.0%
Disc. at 4.0%	95.2%	93.8%	92.8%	83.4%	90.5%	87.2%	90.3%	90.1%	87.7%	95.4%	97.8%	91.0%	93.6%	90.8%	92.0%	83.7%	86.2%	91.7%	96.1%
Disc. at 5.0%	94.1%	92.4%	91.2%	79.9%	88.5%	84.5%	88.1%	88.0%	85.0%	94.4%	97.3%	89.0%	92.2%	88.8%	90.2%	80.3%	83.3%	89.9%	95.2%

15.APPENDIX 4—Impact of Changes in Payment Pattern Methods

This Appendix shows the indicated IIAs and the risk charges for each of the four payment pattern/interest rate combinations in Table 4.1 by LOB. It also shows the percentage change in risk charges from the current risk charges to the risk charges using the 40-year truncated payment pattern with a 4% interest rate.

Exhibit A4-1A
Premium: Current and Indicated IIAs and Risk Charges
Various Payment Pattern Methods/ 5% and 4%Interest Rates
From Largest to Smallest Indicated Increase in Risk Charge (Column 12)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
LOB	IIAs					Risk Factor	Premium Risk Charges 2021 Formula Line 4 and IIA as shown:					4.0% 40 Yr Trunc vs 2022 Formula	
	2022 @5%	2017 Pay Data 5%	Trunc 5%	Trunc 4%	Duration	2022 Line 4	2022 Formula	2017 Pay Data 5%	Trunc 5%	Trunc 4%	% Risk (11)/(8)-100%	% Premium (11)-(8)	
T-Wrnty	0.904	0.968	0.966	0.972	0.7	0.854	3.0%	8.5%	8.3%	8.9%	194.8%	5.8%	
O-Re-Liab	0.777	0.796	0.807	0.841	4.8	1.322	29.5%	31.9%	33.5%	37.9%	28.5%	8.4%	
F2-MPL-C	0.827	0.837	0.839	0.868	3.6	1.130	18.9%	20.0%	20.3%	23.5%	24.3%	4.6%	
H-OL	0.816	0.825	0.815	0.847	4.3	1.013	13.0%	13.9%	12.9%	16.2%	24.0%	3.1%	
D-WC	0.839	0.833	0.836	0.865	4.0	1.044	13.8%	13.1%	13.5%	16.4%	19.3%	2.7%	
R-PL	0.774	0.780	0.782	0.819	5.3	1.263	30.7%	31.5%	31.7%	36.4%	18.5%	5.7%	
G-SL	0.898	0.913	0.912	0.928	1.9	0.922	16.6%	18.0%	17.9%	19.4%	16.5%	2.7%	
E-CMP	0.896	0.902	0.906	0.923	2.0	0.883	14.8%	15.3%	15.7%	17.2%	16.4%	2.4%	
J-APD	0.971	0.971	0.975	0.979	0.5	0.836	4.4%	4.4%	4.7%	5.1%	16.1%	0.7%	
F1-MPL-O	0.767	0.755	0.768	0.808	5.6	1.668	53.4%	51.5%	53.5%	60.2%	12.7%	6.8%	
N-Re-Prop	0.893	0.887	0.905	0.922	2.0	1.170	31.2%	30.5%	32.6%	34.6%	10.8%	3.4%	
B-PPA	0.925	0.924	0.923	0.937	1.6	0.969	12.5%	12.4%	12.3%	13.6%	9.4%	1.2%	
C-CA	0.890	0.888	0.882	0.904	2.5	1.010	18.5%	18.2%	17.7%	19.8%	7.4%	1.4%	
L-Other	0.947	0.945	0.948	0.958	1.1	0.935	14.2%	13.9%	14.3%	15.2%	7.4%	1.0%	
K-Fid/Sur	0.904	0.919	0.906	0.923	2.0	0.854	27.2%	28.5%	27.4%	28.8%	6.1%	1.7%	
A-HO	0.954	0.956	0.958	0.966	0.9	0.936	18.2%	18.4%	18.6%	19.3%	6.1%	1.1%	
I-SP	0.949	0.946	0.947	0.957	1.1	0.863	12.0%	11.7%	11.9%	12.7%	6.0%	0.7%	
M-Intl	0.905	0.907	0.914	0.930	1.9	1.234	55.6%	55.8%	56.7%	58.7%	5.5%	3.1%	
S-FG/MG	0.884	0.909	0.881	0.902	2.5	1.598	75.4%	79.5%	74.9%	78.3%	3.9%	2.9%	
Avg	0.915	0.916	0.917	0.932		0.950	13.5%	13.6%	13.7%	15.2%	12.1%	1.6%	

This Exhibit provides LOB detail related to Table 4.1A.

Before WC tabular reserve adjustment.

Column 6 "Duration" using Macaulay duration using three-year Treasury yields at October 2022. See Appendix 5. Provided for background; not used in this calculation.

Exhibit A4-1B
Reserves: Current and Indicated IIAs and Risk Charges
Various Payment Pattern Methods/ 5% and 4% Interest Rates
From Largest to Smallest Indicated Increase in Risk Charge (Column 12)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
LOB	IIAs					Risk Factor	Reserve Risk Charges					4.0% 40 Yr Trunc vs 2022 Formula	
	2022 @5%	2017 Pay Data 5%	Trunc 5%	Trunc 4%	Duration	2022 Line 4	2022 Formula	2017 Pay Data 5%	Trunc 5%	Trunc 4%	% Risk (11)/(8)-100%	% Reserve (11)-(8)	
M-Intl	0.874	0.932	0.888	0.908	2.6	0.359	18.8%	26.7%	20.7%	23.4%	24.7%	4.6%	
F2-MPL-C	0.883	0.887	0.881	0.903	2.6	0.276	12.7%	13.2%	12.5%	15.2%	19.7%	2.5%	
E-CMP	0.876	0.895	0.885	0.905	2.5	0.494	30.9%	33.7%	32.2%	35.3%	14.2%	4.4%	
C-CA	0.911	0.914	0.912	0.928	1.9	0.276	16.2%	16.6%	16.3%	18.4%	13.3%	2.2%	
A-HO	0.938	0.943	0.941	0.952	1.2	0.213	13.8%	14.4%	14.2%	15.5%	12.5%	1.7%	
B-PPA	0.928	0.925	0.924	0.938	1.6	0.179	9.4%	9.1%	8.9%	10.6%	12.4%	1.2%	
H-OL	0.852	0.860	0.850	0.877	3.5	0.531	30.4%	31.6%	30.2%	34.2%	12.3%	3.8%	
T-Wrnty	0.940	0.976	0.952	0.961	1.0	0.371	28.9%	33.8%	30.5%	31.8%	10.0%	2.9%	
N-Re-Prop	0.901	0.904	0.902	0.920	2.1	0.415	27.5%	27.9%	27.6%	30.1%	9.5%	2.6%	
G-SL	0.890	0.904	0.880	0.901	2.8	0.304	16.1%	17.9%	14.8%	17.5%	9.2%	1.5%	
R-PL	0.841	0.828	0.833	0.862	3.9	0.802	51.5%	49.2%	50.1%	55.3%	7.4%	3.8%	
F1-MPL-O	0.865	0.850	0.845	0.872	3.6	0.383	19.6%	17.6%	16.9%	20.6%	5.1%	1.0%	
D-WC	0.830	0.827	0.799	0.834	5.5	0.344	11.6%	11.2%	7.4%	12.0%	4.2%	0.5%	
J-APD	0.976	0.974	0.973	0.978	0.5	0.155	12.7%	12.6%	12.4%	13.0%	2.1%	0.3%	
O-Re-Liab	0.838	0.839	0.803	0.837	5.2	0.656	38.8%	38.9%	32.9%	38.5%	-0.6%	-0.2%	
I-SP	0.966	0.966	0.944	0.954	1.2	0.246	20.4%	20.4%	17.6%	18.9%	-7.3%	-1.5%	
S-FG/MG	0.926	0.957	0.899	0.917	2.1	0.179	9.2%	12.9%	6.0%	8.2%	-11.1%	-1.0%	
K-Fid/Sur	0.940	0.956	0.890	0.910	2.3	0.371	28.9%	31.0%	22.1%	24.8%	-14.2%	-4.1%	
L-Other	0.967	0.963	0.922	0.936	1.6	0.220	18.0%	17.5%	12.5%	14.3%	-20.7%	-3.7%	
Avg	0.879	0.881	0.867	0.890		0.365	19.5%	19.8%	17.9%	21.2%	8.5%	1.7%	

This Exhibit provides LOB detail related to Table 4.1B.

Before WC tabular reserve adjustment.

Column 6 "Duration" using Macaulay duration using three-year Treasury yields at October 2022. See Appendix 5. Provided for background; not used in this calculation.

16.APPENDIX 5—PV Method

This Appendix provides supporting material related to the following:

1. Implementing RDHA with PV indicated risk charges
2. Additional PV and Undiscounted Regression Statistics
3. Sample duration calculation
4. Selection of interest rate lag and average period

Implementing RDHA with PV Indicated Risk Charges

In the PV Method, we initially calculate risk charges using the 40-year runoff payment pattern, i.e., before RDHA. Our initial PV indicated risk charges are also before catastrophe adjustments.

Exhibits A5-1A and 1B show the calculation of PV indicated risk charges after RDHA and after catastrophe adjustments as follows:

Column 2 shows the PV indicated risk charges by LOB based on the analysis we describe in Section 5. These use 1988-2017 experience, the 40-year runoff payment pattern, and the interest rates varying yearly. These are before any catastrophe adjustment.⁸³

Column 3 shows the IIA based on the 40-year runoff payment pattern and the 4% interest rate from Appendix 2, Exhibit A2-5.

Column 4 shows the undiscounted risk charge based on columns 2 and 3 as follows:

- Premium Risk: (4) = $\{(2) + 1.0 - (12)\} / (3) + (12) - 100\%$.
- Reserve Risk: (4) = $[1.0 + (2)] / (3) - 100\%$

These formulas are the reverse of the risk charge formulas shown in Notes to Table 1.1.

Column 5 shows the indicated Line 4 risk factor based on the undiscounted risk charge in column 4 using the following formulas:

- Premium Risk factor: (5) = $(4) + 1.0 - (12)$
- Reserve risk factor: (5) = (4)

Column 6 shows the IIA based on the 40-year truncated payment patterns and a 4% interest rate, Appendix 3, Exhibits A3-2A and 2B for premium and reserve risk, respectively.

Column 7 is the indicated risk charge, including the RDHA, before catastrophe adjustment:

⁸³ We apply the RDHA to the indicated risk charges before the catastrophe adjustments, as the underlying data is before catastrophe adjustments. That produces slightly higher RDHAs than if we applied the catastrophe adjustments to indicated risk charges net of the catastrophe adjustments.

- Premium risk charge: $(7) = (5) * (6) + (12) - 100\%$
- Reserve risk charge: $(7) = \{1.0 + (5)\} * (6) - 100\%$

Column 8: Current catastrophe adjustment from Table 7.1

Column 9: Risk charge with RDHA net of current catastrophe risk charge

- Premium or Reserve Risk: $(9) = (8) - (7)$

Column 10 shows the RDHA as a percentage of the risk charge

- Premium or Reserve Risk: $(10) = \{(9) - (2)\} / \text{Absolute value } (2)$

Column 11 shows the RDHA as a percentage of premium or reserves.

- Premium or Reserve Risk: $(10) = (9) - (2)$

Two observations from column 10 are the following:

- The risk development horizon risk adjustment is more significant for reserve risk than for premium risk. The all-lines combined RDHA % risk is 14.9% of reserve risk versus 3.2% of premium risk. A larger RDHA for reserve risk is expected because the payment pattern is generally longer for reserve risk than for premium risk.
- The RDHA is largest for the longest tail LOBs, D-WC and O-Re-Liab.

**Exhibit A5-1A
 Premium: Risk Development Horizon Adjustment (RDHA)**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
LOB	PV Indicated Risk Charge gross of cat adj	Indicated IIA/ 4% runoff	Undiscounted Indicated risk charge before RDHA	Indicated Risk Factor (Line 4)	Indicated IIA/ 4% trunc	PV Indicated Risk Charge/ with RDHA/ gross of cat adj	Current Cat Adjustment	Indicated Risk Charge/ with RDHA/ net of current cat adj	RDHA % Risk	RDHA % Premium	Expense Ratio (Table 1.1)
A-HO	21.3%	96.6%	24.6%	95.7%	96.6%	21.3%	2.8%	18.6%	0.1%	0.0%	28.9%
B-PPA	13.7%	93.7%	19.8%	97.0%	93.7%	13.7%		13.7%	0.3%	0.0%	22.8%
C-CA	20.1%	90.3%	29.9%	101.3%	90.4%	20.1%		20.1%	0.4%	0.1%	28.6%
D-WC	8.9%	83.3%	25.5%	99.3%	86.5%	12.0%		12.0%	34.6%	3.1%	26.2%
E-CMP	17.3%	92.1%	24.4%	88.7%	92.3%	17.6%	1.8%	15.9%	1.4%	0.2%	35.6%
F1-MPL-O	34.5%	79.5%	62.7%	137.2%	80.8%	36.3%		36.3%	5.0%	1.7%	25.5%
F2-MPL-C	23.9%	86.3%	39.5%	114.0%	86.8%	24.4%		24.4%	2.0%	0.5%	25.5%
G-SL	20.0%	92.4%	27.1%	93.3%	92.8%	20.4%	1.6%	18.9%	1.6%	0.3%	33.8%
H-OL	12.5%	83.7%	28.6%	98.2%	84.7%	13.5%		13.5%	8.2%	1.0%	30.4%
I-SP	9.4%	95.7%	13.0%	82.9%	95.7%	9.5%	1.6%	7.9%	0.1%	0.0%	30.1%
J-APD	5.4%	97.9%	7.2%	83.9%	97.9%	5.4%		5.4%	0.0%	0.0%	23.2%
K-Fid/Sur	10.5%	92.2%	15.6%	65.7%	92.3%	10.6%		10.6%	0.9%	0.1%	50.0%
L-Other	14.3%	95.8%	18.2%	92.6%	95.8%	14.3%		14.3%	0.1%	0.0%	25.6%
M-Intl	93.4%	92.5%	105.6%	161.7%	93.0%	94.3%		94.3%	0.9%	0.9%	43.9%
N-Re-Prop	39.6%	91.9%	49.5%	122.8%	92.2%	39.9%	6.9%	33.5%	0.8%	0.3%	26.7%
O-RE-Liab	19.6%	81.1%	41.3%	114.6%	84.1%	23.0%		23.0%	17.5%	3.4%	26.7%
R-PL	26.6%	80.1%	49.8%	116.8%	81.9%	28.6%		28.6%	7.8%	2.1%	33.0%
S-FG/MG	153.2%	90.2%	177.2%	243.0%	90.2%	153.4%		153.4%	0.1%	0.2%	34.1%
T-Wrnty	21.6%	97.2%	24.3%	98.5%	97.2%	21.6%		21.6%	0.0%	0.0%	25.8%
Avg	14.0%	92.7%	21.1%	94.1%	93.2%	14.4%	0.8%	13.7%	3.2%	0.4%	27.0%

Before WC tabular adjustment.

Exhibit A5-1B
Reserve: Risk Development Horizon Adjustment (RDHA)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
LOB	PV Indicated Risk Charge	Indicated IIA/ 4% runoff	Undiscounted Indicated risk charge before RDHA	Indicated Risk Factor (Line 4)	Indicated IIA/ 4% trunc	PV Indicated Risk Charge/ with RDHA/ gross of cat adj	Current Cat Adjustment	Indicated Risk Charge/ with RDHA/ net of current cat adj	RDHA % Risk	RDHA % Reserve
A-HO	16.4%	95.1%	22.4%	22.4%	95.2%	16.6%	0.0%	16.6%	0.8%	0.1%
B-PPA	12.8%	93.7%	20.4%	20.4%	93.8%	12.9%	0.0%	12.9%	1.3%	0.2%
C-CA	25.7%	92.6%	35.7%	35.7%	92.8%	25.9%	0.0%	25.9%	0.9%	0.2%
D-WC	-1.8%	78.3%	25.5%	25.5%	83.4%	4.6%	0.0%	4.6%	362.5%	6.4%
E-CMP	31.4%	89.8%	46.3%	46.3%	90.5%	32.5%	0.0%	32.5%	3.5%	1.1%
F1-MPL-O	8.0%	86.1%	25.4%	25.4%	87.2%	9.4%	0.0%	9.4%	18.1%	1.4%
F2-MPL-C	-1.5%	89.6%	9.8%	9.8%	90.3%	-0.9%	0.0%	-0.9%	43.4%	0.7%
G-SL	21.5%	88.4%	37.4%	37.4%	90.1%	23.9%	0.0%	23.9%	11.2%	2.4%
H-OL	27.4%	86.4%	47.4%	47.4%	87.7%	29.2%	0.0%	29.2%	6.6%	1.8%
I-SP	21.3%	95.4%	27.1%	27.1%	95.4%	21.3%	0.0%	21.3%	0.2%	0.1%
J-APD	11.2%	97.8%	13.6%	13.6%	97.8%	11.2%	0.0%	11.2%	-0.1%	0.0%
K-Fid/Sur	43.7%	90.8%	58.3%	58.3%	91.0%	44.0%	0.0%	44.0%	0.7%	0.3%
L-Other	14.6%	93.6%	22.4%	22.4%	93.6%	14.7%	0.0%	14.7%	0.6%	0.1%
M-Intl	81.2%	88.9%	103.9%	103.9%	90.8%	85.1%	0.0%	85.1%	4.9%	4.0%
N-Re-Prop	19.6%	91.3%	31.0%	31.0%	92.0%	20.4%	0.0%	20.4%	4.3%	0.8%
O-RE-Liab	19.9%	79.3%	51.3%	51.3%	83.7%	26.5%	0.0%	26.5%	33.4%	6.6%
R-PL	97.7%	84.7%	133.6%	133.6%	86.2%	101.3%	0.0%	101.3%	3.7%	3.6%
S-FG/MG	-5.1%	91.6%	3.5%	3.5%	91.7%	-5.0%	0.0%	-5.0%	1.8%	0.1%
T-Wrnty	30.2%	96.1%	35.5%	35.5%	96.1%	30.2%	0.0%	30.2%	0.0%	0.0%
Avg	16.7%	87.2%	34.1%	34.1%	89.0%	19.2%	0.0%	19.2%	14.9%	2.5%

Before WC tabular adjustment.

RDHA Sensitivity to Selected Interest Rate

The RDHA uses a 4% interest rate. Exhibit A5-2, below, shows the indicated risk charges with RDHAs using interest rates of 3% and 5%. The effect on risk charges of the different interest rates is small.

Exhibit A5-2
All-Line Average Indicated Risk Charge
Sensitivity of RDHA to Alternative Interest Rate Assumptions

(1)	(2)	(3)	(4)	(5)
Interest Rate	Indicated Risk Charge		Change in Indicated Risk Charge vs 4%	
	Premium	Reserves	Premium	Reserves
5%	13.76%	19.55%	0.5%	1.9%
4%	13.70%	19.18%	0.0%	0.0%
3%	13.62%	18.73%	-0.6%	-2.4%

Additional PV and Undiscounted Regression Statistics

The Tables in Section 5 show the relationships between undiscounted risk charges, PV risk charges, interest rates, and time, for 1980-2017 (2013 for reserves). Exhibits A5-3 and A5-4, below, provide some supplemental information.

The analysis in Section 5 used data from 1980-2017. Our calibration of risk charges uses experience for 1988 and subsequent years. Therefore, Exhibit A5-3 summarizes some of the regression statistics for the 1988 and subsequent years.

Exhibit A5-3
Additional Regression Statistics

Row	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	X and Y Regression Variables	Premium				Reserve			
		R-Squared		Slope-% Prem		R-Squared		Slope-% Reserve	
		All Yrs	≥88	All Yrs	≥88	All Yrs	≥88	All Yrs	≥88
(1)	Interest vs Time	84%	81%	-0.3%	-0.3%	81%	79%	-0.3%	-0.2%
(2)	Undisc vs Interest	54%	31%	271%	175%	75%	35%	729%	333%
(3)	Undisc vs. Time	34%	23%	-0.7%	-0.4%	57%	28%	-2.1%	-0.8%
(4)	Undisc vs. Time Scaled to PV Avg	NA	NA	-0.39%	-0.27%			-0.84%	-0.32%
(5)	PV vs Time	0.5%	1.0%	-0.05%	0.07%	26%	1.2%	-0.69%	0.11%

The columns labeled “All Yrs,” show the information we discuss in Section 5. The columns labeled “≥88” show the corresponding values calculated for the years 1988 and subsequent. In any row, comparing any pair of columns, e.g., 2 and 3, 4 and 5, etc., the relationships between undiscounted

risk charges, PV risk charges, interest rates, and time are qualitatively similar for years beginning 1980 or years beginning 1988. While the relationships are somewhat less strong for the years beginning in 1988, these “≥88” statistics show that our interpretation remains reasonable for the period beginning in 1988.

Also, in Section 5, we compare the slopes of undiscounted risk charges to those of PV risk charges. The PV risk charges, being discounted, have lower values than the undiscounted risk charges. Therefore, all else equal, the slope of the PV risk charges as a percentage of premium or reserves will tend to be lower than that of the undiscounted risk charges as a percentage of premium/reserves. This can distort our comparison of the two slopes.

Table A5-4, below, rows 1 and 2 show the undiscounted and PV average premium and reserve risk charge for each set of years. Row 3 is the ratio of those values.

**Exhibit A5-4
Additional Regression Information
Multi-Line Average Undiscounted and PV Risk Charges**

Row	(1)	(2)	(3)	(4)	(5)
	Average Risk Charge	Premium Risk		Reserve Risk	
		All Yrs	≥88	All Yrs	≥88
(1)	Undiscounted	27.1%	23.0%	47.7%	34.9%
(2)	PV	14.8%	14.2%	18.7%	13.4%
(3)	Scaling Factor (3) = (2)/(1)	54.7%	61.5%	39.3%	38.3%

Exhibit A5-3, row 4, shows the undiscounted risk charge slope after the scaling factor from Exhibit A5-4, row 3. Comparing Exhibit A5-3, rows 4 and 5, we see that after adjustment, the slope of the undiscounted risk charges in Exhibit A5-3, row 4 remains further from zero than the slope of the PV risk charges Exhibit A5-3, row 4. This finding is consistent with our conclusion that PV indicated risk charges are more stable over time than the undiscounted indicated risk charges, during either period.

Duration Matching of U.S. Treasury Rates

Our PV indicated present value calculations use the average U.S. Treasury rates over the year two years before the AY (for premium risk) and two years before the initial reserve year (for reserve risk). In these U.S. Treasury rates, we match the U.S. Treasury security time to maturity to the duration of the payment patterns. We calculate duration-matched interest rates as follows:

- For each line of business, for each AY/initial reserve year, we first calculate the (Macaulay) duration of the payment pattern (either premium or reserve) using the average three-year maturity Treasury rate for the year, two years prior to the AY/initial reserve year.
- Using this duration, we interpolate between the two closest spot rates (above and below) to calculate the spot rate for discounting.

For example, in 2006, the R-PL duration using the three-year Treasury rate is 5.5 years. The two closest average spot rates from 2004 are the five-year average of 3.43% and the seven-year average of 3.87%. We interpolate between these rates as follows to obtain the duration-matched rate of 3.54% for premium risk as follows:

- $3.54\% = 3.43\% \times (7-5.5) / (7-5) + 3.87\% \times (5.5-5) / (7-5)$

We use this 3.54% interest rate and the 40-year runoff AY payment pattern for R-PL to discount 2006 company losses under the PV Method.

Interest Rate Sensitivity: Lags and Averaging Period

Our PV Method uses U.S. Treasury interest rates, with durations matched to the payment pattern by LOB, for average interest rates during the year, two years before the AY and two years before the initial reserve year. We refer to that as being “lagged by two years.”

The rows in Exhibit A5-5 show the results of various methods of selecting U.S. Treasury interest rates, as follows:

- For premium risk, columns 3-5, the first four rows are based on the average U.S. Treasury interest rates during the AY and during years lagged by one, two, and three years from the AY, respectively.

The final four rows use the two-year average of interest rates during the two years ending with the AY and during the two years lagged one, two, and three before the AY, respectively.

- For reserve risk, columns 6-8, the first four rows are the average U.S. Treasury interest rates during the initial reserve year and during years lagged one, two, and three years before the initial reserve year, respectively.

For example, for AY 1988 and initial reserve year 1998, i.e., reserves at December 31, 1988, we use the 1986 U.S. Treasury interest rate for the row “One Yr Avg/Two Yrs Prior To AY.”

The final four rows consider the two-year average of interest rates during the two years ending with the initial reserve year and during the two years lagged one, two, and three years before the initial reserve year, respectively.

We select the average risk charge two years before for the AY and the initial reserve year considering the following:

- R-squared values for all years (columns 3 and 6),
- R-squared values for 1988 and subsequent (columns 4 and 7), and

- Resulting PV indicated risk charges using the years 1988 and subsequent data⁸⁴ (columns 5 and 8).

The selected interest rate period has the second highest of the eight R-squared values for both premium risk and reserve risk years 1988 and subsequent. The indicated risk charge is in the middle of the values from the methods with the highest three R-squared values.

Exhibit A5-5
Sensitivity to Variations in Interest Rate—R-squared values and Indicated Risk Charges
Average of Eight LOBs (Premium)/Seven LOBs (Reserve) Used in Section 5 PV Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Average period	Lag	Premium Risk			Reserve Risk		
		R-squared		PV Indicated Risk Charge	R-squared		PV Indicated Risk Charge
		All Yrs	≥88		All Yrs	≥88	
One Year Average	Current	33.9%	17.0%	15.6%	58.9%	27.0%	18.6%
One Year Average	One Year	45.2%	26.3%	15.8%	70.3%	33.7%	17.6%
One Year Average	Two years	54.2%	30.6%	15.6%	75.3%	34.7%	16.9%
One Year Average	Three Years	55.0%	28.6%	15.1%	66.8%	30.6%	15.8%
Two Year Average	Current	40.6%	22.4%	16.1%	66.8%	31.6%	18.1%
Two Year Average	One Year	51.2%	29.6%	15.6%	75.6%	35.8%	17.2%
Two Year Average	Two years	56.6%	30.9%	15.3%	74.3%	34.6%	16.2%
Two Year Average	Three Years	50.3%	29.1%	14.8%	60.3%	31.4%	15.2%

Risk charges gross of cat risk adjustment, net of RDHA, and before WC tabular reserve adjustment.

⁸⁴ The final year is 2017 for premium risk and 2013 for reserve risk, as shown in Section 5.

17. APPENDIX 6—LOB Experience Before 1988

As noted in Section 5, we base the indicated risk charges on data for AYs and initial reserve years 1988 and subsequent.

Data for 1980-1987 is available for some LOBs. Exhibit A6-1A below shows the differences between the indicated risk charges including 1980-1987 data and those excluding those years, by LOB, for LOBs with any 1980-1987 data.

Exhibit A6-1A
Premium: PV Indicated Risk Charge—1980-1987, 1988-2017, All Years
Listed in Order of Increasing Difference Between “PV All” and “PV≥1988” (Column 5)

LOB	Indicated Premium Risk Charge				Change in Risk Charge	
	(1)	(2)	(3)	(4)	(5)	(6)
	2021 Formula	PV≥88	PV <88	PV all	$((4)-(2))/(2)$ % risk factor	(4)-(2) % Premium
A-HO	18.2%	18.6%	10.6%	16.7%	-10.1%	-1.9%
D-WC	13.8%	8.9%	5.7%	8.2%	-8.2%	-0.7%
M-Intl	55.6%	93.4%	71.3%	88.0%	-5.9%	-5.5%
F1-MPL-O	53.4%	34.5%	31.2%	33.9%	-1.8%	-0.6%
F2-MPL-C	18.9%	23.9%	5.9%	23.5%	-1.7%	-0.4%
R-PL	30.7%	26.6%	25.7%	26.4%	-0.5%	-0.1%
B-PPA	12.5%	13.7%	13.7%	13.7%	0.1%	0.0%
C-CA	18.5%	20.1%	22.6%	20.7%	3.1%	0.6%
E-CMP	14.8%	15.7%	21.7%	16.7%	6.6%	1.0%
G-SL	16.6%	18.6%	27.4%	21.4%	15.1%	2.8%
H-OL	13.0%	12.5%	46.7%	17.0%	36.0%	4.5%
O-Re-Liab	29.5%	19.6%	41.7%	27.5%	40.6%	8.0%

Before RDHA. Gross of catastrophe adjustment.

Regarding premium risk, we note that:

- Only 12 (of 19) LOBs have data before 1988.⁸⁵
- Of the 12, three, F1-MPL-O, F2-MPL-C, and R-PL, have data for only some of the years before 1988.
- For 7 of the 12 LOBs, the effect of including the 1980-1987 data is, ±1% of premium.

⁸⁵ The limits on the availability of data in the early 1980s relate to the structure of the Annual Statement. For example, certain LOBs were consolidated with other LOBs in the early years, e.g., F1-MPL-O, F2-MPL-C, and R-PL. Also, the Annual Statement had Schedule O for Two-Year LOBs and Schedule P for Ten-LOBs. Our data is from Schedule P only.

- However, including the 1980-1987 data would produce large increases for H-OL and O-Re-Liab, lines known to have been very unprofitable in those years.

Exhibit A6-1B shows the same information for reserve risk.

Exhibit A6-1B
Reserve: PV Indicated Risk Charge—1980-1987, 1988-2017, All Years
Listed in Order of Increasing Difference Between “PV All” and PV_{≥1988}” (Column 5)

LOB	Indicated Reserve Risk Charge				Change in Risk Charge	
	(1)	(2)	(3)	(4)	(5)	(6)
	2021 Formula	PV _{≥88}	PV <88	PV all	$\frac{((4)-(2))}{(2)}$	$(4)-(2)$
				% risk factor	% Reserves	
D-WC	11.6%	-1.8%	-11.7%	-3.1%	-77.7%	-1.4%
G-SL	16.1%	21.5%	30.8%	22.9%	6.6%	1.4%
C-CA	16.2%	25.7%	35.9%	27.5%	6.9%	1.8%
R-PL	51.5%	97.7%	152.1%	106.3%	8.7%	8.5%
B-PPA	9.4%	12.8%	19.7%	13.9%	9.0%	1.2%
A-HO	13.8%	16.4%	27.3%	18.5%	12.5%	2.1%
E-CMP	30.9%	31.4%	62.0%	37.0%	17.8%	5.6%
M-Intl	18.8%	81.2%	169.6%	98.9%	21.9%	17.7%
F1-MPL-O	19.6%	8.0%	54.0%	11.4%	42.6%	3.4%
F2-MPL-C	12.7%	-1.5%	17.1%	-0.9%	43.0%	0.7%
H-OL	30.4%	27.4%	102.5%	42.2%	54.1%	14.8%

Before RDHA.

Regarding reserve risk, we note the following:

- Only 11 (of 19) LOBs have any data before 1988.
- Of the 11, three, F1-MPL-O, F2-MPL-C, and R-PL, have data for only some of the years before 1988.
- The effect of including the 1980-1987 data would be large for some LOBs, particularly those LOBs known to have had extreme adverse reserve development in the early 1980s, e.g., H-OL, F1-MPL-O, and R-PL. We believe the risk charges are outside the level expected in a 38-year experience period (1980-2017).
- O-Re-Liab would likely also show high indicated reserve risk charges for the 1980-1987 period, but there is no O-Re-Liab reserve development data for that period.⁸⁶
- Including the 1980-1987 data would produce large increases for most of these LOBs.

On balance, regarding premium and reserve risk, we exclude the 1980-1987 experience in our indicated risk charges, considering the following:

⁸⁶ Due to changes in the structure of Schedule P.

- We do not have data for all LOBs,
- The likelihood that the adverse indicated risk charges might be outside the range expected in a 38-year experience period, and
- We consider business issues related to the early 1980s compared to subsequent years, as discussed in the April 2021 Report, which we repeat in Exhibit A6-2 below.

We conclude that, as we did for the April 2021 Report, the PV indicated risk charges in this Report [August 2023] would not use the experience before 1988. However, we note the exclusion of 1980-1987 when discussing safety levels in Section 9.

Exhibit A6-2
Extract from April 2021 Report (pages 17-18)

Exclude AYS and Initial Reserve Years Prior to 1988

For this Report [April 2021] we have experience for AYS/Reserve Years 1980 to 1987 that was not available for the 2016 Report. Looking at indicated Risk Factors by decade, we find that for nearly all the liability LOBs, this oldest block of years shows the highest indicated PRFs and RRFs.

This pattern may be due to factors that might not be applicable to current conditions. For example, the 1993 Report on Reserve and Underwriting Risk Factors by the American Academy of Actuaries Property/Casualty Risk-Based Capital Task Force (page 4)⁸⁷ identified four reasons why the experience of the 1980's might not be suitable for projection of the future. These are:

- *The tort liability explosion, particularly in respect to asbestos and environmental liabilities.*
- *A great deal of naïve capacity, focused especially on general liability and reinsurance lines.*
- *High interest rates, creating intense pressures to engage in cash flow underwriting.*
- *High inflation rates.*

Other considerations include:

- Company loss reserving practices may have improved because of required actuarial opinions and increased regulatory, rating agency and management attention to reserving.
- The adverse experience in these years triggered expansion in the use of claims-made policies, pollution exclusions, asbestos exclusions, and other policy changes.
- Company pricing discipline and pricing methodology may have improved since the 1980s.

Therefore, in this Report [April 2021], we do not use the experience before 1988 because these early years may not be sufficiently relevant to the present conditions.

⁸⁷ American Academy of Actuaries Property/Casualty Risk-Based Capital Task Force, "[Report on Reserve and Underwriting Risk Factors](#)," May 1993.

18. APPENDIX 7—Catastrophe Adjustment to Indicated Premium Risk Charges

Section 7 discusses the data we use to select the catastrophe adjustments. There are important limitations related to that data, and we discuss those limitations below.

In 2013, the RBC formula added an “information only” risk component, R_{CAT} , based on the company’s modeled exposure to hurricane and earthquake losses. In 2017, the R_{CAT} element officially became a part of the RBC Formula.

We determine the indicated premium risk factors with data that includes earthquake and hurricane losses. Therefore, to avoid double-counting catastrophe risk, we remove the effect of actual hurricanes and earthquakes from the experience data set, thereby reducing the otherwise applicable premium risk factors for the catastrophe-affected LOBs. We refer to this reduction as the catastrophe adjustment.

Scale of Catastrophe Adjustment

The impact of the catastrophe adjustment will vary by company. Overall, though, the dollar impact on industry RBC of catastrophe adjustments is as follows:

- Applying the current (i.e., incumbent) catastrophe adjustments to 2017 net earned premium, implies a \$4.2 billion reduction in premium risk RBC.
- Applying the selected catastrophe adjustments to 2017 net earned premium, implies a \$6.9 billion reduction in premium risk RBC.
- This is a \$2.6 billion further reduction in premium risk RBC compared to the current catastrophe adjustments.⁸⁸

The impacts on CAL are lower due to reductions due to IIAs by LOB, diversification between LOBs, and diversification between risk charge elements.

The approximate dollar magnitude of the selected catastrophe adjustments (\$6.9 billion) should be seen relative to the rest of the RBC Formula. For example, for the U.S. P&C industry overall 2017 net earned premium is \$541 billion, the 2017 premium RBC premium risk (R5) is \$69 billion, the 2017 R_{CAT} is \$51 billion, and the 2017 RBC CAL is \$300 billion.⁸⁹

The fact that R_{CAT} (\$51 billion) is much larger than the dollar amount of the catastrophe adjustment (\$6.9 billion) is reasonable because R_{CAT} is the modeled 99th percentile for hurricanes and earthquakes and the premium risk charges are calibrated at the 87.5th percentile.

⁸⁸ Approximately half of this \$2.6 billion reduction relates to N-Re-Prop.

⁸⁹ The dollar magnitude of the selected catastrophe adjustments shown here is a simplified calculation and is intended as an overview. For example, we do not consider the diversification across RBC risk elements, R0, R1, etc., the diversification across LOBs in premium risk, or the own-company adjustment for the cat LOBs. Also, we apply the catastrophe adjustment to net earned premium while the RBC Formula applies them to net written premium.

Data

As part of implementing R_{CAT} , companies⁹⁰ report their current modeled exposure to catastrophe losses for all LOBs combined. In addition, companies report their actual U.S. and non-US catastrophe losses.

Companies report this hurricane and earthquake loss experience data in their confidential RBC Filings that are not publicly available. In this analysis, we use the term “Cat Data” to refer to the confidential RBC data from RBC forms PR101, PR102, ..., and PR122, one form for each LOB. Cat Data in those forms provides the following fields for each LOB, company, and AY in each RBC Filing year:

- US Catastrophe Incurred Losses
- Non-US Catastrophe Incurred Losses
- Non-Catastrophe Incurred Losses
- Net Earned Premium (NEP)

In each RBC Filing, Cat Data contains 10 years of loss experience for each LOB, for both Ten-Year and Two-Year LOBs. The first RBC information Filing with Cat Data was as of December 2013, which provides data for AYs 2004-2013. The Cat Data for this review includes AYs 2004-2017. Appendix 9 shows the Academy Committee’s instructions to Regulators to collect blinded “Cat Data.”

The NAIC RBC Instructions for R_{CAT} (PR027) state that “modeled losses are to be entered using the insurance company’s own insured **property** exposure information as inputs to the model.”⁹¹ Therefore, we understand that the catastrophe loss columns reported in RBC forms PR101 through PR122 include only property experience. Consistent with that understanding, we see zero catastrophe losses in LOBs like B-PPA, D-WC, F1-MPL-O, F2-MPL-C, and H-OL. We do not have an explanation for the small but non-zero raw indicated catastrophe adjustment for R-PL.

We understand that non-proportional reinsurance contracts covering both property and liability exposures (multiline) should be coded as O-Re-Liab. Consistent with that understanding, we observe a small but non-zero, raw indicated catastrophe adjustment for O-Re-Liab.

It might be the case that some reinsurers code non-proportional multiline reinsurance business under N-Re-Prop. We have not investigated how much, if any, insurance industry business is coded as N-Re-Prop instead of O-Re-Liab. The selected catastrophe adjustment is based on the data as reported.⁹²

⁹⁰ Subject to exemptions based on certain de minimis exposure rules.

⁹¹ Refer to 2022 NAIC P&C RBC Instructions for forms PR027A and PR027B, see pages 99 and 100 of the pdf.

⁹² Except for R-PL, where we expect zero catastrophe loss in RBC Cat Data.

Credibility

The number of data points is a measure of the statistical credibility of the data. Column 2 of Exhibit A7-1 shows the number of data points in Cat Data, where each data point represents an LR for a Company or Pool for a particular line of business and AY. Column 3 equals 12.5% of column 2, which is the number of data points in excess of the 87.5th percentile.

For some LOBs, most notably M-Intl, the indicated catastrophe adjustment is based on relatively few data points. The total number of data points for M-Intl is only 109; hence, only the 14 highest of those data points exceed the raw indicated catastrophe adjustment. We consider this relative credibility in our catastrophe adjustment selections.

**Exhibit A7-1
 Number of Data Points**

(1)	(2)	(3)
LOB	2004-17 # data points	
	Total	12.5% of (2)
A-HO	4,924	616
E-CMP	3,441	430
G-SL	708	89
I-SP	4,735	592
J-APD	4,689	586
M-Intl	109	14
N-Re-Prop	427	53
O-Re-Liab	357	45
R-PL	1,119	140

Data Quality: General

The catastrophe loss experience in RBC Filings is not subject to the same level of audit and transparency as the Schedule P data we use for much of the Line 4 calibration. The R_{CAT} elements of the RBC Formula were introduced on an “information only” basis beginning with year-end 2013 reporting and as an official element in the RBC calculation at year-end 2017.⁹³

Data from a new process, particularly when collected on an exploratory basis, is subject to increased risk of quality issues.

⁹³ NAIC Center for Insurance Policy and Research (CIPR), August 2017 Newsletter

This is the first time we are using this data. Certain features of the data are unexpected but may become clearer over time.

We identify some specific data quality matters in the following sections.

Is the Cat Data Set Representative of the Total Calibration Data Set—Number of Data Points?

We obtain Cat Data from confidential RBC Filings. We obtain the Academy calibration data from Annual Statements for Ten-Year LOBs and RBC Filing data for Two-Year LOBs.

It would be optimal if the data from the Annual Statement and RBC Filing sources were the same for AYs 2004-2017, the years the data sets have in common. In practice, however, not all companies make RBC Filings, and reasonableness reviews eliminate some catastrophe data points.

Exhibit A7-2 compares the number of data points in the Academy calibration and the number of data points in the RBC catastrophe data. The counts are close for Two-Year LOBs I-SP and J-APD, where both the Academy calibration data and the Cat Data come from RBC Filings. The counts also closely match for the LOBs with the fewest data points, M-Intl, N-Re-Prop, and O-Re-Liab. Without access to RBC data by company, we cannot identify the reasons for the larger differences in the other LOBs.

**Exhibit A7-2
Matching Data Points in Academy Catastrophe Adjustment Calibrations
AYs 2004-2017**

(1)	(2)	(3)	(4)	(5)
LOB	# Data Points		% Overlap: (3)/(2)	Difference
	In Academy Calibration	In Cat Data		
A-HO	5,447	4,924	90.4%	9.6%
E-CMP	3,827	3,441	89.9%	10.1%
G-SL	839	708	84.4%	15.6%
I-SP	4,830	4,735	98.0%	2.0%
J-APD	4,839	4,689	96.9%	3.1%
M-Intl	110	109	99.1%	0.9%
N-Re-Prop	435	427	98.2%	1.8%
O-Re-Liab	366	357	97.5%	2.5%
R-PL	1,235	1,119	90.6%	9.4%

Is the Cat Data Set Representative of Total Calibration Data Set—87.5th Percentile LRs?

In the Cat Data, adding U.S. Catastrophe Losses, Non-U.S. Catastrophe Losses, and Non-Catastrophe Losses, we obtain Total Losses. We compare indicated risk charges using the Total

Losses from Cat Data to indicated risk charges using Academy calibration data. Exhibit A7-3 shows the following:

- Column 2 shows the indicated undiscounted risk charge based on the AY 2004-2017 portion of the Academy calibration data set. (Exhibit A7-2 column 2, above, shows the number of data points in this data set, by LOB.)
- Column 3 shows the indicated undiscounted risk charge based on the Cat Data for the data points in both the Academy calibration data set and the Cat Data. (Exhibit A7-2 column 3 shows the number of data points in this data set.)
- Column 4 shows the indicated undiscounted risk charge based on the Academy calibration data for the data points in both the Academy calibration data set and the Cat Data.

Exhibit A7-2 (column 2 versus column 3) shows that the number of data points underlying Exhibit A7-3 column 2 differs from those underlying Exhibit A7-3 columns 3 and 4. Therefore, it is not surprising that the indicated undiscounted risk charge in Exhibit A7-3 column 2 does not equal the indicated undiscounted risk charge in Exhibit A7-3 columns 3 and 4.

Surprisingly, the indicated undiscounted risk charges shown in columns 3 and 4 are not the same, even though they are based on the same AY/LOB/company-pool data points. The differences between columns 3 and 4 are large for some LOBs. We cannot evaluate the reasons for the difference since the Cat Data is confidential.

**Exhibit A7-3
 Comparison of 87.5th Percentile Undiscounted Risk Charges**

Indicated Undiscounted Risk Charge (2004-2017 Data)			
(1)	In AAA Calib Data	In AAA Calib Data and in Cat Data	
	(2)	(3)	(4)
LOB	Line 4 Calib	Using Cat Data	Using Calib Data
A-HO	20.1%	20.4%	19.6%
E-CMP	17.6%	18.9%	16.0%
G-SL	20.3%	29.8%	20.0%
I-SP	11.5%	12.9%	11.3%
J-APD	5.5%	8.0%	5.5%
M-Intl	121.6%	136.0%	124.4%
N-Re-Prop	40.7%	48.8%	40.7%
O-Re-Liab	14.5%	27.2%	15.0%
R-PL	34.4%	33.8%	35.9%

Time period

The indicated catastrophe adjustment is based on data from AYs 2004-2017, while the overall indicated risk factors that require adjustment are based on data from AYs 1988-2017.

The catastrophe adjustment depends on the effect of catastrophe losses on the 87.5th percentile LR during the experience period. That adjustment might differ for the 2004-2017 period, for which we have Cat Data (catastrophe calibration period), compared to the 1988-2017 period used for overall risk charge calibration.⁹⁴

US Earthquake

The largest earthquake in the 1988-2017 period is the January 1994 Northridge, California, earthquake (insured loss of \$15 billion at that time and over \$30 billion if expressed in 2023 dollars).⁹⁵ This is part of the overall data but not part of the catastrophe calibration period.

During the 2004-2017 catastrophe calibration period the two largest U.S. earthquakes (based on insured losses) were the August 2014 South Napa, California, earthquake (insured loss of \$200 million) and the August 2011 Virginia/Washington D.C. earthquake (insured loss of \$100 million).

⁹⁴ Cat Data also includes non-U.S. hurricanes and earthquakes. There have been numerous major non-U.S. earthquakes in 2004-2017, but we have not compared the effects on US (re)insurers of non-U.S. hurricanes and earthquakes during the two time periods, 1988-2003 and 2004-2017.

⁹⁵ Insured loss amounts of these US earthquakes was retrieved from the Insurance Information Institute, "[A Firm Foundation: How Insurance Supports the Economy \(Earthquakes\)](#)," on August 1, 2023.

Since the overall calibration loss data includes Northridge and the catastrophe calibration period includes only a few smaller U.S. earthquakes, the earthquake element in the catastrophe adjustments may be too small.

US Hurricanes

Both the 1988-2003 period and the catastrophe calibration period include numerous major U.S. hurricanes.

Hurricanes affect many more company-pool AY data points than earthquakes, and the number of hurricanes per year is higher in the 2004-2017 period than in the earlier 1988-2003 period.⁹⁶ To the extent that catastrophes drive risk charges, and if all else were equal, the 87.5th percentile LR for 2004-2017 would be higher than the 87.5th percentile for the earlier period.

Comparing 1988-2003 to 2004-2017

To test this hypothesis, Columns 2-4 in Exhibit A7-4 below show the 87.5th percentile PV indicated risk charge⁹⁷ for the 1988-2003 period for which we have no catastrophe experience, for the 2004-2017 period, where we have catastrophe experience, and for the total 1988-2017 period. Column 5 shows the ratio of column 4 to column 3. The values are nearly all greater than 1.0, showing that, contrary to that hypothesis, the 87.5th percentile PV LRs are higher in the earlier period than in the more recent period.

⁹⁶ At "[Continental United States Hurricane Impacts/Landfalls, 1851-2022](#)," the National Oceanic and Atmospheric Agency reports 1.3 hurricane landfalls per year in 1988-2003 and 1.8 hurricane landfalls per year in 2004-2017. NOAA and other sources show a similar relationship for tropical storm landfalls.

⁹⁷ In Section 5, we show that, for all-lines combined, earlier periods had higher 87.5th percentile loss ratios than more recent years. We also observed that the pattern is less evident on a PV basis than on an undiscounted basis. Therefore, we use PV LRs for this comparison.

**Exhibit A7-4
 87.5th Percentile PV LR by LOB**

(1)	(2)	(3)	(4)	(5)
87.5 th PV LR by Time Period				
LOB	1988-03	2004-17	1988-17	(4)/(3)
A-HO	0.937	0.893	0.924	1.034
E-CMP	0.834	0.789	0.817	1.035
G-SL	0.880	0.831	0.862	1.038
I-SP	0.790	0.804	0.793	0.987
J-APD	0.826	0.802	0.822	1.025
M-Intl	1.489	1.720	1.495	0.870
N-Re-Prop	1.135	1.101	1.128	1.025
O-Re-Liab	1.009	0.745	0.929	1.247
R-PL	1.011	0.837	0.936	1.119

However, for the LOBs with larger catastrophe adjustments, the differences in the different time periods are generally small, e.g., under 1.05.⁹⁸ Therefore, we do not adjust for the difference in time periods.

Catastrophe experience as a share of total experience

To obtain further insight into the distribution of catastrophe losses, we calculate the ratio of the total catastrophe losses to the total losses for each LOB. Column 4 in Exhibit A7-5, below, shows that percentage. We compare that to the ratio of the 87.5th percentile catastrophe losses to the 87.5th percentile total losses, shown in column 3 in Exhibit A7-5.

Except for M-Intl and R-PL, the ratio of catastrophe losses to total losses is greater than the ratio of the 87.5th percentile catastrophe losses to the 87.5th percentile total losses. We understand this to mean that while catastrophes are important, other factors, combined, are more important in driving the risk charges. While that might seem surprising, we note that the total LRs are net of reinsurance, and company catastrophe reinsurance programs likely mitigate the effect of major events on the company net LRs and reduce the role of catastrophes in driving the total risk by LOB.

⁹⁸ The LOBs with column 5 of Exhibit A7-4 greater than 1.05/less than .95 are M-Intl, with low credibility based on the small number of data points, O-Re-Liab with a very small adjustment, and R-PL, which we expect would have had zero catastrophe losses.

**Exhibit A7-5
Catastrophe Share of Total Losses**

(1)	(2)	(3)	(4)
	col 5	col 5/col 3	Cat Data
LOB	87.5th Cat LR	87.5th Cat LR/ 87.5th Total LR	Cat \$/ Total \$
A-HO	2.6%	2.8%	4.9%
E-CMP	1.6%	2.0%	4.6%
G-SL	4.3%	4.5%	5.1%
I-SP	3.4%	4.1%	10.5%
J-APD	0.6%	0.7%	1.5%
M-Intl	32.8%	17.1%	15.9%
N-Re-Prop	25.9%	21.2%	26.6%
O-Re-Liab	0.4%	0.4%	0.9%
R-PL	0.3%	0.3%	0.0%

Notes:

Column 2, 87.5th Cat LR = 87.5th Total LR – 87.5th LR excluding cats=Indicated Cat Adjustment.

Exhibit A7-5 column 2 is equal to Table 7.1 column 5.

Exhibit A7-5 column 3 = The ratio of Table 7.1 column 5 to Table 7.1 column 3.

Experience at higher percentiles

Our analysis of indicated risk factors includes the development of indicated risk factors at safety levels of 87.5th percentile, 90th percentile, and 95th percentile.

Therefore, we calculate indicated catastrophe adjustments at those percentiles. We show the results in Exhibit A7-6 below.

- Column 2 is the raw catastrophe adjustment, equal to the values in Section 7, Table 7-1, column 5.
- Columns 3 and 4 give the corresponding information at safety levels of 90% and 95%.
- Column 5 is the indicated undiscounted risk charge using the Cat Data set, catastrophe losses plus non-catastrophe losses, equal to the values in Section 7, Table 7-1, column 7.
- Columns 6 and 7 give the corresponding information at safety levels of 90% and 95%.
- Column 8 is the ratio of the indicated catastrophe adjustment to the total undiscounted risk charge, equal to the values in Section 7, Table 7-1, column 8, when the selected catastrophe adjustment equals the raw indicated catastrophe adjustment.
- Columns 9 and 10 give the corresponding information at safety levels of 90% and 95%.

As must be the case for all LOBs, the indicated risk charges increase as the safety level increases (columns 5-7).

For most LOBs, the raw catastrophe adjustments increase as the safety level increases (columns 2-4). That is not the case, though, for J-APD and N-Re-Prop, where the adjustment is

level or nearly level, or for M-Intl, O-Re-Liab, and R-PL, where the adjustment decreases as the safety level increases.

The decreasing indicated adjustment for M-Intl is unusual. It suggests a loss distribution in which catastrophe losses are represented in the worst 12.5% of LRs but are less represented in the worst 10% or 5% of LRs, where adverse LRs are, apparently, driven by factors other than catastrophes.

The decrease in R-PL with a negative indicated catastrophe adjustment suggests data issues, which is not surprising given that we expect no catastrophe losses for R-PL.

**Exhibit A7-6
Catastrophe Adjustment at Higher Percentiles**

(1)	Raw Cat Adjustment by %-ile			Indicated Risk Charge			Cat/Gross Risk Charge		
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LOB	87.5th Percentile	90th Percentile	95th Percentile	87.5th Percentile	90th Percentile	95th Percentile	87.5th Percentile	90th Percentile	95th Percentile
A-HO	2.6%	3.5%	4.6%	20.4%	25.4%	41.4%	12.7%	13.8%	11.1%
E-CMP	1.6%	2.4%	4.8%	18.9%	23.9%	40.9%	8.6%	10.1%	11.8%
G-SL	4.3%	3.6%	11.9%	29.8%	36.6%	72.1%	14.4%	9.7%	16.4%
I-SP	3.4%	4.6%	7.8%	12.9%	18.6%	41.5%	26.3%	24.8%	18.8%
J-APD	0.6%	0.6%	0.6%	8.0%	11.3%	23.0%	7.5%	5.0%	2.6%
M-Intl	32.8%	5.6%	0.0%	136.0%	150.0%	303.0%	24.1%	3.7%	0.0%
N-Re-Prop	25.9%	22.9%	26.3%	48.8%	59.6%	99.1%	53.0%	38.4%	26.5%
O-Re-Liab	0.4%	0.3%	0.0%	27.2%	36.2%	69.1%	1.3%	0.9%	0.0%
R-PL	0.3%	0.0%	-0.7%	33.8%	42.5%	85.4%	0.8%	0.0%	-0.8%

Selected Catastrophe Adjustments

The data issues we identify above are important. In principle, we might limit our reliance on the indications from Cat Data by giving some weight to the current catastrophe adjustments. However, we have limited information on the origin of the current catastrophe adjustments. Those factors are likely subject to the same or greater data limitations than Cat Data.

The data issues identified may be resolved with additional data and/or further explored in future calibration studies.

At this time, though, since we have no data source better than Cat Data for catastrophe adjustment purposes, we rely primarily on the indicated catastrophe adjustments from that data.

Exhibit A7-7 shows our selected catastrophe adjustments at the three safety levels presented in this report.

**Exhibit A7-7
Selected Catastrophe Adjustments**

(1)	(2)	(3)	(4)
LOB	87.5th Percentile	90th Percentile	95th Percentile
A-HO	2.6%	3.5%	4.6%
E-CMP	1.6%	2.4%	4.8%
G-SL	4.3%	3.6%	11.9%
I-SP	3.4%	4.6%	7.8%
J-APD	0.6%	0.6%	0.6%
M-Intl	<i>15.0%</i>	<i>0.0%</i>	<i>0.0%</i>
N-Re-Prop	25.9%	25.9%	25.9%
O-Re-Liab	0.4%	0.3%	0.0%
R-PL	<i>0.0%</i>	<i>0.0%</i>	<i>0.0%</i>

We select the raw catastrophe adjustment indications except for M-Intl, N-Re-Prop, and R-PL.

For N-Re-Prop, we select the same adjustment for all safety levels as the number of data points is relatively low. We select a zero adjustment for R-PL, as we do not expect catastrophe exposure and where the raw catastrophe adjustment indications at higher percentile levels suggest data issues.

For M-Intl, we select an adjustment lower than the raw catastrophe adjustment indications because, compared to other LOBs, Intl data has:

- Low credibility (Exhibit A7-1),
- An unusual ratio of 1988-2003 risk charge to 2004-2017 risk charge (Exhibit A7-4),
- An unusual relationship between the average catastrophe share of losses as a percentage of total losses and the 87.5th percentile catastrophe share of losses as a percentage of the 87.5th percentile total losses (Exhibit A7-5), and
- It has a sharply declining catastrophe adjustment by safety level (Exhibit A7-6).

R_{CAT} Instructions

We have two observations regarding the RBC forms and calculations:

- For J-APD, the Lines 1 to 3 calculations of PR018 (which compare the company historical loss ratio to the industry historical loss ratio) use total losses, including catastrophe losses. For other LOBs with catastrophe adjustments, the calculations in Lines 1 to 3 use losses excluding the company catastrophe losses.

As the data shows catastrophe losses for J-APD, it might be appropriate to make the J-APD calculations for Lines 1 to 3 of PR018 the same as for the other LOBs with catastrophe exposure.

- A key assumption in our analysis is that the hurricane and earthquake modeling includes reasonable provisions for all losses of the types that are reported in the

catastrophe experience. The NAIC should consider the extent to which the modeling is sufficiently comprehensive.

- In the section above, “Is the Cat Data Set Representative of Total Calibration Data Set-87.5th Percentile LRs?,” we observed unexpected differences between Annual Statement data and RBC data. That may be an issue related to the early-year use of the RBC forms PR101, etc., for reporting historical hurricane and earthquake loss experience. The NAIC should consider whether differences can be investigated.

19.APPENDIX 8—Type of Company: Background

Definition

The NAIC impact model assigns each company to one of six categories—Personal Lines, Commercial Lines, Medical Professional Liability, Reinsurance, Workers Compensation, or Not Otherwise Classified (‘Other’ or ‘NOC’) by determining the amount of net written premium plus loss and LAE reserves (NWP + Reserves) for each of the six categories shown in Exhibit A8-1 below and then determining the category with the highest amount of premium plus reserves.

**Exhibit A8-1
 Key LOBs for Type of Company Categorization**

Schedule P Line	Category	Schedule P Line	Category
(1) HO	Personal Lines	(12) APD	Personal Lines
(2) PPA	Personal Lines	(10) Fid/Sur	NOC
(3) CA	Commercial Lines	(13) Other	NOC
(4) WC	Workers Compensation	(15) Intl	NOC
(5) CMP	Commercial Lines	(16) Re-Prop	Reinsurance
(6) MPL-O	Medical Professional	(17) Re-Liab.	Reinsurance
(7) MPL-C	Medical Professional	(18) PL	Commercial Lines
(8) SL	NOC	(14) FG/MG	NOC
(9) OL	Commercial Lines	(19) Wrnty	NOC
(11) SP	Commercial Lines		

LOB Share With Each Type of Company

Exhibit A8-2 shows the proportion of NWP+Reserves LOB within each Type of Company category, from 2019 RBC Filings.

**Exhibit A8-2
 Distribution of NWP + Reserves by LOB Within Each Type of Company**

LOB\Category	Commercial	Med Mal	NOC	Personal	Reinsurer	Workers Comp	Total
HF	6%	0%	0%	17%	2%	2%	10%
PPA	6%	0%	0%	45%	2%	4%	22%
CA	8%	0%	0%	3%	2%	4%	5%
WC	16%	1%	0%	2%	2%	73%	15%
CMP	10%	0%	0%	3%	1%	6%	6%
MM Occ	0%	24%	0%	1%	0%	0%	1%
MM CM	1%	72%	0%	1%	0%	0%	2%
SL	2%	0%	20%	0%	2%	0%	1%
OL	30%	2%	22%	3%	8%	6%	16%
FID/SUR	1%	0%	38%	0%	0%	1%	1%
SP	9%	0%	2%	2%	6%	1%	5%
APD	4%	0%	0%	18%	1%	2%	9%
Other	1%	0%	13%	0%	0%	0%	1%
Fin/Mortgage	0%	0%	0%	0%	0%	0%	0%
INTL	0%	0%	0%	0%	3%	0%	0%
Rein (Prop and	1%	0%	0%	2%	21%	0%	2%
Rein (LiAl)	3%	1%	0%	2%	49%	1%	3%
PL	2%	0%	0%	0%	0%	1%	1%
WAR	0%	0%	4%	0%	0%	0%	0%
Total %	100%	100%	100%	100%	100%	100%	100%
Total - \$	612,343,230	21,289,449	7,851,892	524,169,525	14,841,788	119,683,083	1,300,178,967

Source: 2019 RBC Filings.

The shaded elements are the three LOBs with the largest volume within the Type of Business category. For example, the main LOBs within the category NOC are K-Fid/Sur, H-OL, and G-SL. The Medical Professional Type of Company is predominantly F2-MPL-C.

20.APPENDIX 9—Cat Data Collection Instructions

This appendix shows the Committee’s instructions to the Regulators to collect blinded data for Ten-Year LOBs for catastrophe adjustment purposes.

We developed these instructions for Ten-Year LOBs. For Two-Year LOBs, the NAIC followed the same method.

INSTRUCTIONS PROVIDED TO REGULATORS

Abbreviations/Short Descriptions:

We use the following abbreviations/short descriptions in this write-up:

- “AY” represents accident year.
- “ASY” represents annual statement year.
- “IL” or “incurred loss” represents incurred loss and loss adjustment expenses net of reinsurance.
- “NEP” or “premium” represents earned premium net of reinsurance.
- “AS” means Annual Statement, as in AS NEP = NEP from Annual Statement data.
- “Ten-Year LOBs” are LOBs for which Schedule P contains information on the most recent 10 AYs.
- “Two-Year LOBs” are LOBs for which Schedule P contains information on the most recent 2 AYs.

Files:

- “AAA Calib Data” = the file “AAA Calib Data (05.28.21).xlsx”
 - This is the AAA P/C RBC Committee’s base data for calibration of Ten-Year LOBs.
 - It includes data for Ten-Year LOBs only. It is drawn from Schedule P.
 - It reflects pooling.
 - It reflects all the filtering used in Academy Line 4 calibration (as described in the March 2021 AAA P/C RBC Committee paper).
 - Each record in this file contains the following fields: LOB/company-pool- code/ASY/AY/NEP/IL.
- “RBC Calib Data” = the file prepared by Sak-man Luk with confidential RBC data for Two-Year LOBs.
 - This is the AAA P/C RBC Committee’s base data for calibration of Two-Year LOBs; calibration is done by regulators due to data confidentiality,
 - It includes data for Two-Year LOBs only. It is drawn from RBC Filings.
 - It reflects pooling.
 - It reflects all the filtering used in Academy Line 4 calibration.
 - Each record in this file contains the following fields: LOB/company-pool- code/ASY/AY/NEP/IL.

- “Cat Data” = the file with confidential cat experience and non-cat data from RBC forms PR101, ... etc. For each LOB, Company, AY, and ASY, it includes the following fields:
U.S. CAT IL/Non-US CAT IL/Non-CAT IL/NEP
- “Pooling Map” = workbook showing the conversion of company-code/ASYS to pool-code/ASYS
 - File name = “Pooling- 1984-2017 April 30 2019-to AY.xlsx”.
 - Each record in this file has fields Company Code (“CoCode”)/ASY/Pool Code

Algorithm: Consolidate records in “Cat Data” as follows:

1. Select the most mature valuation of IL/NEP for each company, AY, LOB. (Maturity = Annual Statement Year, a.k.a. Report Year, minus AY plus 1)
2. Using the file “Pooling Map,” add a new “company-pool” field to each of the records in “Cat Data” selected in step #1.
The company-pool field is the pool code (from “Pooling Map”) if the ASY/company indicates the record is part of a pool, otherwise the company-pool field is the company code.
3. Sum the NEP and IL amounts from step 2, by company-pool, to produce a total US Cat IL/Non-US CAT IL/Non-CAT IL/NEP for each company-pool/AY/LOB.

For Ten-Year LOBs:

4. Using “Cat Data” output, after applying the above algorithm, and using the “AAA Calib Data,” determine which records are in one or both of those two files. Specifically:
5. In “Cat Data”
 - a. Add a field “Match” = “Yes/No,” to indicate whether the “Cat Data” LOB/AY/Company-Pool-code record has a matching LOB/AY/Company-Pool-code in the “AAA Calib Data” file.
 - b. Add two fields for Annual Statement NEP and IL, abbreviated to AS NEP and AS IL:
 - If there is a match (5a=Yes), set the AS NEP and AS IL equal to those from “AAA Calib Data” (The NEPs should be the same; the IIs might differ because of different development age).
 - If there is no match (5a=No), set AS NEP = “NA” and AS IL = “NA”.
6. In “AAA Calib Data”:
 - a. Add a field “Yes/No,” to indicate whether the “AAA Calib Data” LOB/AY/Company-Pool-code record has a matching LOB/AY/Company-Pool-code in the “Cat Data” file.

7. Summarize the following record counts, for AYs 2004 through 2017 in total by LOB, and by individual AY within LOB for each individual AY from 2004 through 2017:
 - a. From “Cat Data”:
 - The total number of records
 - The number of records in “Cat Data” and in “AAA Calib Data”
 - The number of records in the “Cat Data” only (in other words, in the “Cat Data” but not in the “AAA Calib Data”)
 - b. From the “AAA Calib Data”:
 - The total number of records
 - The number of records in “AAA Calib Data” and in “Cat Data”
 - The number of records in the “AAA Calib Data” only (in other words, in the “AAA Calib Data” but not in the “Cat Data”)

Table 1, attached, shows a possible format for the record count summaries described in step 7.

8. Similar to step 7, summarize NEP for AYs 2004 through 2017 in total by LOB, and by individual AY within LOB for each individual AY from 2004 through 2017.

Table 2, attached, shows a possible format for the NEP summaries described in step 8.

Table 3, attached, shows a possible format for the 87.5th percentile results described below in steps 9, 10, and 11.

9. In “Cat Data,” for each LOB, calculate the 87.5th percentile of the Non-CAT LRs over all accident years (2004 through 2017) for the companies/pools in both data sets (counted in column 2 of Table 1).
 - Definition: Non-CAT LR = Non-CAT IL divided by NEP.
 - Enter the 87.5th percentile results into column 1 of Table 3.
10. In “Cat Data,” for each LOB, calculate the 87.5th percentile of the total LRs over all accident years (2004 through 2017) for the companies/pools in both data sets (counted in column 2 of Table 1).
 - Definition: total LR = Total IL divided by NEP.
 - Note that Total IL = U.S. Cat IL + Non-U.S. Cat IL + Non-CAT IL.
 - Enter the 87.5th percentile results into column 2 of Table 3.
11. In “AAA Calib Data,” for each LOB, calculate the 87.5th percentile of the LRs over all accident years (2004 through 2017) for the companies/pools in both data sets (counted in column 5 of Table 1).

- Definition: LR = IL divided by NEP.
- Enter the 87.5th percentile results into column 3 of Table 3.

Note that there are 32,248 records in the “AAA Calib Data” for AY 2004 through AY 2017.

We expect that the “Cat Data” file will be larger, perhaps twice the number of data points in “AAA Calib Data”. This is because the “AAA Calib Data” only includes records which have successfully passed all filtering (in other words, it excludes data from companies with small premium, minor lines, etc.).

Table 1
(Refer to Step 7) Sample Summary of Record Counts—Ten-Year LOBs

		Table 1: Record Counts: Refer to Step 7 for Instructions					
		Ten-Year LOBs					
Data Set >>		"Cat Data"			"AAA Calib Data"		
Column Number >>		(1)	(2)	(3)	(4)	(5)	(6)
		3=1-2			6=4-5		
LOB	AY	# in Cat Data: Total	# in Cat Data and in AAA Calib Data	# in Cat Data and NOT in AAA Calib Data	# in AAA Calib Data: Total	# in AAA Calib Data and in Cat data	# in AAA Calib Data and NOT in Cat data
all	2004-2017						
A	2004-2017						
B	2004-2017						
C	2004-2017						
...	2004-2017						
R	2004-2017						

A	2004						
A	2005						
A	2006						
A	2007						
A	2008						
A	2009						
A	2010						
A	2011						
A	2012						
A	2013						
A	2014						
A	2015						
A	2016						
A	2017						
B	2004						
...	...						

Table 2
(Refer to Step 8) Sample Summary of NEP—Ten-Year LOBs

Table 2: NEP Summary: Refer to Step 8 for Instructions						
Ten-Year LOBs						
Data Set >>		"Cat Data"			"AAA Calib Data"	
Column Number >>		(1)	(2)	(3)	(4)	(6)
		3=1-2			6=4-5	
LOB	AY	NEP in Cat Data: Total	NEP in Cat Data and in AAA Calib Data	NEP in Cat Data and NOT in AAA Calib Data	NEP in AAA Calib Data: Total	NEP in AAA Calib Data and in Cat data
all	2004-2017					
A	2004-2017					
B	2004-2017					
C	2004-2017					
...	2004-2017					
R	2004-2017					

A	2004					
A	2005					
A	2006					
A	2007					
A	2008					
A	2009					
A	2010					
A	2011					
A	2012					
A	2013					
A	2014					
A	2015					
A	2016					
A	2017					
B	2004					
...	...					

Table 3
(Refer to steps 9, 10, and 11) 87.5 percentile results

		Table 3: 87.5 Percentile Results		
		Ten-Year LOBs		
Column Number >>		(1)	(2)	(3)
		Refer to Step 9	Refer to Step 10	Refer to Step 11
LOB	AY	Cat Data and in AAA Calib Data Non-CAT loss ratio	Cat Data and in AAA Calib Data total loss ratio	AAA Calib Data and in Cat Data loss ratio
A	2004-2017			
B	2004-2017			
C	2004-2017			
...	2004-2017			
R	2004-2017			

21. GLOSSARY

Term	Definition/Description
2010 Method	The payment pattern method used the last time IIAs were updated in 2010, using data through 2008.
40-year Runoff Payment Pattern	Payment pattern constructed in this Report, extending to as many as 40 years of loss payments, as indicated by the data.
40-year Truncated Payment Pattern	40-year runoff payment patterns but limited to 10 years.
ACL	Authorized Control Level required capital from the RBC Formula; 50% of CAL.
Age	Development age: <ul style="list-style-type: none"> • For an AY, age 1 refers to payments, reserves, or incurred amounts at the end of the AY; • For reserves, age 1 refers to the initial reserve, i.e., the reserve at the year ending at the valuation date, usually the end of the least mature AY in that reserve.
AY	Accident year
CAL	Company Action Level, required capital value from the RBC Formula.
Cat Data	Confidential RBC data from RBC forms PR101 - PR122, one form for each LOB. Cat Data in those forms provides the following fields for each LOB, company, and AY in each RBC Filing year: U.S. Catastrophe Incurred Losses, Non-US Catastrophe Incurred Losses, Non-Catastrophe Incurred Losses, Net Earned Premium.
Cat losses	Losses from specified U.S.-Hurricane, U.S.-Earthquake, Non-U.S. Hurricane, Non-U.S. Earthquake, including designated tropical storms (in the hurricane category).
Catastrophe calibration period	The 2004-2017 period, for which we have Cat Data.
Committee	American Academy of Actuaries Property and Casualty Risk-Based Capital Committee
Current Factors	Factors in the 2022 RBC Formula
Expense Ratio	2017 industry net expenses divided net earned premium, from the 2017 Insurance Expense Exhibit, by LOB.
IIA	Investment Income Adjustment; Also referred to as Line 7/8.
Initial reserve	The reserve at the end of the selected valuation date.
Initial Reserve Year	The year ending at the selected valuation date. This is usually the year of the least mature AY in the reserve, i.e., the initial reserve year for the reserves as of December 31, 1995, is 1995.
Interest Rate	Per annum interest rate, U.S. Treasuries, unless otherwise specified.
LDF	Loss development factor
Line 4 Factor	Risk factor, line in RBC Formula PR017, PR018.
Line 7/8 Factor	IIA, row in RBC Formula, PR017 (Line 8) and PR018 (Line 7).
LOB	Line of Business

Term	Definition/Description
LR	Loss Ratio, loss and all loss adjustment expenses divided by earned premium, net of reinsurance.
NOC	“NOC,” standing for Not Otherwise Classified, means companies for which the portion of net written premium plus loss reserves is greatest for the sum of the following LOBs: G-SL, K-Fid/Sur, L-Other, M-Intl, or S-FG/MG.
PR017	Page of the P&C RBC formula that contains calculations for R4 UW Risk—Reserves.
PR018	Page of the P&C RBC formula that contains calculations for R5 UW Risk—Net Written Premium.
Premium IIA	Investment Income Adjustment for premium risk. Line 7 on page PR0018.
Premium risk charge	Premium risk charge for LOBs generally.
Premium risk charge _{LOB}	Simplified: Premium Risk Factor _{LOB} * IIA _{LOB} + Industry Average Expense Ratio _{LOB} - 100%
Premium risk factor	Line 4 in RBC Formula PR018
PV indicated risk charge	The 87.5 percentile of discounted data points (RRRs or LR), and, for premium risk, the industry expense ratio by line of business minus 100%.
PV Method	Calibrate Line 4 and IIAs combined, using the PV indicated risk charge.
R0	Part of the RBC Formula for Affiliated Insurance Companies and Misc. Other Amounts.
R2	Part of the RBC formula for Equity Assets.
R4 or R4- UW Risk—Reserves	Part of the RBC Formula for UW Risk—Reserves RBC on page PR017.
R5 or R5 - UW Risk—Net Written Premium	Part of the RBC Formula for UW Risk—Net Written premium RBC page PR018.
RBC	Risk-Based Capital
RBC Formula	References relate to the 2022 RBC Formula.
R _{CAT}	Part of the RBC Formula that accounts for earthquake and hurricane premium risk.
Reported Risk Development Horizon or Risk Development Horizon	The window of available data, the 10 years provided in Schedule P and RBC data.
Reserve IIA	Investment Income Adjustment for reserve risk. Line 8 on page PR0017.
Reserve Risk Charge	Reserve risk charge for LOBs generally.
Reserve Risk Charge _{LOB}	Simplified: (1.0 + Reserve Risk Factor _{LOB}) * IIA _{LOB} - 100%
Reserve Risk Factor	Line 4 in RBC Formula PR017

Term	Definition/Description
Risk Development Horizon Adjustment (RDHA)	The anticipated increase in indicated risk charges with increasing age of data points.
RRR	Reserve Runoff Ratio
Ten-Year LOBs	LOBs for which Schedule P contains information on the most recent 10 AYs.
TAC	Total Adjusted Capital as defined in the RBC Formula.
Two-Year LOBs	LOBs for which Schedule P contains information on the most recent 2 AYs.
Undiscounted Premium Risk Charge	The premium risk charge before applying the IIAs. Calculated as follows: $\text{Undiscounted Premium Risk Charge}_{\text{LOB}} = \text{Premium Risk Factor}_{\text{LOB}} + \text{Industry Average Expense Ratio}_{\text{LOB}} - 100\%$
Undiscounted Reserve Risk Charge	The reserve risk charge before applying the IIAs, calculated as follows: $\text{Undiscounted Reserve Risk Charge}_{\text{LOB}} = \text{Reserve Risk Factor}_{\text{LOB}}$
Updated Data	Data through 2017
Working Group	National Association of Insurance Commissioners' Property and Casualty Risk-Based Capital Working Group

**Exhibit A12-2
LOB Descriptions**

(1)	(2)	(3)	(4)
Schedule P LOB Name	RBC LOB Name (PR017 and PR018)	Schedule P Letter Code	Short Label
Homeowners & Farmowners	H/F	A	HO
Private Passenger Auto Liability	PPA	B	PPA
Commercial Auto Liability	CA	C	CA
Workers' Compensation	WC	D	WC
Commercial Multiple Peril	CMP	E	CMP
Medical Professional Liability (Occurrence)	MPL OCCURRENCE	F1	MPL-O
Medical Professional Liability (Claims Made)	MPL CLMS MADE	F2	MPL-C
Special Liability (Note 1)	SL	G	SL
Other Liability: Claims Made and Other Liability: Occurrence	OL	H	OL
Special Property (Note 2)	SPECIAL PROPERTY	I	SP
Auto Physical Damage	AUTO PHYSICAL DAMAGE	J	APD
Fidelity & Surety	FIDELITY/SURETY	K	Fid/Sur
Other (Inc Credit, Accident & Health) (Note 3)	OTHER (INCLUDE CREDIT, A&H)	L	Other
International (Note 4)	INTL	M	Intl
Reinsurance: Nonproportional Assumed Financial and Reinsurance: Nonproportional Assumed Property	REIN PROPERTY & FINANCIAL LINES	N	Re-Prop
Reinsurance: Nonproportional Assumed Liability	REIN LIABILITY	O	Re-Liab
Product Liability: Claims Made and Product Liability: Occurrence	PL	R	PL
Financial & Mortgage Guaranty	FINANCIAL/MORTGAGE GUARANTY	S	FG/MG
Warranty	WARRANTY	T	Wrnty

The 19 RBC LOBs are a subset of the 22 Schedule P LOBs, which is a subset of the 45 Statutory Page 14 LOBs, plus write-in LOBs in the “Underwriting and Investment Exhibit Part 1 Premium Earned” section of the Annual Statement

Note 1: Special Liability consists of Statutory Page 14 LOBs: Ocean Marine, Aircraft (all perils), and Boiler and Machinery (Statutory Page 14 LOBs 8, 22, and 27).

Note 2: Special Property consists of Statutory Page 14 LOBs: Fire, Allied Lines, Inland Marine, Earthquake, and Burglary and Theft (Statutory Page 14 LOBs 1, 2, 9,12, and 26).

Note 3: Other (Inc Credit, Accident & Health) consists of Statutory Page 14 LOBs: Group A&H, Credit A&H (group and individual), Other A&H, and Credit (Statutory Page 14 LOBs 13, 14, 15, and 28)

Note 4: LOB International consists of non-US business that cannot be identified by Statutory Page 14 LOB in the 2017 Annual Statement.



TO: Tom Botsko, Chair of the Property and Casualty Risk-Based Capital (E) Working Group

FROM: John Rehagen, Acting Chair of the Reinsurance (E) Task Force

RE: 2023 Due Diligence Review of Qualified Jurisdictions & Reciprocal Jurisdictions

DATE: November 16, 2023

Executive Summary & Recommendation

At the 2023 Summer National Meeting call of the Reinsurance (E) Task Force, it was noted that a project had been started by NAIC staff to create a new disclosure to collect more information of insurers catastrophe reinsurance programs. For background, with the recent catastrophe-related insolvencies in the market and increasing cost of CAT reinsurance coverage, state insurance regulators have identified a need to collect additional detail from insurers on the structure of their catastrophe reinsurance program and any changes from the prior year on an annual basis. As such information could be viewed as confidential and proprietary, and as it is closely related to the existing PR027 RCAT charge in Property/Casualty RBC, the collection of additional information on an insurer's catastrophe reinsurance program is being proposed through a series of questions added to the PR027 Catastrophe Risk Interrogatories included in the RBC Blanks.

The first draft of the proposed new disclosure was exposed for comments on Sept. 21, and two comment letters were received. As a result of the comment letters, NAIC staff made changes to their draft document, which is included in this referral. The Task Force reviewed these changes on its call on Nov. 16, and agreed with NAIC staff's changes and recommend that the Property and Casualty Risk-Based Capital (E) Working Group use that as their working document going forward. All these documents are included as attachments to this referral.

We recommend that the Property and Casualty Risk-Based Capital (E) Working Group expose the updated working copy of the proposal at its during the Fall National Meeting. Reinsurance (E) Task Force members and staff support will be available to assist with any questions during this process.

Washington, DC 444 North Capitol Street NW, Suite 700, Washington, DC 20001-1509 p | 202 471 3990 f | 816 460 7493

Kansas City 1100 Walnut Street NW, Suite 1500, Kansas City, MO 64106-2197 p | 816 842 3600 f | 816 783 8175

New York One New York Plaza, Suite 4210, New York, NY 20004 p | 212 398 9000 f | 212 382 4207

www.naic.org

Capital Adequacy (E) Task Force RBC Proposal Form

- | | | |
|---|---|---|
| <input type="checkbox"/> Capital Adequacy (E) Task Force | <input type="checkbox"/> Health RBC (E) Working Group | <input type="checkbox"/> Life RBC (E) Working Group |
| <input checked="" type="checkbox"/> Catastrophe Risk (E) Subgroup | <input checked="" type="checkbox"/> P/C RBC (E) Working Group | <input type="checkbox"/> Longevity Risk (A/E) Subgroup |
| <input type="checkbox"/> Variable Annuities Capital. & Reserve (E/A) Subgroup | <input type="checkbox"/> Economic Scenarios (E/A) Subgroup | <input type="checkbox"/> RBC Investment Risk & Evaluation (E) Working Group |

<p style="text-align: right;">DATE: <u>September 20, 2023</u></p> <p>CONTACT PERSON: <u>Jake Stultz</u></p> <p>TELEPHONE: _____</p> <p>EMAIL ADDRESS: <u>jstultz@naic.org</u></p> <p>ON BEHALF OF: <u>Reinsurance (E) Task Force</u></p> <p>NAME: <u>John Rehagen (Chair)</u></p> <p>TITLE: <u>Director, Insurance Company Regulation</u></p> <p>AFFILIATION: <u>Missouri DCI</u></p> <p>ADDRESS: <u>P.O. Box 690</u> <u>Jefferson City, MO 65102</u></p>	<p style="text-align: center;">FOR NAIC USE ONLY</p> <p>Agenda Item # <u>2023-13-CR</u> Year <u>2024</u></p> <p style="text-align: center;">DISPOSITION</p> <p>ADOPTED:</p> <p><input type="checkbox"/> TASK FORCE (TF) _____</p> <p><input type="checkbox"/> WORKING GROUP (WG) _____</p> <p><input type="checkbox"/> SUBGROUP (SG) _____</p> <p>EXPOSED:</p> <p><input type="checkbox"/> TASK FORCE (TF) _____</p> <p><input type="checkbox"/> WORKING GROUP (WG) _____</p> <p><input type="checkbox"/> SUBGROUP (SG) _____</p> <p>REJECTED:</p> <p><input type="checkbox"/> TF <input type="checkbox"/> WG <input type="checkbox"/> SG _____</p> <p>OTHER:</p> <p><input type="checkbox"/> DEFERRED TO _____</p> <p><input type="checkbox"/> REFERRED TO OTHER NAIC GROUP _____</p> <p><input type="checkbox"/> (SPECIFY) _____</p>
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IDENTIFICATION OF SOURCE AND FORM(S)/INSTRUCTIONS TO BE CHANGED

- | | | |
|--|--|--|
| <input type="checkbox"/> Health RBC Blanks | <input checked="" type="checkbox"/> Property/Casualty RBC Blanks | <input type="checkbox"/> Life and Fraternal RBC Blanks |
| <input type="checkbox"/> Health RBC Instructions | <input type="checkbox"/> Property/Casualty RBC Instructions | <input type="checkbox"/> Life and Fraternal RBC Instructions |
| <input type="checkbox"/> Health RBC Formula | <input type="checkbox"/> Property/Casualty RBC Formula | <input type="checkbox"/> Life and Fraternal RBC Formula |
| <input type="checkbox"/> OTHER _____ | | |

DESCRIPTION/REASON OR JUSTIFICATION OF CHANGE(S)

Given the recent catastrophe-related insolvencies and increasing cost of CAT reinsurance coverage, state insurance regulators have identified a need to collect additional detail from insurers on the structure of their catastrophe reinsurance program on an annual basis. As such information could be viewed as confidential and proprietary, and as it is closely related to the existing PR027 RCAT charge in Property/Casualty RBC, the collection of additional information on an insurer's catastrophe reinsurance program is being proposed through a series of questions added to the PR027 Catastrophe Risk Interrogatories included in the RBC Blanks.

Additional Staff Comments:

The RBC Blanks proposal has been developed, exposed for public comment and discussed in detail through the meetings of the Reinsurance (E) Task Force to ensure that it meets regulatory needs and is fit for purpose.

**** This section must be completed on all forms.**

Revised 2-2023

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INTERROGATORY ON CATASTROPHE RISK REINSURANCE PROGRAM PR027 (This interrogatory is for all natural catastrophe perils, and is not limited to earthquake, hurricane and wildfire.)

(1) Provide a narrative description of the natural catastrophe reinsurance program in place at the insurer, by peril where appropriate, including but not limited to:

(1a) Traditional reinsurance coverage in place (e.g., aggregate excess of loss, aggregate stop loss) and layers thereof, attachment points, participating reinsurers (affiliated/not affiliated), exhaustion limits, capacity for each category of risk transfer, information on existing quota share and related attachment points, reinstatement provisions, etc.

(1b) Non-traditional alternatives to reinsurance (e.g., catastrophe bonds and other insurance-linked securities, sidecars, parametric coverage, weather derivatives, etc.)

(2) Provide a graphical representation of the catastrophe reinsurance program (i.e., structure chart or reinsurance tower) in place at the insurer, by peril where appropriate. Please include any relevant data that is requested in Question (1a) above.

(3)
Y/N

(3) Have there been any significant changes in the reinsurance program structure from the prior year (Y/N)

(3a) Describe any significant changes from the prior year:

(4) Provide the annual program renewal date(s):

	(4a) Reinsurance Treaty	(4b) Begin Date	(4c) End Date
0000001			
0000002			
0000003			
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0000005			
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November 7, 2023

John Rehagen, Chair
Reinsurance (E) Task Force
National Association of Insurance Commissioners
c/o Jake Stultz and Dan Schelp
Via email: jstultz@naic.org and dschelp@naic.org

Re: Joint Trades Comments Regarding RBC Reinsurance Program Interrogatory

Dear Mr. Rehagen:

Thank you for the opportunity to comment on the proposed P&C Risk-Based Capital Interrogatory (the proposal), which is intended to collect additional detail from insurers on the structure of their natural catastrophe reinsurance program, including any changes from the prior year. This letter is submitted on behalf of the American Property Casualty Insurance Association (APCIA), the National Association of Mutual Insurance Companies (NAMIC) and the Reinsurance Association of America (RAA).

APCIA is the primary national trade association for home, auto, and business insurers. APCIA promotes and protects the viability of private competition for the benefit of consumers and insurers, with a legacy dating back 150 years. APCIA members represent all sizes, structures, and regions – protecting families, communities, and businesses in the U.S. and across the globe.

NAMIC consists of more than 1,500 member companies, including seven of the top 10 property/casualty insurers in the United States. The association supports local and regional mutual insurance companies on main streets across America as well as many of the country's largest national insurers. NAMIC member companies write \$357 billion in annual premiums and represent 69 percent of homeowners, 56 percent of automobile, and 31 percent of the business insurance markets. Through its advocacy programs NAMIC promotes public policy solutions that benefit member companies and the policyholders they serve and fosters greater understanding and recognition of the unique alignment of interests between management and policyholders of mutual companies.

The RAA is a national trade association representing reinsurance companies doing business in the United States. RAA membership is diverse, including reinsurance underwriters and intermediaries licensed in the U.S. and those that conduct business on a cross-border basis. The RAA also has life reinsurance affiliates and insurance-linked securities (ILS) fund managers and market participants that are engaged in the assumption of property/casualty risks. The RAA represents its members before state, federal and international bodies.

The RBC proposal form provided the following justification for the proposal:

APCIA/NAMIC/RAA Letter
Page 2

Given the recent catastrophe-related insolvencies and increasing cost of CAT reinsurance coverage, state insurance regulators have identified a need to collect additional detail from insurers on the structure of their catastrophe reinsurance program on an annual basis.

We fully appreciate and support insurance regulators' need to understand insurers' natural catastrophe risk exposure and the reinsurance programs designed to mitigate these risks. We also appreciate that the proposal is designed as an RBC interrogatory to ensure its confidentiality. After reviewing the proposal and discussing it with our members, we had a number of questions about the purpose of the proposal, its scope, and whether its proposed format would provide useful information to state regulators. To address these questions and ensure our comments are fully informed and useful, we held conversations with a member of the Task Force and several NAIC staff. Following is a brief summary of a few of the questions and the answers provided by the NAIC:

Q1 Have there in fact been many recent catastrophe related insolvencies? 2022 P&C RBC Aggregate Report indicates continued improvement in the number of insurers at various RBC action levels.

A1 Yes, there have been several recent insolvencies in certain catastrophe prone states, but there have also been recent insolvencies and impairments in other states, particularly those exposed to secondary perils such as convective storms. Some smaller insurers are reporting challenges in affording sufficient reinsurance coverage and are retaining more catastrophe risk.

Q2 Current RBC RCat requires reporting catastrophe risk, net of reinsurance, for Hurricane, EQ and Windstorm (information only) at the 50, 100, 250 and 500 return periods. The change RCat values from prior periods would provide directional and quantitative information about net catastrophe exposure. Do the states really need the high level of detail in the proposal for all insurers subject to RCat reporting?

A2 Yes. Several states have been requesting this information annually from many of their domestic insurers, and while the reinsurance program is considered in detail on financial examinations, that process is too infrequent. An annual requirement would provide all states with this information for each of their domestic insurers.

Q3 Has the NAIC considered that most insurance groups purchase insurance at the group level? The disclosures in the proposal would have to be allocated to individual RBC reporting entities and is unlikely to provide consistent and useful information.

A3 The Task Force might consider allowing group reporting.

Q4 Would the NAIC consider limiting the scope of the proposal? RBC aggregate data shows nearly 1400 reporting entities with greater than a 1000% RBC ratio. Large groups are required to report similar information in their ORSA, Annual Registration Statement and in public reporting to the SEC.

APCIA/NAMIC/RAA Letter
Page 3

A4 The Task Force might consider limiting the scope of the proposal if industry suggested thresholds would not exclude insurers that lack sufficient reinsurance programs for natural catastrophe perils.

Q5 The narrative description in the proposal is quite detailed, requiring a description of the natural catastrophe reinsurance program by peril, and separately providing granular program details (including type of coverage, layers, attachment points, limits, reinstatement provisions, etc.) for traditional and non-traditional reinsurance, and a graphical representation of the reinsurance program. This level of detailed reporting would be a significant compliance burden for many insurers and is often not available on a legal entity basis.

A5 The proposal was designed based on public company disclosures. Regulators expect that insurers also report at this level of detail to their management and board of directors.

We appreciate the dialogue with the NAIC about the purpose of the proposal and the rationale for its current design. We agree with the NAIC that state regulators should expect insurers to have robust processes and controls in place to manage natural catastrophe risk through an effective reinsurance program and through other means. We request that you consider the following suggestions for improvement to the proposal.

Group Reporting Option:

Public company financial reporting is reported on a consolidated basis, with details provided only for material amounts and risks. Based on the trades review of several large insurance groups' 10K filings, none report the level of detail requested in the proposal and none provide a reinsurance coverage tower graphic. Because catastrophe risk is managed, and reinsurance is purchased at the group level, the legal entity detail requested in the proposal will be challenging to complete and is unlikely to provide useful information to state regulators. Purchasing reinsurance protection at the group level, provides coverage for multiple catastrophe perils, provides administrative efficiency, and provides more effective coverage, since it covers several potential natural catastrophe losses in the group and is not sub-limited to specific legal entities. Multiple cedant reinsurance contracts require allocation agreements that allocate premiums and recoveries, but many elements of the proposal, such as coverage limits, attachments points, etc. cannot be allocated to individual entities. If these elements were allocated to individual entities, they would not provide useful information.

Example: An insurance group has a multiple cedant reinsurance contract that pays \$5 million XS of \$5 million and is spread among 5 entities in the group that write equal premiums. These entities might report \$1 million of limit each. If company A has a \$2 million loss from a covered event, but none of its affiliates have a loss from that event, a reader of this interrogatory might assume that company A has reinsurance protection, but because the reinsurance contract attaches at \$5 million, there would be no recovery.

APCIA/NAMIC/RAA Letter
Page 4

We request that the Task Force consider modifying the proposal to allow group reporting rather than entity level reporting. Group level reporting is consistent with how insurance groups manage their catastrophe risks and artificial entity level allocations will not provide meaningful or comparable information to state regulators. We recommend that the interrogatory be prepared on a group level, include a list of the legal entities included in the group and perhaps also provide a summary of the allocation agreement. Identical filings could be included in each individual entity's RBC Interrogatory.

Material Perils:

Based on our review of several public filings, no reporting entities that we observed report the requested level of detail in the proposal for material natural catastrophe perils. Often this is broken out separately for hurricane and earthquake and frequently for only two major geographic areas (e.g., U.S. and Canada or U.S. and non-U.S.) Sometimes this information is only provided on an all perils basis world-wide. Providing this level of detail for immaterial risks will be time consuming, is inconsistent with financial reporting requirements for GAAP and Statutory Accounting and is unlikely to provide useful information to state insurance regulators.

Reinsurance Tower Graphic:

None of the public companies we observed provided a graphical presentation of the reinsurance program in their public filings. This is likely because they have overlapping reinsurance coverage for multiple perils, purchase reinsurance using a variety of different programs covering several geographic regions, use multiple, varying reinsurance structures for the same or similar risks and use facultative reinsurance cover for individual policies for program business. As a result, such graphical presentations would be very difficult to prepare and are unlikely to yield useful information. Preparing the requested graphics by peril will be costly and will unlikely provide useful information to state regulators.

We suggest the Task Force consider requiring separate reinsurance tower graphics for the top two or three perils that are material to the reporting entity's catastrophe reinsurance program. Based on our discussions with reinsurance intermediaries, most smaller insurers typically have only one major reinsured catastrophe peril, and do prepare a reinsurance tower graphic or receive it from their broker.

Redefining the Scope:

According to NAIC staff, approximately 870 RBC reporting entities are subject to RCat currently. This group is likely to grow if and when wildfire risk, convective storm risk and other catastrophe perils are eventually included in the RCat requirement. Basing the proposal only on insurers subject to RCat may in fact miss many insurers that are exposed to catastrophe risks other than hurricane and earthquake. For those insurers, a separate request of the insurer, as part of the annual financial analysis process, may be the best way for state insurance regulators to obtain information about catastrophe exposed insurers' reinsurance programs.

APCIA/NAMIC/RAA Letter
Page 5

In order to better direct this requirement toward insurers facing increased solvency risk, the Task Force should consider narrowing the scope to focus on insurers with a higher risk of financial impairment or a higher risk of triggering an RBC action level as a consequence of their natural catastrophe risk and reinsurance program. A more focused scope should include insurers with significant catastrophe risk net of reinsurance, a high reliance on reinsurance to manage their catastrophe risk and perhaps include RBC ratios as an additional filter. Based on our analysis of annual statement data and review of several public company 10K filings, we suggest the following potential scope thresholds for consideration by the Task Force.

Proposed Scope Thresholds:

The following scope thresholds would be more effective identifying insurers that have significant net catastrophe exposure and that should be subject to the proposed RBC interrogatory and increased supervisory attention.

1. RBC Ratio below 1000% AND Reinsurance Utilization Rate greater than 30% (instead of reinsurance utilization, the Task Force could use a ratio derived from Schedule F, Part 6 “Restatement of Balance Sheet to Identify Net Credit for Reinsurance” at perhaps >50% of surplus)

OR

2. Probable Maximum Loss (PML) net of reinsurance as a percentage of Surplus of 25% or more

An RBC ratio greater than 1000% should in most cases indicate that the risk of insolvency in the near future is remote. However, RBC alone might not identify insurers that are heavily reliant on reinsurance if their net retention is low or if the catastrophe exposure is not a peril included in RCat. As a result, we propose pairing RBC with a reinsurance utilization rate threshold. Reinsurance utilization is typically measured as ceded reinsurance premium divided by gross written premiums and is a measure of the reliance on reinsurance. Industry aggregate data show that the industry aggregate reinsurance utilization ratio fluctuates in a very narrow band around 18%, so 30% may be a reasonable threshold. Based on our analysis of NAIC Annual Statement data these two criteria would result in 524 legal entities in scope for the proposed interrogatory.

Alternatively, the Task force might consider using a ratio of the effect of reinsurance on the balance sheet as a percentage of surplus, which can be derived easily from data in Schedule F, Part 6. We have not performed an analysis of this alternative using Annual Statement data, but a reasonable threshold might be a net benefit of reinsurance of 50% or more of an insurer’s surplus.

We are proposing net PML as a percentage of surplus as an additional threshold. This information is available in the RCat filings and the Annual Statement, so should be easily verifiable for any insurer currently subject to RCat. We believe that this threshold is more likely to focus regulators’ attention on the types of insurers that prompted this proposal. Since this data is confidential, we do not have the information to make an informed recommendation on the threshold but based on public company reporting and other public information, perhaps net PML of 25% of surplus at the 1-in-250 return period would be a good starting point. The Task force might want to consider

APCIA/NAMIC/RAA Letter
Page 6

adding a change in PML to surplus ratios as an additional criterion. Finally, while the current scope of the proposal only includes insurers subject to RCat, using the net PML criteria could form the basis for separate state requests for similar information from other insurers that may have significant natural catastrophe risk other than hurricane and earthquake risk.

Thank you again for the opportunity to provide comments. We look forward to further engagement on these issues.

Sincerely,

Joseph B. Sieverling, SVP and Director of Financial Services
Reinsurance Association of America

Matthew Vece, Director, Financial & Tax Counsel
American Property and Casualty Insurance Association

Colleen W. Scheele, Public Policy Counsel and Director of Financial and Tax Policy
National Association of Mutual Insurance Companies

cc: Tom Botsko, Chair Property Casualty RBC (E) Working Group
Wanchin Chou, Chair, Catastrophe Risk (E) Subgroup



Association of Bermuda Insurers and Reinsurers

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Tel: 441 294-7221

600 Pennsylvania AVE SE
Front 2, #15872
Washington, DC 20003-9998
Tel: 202-783-2434

October 30, 2023

Director Chlora Lindley-Myers (MO), Chair
c/o John Rehagen
Reinsurance (E) Task Force
National Association of Insurance Commissioners

NAIC staff: jstultz@naic.org; dschelp@naic.org

RE: Proposed New Disclosures for Catastrophe Reinsurance Programs for P&C RBC

On behalf of the 31 members of The Association of Bermuda Insurers and Reinsurers ("ABIR"), we kindly thank the National Association of Insurance Commissioners ("NAIC") for the opportunity to comment on its consultation of the proposed new disclosures for catastrophe reinsurance programs for P&C RBS ("Disclosures"), which is currently exposed until November 7, 2023.

ABIR represents the public policy interests of Bermuda's leading insurers and reinsurers. ABIR members operate from more than 150 countries around the world. ABIR members employ over 37,000 Americans in the U.S. and for over three decades have protected consumers around the world by providing affordable and accessible insurance protection and peace of mind.

The Bermuda market makes up about 35% of the global reinsurance market based on property & casualty net premiums earned. ABIR members at year end 2022 wrote global group gross written premiums of \$145 billion and net premium written of US\$111.8 billion. Since 1997, Bermuda insurers & reinsurers have paid nearly half a trillion USD in claim payments to American consumers and business, predominantly for natcat, specialty and financial risk recovery.

As a jurisdiction, Bermuda earned the designation as one of the inaugural, NAIC reciprocal jurisdictions effective January 1, 2020. The Bermuda market is proud of its leadership role in providing risk-diversifying capital through international reinsurance.

The Disclosures

We understand the catalyst for this development of this proposed annual disclosure is recent catastrophe-related insurer insolvencies and the increasing cost of catastrophe reinsurance coverage. We recognize and appreciate the NAIC's desire to ensure that regulated insurers are adequately reinsured for catastrophes, and we encourage the development of catastrophe reinsurance market. We acknowledge that the Disclosures may result in the identification of gaps in a cedants reinsurance program and therefore could possibly have a positive impact to reinsurers.

Representing Bermuda's Major International Insurers and Reinsurers

Recommendations

We believe that proposed approach which requires each insurer, by individual program, to provide detailed disclosures that could lead to violations of confidentiality provisions and discourage certain reinsurers from providing capacity in some situations. Further, we believe that such detailed disclosures could jeopardize the development of reinsurance structures for future catastrophe protection. While we recognize that the state regulators must have oversight into regulated insurers' catastrophe risk protection, we would suggest that the required disclosures be limited to providing the aggregate protection from traditional and non-traditional catastrophe reinsurance programs along with a narrative describing such programs.

ABIR and its member companies stand ready to provide additional information to the NAIC and state insurance regulators as may be required during this consultative process.

If you have any questions in the meantime, please do not hesitate to contact Suzanne Williams-Charles on 441-705-4422 or at suzanne.williams-charles@abir.bm.

Sincerely,



John Huff
President and CEO



Suzanne Williams-Charles
Director of Policy and Regulation, Corporate Secretary
And Data Privacy Officer

INTERROGATORY ON CATASTROPHE RISK REINSURANCE PROGRAM PR027

NOTE: This interrogatory is intended for completion by all property and casualty RBC filers that are exposed to natural catastrophe perils, and is not limited to earthquake, hurricane and wildfire and the associated RCAT exemptions. Insurance entities that participate in group reinsurance programs may respond to the interrogatory at a group level.

- (1) Provide an overall narrative description of the natural catastrophe reinsurance program in place at the insurer/group, by peril where appropriate, including elements such as the types of reinsurance coverage in place, attachment points/retention levels, exhaustion limits, reinstatement provisions, etc. When possible and relevant, provide a graphical reinsurance tower as an attachment.

[Redacted]

(2)
Y/N

- (2) Have there been any significant changes in the reinsurance program structure from the prior year (i.e., change in cost, level of coverage) (Y/N)

[Redacted]

- (2a) If yes, describe any significant changes from the prior year:

[Redacted]

(3)
MM/DD/YYYY

- (3) Provide the primary program renewal date (i.e., 1/1/XX or 7/1/XX):

[Redacted]



November 3, 2023

Tom Botsko, Chair
Property Casualty Risk-Based Capital (E) Working Group
National Association of Insurance Commissioners
c/o Ms. Eva Yeung, NAIC
Eyeung@NAIC.org

Re: AAA Paper on R4 & R5 Underwriting and IIA Factor Update

Dear Ms. Yeung:

Thank you for the opportunity to comment on the American Academy of Actuaries paper regarding the methodology for deriving the R4 & R5 Line 4 and Investment Income Adjustment factors. RAA appreciates the comprehensive work of the Academy to continue improving the methodology and the thoughtful approach undertaken to incorporate the Present Value Method.

The RAA is a national trade association representing reinsurance companies doing business in the United States. RAA membership is diverse, including reinsurance underwriters and intermediaries licensed in the U.S. and those that conduct business on a cross-border basis. The RAA also has life reinsurance affiliates and insurance-linked securities (ILS) fund managers and market participants that are engaged in the assumption of property/casualty risks. The RAA represents its members before state, federal and international bodies.

We support the overall approach the Academy proposes. However, there are certain policy options that have been presented for further consideration by regulators that can have significantly negative or even onerous impacts on the capital requirements for (re)insurers, depending on which options are chosen. We encourage a careful and measured evaluation of these policy and implementation options and look forward to providing future comments throughout the process.

Ongoing Adjustments for Future Interest Rate Changes:

It will be important to periodically update the Line 4 and Investment Income Adjustment factors using the Present Value Method to reflect future changes in interest rates and additional years of data from Schedule P that are used in calculating loss and reserve runoff ratios and changes in payment patterns By Line of Business (BLOB). This will ensure that the underwriting risk charge reflects changes in market conditions over time.

BLOB Reasonableness Review:

Changes in indicated capital requirements by BLOB should be reviewed for reasonableness in terms of the dollar amount of capital required to write the same dollar amount of premium. It is important to take a step back and evaluate, for reasonableness, the BLOB marketplace impact of proposed changes. This review can prevent unintended consequences to the availability and affordability of insurance in market segments.

RAA Comment
Page 2

Transition Limits:

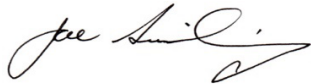
We agree with the Academy that transition limits, to phase in substantial changes to indicated risk charges, should be implemented as they have been in previous updates to the factors.

Safety Level

We do not believe that a change in safety level from the current 87.5th percentile is warranted and note the severe and unreasonable impact on many lines of business that would result at the 95th percentile. As has been noted by the Academy, the time horizon for Reserve Risk is over 9 years.

Thank you for the chance to provide these comments, and we look forward to offering our perspective.

Sincerely,



Joseph B. Sieverling
Senior Vice President
Director of Financial Services



Scott Williamson
Senior Vice President
Director of Analytics

FLORIDA COMMISSION ON HURRICANE LOSS PROJECTION METHODOLOGY

NAIC Fall National Meeting
December 2, 2023

FORMATION OF THE COMMISSION

Hurricane Andrew (1992) caused significant disruptions and failures in the Florida property insurance market

Traditional methods used to project hurricane loss cost considered inappropriate after Hurricane Andrew

Legislature recognized the need for expert evaluation of catastrophe models

Key questions

- How to address the “Black Box” problem
- How to protect proprietary processes and structure of the models under state Sunshine Laws
- What collective expertise is needed to evaluate catastrophe models

FORMATION OF THE COMMISSION *(Continued)*

Created by the Florida Legislature as an independent commission in 1995

Housed within the State Board of Administration of Florida

Funded out of the Florida Hurricane Catastrophe Fund

- Annual budget \$1.65 million

Operates under statute (Section 627.0628, Florida Statutes)

Structure and process designed to address Black Box problem

- On-site audit (Professional Team)
- Trade secret sessions (added by the Legislature in 2005)
- Commission member on-site visits provide greater access to the model

COMPOSITION OF THE COMMISSION

Twelve-member panel of experts to provide the most actuarially sophisticated guidelines and standards for the projection of hurricane and flood losses

- Actuary: Industry
- Actuary: Office of Insurance Regulation
- Actuary: Florida Hurricane Catastrophe Fund (FHCF) Advisory Council
- Insurance Consumer Advocate
- Director of the Division of Emergency Management
- FHCF Chief Operating Officer
- Executive Director of Citizens Property Insurance Corporation
- Insurance Finance Expert*
- Statistics Expert*
- Computer System Design Expert*
- Meteorology Expert*
- Licensed Professional Structural Engineer*

*Full-time faculty member of the State University System

PROFESSIONAL TEAM

Composition – Actuary, Statistician, Meteorologist, Hydraulic Engineer, Computer/Information Scientist, Structural Engineer, Coastal Engineer

Participates in all phases of the Commission's activities

- Report of Activities development
- Submission review
- On-site audit – full access to the model data, documentation and source codes
- Commission meeting participation and support
- Identification of important trends and research

Two experts for each discipline, a primary member and a backup member

ROLE OF THE COMMISSION

Defined in Section 627.0628(3)(a), Florida Statutes

- *The Commission shall consider any actuarial methods, principles, standards, models, or output ranges that have the potential for improving the accuracy of or reliability of hurricane loss projections used in residential property insurance rate filings and flood loss projections used in rate filings for personal lines residential flood insurance coverage*
- *The Commission shall revise previously adopted actuarial methods, principles, standards, models, or output ranges every odd-numbered year for hurricane loss projections and no less than every 4 years for flood loss projections*

COMMISSION FINDINGS AND IMPLICATIONS

With respect to a rate filing:

- *An insurer shall employ and may not modify or adjust actuarial methods, principles, standards, models, or output ranges found by the commission to be accurate or reliable in determining hurricane loss factors and probable maximum loss levels for use in a rate filing under s. 627.062*
- *An insurer may employ a model in a rate filing until 120 days after the expiration of the commission's acceptance of that model and may not modify or adjust models found by the commission to be accurate or reliable in determining probable maximum loss levels*
- *An insurer is not prohibited from using a straight average of model results or output ranges for the purposes of a rate filing for personal lines residential flood insurance coverage under s. 627.062*

COMMISSION KEY PRINCIPLES

All models or methods shall be theoretically sound

Models or methods shall not be biased to overstate or understate results

The output of models or methods shall be reasonable, and the modeler shall demonstrate its reasonableness

All sensitive components of models or methods shall be identified

COMMISSION STANDARDS

Six Hurricane Categories

- General
- Meteorological
- Statistical
- Vulnerability
- Actuarial
- Computer/Information

Seven Flood Categories

- General
- Meteorological
- Hydrological and Hydraulic
- Statistical
- Vulnerability
- Actuarial
- Computer/Information

Standards have evolved across time

HURRICANE REQUIREMENTS (2023)

Standards	<u>General</u>	<u>Meteorological</u>	<u>Statistical</u>	<u>Vulnerability</u>	<u>Actuarial</u>	<u>Computer/ Information</u>
35 118 subparts	5 14 subparts	6 16 subparts	6 7 subparts	4 17 subparts	6 32 subparts	8 32 subparts
Disclosures 203	40	42	23	43	42	13
Forms 28	7	3	6	5	7	0
On-Site Audit Requirements 218	23	34	24	54	30	53

FLOOD REQUIREMENTS (2021)

Standards	<u>General</u>	<u>Meteorological</u>	<u>Hydrological & Hydraulic</u>	<u>Statistical</u>	<u>Vulnerability</u>	<u>Actuarial</u>	<u>Computer/ Information</u>
37 130 subparts	5 14 subparts	5 19 subparts	4 15 subparts	5 6 subparts	4 14 subparts	6 29 subparts	8 33 subparts
Disclosures 262	45	48	36	16	65	43	9
Forms 27	8	0	5	2	4	8	0
On-Site Audit Requirements 268	34	39	33	22	49	40	51

MODEL APPROVAL

Model must pass all standards

Only one version of the model permitted

Hurricane and flood models reviewed independently

Only long-term models have been reviewed and found acceptable

No formal voting on other model types

- Short or near-term models
- Elicitation (expert opinion) models
- Open platform models

CURRENT ACCEPTED HURRICANE MODELS

Verisk (formerly AIR Worldwide) – since 1996

CoreLogic (formerly EQECAT) – since 1997

Risk Management Solutions (RMS) – since 1997

Applied Research Associates (ARA) – since 1999

Florida Public Hurricane Loss Model (Florida International University) – since 2006

Karen Clark & Company – since 2017

Impact Forecasting – since 2019

MODELING ORGANIZATIONS

Modelers support and recognize the importance of the work of the Commission

“AIR is a strong proponent of the Commission and sees great value in the submission process as it allows, among other benefits, transparency in the model building process while protecting modelers’ intellectual property. It also promotes and establishes the validity of catastrophe models in general.”
July 22, 2011

“KCC is pleased to be leading the industry as the first catastrophe modeling company to subject our flood model to the most comprehensive, thorough, and objective external review process.”
December 15, 2022

“We very much value this process. And as you know, many states look to Florida and this review as not every state has been able to dedicate the resources or have the same professional review. We feel the process is very valuable for us as a company, but certainly for the entire U.S. insurance industry.”
KCC, July 19, 2023

SUMMARY OF COMMISSION ACTIVITIES

Average 9 meeting days a year

Average 7 on-site hurricane model audits during review years

Hurricane Standards Report of Activities published every odd year

Flood Standards Report of Activities published every other odd year

Rigorous public disclosure, on-site audits, and evaluation process

Reviewed 10 different modeling organizations over 27 years

Total Cost to Date: over \$10.7 million

All Commission documentation is available on the Commission's website, <https://fchlpm.sbafla.com/>

COMMISSION PROCESS

Development and Adoption of Standards and Acceptability Process

- Professional Team meets and drafts preliminary revisions to the Report of Activities
- Commission committee meetings
- Commission meeting to adopt the standards and Report of Activities
- Report of Activities published and provided to the Modelers

Review of Model Submissions

COMMISSION PROCESS *(Continued)*

Model Submissions

- Hurricane model submissions are due November 1 of the following even year (1 year)
- Flood model submissions are due November 1 of the following odd year (2 years)

Review of Model Submissions

- Professional Team reviews to identify any deficiencies and issues and meets to develop recommendations to the Commission
- Commission meets to review and amend, as necessary, the list of deficiencies and issues recommended by the Professional Team
- Commission sends letter of deficiencies and issues to Modelers with deadline for responding to deficiencies before the on-site audits begin
- Professional Team pre-visit letters are provided to Modelers
- Pre-visit conference call with Professional Team if requested by Modeler

COMMISSION PROCESS *(Continued)*

Professional Team On-Site Review

- Audits every aspect of the model for verification and compliance with every standard
- Performs a due diligence review regarding the data and information provided in the disclosures and forms
- Provides a report to the Commission of the audit results
- Two possible outcomes regarding auditing for compliance with the standards
 - The model complies with all the standards, or
 - The model does not comply with all the standards

COMMISSION PROCESS *(Continued)*

Professional Team Cannot Verify All Standards

- If the problems can be corrected while the Professional Team is on-site, they will review any corrective actions taken before determining verification of a standard
- If the problems cannot be corrected while the Professional Team is on-site, the Modeler has 7 days from the final day of the audit to request an additional verification review, and then has an additional 30 days to submit corrections and revisions
- Modeler has the option to forego an additional verification review and present its arguments for compliance directly to the Commission at the model review meeting or it may withdraw its request for review

COMMISSION PROCESS *(Continued)*

Professional Team Additional Verification Review

- Audits corrections and revisions made to the model and submission documentation
- Audits for compliance with standards not verified during the initial on-site review
- Performs additional on-site tests of the model
- Reviews any new or revised trade secret material
- Appends its report to the Commission with the additional verification review results

COMMISSION PROCESS *(Continued)*

Commission Meeting to Review Models for Acceptability

- Reviews each model separately
- Closed session for review of trade secret information
- Public sessions
 - Modeler presentations
 - Commission votes on all standards
- Model is found acceptable only if it meets all standards
- If the model fails to be found acceptable, the Modeler has up to 30 days to file a written appeal of the Commission's finding

COMMISSION PROCESS *(Continued)*

Appeal Process for a Model Not Found Acceptable

Process for Problems Discovered After a Model has been Found Acceptable

Process for Interim Model and Interim Platform Updates After a Model has been Found Acceptable

Process for Model Update for Consistency of Hurricane and Flood Models

Review and Acceptance Criteria for Functionally Equivalent Model Platforms

CURRENT WORK OF THE COMMISSION

2021 Hurricane Standards

- Model submissions were due November 1, 2022
- Received 7 hurricane model submissions – ARA, CoreLogic, Florida Public Model, Impact Forecasting, KCC, RMS, and Verisk
- Commission meetings to review models for acceptability – June 1 & 2, 2023 and July 19 & 20, 2023
- Additional verification review of Verisk model – November 2 & 3, 2023
- Commission meeting to review Verisk model for acceptability – January 4, 2024

2023 Hurricane Standards

- Committee meetings to draft proposed 2023 hurricane standards – September 27 & 28, 2023
- Commission meetings to adopt 2023 hurricane standards and Report of Activities – October 25 & 26, 2023
- Model submissions due November 1, 2024

CURRENT WORK OF THE COMMISSION *(Continued)*

2021 Flood Standards

- Model submissions were originally due November 1, 2023; an extension to January 31, 2024, if needed, was granted in August
- No flood model submissions were received on November 1, 2023
- Commission added an additional submission date of June 1, 2025

For submissions received on January 31, 2024:

- Commission meeting to review submissions for deficiencies: March 2024
- Professional Team on-site reviews: April – June 2024
- Professional Team additional verification reviews: July – August 2024
- Commission meetings to review models for acceptability: September – October 2024

CONTACT INFORMATION

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Draft Pending Adoption

Attachment Six
Capital Adequacy (E) Task Force
12/2/23

Draft: 12/12/23

Risk-Based Capital Investment Risk and Evaluation (E) Working Group
Orlando, Florida
December 2, 2023

The Risk-Based Capital Investment Risk and Evaluation (E) Working Group of the Capital Adequacy (E) Task Force met in Orlando, FL, Dec. 2, 2023. The following Working Group members participated: Philip Barlow, Chair (DC); Thomas Reedy (CA); Wanchin Chou (CT); Carolyn Morgan (FL); Carrie Mears (IA); Vincent Tsang (IL); Fred Andersen (MN); Debbie Doggett (MO); Lindsay Crawford (NE); Jennifer Li (NH); Bob Kasinow and Bill Carmello (NY); Dale Bruggeman and Tom Botsko (OH); Jamie Walker (TX); Doug Stolte (VA); Steve Drutz (WA); and Amy Malm (WI).

1. Adopted its Oct. 17 and Summer National Meeting Minutes

The Working Group met Oct. 17 and took the following action: 1) discussed the American Academy of Actuaries (Academy) candidate principles for structured securities risk-based capital (RBC).

Stolte made a motion, seconded by Chou, to adopt the Working Group's Oct. 17 (Attachment Six-A) and Aug. 13 (*see NAIC Proceedings – Summer 2023, Capital Adequacy (E) Task Force, Attachment*) minutes. The motion passed unanimously.

2. Received Updates from the Valuation of Securities (E) Task Force and Statutory Accounting Principles (E) Working Group

Mears said there is a proposal that will be discussed at an upcoming Valuation of Securities (E) Task Force meeting that allows some discretion if the Task Force finds any issues with the targeted securities that the Securities Valuation Office (SVO) reviews. It was first proposed in the spring, and the Task Force reviewed comment letters in the summer. The Task Force engineered the proposal to incorporate the feedback, and it will be considered for exposure at the meeting. In addition, the Task Force is going to go over the history of the filing exemption (FE) for the benefit of state insurance regulators to understand the evolution that has occurred over time.

Bruggeman highlighted key aspects of the bond project. He said the accounting and the reporting revisions have been adopted with an effective date of January 2025. He said the principles-based bond project was undertaken to better define what is permitted to be reported as a bond on Schedule D-1, to improve accounting and reporting, and to ensure regulators have transparency to the investment risks held by insurers. Adopted revisions are publicly available on the NAIC's website. The remaining aspects of the bond project are focused on the accounting and reporting guidance for the debt securities that will not qualify as bonds. There is a current Statutory Accounting Principles (E) Working Group exposure on *SSAP No. 21R—Other Admitted Assets* and a current exposure at the Blanks (E) Working Group with the proposed revisions for Schedule BA reporting. It is anticipated that these revisions will be considered for adoption in February 2024.

Bruggeman said the Statutory Accounting Principles (E) Working Group has added a long-term project to its agenda to review and establish guidance for the interest maintenance reserve (IMR) and asset valuation reserve (AVR) in *SSAP No. 7—Asset Valuation Reserve and Interest Maintenance Reserve*. An IMR ad hoc group has been formed with representatives from the Statutory Accounting Principles (E) Working Group, Life Actuarial (A) Task Force, Life Risk-Based Capital (E) Working Group, and both accounting and actuarial industry representatives. Additional Statutory Accounting Principles (E) Working Group projects that may result in risk-based capital (RBC) considerations include investments in tax credits, collateral loans, and cash equivalents/short-term investments.

Draft Pending Adoption

Attachment Six
Capital Adequacy (E) Task Force
12/2/23

3. Heard a Presentation from the Academy on its Candidate Principles for Structured Securities RBC

Barlow reminded the Working Group that the Academy had previously presented its candidate principles for structured securities RBC and has updated them based on feedback received (Attachment Six-B). Steve Smith (Academy) said there are six principles instead of the seven that were discussed in the October meeting. The Academy eliminated two of the principles and split the first principle into two based on state insurance regulator feedback. The first principle now emphasizes the limits of what kind of risk should be incorporated into RBC based on its purpose. The second principle emphasizes the need for RBC to be considered for emerging investment risks where there are material solvency issues.

Concerning the third principle, Smith said there are some adjustments from the prior version, but its core remains the same. Capital is downstream from accounting, which is meant to measure the risk to statutory surplus. There are some specific implications. Whether an asset is marked-to-market through surplus will impact the way the C-1 factor is calibrated. If an asset is held at an amortized cost, there are only two ways (an impairment or a default) that the statutory surplus will get impacted. The credit risk is measured to come up with the C-1 charge for an amortized cost asset. A marked-to-market asset will impact statutory surplus through market value changes, even if they are not purely related to credit events. Therefore, calibrating a marked-to-market asset, such as the residual tranche of a structured security, needs to incorporate the market value or the volatility of that asset. Structured securities are different from any other bond in that residual tranches are marked-to-market while debt tranches are basically not. Thus, residual and debt tranches will be calibrated with their accounting taken into consideration.

Tsang said C-1 is a required capital calculation, and it does not increase or decrease the statutory surplus. He asked Smith about his comment on the risk of statutory surplus being impacted. Smith said an increase in the C-1 charge does not immediately affect the surplus. The C-1 charge is used to calculate a potential impact on surplus if something happens to the underlying asset. The C-1 charge is a quantification of a potential reduction in statutory surplus when an asset defaults or gets impaired. Hemphill asked Smith to reiterate this principle. Smith said the first two bullet points are the actionable implications for this principle. Based on this downstream accounting, credit events will be looked at for debt tranches. The marked-to-market will be looked at for residual tranches. Hemphill asked Smith whether the third principle really indicates that state insurance regulators should be mindful of the inconsistencies with the accounting treatment when making RBC updates. Smith agreed.

With respect to the fourth principle, Smith said the fact that the underlying collateral is unrated will be ignored when trying to determine the risk for a C-1 factor. Hemphill said this principle indicates that unrated status has no bearing on how to determine a requirement, and it is inconsistent with the general principle to reflect the additional conservatism for statutory reserving or RBC. She said she is uncomfortable with it in terms of overarching principles. Smith said a lack of rating of the underlying collateral is not equivalent to a lack of asset-backed securities (ABS) information. The rating is not there because it is not economical to get each of the tiny pieces of debt rated. There is information in the form of tranche ratings instead of the underlying. Barlow asked Smith to adjust the language to add some clarity.

With respect to the fifth principle, Smith said if the collateral pool in an ABS is actively traded, it is an important factor in assessing the risk of various tranches. The active trading of an ABS may shift risks between the tranches, which needs to be reflected in the risk charges of each tranche. This does not mean that An assumption of credit alpha should reduce c-1 requirements. Using credit rating provider (CRP) ratings already satisfies this candidate principle. However, if something other than CRP ratings is used, the likely future trading activity should be incorporated.

Draft Pending Adoption

Attachment Six
Capital Adequacy (E) Task Force
12/2/23

Tsang asked Smith whether there should be some tolerance in the difference between the total C-1 of the structure and the snapshot of the collateral pool. Smith said the Academy does not intend to use the difference as part of the calibration of factors. Instead, they want to calculate the risk on each tranche directly. Tsang said he hopes it will be more defined. Smith said the Academy prefers not to have that because creating a constraint would make them worry about less accurate risk charges. Tsang said he hopes the RBC arbitrage would be avoided. Smith said the Academy is trying to make sure that the capital charge on each tranche is not lower than the risk. Not setting up a constraint will make avoiding insufficient capital on any tranche easier. Hemphill asked Smith to adjust the language to address Tsang's concern. Smith agreed and suggested modifying the language.

Carmello asked how trading activities fit in with setting an RBC charge. Smith said not accounting for trading activities would result in a shorter time horizon, which may lead to insufficient capital charges. There are more chances for defaults in the exposure with a longer horizon. Carmello asked whether the trading activity for each deal would be factored in. Smith said this principle allows for reflection of rating agency treatment for trading activity.

With respect to principle 6, Smith said it is the former seventh principle, which is the only principle on which no comment was received in October. He said one change has been made since, which is in the second bullet point. The example of what conditional tail expectation (CTE) level would be similar to the 96th percentile in the former version was removed because this is up to the state insurance regulators to decide. The principle is that there should be equal conservatism on all assets, even if different risk measures are used.

Chou agreed with Barlow regarding asking the Academy to continue its work. Barlow asked Smith to make the discussed changes in wording. When that is completed, the Working Group will post the principles on the Working Group web page.

4. Discussed its Next Steps

Barlow said a factor of 45% was set for the residual tranche for 2024. There have been some suggestions of using something more complicated than just a single factor but using more than one factor would require a structural change to the formula. Barlow said the timing would not work for 2024 so using a different factor other than 45% can be considered for 2024.

Having no further business, the Risk-Based Capital Investment Risk and Evaluation (E) Working Group adjourned.

SharePoint/NAIC Support Staff Hub/Committees/E CMTE/CADTF/2023-3-Fall/RBC Investment Risk 12-2-23 Minutes.docx

Draft: 11/14/23

Risk-Based Capital Investment Risk and Evaluation (E) Working Group
Virtual Meeting
October 17, 2023

The Risk-Based Capital Investment Risk and Evaluation (E) Working Group of the Capital Adequacy (E) Task Force met Oct. 17, 2023. The following Working Group members participated: Philip Barlow, Chair (DC); Ted Chang (CA); Wanchin Chou (CT); Ray Spudeck (FL); Carrie Mears and Kevin Clark (IA); Vincent Tsang (IL); Roy Eft (IN); David Nelson (MN); Debbie Doggett (MO); Lindsay Crawford (NE); Jennifer Li (NH); Bob Kasinow and Bill Carmello (NY); Dale Bruggeman and Tom Botsko (OH); Rachel Hemphill (TX); Doug Stolte (VA); Steve Drutz (WA); and Amy Malm (WI).

1. Discussed the American Academy of Actuaries' (Academy) Principles for Structured Securities Risk-Based Capital

Barlow said he believes these principles are important for the Academy to be able to work on the request for developing a proposal to address collateralized loan obligations (CLOs) with the hope that the methodology developed can be more broadly applied to other asset backed structures. Steve Smith (Academy) presented these principles at the Summer National Meeting and Barlow said the goal is for the Working Group to provide feedback and have some agreement on the principles the Academy will use by the Fall National Meeting. Barlow said Working Group members were asked for comments in advance of this meeting and suggested addressing the principles one at a time.

With respect to principle 1, page 17 of the presentation (Attachment Six-A1), Barlow said that aspects of RBC that can change more quickly need to be recognized and addressed in a more flexible way, which requires more granularity and specificity. Smith said the level of precision across the RBC formula should not necessarily be uniform and more precision should be in areas that are more easily arbitrated by companies. Barlow agreed. Carmello said regulators should be concerned if any company has an understated RBC or overstated surplus and are looking at the significance at the company level, not at the industry level. Hemphill said she agrees with Carmello. She would also like to consider a prospective view in terms of current allocations and trends. Clark said he agrees with this principle. He said material exposure that a company has is clearly a regulatory concern but said it is a question of whether it is best addressed by RBC or other regulatory tools. He asked whether there are any principles that can address when an issue is material to enough companies that a change in RBC is necessitated. Barlow said the number of companies which experience the same issue could escalate very rapidly. Stolte said he agrees with Barlow and Hemphill in that what does not seem material today may become the new trend and material in the future. Smith said small allocations at the industry level will not avoid regulatory scrutiny. He asked regulators for guidance on the extent of materiality which leads to a change in the RBC formula.

With respect to principle 2, Barlow asked whether the C-1 factor will become higher when assets are marked to market in a down market. Smith said the Academy is not suggesting a dynamic C-1 factor, but assets will be marked to market, which likely leads to a higher charge. Tsang said the market price already reflects the market's perception about the credibility of these assets. He said it will be a double hit to an investor when a depressed bond has a higher C-1 charge so he questions having a higher C-1 charge on assets that are marked to market because he believes the market price has already provided an additional buffer. Smith said the risk of the statutory surplus is what RBC accounts for, which gives regulators comfort that statutory surplus will remain positive. Changes in the market value of assets from one period to the next will impact the statutory surplus. If an asset is held at the book value, there is no need to worry about the marked to market fluctuations. Tsang said he was looking at the default risk of the assets. Carmello said the market is still very volatile at that point and this is why the market value is required. Tsang said he asked whether another layer, which is the C-1 charge, is needed for

an already depressed asset value. Smith said the market price roughly reflects expected value whereas capital is a tail risk. He said C-1 is meant to measure a reduction in statutory surplus, which is equivalent to default or impairment. He asked whether regulators want to make a change to focus on the long-term default or continue to have it calibrated to statutory surplus explicitly. Tsang asked Smith whether marked to market assets refer to securities such as stocks or assets that are in the other-than-temporary impairment category and have to be marked to market. Smith said they refer to stocks or more specifically asset backed securities' (ABS) residual tranches. Tsang asked Smith to clarify what marked to market assets mean in this context. Smith said the Academy will work on a clarification.

With respect to principle 3, Clark asked about its implication and the expected impact. Smith said C-1 should be an accurate measure of the risk of what an actual asset is. Clark said he is concerned about the implication when RBC is only addressed where a measurable capital arbitrage is observed. He asked whether this principle can be rephrased as the capital requirements should align with the risk of the investment. Smith agreed with Clark's comment. Tsang asked whether the ABS would be spoiled when the collateral is not rated. Smith said this is another implication. He said it would not because whether being rated or not is less important than what the risk is. Tsang asked what would happen to the ABS if the collateral does not have a specific C-1 requirement. Smith said the capital added up on the vertical slice will not necessarily be equal to that on the collateral because the capital on the collateral is not calibrated to the risk while the capital on the ABS is. Tsang said it implies that there is no arbitrage when the collateral is unrated and said a clarification would be helpful. Hemphill said she agrees and would like to see this principle rephrased. Smith said the Academy would work on updates based on this feedback.

For principle 4, Clark agreed with this principle, but is not sure whether it necessarily needs to be a principle. Hemphill said she had a similar reaction and would like a clarification of what exactly the concern is to make this principle necessarily needed. Carmello said this principle is not needed and suggested getting rid of it. Smith said the Academy did not consider the connection between principle 4 and materiality. It was considered in terms of calculating the C-1 requirement. Barlow asked Smith to explain how this principle could help. Smith said this principle may not be necessary, especially if principle 3 is rephrased. It was intended to further reinforce the idea that C-1 on a given security is based on the risk of that security. The underlying motivation was that C-1 capital has to align with risk. Clark said the revised principles would cover what was intended by this principle.

For principle 5, Clark said he agrees with this principle, but need to be cognizant of what is being captured in the attribute that is used to assign the capital charges. Barlow asked Smith to acknowledge the avoidance of double counting. Smith said it is worth independently thinking through how C-1 should be calculated and then looking to Credit Rating Provider (CRP) ratings to understand how they are calculated and then looking for differences and analyzing those differences. Chou asked Smith to explain how collateral should be treated if the historical data is quite limited or this collateral is relatively new. Smith said if dynamism and the collateral pool are to be considered, there needs to be some kind of reasonable basis for that. Any claims of dynamism that might be credit enhancing need to be justified. Eric Kolchinsky (NAIC) said the question for regulators is marginal trading. Charles Therriault (NAIC) said one concern they generally have is that there's no uniformity across CRP ratings.

Barlow said principle 6 sounds straightforward. He asked Smith about its implications. Smith said this principle boils down to the goal to align capital with risk. This principle is trying to avoid a strict enforcement of having a vertical slice of total capital equal the underlying capital at the expense of getting correct capital at each tranche. Barlow said the Working Group would benefit from looking at some revisions of these principles. Hemphill agrees on the rephrasing.

Barlow said the right risk measure, which depends upon the asset structure, should be used for principle 7. Smith said they will get back to the Working Group with some revisions as quickly as they can.

Having no further business, the Risk-Based Capital Investment Risk and Evaluation (E) Working Group adjourned.

SharePoint/NAIC Support Staff Hub/Committees/E CMTE/CADTF/2023-3-Fall/RBC Investment Risk 10-17-23 Minutes.docx

Principles for Structured Securities RBC

Presentation to NAIC's RBCIRE

August 13, 2023

Steve Smith, MAAA, FSA, CFA

Academy C-1 Subcommittee, Chairperson

Executive Summary— C-1 Asset Modeling

- The American Academy of Actuaries proposes a flowchart to determine whether (a) an asset class needs to be modeled and (b) whether securities within an asset class need to be modeled individually to determine C-1 factors.
- Preference is given toward simpler solutions—if an existing factor can be used, it should be used. Individual security modeling for C-1 determination is a last resort.

Executive Summary— Principles-Based Approach for Structured Securities

- If the result of the flowchart is that an asset class requires modeling, the Academy would support a principles-based approach to the derivation of C-1 factors
- A principles-based approach to RBC for structured securities will allow regulators flexibility in adapting to new structures as they emerge in the marketplace
- This presentation proposes several candidate-principles
 - The Academy supports each of these candidate-principles, but we believe reasonable and informed people may disagree and are seeking guidance from regulators
 - We request that regulators identify which candidate-principles accurately reflect their views—these can then be incorporated into a principles-based approach to structured securities RBC

Discussion Topics

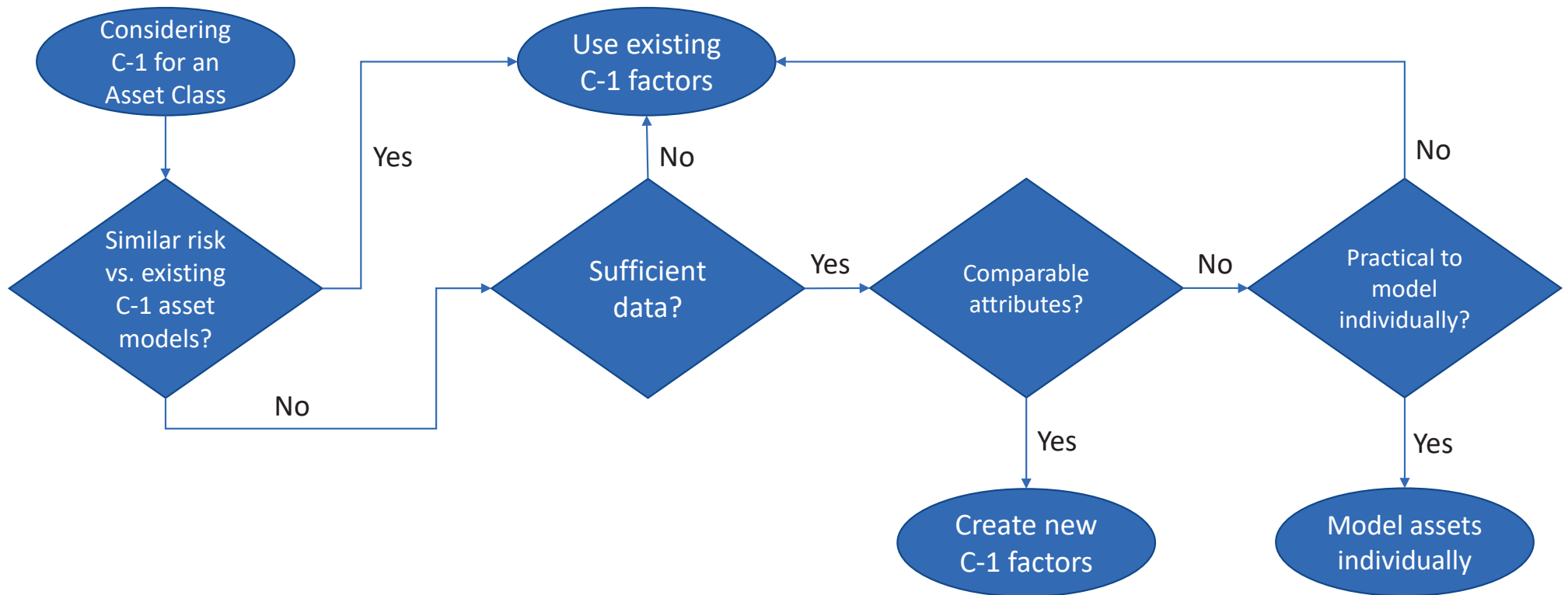
- I. C-1 Modeling Flowchart
- II. Structured Securities C-1 Principles
- III. Appendices
 - a) Appendix A—RBC Arbitrage
 - b) Appendix B—Definitions of Terms

C-1 Modeling Flowchart

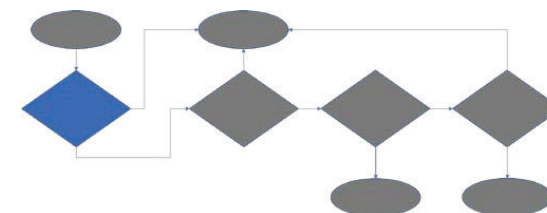
Threshold Questions

- For an asset class to be considered using this flowchart, it should first be verified as having all of the following attributes:
 1. Materiality or likely materiality in the future across the industry. Allocations from a small handful of companies would not justify changes to the RBC formula.
 2. The risk that would be modeled needs to be incorporated in C-1. For example, illiquidity alone would not be a sufficient justification because C-1 does not measure illiquidity risk.
 3. The expected benefits of a more precise calculation should outweigh the expected costs of building and using a new model. Costs include both time and energy spent to build the model as well as the negative effect of added complexity within the RBC formula.
- The burden to verify these attributes falls on the party asking for a more exact determination of RBC

C-1 Modeling Flowchart

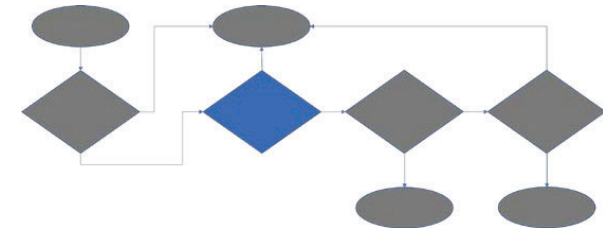


Decision: similar risk vs. existing C-1 asset models



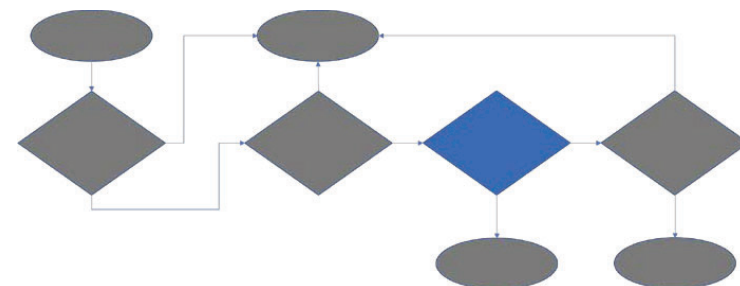
- Answer “yes” if the relative risk differences between risk categories (usually ratings or designations for fixed income) is similar to that of an existing set of C-1 factors.
- For example, municipal bonds and bank loans would each likely have an answer of “yes,” because relative increase in risk as ratings decrease is similar to that of corporate bonds.
- CLOs and some other structured securities would likely have an answer of “no,” because tail risk increases more quickly as the rating decreases compared to corporate bonds.

Decision: sufficient data



- Answer “yes” if data exist to enable risk modeling, and in particular tail risk modeling.
- For example, CLOs would likely have an answer of “yes,” because their bank loan collateral has ample historical loss data and the waterfall structure is well documented.
- Some esoteric ABS, especially residual tranches, may have an answer of “no” if insufficient data are available.

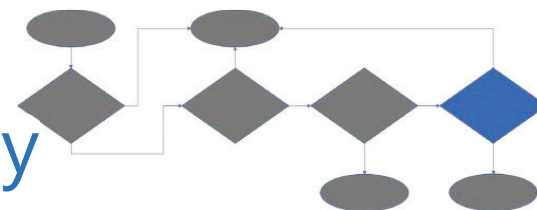
Decision: comparable attributes



- Answer “yes” if most individual assets within this asset class have an easily identifiable attribute that can be used to sort the assets into risk buckets.
- For example, CLOs would likely have an answer of “yes,” because most CLOs are rated by CRPs and those ratings can reasonably sort each individual CLO security into a risk bucket.
- Asset classes that are typically not rated by CRPs may have an answer of “no” here, but don’t automatically. For example, commercial mortgage loans are also a likely “yes” because DSCR and LTV substitute for CRP ratings as comparable attributes.

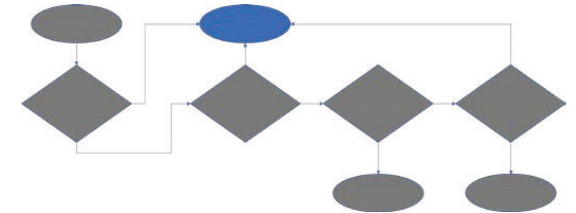
Initialism guide: CLO = collateralized loan obligation. CRP = credit rating provider. DSCR = debt service coverage ratio. LTV = loan-to-value

Decision: practical to model individually



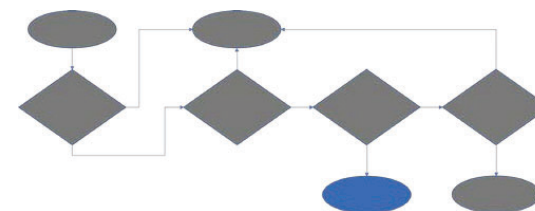
- Answer “yes” if individual assets within the asset class have several attributes that differentiate individual assets and can be used for risk modeling or if existing modeling software can be used.
- For example, CLOs would likely have an answer of “yes.” because off-the-shelf software exists that can model individual CLOs (however, CLOs may never have arrived at this decision point if they were deemed to have comparable attributes).
- If modeling cannot reasonably be done in a timely and cost-effective manner for RBC filing, then the answer here must be “no.”
- Some esoteric ABS may have an answer of “no” if the relevant risk is so specific to each deal that a common modeling framework does not apply across a reasonably large share of securities.

Outcome: use existing C-1 factors



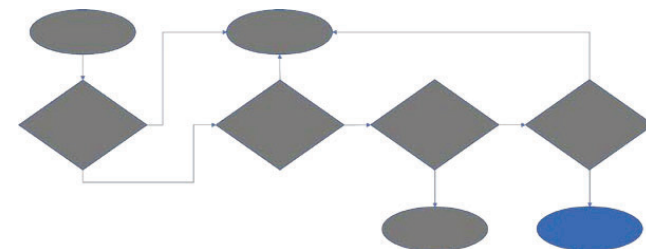
- This outcome can either mean to use existing C-1 factors directly, without adjustment, or it can mean to make slight adjustments to existing C-1 factors.
- For example, municipal bonds and bank loans currently use corporate bond C-1 factors without adjustment.
- Schedule BA real estate currently uses Schedule A real estate C-1 factors but with an upward adjustment resulting in a proportionately higher C-1 factor for BA real estate.

Outcome: create new C-1 factors



- This outcome means that a new set of C-1 factors should be developed for this asset class.
- For example, CLOs may retain the 20 possible designations that they are currently mapped into. But instead of those 20 designations corresponding to the 20 corporate bond C-1 factors, CLOs may instead have their own set of 20 C-1 factors.
- Instead of just a slight adjustment to existing C-1 factors, this outcome requires fundamental modeling work to derive new factors.

Outcome: model asset individually



- This outcome means that each asset within this asset class needs to be modeled individually in order to generate a C-1 factor.
- In practice, this is currently how non-agency RMBS and CMBS are treated. The modeling work is done by the Structured Securities Group to determine the NAIC designation, after which point corporate bond factors are used. This is functionally similar to modeling each RMBS and CMBS security individually to determine its C-1 factor.
- Because of the significant operational complexity involved, this outcome is a last resort.

Structured Securities C-1 Principles

Glossary of Terms

- **ABS**: bonds falling within the emerging definition of ABS in SSAP 26, most recently exposed November 16, 2022
- **Vertical Slice**: an investment in all tranches of an ABS in equal proportion to the total outstanding
- **RBC-transformative ABS**¹: ABS where a vertical slice draws a lower aggregate C-1 requirement, considering only base factors (before portfolio adjustment and covariance adjustment), than its underlying collateral would draw if held directly by a life insurer
- **RBC Arbitrage (narrower)**: Holding a vertical slice of an RBC-transformative ABS
- **RBC Arbitrage (broad)**: Holding any part of an RBC-transformative ABS

1. Conversely, one could then define RBC-neutral ABS as ABS where a vertical slice draws aggregate C1 equal to that which would be drawn by its underlying collateral

Candidate-Principle #1. The RBC Formula Is a Blunt Filtering Tool

- **The purpose of RBC is to help regulators identify weakly capitalized insurers, therefore small inaccuracies in RBC formulaic requirements will seldom justify a change to the RBC formula**
 - A structure that is close to RBC-neutral may not require a change in C-1 requirements.
 - Small allocations to RBC-transformative ABS may not require a change in C-1 requirements.
 - Small allocations to RBC-transformative ABS at the industry level will not avoid regulatory scrutiny.

Candidate-Principle #2. RBC Is Based on Statutory Accounting

- **RBC measures the impact of risk on statutory surplus. Changes in accounting treatment will affect C-1 requirements**
 - All else equal, assets that are marked to market (“MTM”) may have higher C-1 requirements because C-1 on MTM assets incorporates price fluctuations in addition to credit losses.

Candidate-Principle #3. C-1 Established for Underlying Collateral

- **RBC arbitrage can only be measured for ABS where the underlying collateral has an established asset-class-specific C-1 requirement**
 - ABS collateral may include unrated debt securities that would be either NAIC-6 or non-admitted if held directly by insurers—NAIC-6 assets draw a 30% pre-tax C-1 factor regardless of risk.
 - This unrated collateral, often non-corporate, typically does not have an established asset-class-specific framework for assigning C-1 (e.g., auto loans or credit card receivables).
 - ABS including such collateral is very often RBC-transformative because it converts NAIC-6 or non-admitted assets into rated paper.
 - Because the underlying collateral does not have an established asset-class-specific C-1 requirement, forcing C-1 on the ABS to be RBC-neutral would likely result in a C-1 requirement that is more conservative than C-1 for comparable risk in other asset classes.

Candidate-Principle #4. Intentions Don't Matter For C-1 Requirements

- **The motivation behind creating an ABS structure should have no bearing on its C-1 requirements.** Even a structure designed with the explicit intent of reducing C-1 requirements should be treated like any other ABS. C-1 requirements represent a quantitative assessment of risk.
 - For many structures, it may be impractical or even impossible to objectively determine the intention of the design.
 - Even structures not designed to reduce C-1 may nevertheless lead to insufficient C-1 requirements.

Candidate-Principle #5.

C-1 Requirements Reflect Likely Future Trading Activity

- **C-1 requirements on ABS should treat the collateral as a dynamic pool of assets, incorporating future trading activity that is likely to occur based on historical data or mandated by the structure's legal documents.**
 - If C-1 requirements on ABS acknowledge the evolving nature of the collateral pool, the total C-1 of the structure may not equal the C-1 of a snapshot of the collateral pool at any one point in time.
 - Specific to CLOs, management of the collateral is a known factor impacting risk that can be modeled with reference to historical data.
 - While the Academy supports this candidate-principle, we acknowledge that the current C-1 framework generally does not incorporate likely future changes to a portfolio, except indirectly in cases where Credit Rating Providers have assigned a rating that incorporates assumptions about portfolio management.
 - The RBCIRE WG have expressed concerns with incorporating active management in C-1 requirements for CLOs.
 - This candidate-principle does not imply incorporating credit selection on the part of the ABS manager. In other words, this candidate-principle is separate from the concept of active management as commonly understood.

Candidate-Principle #6. C-1 Requirement for Each Tranche Is Independent

- **RBC is based on the holdings of an insurer; assets not owned by an insurer should not impact its RBC**
 - This principle would imply RBC arbitrage depends on which tranche is held, even if an insurer holds a tranche issued by an RBC-transformative ABS.
 - This principle would imply that RBC arbitrage exists only in the tranches whose C-1 requirement is inadequate relative to the measured risk.
 - This principle would avoid tainting an entire structure with the label of RBC arbitrage in cases where C-1 is already sufficient for the particular tranche held by an insurer.
 - One practical drawback to this principle is it requires measuring risk at each tranche. The broad definition is simpler; showing that a structure is RBC-transformative is sufficient to identify RBC arbitrage per the broad definition. However, a C-1 requirement is still needed for each tranche held by an insurer, so the apparent simplicity under the broad definition is illusory.

Candidate-Principle #7. Different Risk Measures

- Each C-1 factor is based on the asset class's risk profile. However, the risk profile for at least some ABS is quite different from the risk profile for bonds. Therefore, **C-1 requirements for ABS** should be calibrated to **different risk measures** where appropriate.
 - In our December 2022 report to RBCIRE WG, the Academy recommended adopting a different risk measure for CLOs—Conditional Tail Expectation (“CTE”)—because CTE may better capture tail risk inherent in CLOs.
 - While different risk *measures* are appropriate, each asset's C-1 factor aims for a similar *magnitude*. For example, because most bonds use a 96th percentile, a CTE-96 for CLOs would be overly conservative. CTE-90 would be more consistent with the 96th percentile.
 - It is impossible to simultaneously reject this candidate-principle and require that all ABS structures are RBC-neutral, because in this case the collateral and the ABS would have C-1 requirements set to different statistical safety levels.

Summary of Candidate-Principles

1. The purpose of RBC is to help regulators identify weakly capitalized insurers, therefore small inaccuracies in RBC requirements may not justify a change to the RBC formula.
2. RBC measures the impact of risk on statutory surplus. Changes in accounting treatment will affect C-1 requirements.
3. RBC arbitrage can only be measured for ABS where the underlying collateral has an established asset-class-specific C-1 requirement.
4. The motivation behind creating an ABS structure should have no bearing on its C-1 requirements.
5. C-1 requirements on ABS should treat the collateral as a dynamic pool of assets, incorporating future trading activity that is likely to occur based on historical data or mandated by the structure's legal documents.
6. RBC is based on the holdings of an insurer; assets not owned by an insurer should not impact its RBC.
7. C-1 requirements for ABS should be calibrated to different risk measures where appropriate.

Key Questions for Regulators

- Which candidate-principles do regulators support?
- Are there additional principles not outlined herein that also ought to be incorporated into RBC for ABS?

Appendix A—RBC Arbitrage

Impact of Principles on Definition of RBC Arbitrage

- By discussing broader principles, this presentation seeks to spark conversation on the definition of Risk-Based Capital (RBC) arbitrage in Asset Backed Securities (ABS) and clarify the implications of conflicting RBC arbitrage definitions.
- The NAIC's Investment Analysis Office (IAO) has proposed a constraint in the model used to determine designations, and therefore RBC requirements, for CLOs. This constraint would eliminate RBC arbitrage, as defined by the IAO, that the IAO believes is present in CLOs.
- Competing definitions among interested parties and regulators have been used in some formal and informal discussions, so far without a forum for being discussed directly.
- This presentation attributes differences in RBC arbitrage definitions to underlying principles of RBC. The C1WG is requesting guidance from regulators on which principles should be followed. Once the principles have been identified, RBC arbitrage can be more clearly defined and more effectively mitigated. These principles will also guide a broader effort around improving the C-1 framework for all ABS.

Asset Classes With Greatest Potential for RBC Arbitrage

Established asset-class-specific C-1	CLO Non-Agency RMBS/CMO CMBS CFO	Agency RMBS
No established asset-class-specific C-1	Consumer Finance Asset-based Lending Credit feeder fund	
	Tranched	Pass-Through

- Quantifying RBC arbitrage is most direct when the underlying collateral has an explicit C-1 factor
- Tranched structures are more likely to produce RBC arbitrage than pass-through structures because tranching transforms risk
- RBC arbitrage discussions should focus on tranching structures with established asset-class-specific C-1

Definitions of RBC Arbitrage

- IAO has expressed its view that holding **any tranche** of a securitization whose vertical slice carries a different aggregate C-1 requirement compared to the underlying collateral constitutes RBC arbitrage—we term this the **broad**¹ definition of RBC arbitrage
- An alternative, **narrower**¹ definition of RBC arbitrage includes only instances where an insurer holds a **vertical slice**¹
- Many other possible definitions lie somewhere in between

1. Please see Appendix B—Definitions of Terms for precise definitions of technical terms.

IAO Usage of the Term “RBC Arbitrage”

- A [letter from IAO to VOSTF](#) dated May 25, 2022, introduces the concept of RBC arbitrage within the context of CLOs: “The aggregate RBC factor for owning all of the CLO tranches should be the same as that required for owning all of the underlying loan collateral. If it is less, it means there is RBC arbitrage.”
- SVO’s Structured Equity & Funds Proposal dated November 28, 2022, also uses the term “RBC arbitrage” with effectively the same meaning but expanding the scope from CLOs to include certain feeder fund structures.

Academy Usage of “RBC Arbitrage”

- In our presentation to RBCIREWG dated December 14, 2022, the Academy disagreed with the concept that the existence of RBC arbitrage, as defined by IAO, necessarily implied an incorrect C-1 requirement
- The Academy believes dialogue among all parties will be improved if we first collectively agree on a definition of RBC arbitrage before discussing its implications for C-1 requirements

Related Regulatory Concerns

- IAO has also pointed out the possibility of RBC-transformative ABS being used to reclassify investments to technically comply with investment limits set forth in state insurance law, for example converting equity to debt for statutory purposes
- RBC-transformative ABS may also be used to reclassify investment returns or losses from an accounting perspective
- While we acknowledge these related potential issues, this presentation focuses only on C-1 implications of RBC-transformative ABS

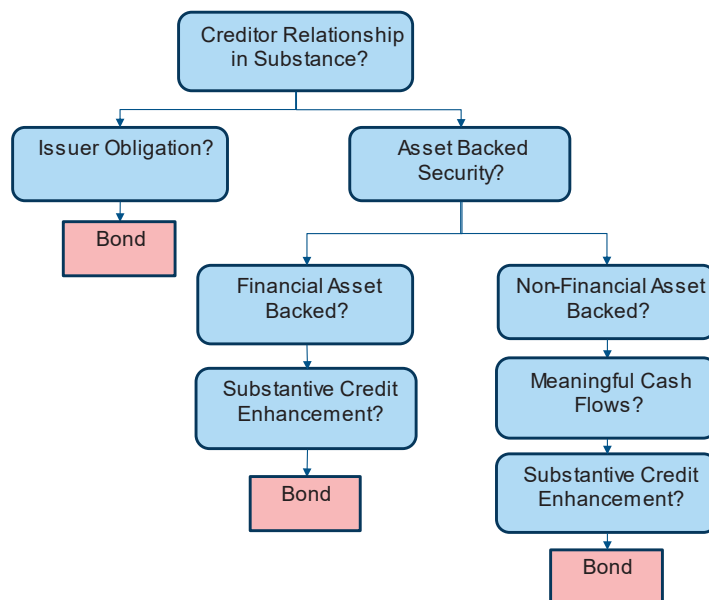
Appendix B—Definitions of Terms

ABS Definition

- RBC arbitrage discussions typically involve structured securities, for example CLOs and rated note feeder fund structures.
- Within this presentation, we refer to all such structured securities as **ABS**, and we intend for the definition of ABS to align with the emerging definition of ABS in **SSAP 26**, [most recently exposed November 16, 2022](#). Under this definition, ABS has a primary purpose of raising debt capital backed by collateral that provides the cash flows to service the debt.

ABS Definition, Continued

Bond Principles Flowchart



- Exposed principles-based definition of ABS is illustrated here
- Image taken from “Assets: Regulatory Updates in Life Insurance” April 4, 2023, [webinar](#) by the American Academy of Actuaries

Vertical Slice Definition

A vertical slice is an investment in all tranches of an ABS in equal proportion to the total outstanding. A vertical slice is economically equivalent to a direct investment in the underlying collateral at any one point in time.

RBC-Transformative ABS Definition

An RBC-transformative ABS is any ABS where a vertical slice draws a lower aggregate C-1 requirement than its underlying collateral would draw if held directly by a life insurer.

Narrowly Defined RBC Arbitrage

- **Holding a vertical slice of an RBC-transformative ABS** constitutes RBC arbitrage under the narrow definition.
- In this case, it is unambiguously true that absent the structure of the ABS a life insurer would be required to hold a higher level of C-1 capital.
- Even under the narrow definition of RBC arbitrage, C-1 requirements for the collateral may be inappropriately high rather than the ABS C-1 requirements being inappropriately low. Also, C-1 for the ABS and its collateral may be calibrated precisely to the prescribed risk measures despite the ABS being RBC-transformative. Regardless, in such cases holding a vertical slice of an RBC-transformative ABS would still constitute RBC arbitrage.

Broadly Defined RBC Arbitrage

- **Holding any part of an RBC-transformative ABS** constitutes RBC arbitrage under the broad definition
- For example, any CLO holdings would constitute RBC arbitrage under this definition, because CLOs are an RBC-transformative ABS (as discussed in the Academy's [December 2022 presentation to RBCIREWG](#))
- IAO letters written to VOSTF during 2022 employ the broad definition of RBC arbitrage

QUESTIONS

Contact:

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Updated Principles for Structured Securities RBC

Presentation to NAIC's RBCIRE
December 2, 2023

Steve Smith, MAAA, FSA, CFA
Chairperson, Academy C-1 Subcommittee

Executive Summary: C-1 Asset Modeling

The American Academy of Actuaries proposes a flowchart to determine whether

- An asset class needs to be modeled, and
- Securities within an asset class need to be modeled individually to determine C-1 factors.

Simpler solutions are preferred—if an existing factor can be used, it should be used.

Individual security modeling for C-1 determination is a last resort.

Executive Summary: Principles-Based Approach for Structured Securities

If the result of the flowchart is that an asset class requires modeling, we would support a principles-based approach to the derivation of C-1 factors

- A principles-based approach to RBC for structured securities (referred to as “ABS” throughout this presentation) allows flexibility when adapting to new structures as they emerge in the marketplace

This presentation proposes several candidate-principles, all of which the Academy supports. However, reasonable and informed people may disagree.

REQUEST: Regulators identify which candidate-principles accurately reflect their views, in order to incorporate them into a structured securities RBC principles-based approach.

Discussion Topics

- I. C-1 Modeling Flowchart
- II. Structured Securities C-1 Principles
- III. Appendices
 - a) Appendix A—RBC Arbitrage
 - b) Appendix B—Definitions of Terms

C-1 Modeling Flowchart

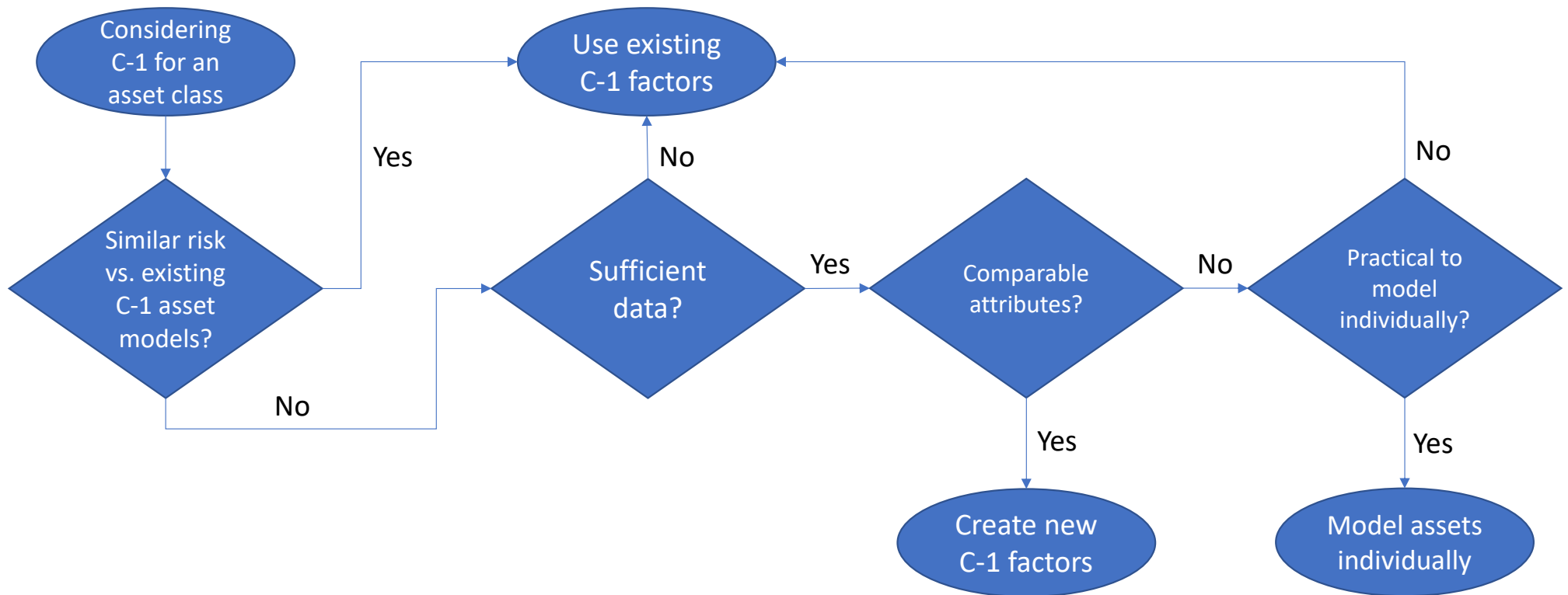
Threshold Questions

For an asset class to be considered using this flowchart, it should first be verified as having all of the following attributes:

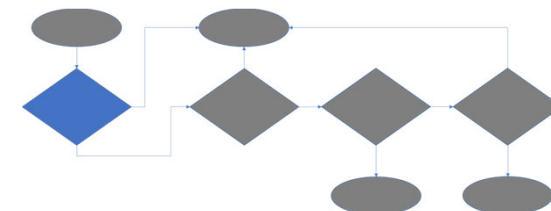
1. Materiality or likely materiality in the future across the industry. Allocations from a small handful of companies would not justify changes to the RBC formula.
2. The risk that would be modeled needs to be incorporated in C-1. For example, illiquidity alone would not be a sufficient justification because C-1 does not measure illiquidity risk.
3. The expected benefits of a more precise calculation should outweigh the expected costs of building and using a new model. Costs include both time and energy spent to build the model as well as the negative effect of added complexity within the RBC formula.

The burden to verify these attributes falls on the party asking for a more exact determination of RBC.

C-1 Modeling Flowchart



Decision—similar risk vs. existing C-1 asset models



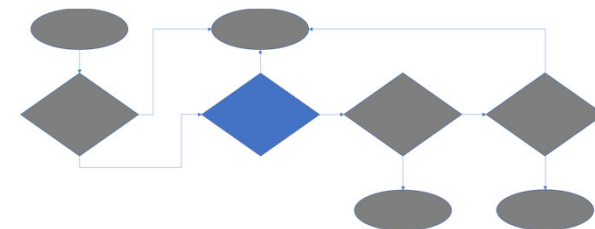
Answer “yes” if the relative risk differences between risk categories (usually ratings or designations for fixed income) is similar to that of an existing set of C-1 factors.

- For example, municipal bonds and bank loans would each likely have an answer of “yes,” because relative increase in risk as ratings decrease is similar to that of corporate bonds.

CLOs and some other structured securities would likely have an answer of “no,” because tail risk increases more quickly as the rating decreases compared to corporate bonds.

CLO = collateralized loan obligation.

Decision—sufficient data

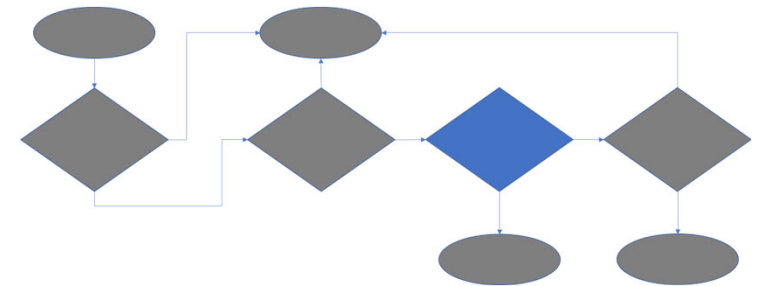


Answer “yes” if data exist to enable risk modeling, and in particular tail risk modeling.

- For example, CLOs would likely have an answer of “yes,” because their bank loan collateral has ample historical loss data and the waterfall structure is well documented.

Some esoteric ABS, especially residual tranches, may have an answer of “no” if insufficient data are available.

Decision—comparable attributes



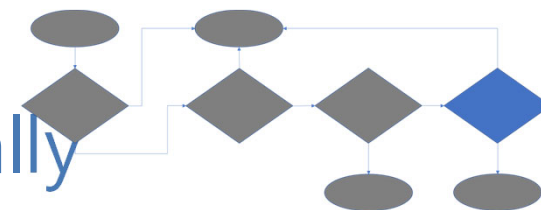
Answer “yes” if most individual assets within this asset class have an easily identifiable attribute that can be used to sort the assets into risk buckets.

- For example, CLOs would likely have an answer of “yes,” because most CLOs are rated by CRPs and those ratings can reasonably sort each individual CLO security into a risk bucket.

Asset classes that are typically not rated by CRPs may have an answer of “no” here, but don’t automatically. For example, commercial mortgage loans are also a likely “yes” because DSCR and LTV substitute for CRP ratings as comparable attributes.

CRP = credit rating provider. DSCR = debt service coverage ratio. LTV = loan-to-value.

Decision—practical to model individually



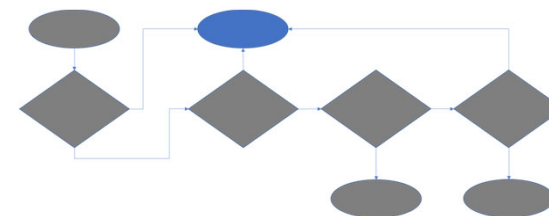
Answer “yes” if individual assets within the asset class have several attributes that differentiate individual assets and can be used for risk modeling or if existing modeling software can be used.

- For example, CLOs would likely have an answer of “yes” because off-the-shelf software exists that can model individual CLOs (however, CLOs may never have arrived at this decision point if they were deemed to have comparable attributes).

If modeling cannot reasonably be done in a timely and cost-effective manner for RBC filing, then the answer here must be “no.”

Some esoteric ABS may have an answer of “no” if the relevant risk is so specific to each deal that a common modeling framework does not apply across a reasonably large share of securities.

Outcome—use existing C-1 factors

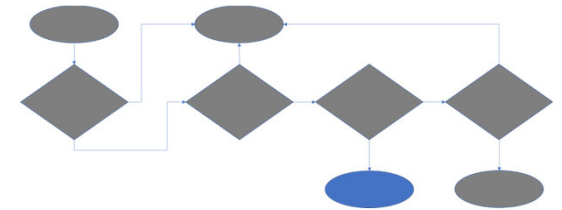


This outcome can either mean to use existing C-1 factors directly, without adjustment, or it can mean to make slight adjustments to existing C-1 factors.

- For example, municipal bonds and bank loans currently use corporate bond C-1 factors without adjustment.

Schedule BA real estate currently uses Schedule A real estate C-1 factors, but with an upward adjustment resulting in a proportionately higher C-1 factor for BA real estate.

Outcome—create new C-1 factors

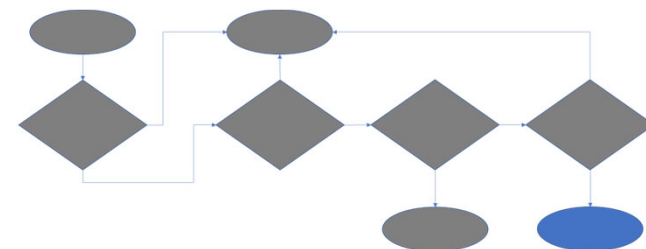


This outcome means that a new set of C-1 factors should be developed for this asset class.

- For example, CLOs may retain the 20 possible designations that they are currently mapped into. But instead of those 20 designations corresponding to the 20 corporate bond C-1 factors, CLOs may instead have their own set of 20 C-1 factors.

Instead of just a slight adjustment to existing C-1 factors, this outcome requires fundamental modeling work to derive new factors.

Outcome—model asset individually



This outcome means that each asset within this asset class needs to be modeled individually in order to generate a C-1 factor.

In practice, this is currently how non-agency RMBS and CMBS are treated. The modeling work is done by the Structured Securities Group to determine the NAIC designation, after which point corporate bond factors are used. This is functionally similar to modeling each RMBS and CMBS security individually to determine its C-1 factor.

Because of the significant operational complexity involved, this outcome is a last resort.

Structured Securities C-1 Principles

Glossary of Terms

- **ABS**: bonds falling within the emerging definition of ABS in SSAP 26, most recently exposed November 16, 2022
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- **RBC Arbitrage (broad)**: holding any part of an RBC-transformative ABS

1. Conversely, one could then define RBC-neutral ABS as ABS where a vertical slice draws aggregate C1 equal to that which would be drawn by its underlying collateral.

Candidate-Principle #1. The RBC Formula Is a Blunt Filtering Tool

The purpose of RBC is to help regulators identify potentially weakly capitalized insurers, therefore changes that have a small impact on RBC ratios may not justify a change to the RBC formula

The frequency of changes to the RBC formula is practically limited by NAIC processes and stakeholders' available time, therefore it is important to prioritize the most material potential changes to the RBC formula.

Small allocations to RBC-transformative ABS by a limited number of insurers may not require a change in C-1 requirements across the entire industry.

Candidate-Principle #2. Emerging Risks Require Regulatory Scrutiny

Emerging investment risks create concerns for regulators, and existing regulatory tools can be considered alongside RBC for addressing these newer risks—but RBC needs to be considered when there are material solvency issues.

RBC should address solvency issues, but not every risk will create a material solvency concern.

Modifications to RBC may be necessary, but complementary regulatory tools should also be considered (e.g., ORSA, AAT/AG53, disclosures, examinations, etc.).

RBC-transformative ABS that are held by a small but growing number of insurers or with increased allocation may justify changes to the RBC formula.

More responsive refinements to RBC may be justified in areas where an insurer can more easily adjust its business model to optimize around the RBC formula.

- Refinements that are made should generally be principal-driven and agnostic to specific market conditions.
- Temporary relief may be warranted on occasion, even though it has the effect of contributing anti-cyclicality into RBC.

Candidate-Principle #3. RBC Is Based on Statutory Accounting

C-1 requirements reflect the impact of risk on statutory surplus. Changes in accounting treatment will affect RBC.

All else equal, assets that are marked to market (“MTM”) may have higher C-1 requirements because C-1 on MTM assets incorporates price fluctuations in addition to credit losses.

In practice, this means that C-1 for residual tranches would consider price fluctuations, whereas C-1 for unimpaired rated debt tranches only considers credit losses.

Impaired rated debt tranches are part of a broader issue that applies beyond just structured securities and are therefore outside the scope of this candidate-principle.

Candidate-Principle #4. C-1 Aligns With Risk

C-1 requirements for a given tranche should align with that tranche's risk, to the extent practical.

If an ABS has unrated collateral, the unrated status has no bearing on how to determine the ABS' appropriate C-1 requirement

The existence of unrated collateral does not automatically imply that an ABS should have a higher C-1 requirement.

The existence of unrated collateral also does not automatically imply that an ABS should not have a higher C-1 requirement.

Candidate-Principle #5. C-1 Requirements Reflect Likely Future Trading Activity

C-1 requirements on ABS should treat the collateral as a dynamic pool of assets, incorporating future trading activities that are reasonable and vary appropriately by economic scenario.

C-1 requirements should not be reduced by any amount due to an assumption of credit alpha.

This candidate-principle refers to the trading activity that is subject to or mandated by the structure's legal documents.

If C-1 requirements on ABS acknowledge the evolving nature of the collateral pool, the total C-1 of the structure may not equal the C-1 of a snapshot of the collateral pool at any one point in time.

If designations are based on CRP ratings, then explicit recognition of trading activity may not be required to the extent CRP ratings account for this.

Candidate-Principle #6. Appropriate Risk Measures

Each C-1 factor is based on the asset class's risk profile. However, the risk profile for ABS differs from the risk profile for bonds. Therefore, C-1 requirements for ABS should be calibrated to different risk measures where appropriate.

In our [December 2022 report to RBCIRE WG](#), the Academy recommended adopting a different risk measure for CLOs—Conditional Tail Expectation (“CTE”)—because CTE may better capture tail risk inherent in CLOs.

While different risk *measures* may be appropriate, each asset's C-1 factor aims for a similar *magnitude or level of risk*.

This candidate-principle implies that not all ABS structures are necessarily RBC-neutral, because the collateral and the ABS would have C-1 requirements set to different statistical safety levels.

Summary of Candidate-Principles

1. The purpose of RBC is to help regulators identify potentially weakly capitalized insurers, therefore changes that have a small impact on RBC ratios may not justify a change to the RBC formula.
2. Emerging risks require regulatory scrutiny.
3. C-1 requirements reflect the impact of risk on statutory surplus. Changes in accounting treatment will affect RBC.
4. C-1 requirements on a given tranche align with that tranche's risk.
5. C-1 requirements on ABS should treat the collateral as a dynamic pool of assets.
6. C-1 requirements for ABS should be calibrated to different risk measures where appropriate.

Key Questions for Regulators

Which candidate-principles do regulators support?

Are there additional principles not currently outlined that should be incorporated into RBC for ABS?

Appendix A: RBC Arbitrage

Impact of Principles on Definition of RBC Arbitrage

- By discussing broader principles, this presentation seeks to spark conversation on the definition of Risk-Based Capital (RBC) arbitrage in Asset Backed Securities (ABS) and clarify the implications of conflicting RBC arbitrage definitions.
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Asset Classes With Greatest Potential for RBC Arbitrage

Established asset-class-specific C-1	CLO Non-Agency RMBS/CMO CMBS CFO	Agency RMBS
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- A [letter from IAO to VOSTF](#) dated May 25, 2022, introduces the concept of RBC arbitrage within the context of CLOs: “The aggregate RBC factor for owning all of the CLO tranches should be the same as that required for owning all of the underlying loan collateral. If it is less, it means there is RBC arbitrage.”
- SVO’s Structured Equity & Funds Proposal dated November 28, 2022, also uses the term “RBC arbitrage” with effectively the same meaning but expanding the scope from CLOs to include certain feeder fund structures.

Academy Usage of “RBC Arbitrage”

- In [our presentation to RBCIRE WG](#) dated December 14, 2022, the Academy disagreed with the concept that the existence of RBC arbitrage, as defined by IAO, necessarily implied an incorrect C-1 requirement
- The Academy believes dialogue among all parties will be improved if we first collectively agree on a definition of RBC arbitrage before discussing its implications for C-1 requirements

Related Regulatory Concerns

- IAO has also pointed out the possibility of RBC-transformative ABS being used to reclassify investments to technically comply with investment limits set forth in state insurance law, for example converting equity to debt for statutory purposes
- RBC-transformative ABS may also be used to reclassify investment returns or losses from an accounting perspective
- While we acknowledge these related potential issues, this presentation focuses only on C-1 implications of RBC-transformative ABS

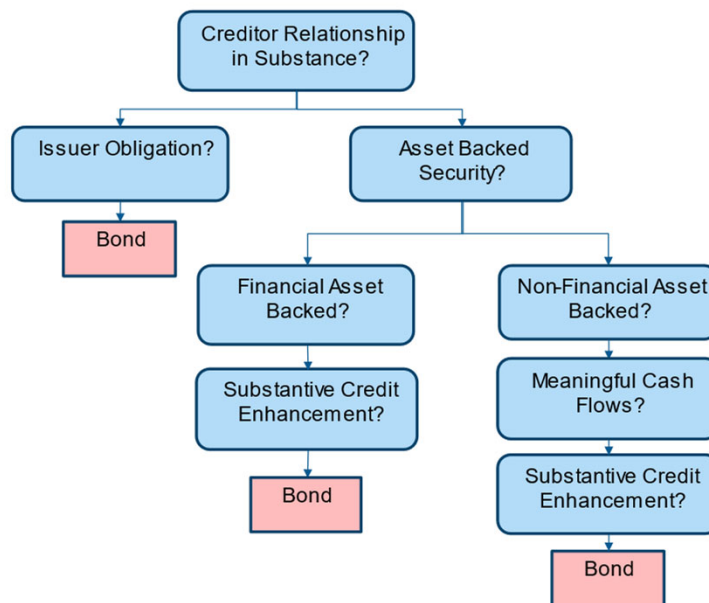
Appendix B: Definitions of Terms

ABS Definition

- RBC arbitrage discussions typically involve structured securities, for example CLOs and rated note feeder fund structures.
- Within this presentation, we refer to all such structured securities as **ABS**, and we intend for the definition of ABS to align with the emerging definition of ABS in **SSAP 26**, [most recently exposed November 16, 2022](#). Under this definition, ABS has a primary purpose of raising debt capital backed by collateral that provides the cash flows to service the debt.

ABS Definition, Continued

Bond Principles Flowchart



- Exposed principles-based definition of ABS is illustrated here
- Image taken from “Assets: Regulatory Updates in Life Insurance” April 4, 2023, [webinar](#) by the American Academy of Actuaries

Vertical Slice Definition

A vertical slice is an investment in all tranches of an ABS in equal proportion to the total outstanding. A vertical slice is economically equivalent to a direct investment in the underlying collateral at any one point in time.

RBC-Transformative ABS Definition

An RBC-transformative ABS is any ABS where a vertical slice draws a lower aggregate C-1 requirement than its underlying collateral would draw if held directly by a life insurer.

Narrowly Defined RBC Arbitrage

Holding a vertical slice of an RBC-transformative ABS constitutes RBC arbitrage under the narrow definition.

In this case, it is unambiguously true that absent the structure of the ABS, a life insurer would be required to hold a higher level of C-1 capital.

Even under the narrow definition of RBC arbitrage, C-1 requirements for the collateral may be inappropriately high rather than the ABS C-1 requirements being inappropriately low. Also, C-1 for the ABS and its collateral may be calibrated precisely to the prescribed risk measures despite the ABS being RBC-transformative. Regardless, in such cases holding a vertical slice of an RBC-transformative ABS would still constitute RBC arbitrage.

Broadly Defined RBC Arbitrage

Holding any part of an RBC-transformative ABS constitutes RBC arbitrage under the broad definition.

For example, any CLO holdings would constitute RBC arbitrage under this definition, because CLOs are an RBC-transformative ABS (as discussed in the Academy's [December 2022 presentation to RBCIRE WG](#)).

IAO letters written to VOSTF during 2022 employ the broad definition of RBC arbitrage.

QUESTIONS

Contact:

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

Capital Adequacy (E) Task Force RBC Proposal Form

- | | | |
|---|--|---|
| <input type="checkbox"/> Capital Adequacy (E) Task Force | <input checked="" type="checkbox"/> Health RBC (E) Working Group | <input type="checkbox"/> Life RBC (E) Working Group |
| <input type="checkbox"/> Catastrophe Risk (E) Subgroup | <input type="checkbox"/> P/C RBC (E) Working Group | <input type="checkbox"/> Longevity Risk (A/E) Subgroup |
| <input type="checkbox"/> Variable Annuities Capital. & Reserve (E/A) Subgroup | <input type="checkbox"/> Economic Scenarios (E/A) Subgroup | <input type="checkbox"/> RBC Investment Risk & Evaluation (E) Working Group |

<p style="text-align: right;">DATE: <u>7-12-23</u></p> <p>CONTACT PERSON: <u>Crystal Brown</u></p> <p>TELEPHONE: <u>816-783-8146</u></p> <p>EMAIL ADDRESS: <u>cbrown@naic.org</u></p> <p>ON BEHALF OF: <u>Health Risk-Based Capital (E) Working Group</u></p> <p>NAME: <u>Steve Drutz</u></p> <p>TITLE: <u>Chief Financial Analyst/Chair</u></p> <p>AFFILIATION: <u>WA Office of Insurance Commissioner</u></p> <p>ADDRESS: <u>5000 Capitol Blvd SE</u> <u>Tumwater, WA 98501</u></p>	<p style="text-align: center;">FOR NAIC USE ONLY</p> <p>Agenda Item # <u>2023-11-H</u> Year <u>2024</u></p> <p style="text-align: center;">DISPOSITION</p> <p>ADOPTED:</p> <p><input type="checkbox"/> TASK FORCE (TF) _____</p> <p><input checked="" type="checkbox"/> WORKING GROUP (WG) <u>11-8-23</u></p> <p><input type="checkbox"/> SUBGROUP (SG) _____</p> <p>EXPOSED:</p> <p><input type="checkbox"/> TASK FORCE (TF) _____</p> <p><input checked="" type="checkbox"/> WORKING GROUP (WG) <u>7-25-23</u></p> <p><input type="checkbox"/> SUBGROUP (SG) _____</p> <p>REJECTED:</p> <p><input type="checkbox"/> TF <input type="checkbox"/> WG <input type="checkbox"/> SG _____</p> <p>OTHER:</p> <p><input type="checkbox"/> DEFERRED TO _____</p> <p><input type="checkbox"/> REFERRED TO OTHER NAIC GROUP _____</p> <p><input type="checkbox"/> (SPECIFY) _____</p>
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IDENTIFICATION OF SOURCE AND FORM(S)/INSTRUCTIONS TO BE CHANGED

- | | | |
|---|---|--|
| <input checked="" type="checkbox"/> Health RBC Blanks | <input type="checkbox"/> Property/Casualty RBC Blanks | <input type="checkbox"/> Life and Fraternal RBC Blanks |
| <input checked="" type="checkbox"/> Health RBC Instructions | <input type="checkbox"/> Property/Casualty RBC Instructions | <input type="checkbox"/> Life and Fraternal RBC Instructions |
| <input type="checkbox"/> Health RBC Formula | <input type="checkbox"/> Property/Casualty RBC Formula | <input type="checkbox"/> Life and Fraternal RBC Formula |
| <input type="checkbox"/> OTHER _____ | | |

DESCRIPTION/REASON OR JUSTIFICATION OF CHANGE(S)

The purpose of this proposal is to include Medicare and Medicaid amounts in Column (1), Line (4) – Other Health Risk Revenue and Line (10) – Fee For Service Offset of page XR013. Column (1), Lines (4) and (10) on page XR014 will be updated to reflect the Columns 8 & 9 in the annual statement reference.

Additional Staff Comments:

The proposed change will create consistent treatment of Medicare and Medicaid amounts throughout Column (1) of page XR013.
7-25-23 cgb WG exposed for 30 days comment period ending on Aug. 24.
8-25-23 cgb No comments received.
11-8-23 cgb The WG adopted the proposal.

**** This section must be completed on all forms.**

Revised 2-2023

† Annual Statement Source

	Line of Business	(1) Comprehensive (Hospital & Medical) - Individual & Group	(2) Medicare Supplement	(3) Dental & Vision	(4) Stand-Alone Medicare Part D Coverage	(5) Other Health	(6) Other Non-Health	(7) Total
(1)	Premium	Page 7, Columns 2 & 3, Lines 1 + 2	Page 7, Column 4, Line 1 + 2	Page 7, Columns 6 & 5, Line 1 + 2			Page 7, Column 14, Lines 1 + 2	
(2)	Title XVIII-Medicare	Page 7, Column 8, Lines 1 + 2	XXX	XXX	XXX	XXX	XXX	Page 7, Column 8, Lines 1 + 2
(3)	Title XIX-Medicaid	Page 7, Column 9, Lines 1 + 2	XXX	XXX	XXX	XXX	XXX	Page 7, Column 9, Lines 1 + 2
(4)	Other Health Risk Revenue	Page 7, Columns 2 + 3 + 8 + 9, Line 4	XXX	Page 7, Columns 6 & 5, Line 4			XXX	
(7)	Net Incurred Claims	Page 7, Columns 2 + 3 + 8 + 9, Line 17	Page 7, Column 4, Line 17	Page 7, Columns 6 & 5, Line 17			XXX	
(10)	Fee-For-Service Offset	Page 7, Columns 2 + 3 + 8 + 9, Line 3	XXX	Page 7, Columns 6 & 5, Line 3			XXX	
(17)	Maximum Per-Individual Risk After Reinsurance	Gen Int Part 2, Lines 5.31 + 5.32	Gen Int Part 2 Line 5.33	Gen Int Part 2 Line 5.34			XXX	XXX

Denotes items that must be manually entered on filing software.

Capital Adequacy (E) Task Force RBC Proposal Form

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> Capital Adequacy (E) Task Force | <input type="checkbox"/> Health RBC (E) Working Group | <input type="checkbox"/> Life RBC (E) Working Group |
| <input type="checkbox"/> Catastrophe Risk (E) Subgroup | <input type="checkbox"/> P/C RBC (E) Working Group | <input type="checkbox"/> Longevity Risk (A/E) Subgroup |
| <input type="checkbox"/> Variable Annuities Capital. & Reserve (E/A) Subgroup | <input type="checkbox"/> Economic Scenarios (E/A) Subgroup | <input type="checkbox"/> RBC Investment Risk & Evaluation (E) Working Group |

<p style="text-align: right;">DATE: <u>10-10-23</u></p> <p>CONTACT PERSON: <u>Eva Yeung</u></p> <p>TELEPHONE: <u>816-783-8407</u></p> <p>EMAIL ADDRESS: <u>eyeung@naic.org</u></p> <p>ON BEHALF OF: <u>Capital Adequacy (E) Task Force</u></p> <p>NAME: <u>Tom Botsko</u></p> <p>TITLE: <u>Chair</u></p> <p>AFFILIATION: <u>Ohio Department of Insurance</u></p> <p>ADDRESS: <u>50 West Town Street, Suite 300</u> <u>Columbus, OH 43215</u></p>	<p style="text-align: center;">FOR NAIC USE ONLY</p> <p>Agenda Item # <u>2023-12-CA</u> Year <u>2024</u></p> <p style="text-align: center;">DISPOSITION</p> <p>ADOPTED:</p> <p><input type="checkbox"/> TASK FORCE (TF) _____</p> <p><input type="checkbox"/> WORKING GROUP (WG) _____</p> <p><input type="checkbox"/> SUBGROUP (SG) _____</p> <p>EXPOSED:</p> <p><input checked="" type="checkbox"/> TASK FORCE (TF) <u>10/11/23</u></p> <p><input type="checkbox"/> WORKING GROUP (WG) _____</p> <p><input type="checkbox"/> SUBGROUP (SG) _____</p> <p>REJECTED:</p> <p><input type="checkbox"/> TF <input type="checkbox"/> WG <input type="checkbox"/> SG _____</p> <p>OTHER:</p> <p><input type="checkbox"/> DEFERRED TO _____</p> <p><input type="checkbox"/> REFERRED TO OTHER NAIC GROUP _____</p> <p><input type="checkbox"/> (SPECIFY) _____</p>
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IDENTIFICATION OF SOURCE AND FORM(S)/INSTRUCTIONS TO BE CHANGED

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> Health RBC Blanks | <input checked="" type="checkbox"/> Property/Casualty RBC Blanks | <input type="checkbox"/> Life and Fraternal RBC Blanks |
| <input checked="" type="checkbox"/> Health RBC Instructions | <input checked="" type="checkbox"/> Property/Casualty RBC Instructions | <input type="checkbox"/> Life and Fraternal RBC Instructions |
| <input type="checkbox"/> Health RBC Formula | <input type="checkbox"/> Property/Casualty RBC Formula | <input type="checkbox"/> Life and Fraternal RBC Formula |
| <input type="checkbox"/> OTHER _____ | | |

DESCRIPTION/REASON OR JUSTIFICATION OF CHANGE(S)

Health: Modified page XR002 to remove the word "Common" the heading of Column (13) and updated page XR010 and XR024 to clarify the line for the Market Value in Excess Affiliated Stocks. This line includes the affiliated amounts for both preferred and common stock.

P/C: Modified PR003 to remove the word "Common" the heading of Column (13) and updated pages PR007 & PR031 to clarify PR007, Line 12 includes the Market Value in Excess affiliated amounts for both preferred and common stocks.

Additional Staff Comments:

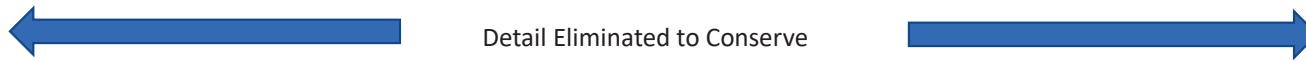
The purpose of this proposal is to clarify that both common and preferred stock are included in the calculation of Market Value in Excess of Stocks for the affiliated investments in Column (13).

**** This section must be completed on all forms.**

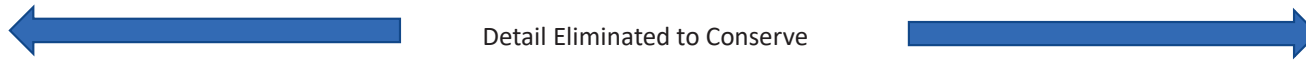
Revised 2-2023

Health

AFFILIATED/SUBSIDIARY STOCKS
 XR002–XR004

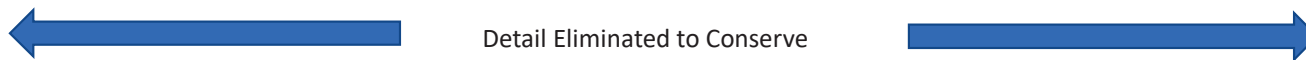


Market Value (including discounted market value) Insurance Affiliates/Subsidiaries (See SSAP No. 97, Paragraph 8a.): If the affiliate/subsidiary’s common stock is publicly traded and the reporting company carries the affiliate/subsidiary at market value, after any “discount,” there are generally two components to the reporting company’s RBC generated by the affiliate/subsidiary. The prorated portion is the percentage of ownership of total common and preferred stock. The smaller of the prorated portion of the affiliate/subsidiary’s own statutory surplus or the prorated portion of its RBC after covariance is added to the H₀ component of the reporting company. ~~In the normal case, Normally,~~ the common and preferred stock book/adjusted carrying value of the affiliate/subsidiary exceeds the prorated portion of the larger of its statutory surplus and its RBC after covariance, an additional charge is applied to H₁. ~~In this case, the additional charge~~ to the H₁ component is the larger of a) 22.5 percent of the affiliate/subsidiary’s common and preferred stock book/adjusted carrying value in excess of the prorated portion of the affiliate’s/subsidiary’s statutory surplus or b) the prorated portion of the affiliate’s/subsidiary’s RBC after covariance in excess of the prorated portion of its statutory surplus. If the affiliate/subsidiary’s common and preferred stock book/adjusted carrying value is less than the prorated portion of its RBC after covariance, but greater than the prorated portion of its statutory surplus, 100 percent of the common and preferred stock book/adjusted carrying value in excess of the prorated portion of the affiliate/subsidiary’s statutory surplus is added to the reporting company’s H₁ component. If the affiliate/subsidiary’s common and preferred stock book/adjusted carrying value is less than the prorated portion of the affiliate/subsidiary statutory surplus, there is no addition to the H₁ component.



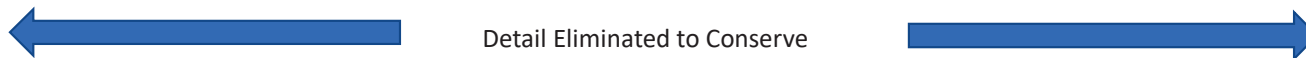
Property/Casualty

AFFILIATED STOCKS
 PR003 – PR005



Market Value (including discounted market value) Insurance Affiliates/Subsidiaries (See SSAP No. 97, Paragraph 8a.): If the affiliate/subsidiary’s common stock is publicly traded and the reporting company carries the affiliate/subsidiary at market value, after any “discount,” there are generally two components to the reporting company’s RBC generated by the affiliate/subsidiary. The prorated portion is the percentage of ownership of the total common and preferred stock. The smaller of the prorated portion of the affiliate/subsidiary’s own statutory surplus or the prorated portion of its RBC after covariance is added to the R₀ component of the reporting company. ~~In the normal case, Normally,~~ the common and preferred stock book/adjusted carrying value of the affiliate/subsidiary exceeds the prorated portion of the larger of its statutory surplus and its RBC after covariance an additional charge is applied to R₂. ~~In this case, the additional charge~~ to the R₂ component is the larger of a) 22.5 percent of the affiliate/subsidiary’s common and preferred

stock book/adjusted carrying value in excess of the prorated portion of the affiliate/subsidiary's statutory surplus or b) the prorated portion of the affiliate/subsidiary's RBC after covariance in excess of the prorated portion of its statutory surplus. If the affiliate/subsidiary's common and preferred stock book/adjusted carrying value is less than the prorated portion of its RBC after covariance, but greater than the prorated portion of its statutory surplus, 100 percent of the common and preferred stock book/adjusted carrying value in excess of the prorated portion of the affiliate/subsidiary's statutory surplus is added to the reporting company's R₂ component. If the affiliate/subsidiary's common and preferred stock book/adjusted carrying value is less than the prorated portion of the affiliate/subsidiaries' s statutory surplus, there is no addition to the R₂ component.



DETAILS FOR AFFILIATED STOCKS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Name of Affiliate	Affil Type	NAIC Company Code or Alien ID Number	Affiliate's RBC after Covariance Before Basic Operational Risk XR025 Line (41) PR032 Line (60) LR031 Line (69) + (73)	Book/Adjusted Carrying Value (Statement Value) of Affiliate's Common Stock	Valuation Basis of Col(5) M - Market Value after any "discount" A - All Other	Total Value of Affiliate's Outstanding Common Stock	Statutory Surplus of Affiliate Subject to RBC (Adjusted for % Owned)	Book/Adjusted Carrying Value (Statement Value) of Affiliate's Preferred Stock	Total Value of Affiliate's Outstanding Preferred Stock	Percent Owned *	RBC Required (H0 Component)	Market Value Excess Component Affiliated Common Stocks RBC Required (H1 Component)
(01)													
(02)													
(03)													
(04)													
(05)													
(06)													
(07)													
(08)													
(09)													
(10)													
(11)													
(12)													
(13)													
(14)													
(15)													
(16)													
(9999999)	Total	XXX	XXX			XXX					XXX		

Denotes items that must be manually entered on filing software.

Remark: Subcategory 8a, 8b and 8c are referring to the directly owned insurance affiliates not subject to RBC look-through
Indirectly owned insurance affiliate not subject to RBC will be included Category 4

* Only applies to Affiliate Type 1 and 2

EQUITY ASSETS

	<u>Annual Statement Source</u>	(1) <u>Bk/Adj Carrying Value</u>	Factor	(2) <u>RBC Requirement</u>
PREFERRED STOCK - UNAFFILIATED				
(1) NAIC 01 Preferred Stock	Included in Schedule D, Part 2, Section 1		0.003	
(2) NAIC 02 Preferred Stock	Included in Schedule D, Part 2, Section 1		0.010	
(3) NAIC 03 Preferred Stock	Included in Schedule D, Part 2, Section 1		0.020	
(4) NAIC 04 Preferred Stock	Included in Schedule D, Part 2, Section 1		0.045	
(5) NAIC 05 Preferred Stock	Included in Schedule D, Part 2, Section 1		0.100	
(6) NAIC 06 Preferred Stock	Included in Schedule D, Part 2, Section 1		0.300	
(7) Total - Unaffiliated Preferred Stock	Sum of Lines (1) through (6)			
(Should equal Page 2, Column 3, Line 2.1 less Sch D Sum, Column 1, Line 18)				
COMMON STOCK - UNAFFILIATED				
(8) Federal Home Loan Bank Stock	Company Records		0.023	
(9) Total Common Stock	Schedule D, Summary, Column 1, Line 25			
(10) Affiliated Common Stock	Schedule D, Summary, Column 1, Line 24			
(11) Other Unaffiliated Common Stock	Lines (9) - (8) - (10)		0.150	
(12) Market Value Excess Affiliated Stocks	XR002 C(13) L(9999999)			
(13) Total Unaffiliated Common Stock and Market Value Excess Affiliated Stocks	Lines (8) + (11) + (12)			

 Denotes items that must be manually entered on filing software.

CALCULATION OF TOTAL RISK-BASED CAPITAL AFTER COVARIANCE

		(1) <u>RBC Amount</u>
H0 - INSURANCE AFFILIATES AND MISC. OTHER AMOUNTS		
(1) Off-Balance Sheet Items	XR005, Off-Balance Sheet Page, Line (21)	_____
(2) Directly Owned Health Insurance Companies or Health Entities	XR003, Affiliates Page, Column (2), Line (1)	_____
(3) Directly Owned Property and Casualty Insurance Affiliates	XR003, Affiliates Page, Column (2), Line (2)	_____
(4) Directly Owned Life Insurance Affiliates	XR003, Affiliates Page, Column (2), Line (3)	_____
(5) Indirectly Owned Health Insurance Companies or Health Entities	XR003, Affiliates Page, Column (2), Line (4)	_____
(6) Indirectly Owned Property and Casualty Insurance Affiliates	XR003, Affiliates Page, Column (2), Line (5)	_____
(7) Indirectly Owned Life Insurance Affiliates	XR003, Affiliates Page, Column (2), Line (6)	_____
(8) Affiliated Alien Insurers - Directly Owned	XR003, Affiliates Page, Column (2), Line (9) + (10) + (11)	_____
(9) Affiliated Alien Insurers - Indirectly Owned	XR003, Affiliates Page, Column (2), Line (12) + (13) + (14)	_____
(10) Total H0	Sum Lines (1) through (9)	=====
H1 - ASSET RISK - OTHER		
(11) Holding Company in Excess of Indirect Subs	XR003, Affiliates Page, Column (2), Line (7)	_____
(12) Investment Subsidiary	XR003, Affiliates Page, Column (2), Line (8)	_____
(13) Investment in Upstream Affiliate (Parent)	XR003, Affiliates Page, Column (2), Line (15)	_____
(14) Directly Owned Health Insurance Companies or Health Entities Not Subject to RBC	XR003, Affiliates Page, Column (2), Line (16)	_____
(15) Directly Owned Property and Casualty Insurance Companies Not Subject to RBC	XR003, Affiliates Page, Column (2), Line (17)	_____
(16) Directly Owned Life Insurance Companies Not Subject to RBC	XR003, Affiliates Page, Column (2), Line (18)	_____
(17) Affiliated Non-Insurer	XR003, Affiliates Page, Column (2), Line (19) + (20) + (21)	_____
(18) Fixed Income Assets	XR006, Off-Balance Sheet Collateral, Lines (27) + (37) + (38) + (39) + XR007, Fixed Income Assets - Bonds, Line (27) + XR008, Fixed Income Assets - Miscellaneous, Line (24)	_____
(19) Replication & Mandatory Convertible Securities	XR009, Replication/MCS Page, Line (9999999)	_____
(20) Unaffiliated Preferred Stock	XR006, Off-Balance Sheet Collateral, Line (34) + XR010, Equity Assets Page, Line (7)	_____
(21) Unaffiliated Common Stock & Market Value Excess Affiliated Stocks	XR006, Off-Balance Sheet Collateral, Line (35) + XR010, Equity Assets Page, Line (13)	_____
(22) Property & Equipment	XR006, Off-Balance Sheet Collateral, Line (36) + XR011, Prop/Equip Assets Page, Line (9)	_____
(23) Asset Concentration	XR012, Grand Total Asset Concentration Page, Line (27)	_____
(24) Total H1	Sum Lines (11) through (23)	=====
H2 - UNDERWRITING RISK		
(25) Net Underwriting Risk	XR013, Underwriting Risk Page, Line (21)	_____
(26) Other Underwriting Risk	XR015, Underwriting Risk Page, Line (25.3)	_____
(27) Disability Income	XR015, Underwriting Risk Page, Lines (26.3) + (27.3) + (28.3) + (29.3) + (30.6) + (31.3) + (32.3)	_____
(28) Long-Term Care	XR016, Underwriting Risk Page, Line (41)	_____
(29) Limited Benefit Plans	XR017, Underwriting Risk Page, Lines (42.2) + (43.6) + (44)	_____
(30) Premium Stabilization Reserve	XR017, Underwriting Risk Page, Line (45)	_____
(31) Total H2	Sum Lines (25) through (30)	=====

Denotes items that must be manually entered on filing software.

DETAILS FOR AFFILIATED STOCKS PR003

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Name of Affiliate	Affil Type	NAIC Company Code or Alien ID Number	Affiliate's RBC After Covariance before Basic Operational Risk L(R031 L(69) + L(73) PR032 L(60) XR025 L(41)	Book/Adjusted Carrying Value (statement value) of Affiliate's Common Stock	Valuation Basis of Column (5) M - Market Value after any "discount" A - All Other	Total Value of Affiliate's Outstanding Common Stock	Statutory Surplus of Affiliate Subject to RBC (Adjusted for % Owned)	Book/Adjusted Carrying Value (statement value) of Affiliate's Preferred Stock	Total Value of Affiliate's Outstanding Preferred Stock	Percent Owned*	RBC Required (R0 Component)	Market Value Excess Component Affiliate Common Stocks RBC Required (R2 Component)
0000001										0.000%	0	0
0000002										0.000%	0	0
0000003										0.000%	0	0
0000004										0.000%	0	0
0000005										0.000%	0	0
0000006										0.000%	0	0
0000007										0.000%	0	0
0000008										0.000%	0	0
0000009										0.000%	0	0
0000010										0.000%	0	0
0000011										0.000%	0	0
0000012										0.000%	0	0
0000013										0.000%	0	0
0000014										0.000%	0	0
0000015										0.000%	0	0
0000016										0.000%	0	0
0000017										0.000%	0	0
0000018										0.000%	0	0
0000019										0.000%	0	0
0000020										0.000%	0	0
0000021										0.000%	0	0
0000022										0.000%	0	0
0000023										0.000%	0	0
0000024										0.000%	0	0
0000025										0.000%	0	0
0000026										0.000%	0	0
0000027										0.000%	0	0
0000028										0.000%	0	0
0000029										0.000%	0	0
0000030										0.000%	0	0
0000031										0.000%	0	0
0000032										0.000%	0	0
0000033										0.000%	0	0
0000034										0.000%	0	0
0000035										0.000%	0	0
0000036										0.000%	0	0
0000037										0.000%	0	0
0000038										0.000%	0	0
0000039										0.000%	0	0
0000040										0.000%	0	0
0000041										0.000%	0	0
0000042										0.000%	0	0
0000043										0.000%	0	0
0000044										0.000%	0	0
0000045										0.000%	0	0
0000046										0.000%	0	0
0000047										0.000%	0	0
0000048										0.000%	0	0
0000049										0.000%	0	0
0000050										0.000%	0	0
(9999999) Total	XXX	XXX	0	0	XXX	0	0	0	0	XXX	0	0

Remark: Subcategory 8a, 8b and 8c are referring to the directly owned insurance affiliates not subject to RBC look-through
 Indirectly owned insurance affiliate not subject to RBC will be included Category 4
 * Only applies to Affiliate Type 1 and 2.
 Denotes items that must be manually entered on the filing software.

PR003

UNAFFILIATED PREFERRED AND COMMON STOCK PR007

		(1) <u>Book/Adjusted</u> <u>Carrying Value</u>	Factor	(2) <u>RBC Requirement</u>
Unaffiliated Preferred Stock				
(1) NAIC 01 Preferred Stock	Sch D Pt 2 Sn 1	0	0.003	0
(2) NAIC 02 Preferred Stock	Sch D Pt 2 Sn 1	0	0.010	0
(3) NAIC 03 Preferred Stock	Sch D Pt 2 Sn 1	0	0.020	0
(4) NAIC 04 Preferred Stock	Sch D Pt 2 Sn 1	0	0.045	0
(5) NAIC 05 Preferred Stock	Sch D Pt 2 Sn 1	0	0.100	0
(6) NAIC 06 Preferred Stock	Sch D Pt 2 Sn 1	0	0.300	0
(7) TOTAL - UNAFFILIATED PREFERRED STOCK (should equal P2 L2.1 C3 less Sch D-Sum C1 L18)	Sum of Ls (1) through (6)	0		0
Unaffiliated Common Stock				
(8) Total Common Stock	Sch D - Summary C1 L25	0		
(9) Affiliated Common Stock	Sch D - Summary C1 L24	0		
(10) Non-Admitted Unaffiliated Common Stock	P2 C2 L2.2 - Sch D Pt6 Sn1 C9 L1899999	0		
(11) Admitted Unaffiliated Common Stock	L(8) - L(9) - L(10)	0	0.150	0
(12) Market Value Excess Affiliated Common Stocks	PR003 C(14) L(9999999)	0		0
(13) Total Unaffiliated Common Stock and Market Value Excess Affiliated Stocks	L(11) + L(12)	0		0

Denotes items that must be manually entered on the filing software.

Calculation of Total Risk-Based Capital After Covariance PR031 R2-R3

(1)

R2 - Asset Risk - Equity		PRBC O&I Reference	RBC Amount
(27)	Common - Affiliate Investment Subsidiary	PR004 L(7)C(2)	0
(28)	Common - Affiliate Hold. Company. in excess of Ins. Subs.	PR004 L(10)C(2)	0
(29)	Common - Investment in Parent	PR004 L(11)C(2)	0
(30)	Common - Aff'd US P&C Not Subj to RBC	PR004 L(12)C(2)	0
(31)	Common - Affil US Life Not Subj to RBC	PR004 L(13)C(2)	0
(32)	Common - Affil US Health Insurer Not Subj to RBC	PR004L(14)C(2)	0
(33)	Common - Aff'd Non-insurer	PR004 L(15)C(2)	0
(34)	Preferred - Aff'd Invest Sub	PR004 L(7)C(3)	0
(35)	Preferred - Aff'd Hold. Co. in excess of Ins. Subs.	PR004 L(10)C(3)	0
(36)	Preferred - Investment in Parent	PR004 L(11)C(3)	0
(37)	Preferred - Affil US P&C Not Subj to RBC	PR004 L(12)C(3)	0
(38)	Preferred - Affil US Life Not Subj to RBC	PR004 L(13)C(3)	0
(39)	Preferred - Affil US Health Insurer Not Subj to RBC	PR004 L(14)C(3)	0
(40)	Preferred - Affil Non-insurer	PR004 L(15)C(3)	0
(41)	Unaffiliated Preferred Stock	PR007 L(7)C(2)+PR015 L(34)C(4)	0
(42)	Total Unaffiliated Common Stock and Fair Value Excess Affiliated Stocks	PR007 L(13)C(2)+PR015 L(35)C(4)	0
(43)	Other Long -Term Assets - Real Estate	PR008 L(7)C(2)	0
(44)	Other Long -Term Assets - Schedule BA Assets	PR008 L(19)C(2)+PR015 L(36)+L(37)C(4)	0
(45)	Misc Assets - Receivable for Securities	PR009 L(1)C(2)	0
(46)	Misc Assets - Aggregate Write-ins for Invested Assets	PR009 L(2)C(2)	0
(47)	Misc Assets - Derivatives	PR009 L(14)C(2)	0
(48)	Replication - Synthetic Asset: One Half	PR010 L(9999999)C(7)	0
(49)	Asset Concentration RBC - Equity	PR011 L(33)C(3) Grand Total Page	0
(50)	Total R2	L(27)+L(28)+L(29)+L(30)+L(31)+L(32)+L(33)+L(34) +L(35)+L(36)+L(37)+L(38)+L(39)+L(40)+L(41)+L(42) +L(43)+L(44)+L(45)+L(46)+L(47)+L(48)+L(49)	0
R3 - Asset Risk - Credit			
(51)	Other Credit RBC	PR012 L(8)-L(1)-L(2)C(2)	0
(52)	One half of Rein Recoverables	0.5 x (PR012 L(1)+L(2)C(2))	0
(53)	Other half of Rein Recoverables	If R4 L(57)>(R3 L(51) + R3 L(52)), 0, otherwise, R3 L(52)	0
(54)	Health Credit Risk	PR013 L(12)C(2)	0
(55)	Total R3	L(51) + L(52) + L(53) + L(54)	0

PR031

Capital Adequacy (E) Task Force
RBC Proposal Form

- | | | |
|---|---|--|
| <input type="checkbox"/> Capital Adequacy (E) Task Force | <input type="checkbox"/> Health RBC (E) Working Group | <input type="checkbox"/> Life RBC (E) Working Group |
| <input checked="" type="checkbox"/> Catastrophe Risk (E) Subgroup | <input type="checkbox"/> Investment RBC (E) Working Group | <input type="checkbox"/> Op Risk RBC (E) Subgroup |
| <input type="checkbox"/> C3 Phase II/ AG43 (E/A) Subgroup | <input type="checkbox"/> P/C RBC (E) Working Group | <input type="checkbox"/> Stress Testing (E) Subgroup |

<p style="text-align: right;">DATE: <u>11/1/2022</u></p> <p>CONTACT PERSON: <u>Eva Yeung</u></p> <p>TELEPHONE: <u>816-783-8407</u></p> <p>EMAIL ADDRESS: <u>eyeung@naic.org</u></p> <p>ON BEHALF OF: <u>Catastrophe Risk (E) Subgroup</u></p> <p>NAME: <u>Wanchin Chou</u></p> <p>TITLE: <u>Chair</u></p> <p>AFFILIATION: <u>Connecticut Department of Insurance</u></p> <p>ADDRESS: <u>153 Market St.</u> <u>Hartford, CT 06103</u></p>	<p style="text-align: center;"><u>FOR NAIC USE ONLY</u></p> <p>Agenda Item # <u>2023-16-CR</u></p> <p>Year <u>2023</u></p> <p style="text-align: center;"><u>DISPOSITION</u></p> <p><input type="checkbox"/> ADOPTED <u>1st release:</u></p> <p><u>2nd release:</u></p> <p><input type="checkbox"/> REJECTED _____</p> <p><input type="checkbox"/> DEFERRED TO _____</p> <p><input type="checkbox"/> REFERRED TO OTHER NAIC GROUP _____</p> <p><input checked="" type="checkbox"/> EXPOSED <u>1st release: 11/16/23</u></p> <p><u>2nd release:</u> _____</p> <p><input type="checkbox"/> OTHER (SPECIFY) _____</p>
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IDENTIFICATION OF SOURCE AND FORM(S)/INSTRUCTIONS TO BE CHANGED

- | | | |
|---|---|--|
| <input type="checkbox"/> Health RBC Blanks | <input type="checkbox"/> Property/Casualty RBC Blanks | <input type="checkbox"/> Life RBC Instructions |
| <input type="checkbox"/> Fraternal RBC Blanks | <input type="checkbox"/> Health RBC Instructions | <input type="checkbox"/> Property/Casualty RBC Instructions |
| <input type="checkbox"/> Life RBC Blanks | <input type="checkbox"/> Fraternal RBC Instructions | <input checked="" type="checkbox"/> OTHER <u>Cat Event Lists</u> |

DESCRIPTION OF CHANGE(S)

2023 U.S. and non-U.S. Catastrophe Event Lists

REASON OR JUSTIFICATION FOR CHANGE **

New events were determined based on the sources from Swiss Re and Aon Benfield.

Additional Staff Comments:

11/16/23 – The Subgroup and the PCRBC WG exposed this proposal for a 7-public comment period ending 11/23/22.

** This section must be completed on all forms.

Revised 11-2013

U.S. List of Catastrophes for Use in Reporting catastrophe Data in PR036 and PR100+

Type of Event	Name	Date	Location	Overall losses when occurred
Wildfire	Texas	2014	Texas, California	> 25 million
Earthquake		2014	California	25+ million
Hurricane	Patricia	2015		25+ million
Hurricane	Joaquin	2015		25+ million
Wildfire	Butte Fire	9/9/15-10/1/15	Amador County, California	~ 300 million
Wildfire	Valley Fire	9/12/15-10/15/15	Lake, Napa and Sonoma County, California	~ 700 million
Hurricane	Matthew	2016	Florida, North Carolina, South Carolina, Georgia and Virginia	\$ 2,698,400,000
Hurricane	Hermine	2016	Florida, North Carolina, South Carolina, Georgia and Virginia	\$ 245,640,000
Wildfire	Erschine Fire	6/23/16-7/11/16	Lake Isabella, Kern County, California	~26 million
Wildfire	Soberanes Fire	7/22/16-9/30/16	Soberanes Creek, Garrapata State Park, Santa Lucia Preserve, Monterey County, California	> 200 million
Wildfire	Chimney Fire	8/13/16-9/6/16	Santa Lucia Range, San Luis Obispo County, California	> 25 million
Wildfire	Clayton Fire	8/13/16-8/26/16	Lake County, California	>25 million
Wildfire	Gatlinburg Wildfire	11/29/16-12/5/16	Sevier County, Gatlinburg, Pigeon Forge, Tennessee	~637 million
Wildfire	Northern California Wildfires	10/8/17-10/31/17	Northern California	~ 11 billion
Wildfire	Southern California Wildfires	12/4/17-12/23/17	Southern California	~ 2.2 billion
Hurricane	Harvey	2017	Texas, Louisiana	25+ million
Hurricane	Jose	2017	East Coast of the United States	25+ million
Hurricane	Irma	2017	Eastern United States	25+ million
Hurricane	Maria	2017	Southeastern United States, Mid-Atlantic States	25+ million
Hurricane	Nate	2017	Louisiana, Mississippi, Alabama, Tennessee and Eastern United States	25+ million
Tropical Storm	Alberto	2018	Southeast, Midwest	25+ million
Hurricane	Lane	2018	Hawaii	25+ million
Tropical Storm	Gordon	2018	Southeast, Gulf coast of the United States, Arkansas and Missouri	25+ million
Hurricane	Florence	2018	Southeast, Mid-Atlantic	25+ million
Hurricane	Michael	2018	Southeastern and East Coasts of United States	25+ million
Wildfire	Spring Creek Fire	6/27/18-7/11/18	Spring Creek, Colorado	< 100 million
Wildfire	Carr, Mendocino California Wildfires	7/23/18-8/15/18	Northern California	>1,000 million
Wildfire	Northern California Camp Wildfire	11/8/18-11/25/18	Butte County, California	>7.5 billion
Wildfire	Southern California Woolsey Wildfires	11/8/18-11/21/18	Los Angeles and Ventura County, California	2.9 billion
Hurricane	Dorian	2019	Southeast, Mid-Atlantic	500+ million
Hurricane	Barry	2019	Southeast, Midwest, Northeast	300+ million
Tropical Storm	Imelda	2019	Plains, Southeast	25+ million
Tropical Storm	Nestor	2019	Southeast	25+ million
Hurricane	Lorenzo	2019	Louisiana, Mississippi, Texas and Arkansas	25+ million
Wildfire	Saddleridge Wildfire	10/10/19-10/23/19	Sylmar, Los Angeles, Calimesa, Riverside County, California	<1,000 million
Wildfire	Kincade Wildfire	10/23/19-11/6/19	Northeast of Geyserville, Sonoma County, California	<1,000 million
Tropical Storm	Cristobal	2020	Southeast, Plains, Midwest	150 million
Tropical Storm	Fay	2020	Southeast, Northeast	400 million
Hurricane	Hanna	2020	Texas	350 million
Hurricane	Isaias	2020	Southeast, Mid-Atlantic, Northeast	> 3 billion
Hurricane	Laura	2020	Plains, Southeast, Mid-Atlantic	> 4 billion
Hurricane	Sally	2020	Southeast (Alabama, Mississippi, Louisiana)	> 1 billion
Tropical Storm	Beta	2020	Plains, Southeast	25+ million
Hurricane	Delta	2020	Gulf Coast of United States, Southeast, Northeast (AL, GA, NC, SC, MS, LA, TX)	> 2 billion
Hurricane	Zeta	2020	Gulf coast of the United States, Southeastern United States, Mid-Atlantic	> 1.5 billion
Wildfire	Cameron Peak	08/13/20-12/02/20	Roosevelt National Forest, Larimer County, Colorado	~71 million
Wildfire	SCU Lightning Complex Wildfire	8/16/20-9/16/20	San Francisco Bay Area, Central Valley, Santa Clara, Alameda, Contra Costa, San Joaquin, Merced, Stanislaus	<1,000 million
Wildfire	Beachie Creek Wildfire	8/16/20-10/10/20	Approx. 2 miles south of Jaw Bones flats in rugged terrain deep in the Opal Creek Wilderness.	>1,000 million
Wildfire	CZU Lightning Complex Wildfire	8/16/20-9/22/20	San Mateo and Santa Cruz Counties, California	>1,000 million
Wildfire	LNU Lightning Complex Wildfire	8/17/20-10/2/20	Lake, Napa, Sonoma, Solano, and Yolo Counties, California	> 1,000 million
Wildfire	Carmel Fire	8/18/20-9/4/20	Carmel Valley, California	<1,000 million

U.S. List of Catastrophes for Use in Reporting catastrophe Data in PR036 and PR100+

Wildfire	North Complex Fire	8/18/20-10/12/20	Plumas and Butte Counties, California	<1,000 million
Wildfire	Creek Fire	9/4/20-10/12/20	Fresno and Madera Counties, California	<1,000 million
Wildfire	Bobcat Fire	9/6/20-10/23/20	Central San Gabriel Mountains, in and around the Angeles National Forest California	< 1,000 million
Wildfire	Babb Road Fire	9/7/20-9/18/20	Malden and Pine City, Palouse County of Eastern Washington	<1,000 million
Wildfire	Almeda Fire	9/7/20-9/16/20	Jackson County, Oregon	<1,000 million
Wildfire	Holiday Farm Fire	9/7/20-10/3/20	Willamette National Forest	<1,000 million
Wildfire	Echo Mountain Complex Fire	9/7/20-9/23/20	north of Lincoln City, Oregon	<100 million
Wildfire	Riverside Fire	9/8/20-10/3/20	Valley Drive between Misty Ridge Drive and Mitchell Avenue, Oregon	<100 million
Wildfire	Slater Fire	9/8/20-10-9/20	Northern California and Southern Oregon	<100 million
Wildfire	Glass Fire	9/27/20-10/19/20	Napa and Sonoma Counties, California	> 1,000 million
Wildfire	East Troublesome Fire	10/14/20-11/9/20	Grand County, Colorado	~543 million
Tropical Storm	Claudette	2021	Gulf Coast of the United States, Georgia, Carolinas	> 350 million
Hurricane	Elsa	2021	East Coast of the United States	1.2 billion
Tropical Storm	Fred	2021	Eastern United States (particularly Florida and North Carolina)	1.3 billion
Hurricane	Henri	2021	Northeastern United States	550 million
Hurricane	Ida	2021	Gulf Coast of the United States (especially Louisiana), East Coast of the United States (especially the Northeastern United States)	44 billion
Tropical Storm	Nicholas	2021	LA, TX	>1.1b
Tropical Storm	Wanda	2021	Southern United States, Mid-Atlantic United States, Northeastern United States	>200 million
Wildfire	Bootleg Wildfire	7/17/21-8/6/21	Northwest of Beatty, Oregon	<1,000 million
Wildfire	Dixie Wildfire	7/14/21-10/5/21	Butte, Plumas, Tehama, Lassen and Shasta Counties, California	>1,000 million
Wildfire	Caldor Fire	8/14/21-10/5/21	El Dorado National Forest and other areas of the Sierra Nevada in El Dorado, Amador, and Alpine County, California	<1,000 million
Wildfire	Corkscrew Fire	8/15/21-8/30/21	Ford, WA; Tum Tum, Springdale, City of Deer Park, Loon Lake, Clayton, H395, Scoop Mt	<100 million
Wildfire	Marshall Fire	12/30/21-1/1/22	Boulder County, Colorado	~ 2 billion
Wildfire	Calf Canyon/Hermits Peak Fire	4/6/22-8/22/22	San Miguel County, Mora County, Taos County	> 25 million
Wildfire	McKinney Fire	7/29/22-9/7/222	Siskiyou County, Northern California	> 25 million
Wildfire	Cedar Creek Fire	8/1/22-present	Central Oregon	> 25 million
Wildfire	Mosquito Fire	9/6/22- present	Northern California, Placer County, El Dorado County	> 25 million
Hurricane	Hurricane Fiona	9/18/22-9/20/22	PR	>3 billion
Hurricane	Jan	9/23/22-10/2/22	Florida and the Carolinas, FL, GA, NC, SC, VA	>110 billion
Hurricane	Hurricane Nicole	11/9/22-11/11/22	FL, GA, SC	>1 billion
Wildfire	Hawaii Wildfire	8/8/23-8/17/23	Hawaii	> 25 million
Hurricane	Hurricane Hilary	8/17/23-8/22/23	West, Southwest United States	> 25 million
Wildfire	Washington Wildfire	8/18/23-8/22/23	Washington	> 25 million
Hurricane	Hurricane Idalia	8/27/23-8/31/23	Southeastern United States	> 25 million
Hurricane	Hurricane Lee	9/14/23-9/17/23	Northeast United States	> 25 million
Tropical Storm	Ophelia	9/22/23-9/26/23	East Coast of the United States	> 25 million

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

Year	Event Type	Begin	End	Event	Country	Affected Area (Detail)	Munich Re NatCATService Insured losses (in original values, US\$m) Criteria: insured losses equal/greater US\$ 25m. Tries to reflect non-US losses only	Swiss Re Sigma: Insured Loss Est. US\$m (mid point shown if range given) Mostly reflect total US and nonUS losses combined.	
2014	Earthquake	07/07/2014		Earthquake	Mexico, Guatemala		N/A	N/A	25+million
2014	Earthquake	04/01/14		Earthquake	Chile		N/A	N/A	100+million
2014	Earthquake	12/02/2014		Earthquake	China		N/A	N/A	350+million
2014	Earthquake	05/04/2014		Earthquake	China		N/A	N/A	80+million
2014	Earthquake	05/05/2014		Earthquake	Thailand		N/A	N/A	62+million
2014	Earthquake	05/24/14		Earthquake	China		N/A	N/A	60+million
2014	Tropical Storm	06/14/14	06/16/14	TS Hagbis	China		N/A	N/A	131+million
2014	Super Typhoon	07/08/14	07/11/14	STY Neoguri	Japan		N/A	N/A	100+million
2014	Super Typhoon	07/15/14	07/20/14	STY Rammason		Philippines, China, Vietnam	N/A	N/A	570+million
2014	Typhoon	07/22/14	07/24/14	TY Matmo		Taiwan, China, Philippines	N/A	N/A	570+million
2014	Cyclone	01/10/14	01/12/14	CY Ian	Tonga		N/A	N/A	48+million
2014	Cyclone	04/10/14	04/14/14	CY Ita	Australia		N/A	N/A	1+million
2014	Wildfire	Summer 2014		Northwest Territories Fire	Canada	Northwest Territories, Canada			~\$3.6b
2015	Hurricane	08/16/92	08/28/92	Hurricane Andrew	Bahamas	Bahamas			> 25 million
2015	Hurricane	10/20/15	10/24/15	Hurricane Patricia		Central America, Mexico	N/A	N/A	> 25 million
2015	Typhoon	06/26/15	07/13/15	Typhoon Chan-hom (Falcon)		Guam, Northern Mariana Islands, Philippines, Japan, Taiwan, Chian, Korea, Russian Far East	N/A	N/A	> 25 million
2015	Severe Tropical Storm	07/01/15	07/10/15	Severe Tropical Storm Linfa (Egay)		Philippines, Taiwan, China	N/A	N/A	> 25 million
2015	Typhoon	07/02/15	07/18/15	Typhoon Nangka		Marshall Islands, Mariana Islands and Japan	N/A	N/A	> 25 million
2015	Typhoon	07/29/15	08/12/15	Typhoon Soudelor (Hanna)		Mariana Islands, Japan, Philippines, Taiwan, Eastern China and South Korea	N/A	N/A	> 25 million
2015	Typhoon	08/13/15	08/30/15	Typhoon Goni (Ineng)		Mariana Islands, Japan, Philippines, Taiwan, China, Russia and Korea	N/A	N/A	> 25 million
2015	Severe Tropical Storm	09/06/15	09/11/15	Severe Tropical Storm Etau		Japan, Russian Far East	N/A	N/A	> 25 million
2015	Typhoon	09/19/15	09/30/15	Typhoon Dujan (Jenny)		Ryukyu Islands, Taiwan, East China	N/A	N/A	> 25 million
2015	Typhoon	09/30/15	10/05/15	Typhoon Mujigae (Kabayan)		Philippines, Vietnam and China	N/A	N/A	> 25 million
2015	Typhoon	10/12/15	10/21/15	Typhoon Koppu (Lando)		Northern Mariana Islands, Philippines, Taiwan, Ryukyu Islands	N/A	N/A	> 25 million
2015	Typhoon	12/03/15	12/08/15	Storm Desmond		Ireland, Isle of Man, United Kingdom, Iceland, Norway and Sweden	N/A	N/A	> 25 million
2015	Hurricane	09/28/15	10/15/15	Hurricane Joaquin		Caribbean Islands, Portugal	N/A	N/A	> 25 million
2015	Earthquake	04/27/15		Earthquake	Nepal		N/A	N/A	> 25 million
2015	Earthquake	09/22/15		Earthquake	Chile		N/A	N/A	> 25 million
2015	Wildfire	11/25/15	12/02/15	Pinery Bushfire	Australia	Lower Mid North, Light River, West Barossa, South Australia, Australia			\$75m
2015	Wildfire	12/25/15		Wye River, Separation Creek bushfires,	Australia	Great Ocean Road region of Victoria, Australia			~\$110m
2016	Hurricane	08/28/16	09/06/16	Hurricane Hermine		Dominican Republic, Cuba, The Bahamas	N/A	N/A	> 25 million
2016	Tropical Cyclone	02/16/16	02/22/16	TC Winston		South Pacific Islands	N/A	N/A	> 25 million
2016	Earthquake	02/06/16		Earthquake	Taiwan	Asia	N/A	N/A	> 25 million
2016	Earthquake	01/03/16		Kaohsiung EQ	India, Bangladesh, Myanmar	Asia	N/A	N/A	> 25 million
2016	Earthquake	02/14/16		Christchurch EQ	New Zealand	Oceania	N/A	N/A	> 25 million
2016	Earthquake	04/14/16	04/16/16	Kumamoto EQs	Japan	Asia	N/A	N/A	> 25 million

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

2016	Earthquake	04/16/16		Ecuador EQ	Ecuador	South America	N/A	N/A	> 25 million
2016	Tropical Cyclone	05/14/16	05/23/16	CY Roanu	Sri Lanka, India, Bangladesh, China	Asia	N/A	N/A	> 25 million
2016	Earthquake	08/24/16		Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/14/16	09/16/16	STY Meranti	China, Taiwan, Philippines	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	07/08/16	07/12/16	STY Nepartak	China, Taiwan	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/26/16	09/29/16	TY Megi	Taiwan, China	Asia	N/A	N/A	> 25 million
2016	Earthquake	09/10/16		Kagera EQ	Tanzania, Uganda	Africa	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/29/16	09/01/16	TY Lionrock	China, Japan, South Korea	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/19/16	09/22/16	TY Malakas	Japan, China	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/18/16	08/20/16	TS Dianmu	China, Vietnam	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	07/31/16	08/03/16	TY Nidia	China, Philippines Vietnam	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/02/16	08/10/16	HU Earl	Belize, Mexico, Caribbean Islands	Caribbean Islands, Mexico and Central America	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/22/16	08/23/16	TS Mindulle	Japan	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/06/16	09/08/16	HU Newton	Mexico	North America (non-U.S.)	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/04/16	10/07/16	STY Chaba	Japan, Korea	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/16/16	10/22/16	STY Haima	Philippines, China	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/14/16	10/20/16	TY Sarika	Philippines, China, Vietnam	Asia	N/A	N/A	> 25 million
2016	Earthquake	10/26/16		Central Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Earthquake	10/27/16		Central Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Earthquake	10/21/16		Tottori	Japan	Asia	N/A	N/A	> 25 million
2016	Hurricane	09/28/16	10/10/16	Hurricane Matthew		Caribbean Islands and Eastern Canada	N/A	N/A	> 25 million
2016	Hurricane	08/28/16	09/06/16	Hurricane Hermine		Dominican Republic, Cuba, The Bahamas	N/A	N/A	> 25 million
2016	Wildfire	01/06/16		Waroona-Yarloop Bushfire	Western Australia				~\$71.25m
2016	Wildfire	05/01/16	05/26/16	Canada Wildfire	Canada	Fort McMurray			\$3.52b
2016	Wildfire	11/22/16	11/27/16	November 2016 Israel Fires	Israel	Various regions in Israel, mainly in Haifa, Judaean Mountains and the Sharon Plain			>\$25m
2017	Earthquake	01/18/17		Earthquake	Italy	Europe	N/A	N/A	> 25 million
2017	Earthquake	01/28/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Earthquake	02/10/17		Earthquake	Philippines	Asia	N/A	N/A	> 25 million
2017	Earthquake	03/27/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Cyclone	03/28/17	04/05/17	CY Debbie	Australia	Queensland, New South Wales, New Zealand	N/A	N/A	> 25 million
2017	Earthquake	05/11/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Typhoon	07/29/17	07/31/17	TY Nesat & TS Haitang	China, Taiwan, Philippines	Asia	N/A	N/A	> 25 million
2017	Typhoon	08/07/17	08/09/17	Typhoon Noru	Japan	Asia	N/A	N/A	> 25 million
2017	Earthquake	08/08/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Typhoon	08/23/17	08/24/17	TY Hato	China	Macau, Hong Kong	N/A	N/A	> 25 million
2017	Typhoon	08/25/17	08/28/17	TY Pakhar	China	Asia	N/A	N/A	> 25 million
2017	Hurricane	08/25/17	09/02/17	Hurricane Harvey		Caribbean Islands and Central America	N/A	N/A	> 25 million
2017	Hurricane	08/30/17	09/16/17	Hurricane Irma		Caribbean Islands and Cape Verde	N/A	N/A	> 25 million
2017	Hurricane	09/05/17	09/26/17	Hurricane Jose		Caribbean Islands and Eastern Canada	N/A	N/A	> 25 million
2017	Hurricane	09/16/17	10/03/17	Hurricane Maria		Caribbean Islands, UK, France and Spain	N/A	N/A	> 25 million
2017	Earthquake	09/07/17		Earthquake		Mexico, Guatemala	N/A	N/A	> 25 million
2017	Earthquake	09/19/17		Earthquake	Mexico	Mexico City	>200	N/A	> 25 million
2017	Hurricane	10/04/17		Hurricane Nate		Central America, Cayman Islands, Cuba Yucatan Peninsula	N/A	N/A	> 25 million
2017	Wildfire	06/06/17		Knysna Fires	South Africa	Knysna region of the Western Cape			~\$146m
2017	Wildfire	07/01/17	08/01/17	British Columbia Wildfires	Canada	British Columbia			>\$78m
2017	Wildfire	10/15/17	10/16/17	Iberian Wildfires	Portugal	Northern Portugal and Northwestern Spain			~\$210m
2018	Earthquake	02/06/18		Earthquake	Taiwan				> 25 million

Attachment Nine
Capital Adequacy (E) Task Force
12/2/23

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

2018	Earthquake	02/16/18		Earthquake	Mexico				> 25 million
2018	Cyclone	02/09/18	02/20/18	CY Gita	Tonga, Fiji, Samoa, New Zealand				> 25 million
2018	Earthquake	02/26/18		Earthquake	Papua New Guinea				> 25 million
2018	Earthquake	03/05/18		Earthquake	Papua New Guinea				> 25 million
2018	Cyclone	03/17/18		CY Marcus					> 25 million
2018	Tropical Storm	05/23/18	05/27/18	Tropical Storm Mekunu	Yamen, Oman , Saudi Arabia				> 25 million
2018	Tropical Storm	06/02/18	06/07/18	Tropical Storm Ewiniar	Vietnam, China, Taiwan, Philippines and Ryukyu Islands	Guangdong Province, Jiangxi, Fujian, Zhejiang Provinces, and Hainan Island.			> 25 million
2018	Earthquake	06/18/18		Earthquake	Japan				> 25 million
2018	Super Typhoon	07/10/18	07/12/18	STY Maria	China, Taiwan, Guam and Japan	Fujian province, Yantze River Basin, Japan's Ryukyu Islands			> 25 million
2018	Tropical Storm	07/17/18	07/24/18	TS Sonh-Tinh	Vietnam, China, Loas	Japan, Russian Far East			> 25 million
2018	Tropical Storm	07/22/18	07/25/15	TS Ampil	China	Jiangsu, Zhejiang, Shandong, and Hebei			> 25 million
2018	Typhoon	07/27/18	08/03/18	TY Jongdari	Japan, China				> 25 million
2018	Earthquake	08/05/15	08/09/18	Earthquake	Indonesia				> 25 million
2018	Tropical Storm	08/09/18	08/15/18	TS Yagi	Philippines, China	Zhejiang, Anhui, Jiangsu and Shandong Provinces.			> 25 million
2018	Tropical Storm	08/13/18	08/19/18	TS Bebinca	China	Hong Kong, Guangdong and Hainan			> 25 million
2018	Typhoon	08/16/18	08/18/18	TY Rumbia	China	Shanghai, Jiangsu, Zhehiang, Anhui, Shandong and Henan			> 25 million
2018	Typhoon	08/23/18	08/25/18	TY Soulik	Japan, South Korea, China and Russia	Haenam County, South Jeolla Province			> 25 million
2018	Typhoon	09/04/18	09/05/18	RY Jebi	Japan, Mariana Islands, Taiwan, Japan, Russian Far East and Artic				> 25 million
2018	Earthquake	09/06/18		Earthquake	Japan	Hokkaido			> 25 million
2018	Super Typhoon	09/15/18	09/18/18	STY Mangkhut	N. Mariana Islands, Philippines, China and Hong Kong				> 25 million
2018	Hurricane	Leslie	09/23/18	Hurricane Leslie	Azores, Bermuda, Europe	Azores, Bermuda, Madeira, Iberian Peninsula, France			> 25 million
2018	Hurricane	10/07/18	10/16/18	Hurricane Michael	Central American, Yucatan Peninsula, Cayman Islands, Cuba, Atlantic, Canad				> 25 million
2018	Wildfire	May-18	Aug-18	Sweden Wildfires	Sweden	ranging from north of Arctic Circle to the southern County of Scania.			>\$87m
2018	Wildfire	Jul-18		Greece Wildfires	Greece	Attica, Greece			~38.1m
2019	Cyclone	05/03/19	05/05/19	Cyclone Fani	India, Bangladesh				>500 million
2019	Earthquake	06/17/19		Earthquake	China				> 25 million
2019	Tropical Storm	08/01/19	08/08/19	Tropical Storm Wipha	China, Vietnam				> 25 million
2019	Typhoon	08/09/19	08/11/19	Typhoon Lekima	China				> 855 million
2019	Typhoon	08/15/19	08/16/19	Typhoon Krosa	Japan				>25 million
2019	Hurricane	08/31/19	09/07/19	Hurricane Dorian	Caribbean, Bahamas, Canada				>1 billion
2019	Typhoon	09/05/19	09/08/19	Typhoon Lingling	Japan, China, Korea				>5.78 billion
2019	Typhoon	09/08/19	09/09/19	Typhoon Faxai	Japan				> 7 billion
2019	Hurricane	09/19/19	09/22/19	Hurricane Humberto	Bermuda				>25+ million
2019	Hurricane	09/17/19	09/26/19	Hurricane Lorenzo	Portugal				>25+ million
2019	Earthquake	11/26/19		Earthquake	Albania				>25+ million
2019	Cyclone	11/08/19	11/11/19	Cyclone Matmo (Bulbul)	India, Bangladesh				>25+ million
2019	Typhoon	10/01/19	10/02/19	Typhoon Hagibis	Japan				> 7 billion
2019	Earthquake	12/18/19		Earthquake	Philippines				>25+ million
2019	Wildfire	Sep-19	Mar-20	Australian Bushfires	New South Wales, Queensland, Victoria, South Australia, Western Australia, Tasmania and Northern Territory				~910 million
2020	Earthquake	03/22/20		Earthquake	Croatia				>25+ million
2020	Cyclone	04/01/20	04/11/20	Cyclone Harold	Solomon Islands, Canuatu, Fiji, Tonga				> 25+ million
2020	Tropical Storm	05/31/20		Tropical Storm Amanda	El Salvador, Guatemala, Honduras				> 25+ million
2020	Tropical Storm	06/01/20	06/05/20	Tropical Storm Cristobal	Mexico, Guatemala, El Salvador				150 million
2020	Hurricane	07/25/20	07/27/20	Hurricane Hanna	Mexico				350 million
2020	Hurricane	07/28/20	08/01/20	Hurricane Isaias	Caribbean, Canada				> 3 billion
2020	Hurricane	08/22/20	08/25/20	Hurricane Laura	Caribbean				> 4 billion

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

2020	Typhoon	05/15/20	05/22/20	Typhoon Amphan	India, Bangladesh, Sri Lanka			15 billion
2020	Tropical Storm	06/03/20	06/04/20	Tropical Storm Nisarga	India			> 25+ million
2020	Typhoon	08/03/20	08/04/20	Typhoon Hagupit	China, Taiwan			> 100+ million
2020	Hurricane	10/05/20	10/12/20	Hurricane Delta	Jamaica, Nicaragua, Cayman Island, Yucatan Peninsula			> 2 billion
2020	Hurricane	10/24/20	10/30/20	Hurricane Zeta	Cayman Islands, Jamaica, Central America, Yucatan Peninsula, Ireland, United Kingdom			> 1.5 billion
2020	Cyclone	04/01/20	04/11/20	Cyclone Harold	Solomon Islands, Canuatu, Fiji, Tonga			> 25+ million
2020	Hurricane	10/31/20	11/14/20	Hurricane Eta	Colombia, Jamaica, Central America, Cayman Islands, Cuba, The Bahamas			> 7.9 billion
2020	Hurricane	11/14/20	11/19/20	Hurricane Iota	ABC Islands, Colombia, Jamaica, Central America			> 1.4 billion
2020	Typhoon	11/22/20	11/23/20	Typhoon Goni	Philippines, Vietnam, Cambodia, Laos			> 400+ million
2020	Typhoon	11/08/20	11/15/20	Typhoon Vamco	Philippines, Vietnam, Laos, Thailand			> 400+ million
2020	Wildfire	10/04/20		Lake Ohau Fire	New Zealand	Northwest of Lake Ohau Village		~\$25m
2020	Wildfire	02/05/21		Perth Hills Wildfire	Australia	Shire of Mundaring, Shire of Chittering, Shire of Northam City of Swan		~\$63m
2021	Earthquake	01/14/21	01/14/21	West Sulawesi	Indonesia			> 58.1 million
2021	Earthquake	02/13/21	02/13/21	Fukushima Prefecture Offshore	Japan			1.3 billion
2021	Tropical Cyclone	05/17/21		Tropical Cyclone Tautae	India			> 25+ million
2021	Tropical Storm	06/19/21	06/23/21	Tropical Storm Claudette	Oaxaca, Veracruz, Atlantic Canada			> 25+ million
2021	Earthquake	06/21/21	06/21/21		Yunnan Dali			> 25+ million
2021	Earthquake	06/21/21	06/21/21		Southern Qinghai			> 25+ million
2021	Hurricane	07/01/21	07/14/21	Elsa	Lesser Antilles, Greater Antilles, Venezuela, Colombia, Atlantic Canada, Greenland, Iceland			50 million
2021	Typhoon	07/16/21	07/31/21	In-fa (Fabian)	Philippines, Ryukyu Islands, Taiwan, China, North Korea			> 25+ million
2021	Tropical Storm	08/11/21	08/20/21	Fred	Lesser Antilles, Greater Antilles, Southern Quebec, The Maritimes			25 million
2021	Hurricane	08/13/21	08/21/21	Grace	Lesser Antilles, Greater Antilles, Yucatan Peninsula, Central Mexico			513 million
2021	Earthquake	08/14/21	08/14/21		Haiti			1 billion
2021	Hurricane	08/26/21	09/04/21	Ida	Venezuela, Colombia, Jamaica, Cayman Islands, Cuba, Atlantic Canada			> 250 million
2021	Earthquake	09/07/21	09/07/21	Guerrero	Mexico			200 million
2021	Earthquake	09/16/21			China			> 25+ million
2021	Hurricane	09/12/21	09/18/21	Nicholas	Yucatan Peninsula, Tamaulipas			1.1 billion
2021	Hurricane	09/10/21	09/11/21	Larry	Canada			80 million
2021	Cyclone	10/02/21	10/04/21	Cyclone Shaheen	Oman, Iran, India, Pakistan, United Arab Emirates, Saudi Arabia, Yemen			> 25+ million
2021	Earthquake	10/07/21	10/07/21		Japan			> 25+ million
2021	Tropical Storm	10/10/21	10/14/21	Tropical Storm Kompas	Philippines, Hong Kong, China			245 million
2021	Earthquake	10/16/21	10/16/21		Indonesia			> 25+ million
2021	Tropical Cyclone	10/24/21	11/02/21	Apollo	Italy, Malta, Tunisia, Algeria, Libya, Turkey			> 25+ million
2021	Tropical Storm	10/31/21	11/07/21	Wanda	Atlantic Canada, Bermuda, Azores			> 25+ million
2021	Earthquake	11/14/21	11/14/21		Iran			> 25+ million
2021	Tropical Cyclone	12/14/21	12/18/21	Rai (Odette)	Caroline Islands, Palau, Philippines			> 25+ million
2022	Wildfire	01/15/22	02/28/22	Corrientes	Corrientes Province, Argentina			> 25+ million
2022	Earthquake	03/16/22		Fukushima Earthquake	Japan			2.8 billion
2022	Tropical Storm	04/08/22	04/12/22	Megi	Philippines			>25+ million
2022	Typhoon	08/28/22	09/07/22	Hinnamnor	Japan, Taiwan, Philippines, South Korea, Russian, Far East			>25+ million
2022	Earthquake	09/05/22		Luding Earthquake	Luding County in Sichuan province			>25+ million
2022	Hurricane	09/14/22	09/28/22	Fiona	Leeward Islands, Puerto Rico, Dominican Republic, Lucayan Archipelago, Bermuda, Eastern Canada, Saint Pierre and Miquelon, Greenland			660 million

Priority 1 – High Priority
Priority 2 – Medium Priority
Priority 3 – Low Priority

**CAPITAL ADEQUACY (E) TASK FORCE
WORKING AGENDA ITEMS FOR CALENDAR YEAR 2024**

2024 #	Owner	2024 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
Ongoing Items – Life RBC							
L1	Life RBC WG	Ongoing	Ongoing	Make technical corrections to Life RBC instructions, blank and /or methods to provide for consistent treatment among asset types and among the various components of the RBC calculations for a single asset type.			
L2	Life RBC WG	1	2023 or later	1. Monitor the impact of the changes to the variable annuities reserve framework and risk-based capital (RBC) calculation and determine if additional revisions need to be made. 2. Develop and recommend appropriate changes including those to improve accuracy and clarity of variable annuity (VA) capital and reserve requirements.	CADTF	Being addressed by the Variable Annuities Capital and Reserve (E/A) Subgroup	
L3	Life RBC WG	1	2023 or later	Provide recommendations for the appropriate treatment of longevity risk transfers by the updated longevity factors and consider expanding the scope to include all payout annuities.	New Jersey	Being addressed by the Longevity (E/A) Subgroup	
L4	Life RBC WG	1	2023 or later	Monitor the economic scenario governance framework, review material economic scenario generator updates, key economic conditions, and metrics, support the implementation of an economic scenario generator for use in statutory reserve and capital calculations and develop and maintain acceptance criteria		Being addressed by the Generator of Economic Scenarios (GOES) (E/A) Subgroup	
Carryover Items Currently being Addressed – Life RBC							
L4	Life RBC WG	1	2023 or later	Update the current C-3 Phase I or C-3 Phase II methodology to include indexed annuities with consideration of contingent deferred annuities as well	AAA		
L5	Life RBC WG	1	2023 or later	Review companies at action levels, including previous years, to determine what drivers of the events are and consider whether changes to the RBC statistics are warranted.			
L6	Life RBC WG	1	2023 or later	Work with the Academy on creating guidance for the adopted C-2 mortality treatment for 2023 and next steps.			
2024 #	Owner	2024 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
Ongoing Items – RBC IR & E							
Carryover Items Currently being Addressed – RBC IR & E							
IR1	RBC IRE	2	2023 or later	Supplementary Investment Risks Interrogatories (SIRI)	Referred from CADTF	The Task Force received the referral on Oct. 27. This referral will be tabled until the bond factors have been adopted and	1/12/2022 11/19/2020

					Referral from Blackrock and IL DOI	the TF will conduct a holistic review all investment referrals.	
IR2	RBC IRE	2	2023 or later	NAIC Designation for Schedule D, Part 2 Section 2 - Common Stocks Equity investments that have an underlying bond characteristic should have a lower RBC charge. Similar to existing guidance for SVO-identified ETFs reported on Schedule D-1, are treated as bonds.	Referred from CADTF Referral from SAPWG 8/13/2018	10/8/19 - Exposed for a 30-day Comment period ending 11/8/2019 3-22-20 - Tabled discussion pending adoption of the bond structure and factors.	1/12/2022 10/11/2018
IR3	RBC IRE	2	2023 or later	Structured Notes - defined as an investment that is structured to resemble a debt instrument, where the contractual amount of the instrument to be paid at maturity is at risk for other than the failure of the borrower to pay the contractual amount due. Structured notes reflect derivative instruments (i.e., put option or forward contract) that are wrapped by a debt structure.	Referred from CADTF Referral from SAPWG April 16, 2019	10/8/19 - Exposed for a 30-day Comment period ending 11/8/2019 3-22-20 - Tabled discussion pending adoption of the bond structure and factors.	1/12/2022 8/4/2019
IR4	RBC IRE	2	2023 or later	Comprehensive Fund Review for investments reported on Schedule D Pt 2 Sn2	Referred from CADTF Referral from VOSTF 9/21/2018	Discussed during Spring Mtg. NAIC staff to do analysis. 10/8/19 - Exposed for a 30-day comment period ending 11/8/19 3-22-20 - Tabled discussion pending adoption of the bond structure and factors.	1/12/2022 11/16/2018
New Items – RBC IR & E							
IR5			2023 or later	Evaluate the appropriate RBC treatment of Asset-Backed Securities (ABS), including Collateralized Loan Obligations (CLO), collateralized fund obligations (CFOs), or other similar securities carrying similar types of tail risk (Complex Assets).	Request from E Committee, SAPWG, VOSTF	Per the request of E Committee comments were solicited asking if these types of assets should be considered a part of the RBC framework.	1/12/2022
IR6			2023 or later	Evaluate the appropriate RBC treatment of Residual Tranches.	Request from E Committee, SAPWG, VOSTF	Per the request of E Committee comments were solicited asking if these types of assets should be considered a part of the RBC framework.	1/12/2022
IR7			2025 or later	Phase 2 Bond analysis - evaluate and develop an approach to map other ABS to current bond factors following the established principles from Phase I where the collateral has an assigned RBC. This project will likely require an outside consultant and the timeline could exceed 2-3 years.	Request from E Committee	Per the request of E Committee comments were solicited requesting the need for outside review.	1/12/2022
IR8	RBC IRE		2023 or later	Address the tail risk concerns not captured by reserves for privately structured securities.	Referral from the Macroprudential (E) Working Group		8/11/2022

2024 #	Owner	2024 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
Ongoing Items – P&C RBC							
P1	Cat Risk SG	1		Continue development of RBC formula revisions to include a risk charge based on catastrophe model output:			
			Year-end 2024 or later	a) Evaluate other catastrophe risks for possible inclusion in the charge - determine whether to recommend developing charges for any additional perils, and which perils or perils those should be.	Referral from the Climate and Resiliency Task Force. March 2021	4/26/21 - The SG exposed the referral for a 30-day period. 6/1/21 - The SG forwarded the response to the Climate and Resiliency Task Force. 2/22/22 - The SG adopted proposal 2021-17-CR (adding the wildfire peril for informational purposes only). The SG continues reviewing other perils for possible inclusion in the Rcat. 8/11/22 – The TF adopted Proposal 2022-04-CR (2013-2021 Wildfire Event Lists) 9/26/22 – The SG formed an ad hoc group to conduct review on severe convective storm models. 7/18/23-The SG is finishing reviewing the following SCS vendor models: RMS, Verisk, KCC, and Corelogic. 12/2/23-Proposal 2023-15-CR (Convective Storm for Informational Purposes Only Structure) was exposed for a 60-day comment period at the Joint P/C RBC and Cat Risk SG meeting.	4/26/2021
P2	PCRBCWG	1	Ongoing	Review and analyze the P/C RBC charges that have not been reviewed since developed.			3/23/2023
Carryover Items Currently being Addressed – P&C RBC							
P3	P&C RBC WG	1	Year-end 2025 or later	Evaluate a) the current growth risk methodology whether it is adequately reflects both operational risk and underwriting risk; b) the premium and reserve based growth risk factors either as a stand-alone task or in conjunction with the ongoing underwriting risk factor review with consideration of the operational risk component of excessive growth; c) whether the application of the growth factors to NET proxies	Refer from Operational Risk Subgroup	1) Sent a referral to the Academy on 6/14/18 conference call.	1/25/2018

				adequately accounts for growth risk that is ceded to reinsures that do not trigger growth risk in their own right.			
P4	P&C RBC WG	1	2024 Summer Meeting or later	Continue working with the Academy to review the methodology and revise the underwriting (Investment Income Adjustment, Loss Concentration, LOB UW risk) charges in the PRBC formula as appropriate.		11/16/23 The Academy provided a presentation on their Underwriting Risk Report at the Joint PCRBC And Cat Risk SG meeting.	6/10/2019
P5	P&C RBC WG	1	2023 Summer Meeting or later	Evaluate the Underwriting Risk Line 1 Factors in the P/C formula.			7/30/2020
P6	Cat Risk SG	1	2025 Spring Meeting	Quantify the R5 Ex-cat Factors for wildfire peril (for informational purposes only) Evaluate the possibility of adding PR018A to determine the R5 including the wildfire peril			3/21/2023
P7	Cat Risk SG	2	2025 Spring Meeting	Evaluate the impact of flood peril to the insurance market			3/21/2023
P8	PCRBCWG	1	2024 Spring Meeting	Adding pet insurance line in the RBC PR017, 018, 035 and RBC Schedule P, parts due to the adoption of the Annual Statement Blanks proposal 2023-01BWG.		12/2/23 Proposal 2023-14-P (Pet Insurance) was exposed for a 60-day comment period at the Joint P/C RBC and Cat Risk SG meeting.	7/27/2023
New Items – P&C RBC							
2024 #	Owner	2024 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
Ongoing Items – Health RBC							
X1	Health RBC WG	Yearly	Yearly	Evaluate the yield of the 6-month U.S. Treasury Bond as of Jan. 1 each year to determine if further modification to the Comprehensive Medical, Medicare Supplement and Dental and Vision underwriting risk factors is required. Any adjustments will be rounded up to the nearest 0.5%.	HRBCWG	Adopted 2022-16-CA (YE-2023)	11/4/2021
X2	Health RBC WG	3	Ongoing	Continue to monitor the Federal Health Care Law or any other development of federal level programs and actions (e.g., state reinsurance programs, association health plans, mandated benefits, and cross-border) for future changes that may have an impact on the Health RBC Formula.	4/13/2010 CATF Call	Adopted 2014-01H Adopted 2014-02H Adopted 2014-05H Adopted 2014-06H Adopted 2014-24H Adopted 2014-25H Adopted 2016-01-H Adopted 2017-09-CA Adopted 2017-10-H The Working Group will continually evaluate any changes to the health formula	

						because of ongoing federal discussions and legislation.	1/11/2018
						Discuss and monitor the development of federal level programs and the potential impact on the HRBC formula.	
Carryover Items Currently being Addressed – Health RBC							
X3	Health RBC WG	2	Year-End 2024 RBC or Later	Consider changes for stop-loss insurance or reinsurance.	AAA Report at Dec. 2006 Meeting	(Based on Academy report expected to be received at YE-2016) 2016-17-CA Adopted proposal 2023-01-CA	
X4	Health RBC WG	2	Year-end 2024 RBC or later	Review the individual factors for each health care receivables line within the Credit Risk H3 component of the RBC formula. Work with the American Academy of Actuaries (Academy) to inquire through the NAIC on the reporting of the health care receivables to better understand why these receivables are being reported as such. With the intention to produce recommendations to improve instruction clarity or provide additional guidance.	HRBC WG	Adopted 2016-06-H Rejected 2019-04-H Annual Statement Guidance (Year-End 2020) and Annual Statement Blanks Proposal (Year-End 2021) referred to the Blanks (E) Working Group	
X5	Health RBC WG	1	Year-end 2024 RBC or later	Work with the Academy to perform a comprehensive review of the H2 - Underwriting Risk component of the health RBC formula including the Managed Care Credit review (Item 18 above) Review the Managed Care Credit calculation in the health RBC formula - specifically Category 2a and 2b. Review Managed Care Credit across formulas. As part of the H2 - Underwriting Risk review, determine if other lines of business should include investment income and how investment income would be incorporated into the existing lines if there are changes to the structure.	HRBCWG	Review the Managed Care Category and the credit calculated, more specifically the credit calculated when moving from Category 0 & 1 to 2a and 2b.	4/23/2021 12/3/2018
X6	Health RBC WG	1	Year-end 2024 or later	Review referral letter from the Operational Risk (E) Subgroup on the excessive growth charge and the development of an Ad Hoc group to charge.	HRBCWG	Review if changes are required to the Health RBC Formula	4/7/2019
X7	Health RBC WG	2	Year-End 2024 or later	Consider the impact of COVID-19 and pandemic risk in the health RBC formula.	HRBCWG		7/30/2020
X8	Health RBC WG	3	Year-End 2025 or later	Discuss and determine the re-evaluation of the bond factors for the 20 designations.	Referral from Investment RBC July/2020	Working Group will use two- and five-year time horizon factors in 2020 impact analysis. Proposal 2021-09-H - Adopted 5/25/21 by the WG	9/11/2020
New Items – Health RBC							

2024 #	Owner	2024 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
Ongoing Items – Task Force							
CA1	CADTF	2	2023	Affiliated Investment Subsidiaries Referral Ad Hoc group formed Sept. 2016	Ad Hoc Group	Structural and instructions changes will be exposed by each individual working group for comment in 2022 with an anticipated effective date of 2023. Proposal 2022-09-CA was adopted at the 2022 Summer Meeting. Proposal 2022-09-CA MOD was adopted at the 2023 Spring Meeting. Proposal 2023-12-CA was adopted at the 2023 Fall Meeting.	
CA2			Ongoing	All investment related items referred to the RBC Investment Risk & Evaluation (E) Working Group			1/12/2022
CA3	CADTF	3	Ongoing	Receivable for Securities factor		Consider evaluating the factor every 3 years. (2024, 2027, 2030 etc.) Factors are exposed for comment. Comments due May 28, 2021 for consideration on June 30th. Factors Adopted for 2021.	
CA4	CADTF	1	2026 or later	Established the Risk Evaluation Ad Hoc Group to: a) Evaluate the RBC factors. b) Potentially develop an evaluating process. c) Prioritize those factors that require reviewing.		7/26/23 – the Risk Evaluation Ad Hoc Group established 3 Ad Hoc Subgroup to focus on different issues: 1) RBC Purposes & Guidelines Ad Hoc Subgroup; 2) Asset Concentration Ad Hoc Subgroup; and 3) Geographic Concentration Ad Hoc Subgroup.	03/23/2023
Carryover Items Currently being Addressed – Task Force							
New Items –Task Force							
CA5	CADTF	2	2024 or later	Evaluate if changes should be made in the RBC formula to reflect the split of the Annual Statement, Schedule D, Part 1 into two sections.	Blanks WG and SAPWG		12/2/2023

CA6	CADTF	2	2024 or later	Evaluate if changes should be made in the RBC formula to reflect the possible changes in the Annual Statement, Schedule BA proposal for non-bond debt securities	Blanks WG and SAPWG	12/2/23 – the TF received a referral from SAPWG regarding the possible Annual Statement reporting for debt securities that do not qualify as bonds on Schedule BA.	12/2/2023
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MEMORANDUM

TO: Carrie Mears, Chair Representative, Valuation of Securities (E) Task Force
Tom Botsko, Chair Representative, Capital Adequacy (E) Task Force

FROM: Dale Bruggeman, Chair of the Statutory Accounting Principles (E) Working Group
Kevin Clark, Vice-Chair of the Statutory Accounting Principles (E) Working Group

DATE: August 28, 2023

RE: SAPWG Schedule BA Proposal for Non-Bond Debt Securities

The purpose of this referral is to notify the Valuation of Securities (E) Task Force and Capital Adequacy (E) Task Force of the Statutory Accounting Principles (E) Working Group’s (SAPWG) proposal to report debt securities that do not qualify as bonds on Schedule BA. A key component of this notice is to highlight that the proposal uses existing Schedule BA reporting provisions for SVO-Assigned NAIC designations in determining RBC.

As preliminary information, as part of the bond project (Ref #2019-21) the SAPWG has been working on a revised bond definition to determine the structures that qualify for bond reporting, either as an issuer credit obligation on a new Schedule D-1-1 or as an asset-backed security on Schedule D-1-2. The new definition and the resulting statutory accounting guidance in *SSAP No. 26R—Bonds* and *SSAP No. 43R—Asset-Backed Securities* was adopted during the 2023 NAIC Summer National Meeting with an effective date of January 1, 2025. Revised bond reporting schedules are currently exposed by the Blanks (E) Working Group and those are anticipated to be considered for adoption by the end of the year. Also, during the 2023 Summer National Meeting, the SAPWG exposed accounting and reporting guidance for debt securities that do not qualify as bonds in *SSAP No. 21R—Other Admitted Assets* and received direction to sponsor a blanks proposal to capture these securities in new reporting lines on Schedule BA - Other Long Term Invested Assets.

The key aspect of this referral is to highlight that the blanks proposal for the new reporting lines intends to divide the debt securities that do not qualify as bonds into separate reporting lines based on whether they have NAIC designations assigned by the SVO from those securities with NAIC designations not assigned by the SVO or that do not have designations. The intent of this reporting is to permit debt securities that do not qualify as bonds, for which the SVO has assigned an NAIC designation, to receive the RBC factor that would have been received if the security had been reported on the bond schedule with an equivalent designation. Although the debt security does not qualify for reporting as a bond due to structure, if the SVO has assessed credit quality with the issuance of an NAIC designation, then the proposed reporting allows for a fixed income RBC factor.

To illustrate an example where a debt security may not meet the bond definition but may warrant a fixed income RBC factor, one of the key principles is that, for debt securities that rely on underlying collateral for repayment,

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underlying collateral must produce meaningful cash flows to service the debt to qualify as a bond. If the debt security relies on the underlying collateral retaining its **value** to repay the debt (e.g. through sale of collateral or refinancing), then it does not qualify to be reported as a bond. For example, a debt security could be secured by non-cashflow-producing real estate at a 50% loan-to-value. While it would not qualify to be reported as a bond, its characteristics are consistent with that of a mortgage loan, and may warrant a fixed income RBC charge.

This proposal does not intend to hinder the Capital Adequacy (E) Task Force’s ability to assess these debt securities and determine the appropriate RBC factor, it simply intends to allow an avenue for certain assets to receive a fixed income factor until the Capital Adequacy (E) Task Force decides if a separate project is needed to review and assess RBC factors for these debt securities. As noted, it is only proposed to be provided for the securities that have an SVO-assigned designation, which is consistent with other Schedule BA lines for which designations influence RBC. Note also that prior to the effective date of the bond definition, these securities are reported as bonds on Schedule D and receive bond RBC factors based on NAIC designation (whether from a credit rating provider for filing exempt securities, or an SVO assigned designation). After adoption, non-qualifying debt securities with NAIC designations that are not assigned by the SVO or that do not have designations are proposed to receive the RBC factor for “other” Schedule BA assets. This is also consistent with the Schedule BA lines that have these separate reporting determinants. Since only reporting entities that file using the life blank can receive RBC reductions for reporting SVO-assigned NAIC designations on Schedule BA, this provision is intended to only apply to those entities until / unless the Capital Adequacy (E) Task Force, and related RBC Working Groups, incorporate changes to provide those capabilities to non-life entities.

The intent of this referral is to inform the Task Forces of the current reporting proposal and request the Valuation of Securities (E) Task Force to assess whether additional guidance is needed within the *Purposes and Procedures Manual of the NAIC Investment Analysis Office* to permit or govern the assignment of SVO-Assigned NAIC Designations for debt securities that do not qualify as bonds.

The following illustrates the proposed Schedule BA reporting lines for these debt securities. A blanks proposal will be developed and exposed by the Blanks (E) Working Group to incorporate these revisions, as well as changes to the AVR with instructions that specifies the mapping from Schedule BA to the AVR for life RBC purposes.

Debt Securities That Do Not Qualify as Bonds

Debt Securities That Do Not Reflect a Creditor Relationship in Substance

NAIC Designation Assigned by the Securities Valuation Office (SVO)

Unaffiliated

Affiliated

NAIC Designation Not Assigned by the Securities Valuation Office (SVO)

Unaffiliated

Affiliated

Debt Securities That Lack Substantive Credit Enhancement

NAIC Designation Assigned by the Securities Valuation Office (SVO)

Unaffiliated

Affiliated

NAIC Designation Not Assigned by the Securities Valuation Office (SVO)

Unaffiliated

Affiliated

Debt Securities That Do Not Qualify as Bonds Solely to a Lack Of Meaningful Cash Flows

NAIC Designation Assigned by the Securities Valuation Office (SVO)

Unaffiliated

Affiliated

NAIC Designation Not Assigned by the Securities Valuation Office (SVO)

Unaffiliated

Affiliated

The Working Group appreciates your time and looks forward to your response. If you have any questions, please contact Dale Bruggeman, or Kevin Clark, SAPWG Chair and Vice Chair, with any questions.

Cc: Julie Gann, Robin Marcotte, Jake Stultz, Jason Farr, Wil Oden, Charles Therriault, Marc Pearlman, Eva Yeung, Dave Fleming, Crystal Brown, Maggie Chang

https://naiconline.sharepoint.com/teams/FRSStatutoryAccounting/Stat Acctg_Statutory_Referrals/2023/SAPWG to VOSTF & CAPTF - Schedule BA.docx



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November 13, 2023

Mr. Tom Botsko, Chairman
Capital Adequacy Task Force
National Association of Insurance Commissioners
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197

Dear Mr. Botsko:

Re: Exposure on Referral from the Statutory Accounting Principles Working Group (Dale Bruggeman) Regarding Schedule BA Proposal for Non-Bond Debt Securities

The American Council of Life Insurers (ACLI) appreciates the opportunity to comment on the above referenced exposure. ACLI is very appreciative of the referral from SAPWG as the ACLI believes both the new principles-based bond definition (effective date January 1, 2025) and any related risk-based capital (RBC) impact should be addressed concurrently.

The proposed breakout on Schedule BA includes the following three classification categories for securities that do not qualify as a bond (or will no longer qualify as a bond) under the principles-based bond definition (PBBB):

- Debt securities that do not reflect a creditor relationship in substance,
- Debt securities that lack substantive credit enhancement, and
- Debt securities that do not qualify as bonds solely to a lack of meaningful cash flows.

These categories are further segregated between those securities that have an NAIC Designation assigned by the SVO and those that do not have an NAIC Designation assigned by the SVO.

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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.

acli.com

ACLI is supportive of the proposed categorizations but is concerned that without addressing RBC concurrently, there may be punitive risk-based capital impacts for insurance companies. For example:

- There may be securities that do not qualify as a bond because they have more than a nominal interest rate adjustment (generally considered to be more than 10% - e.g., > 0.4% for a 4% yielding bond). For example, this might be an adjustment for a sustainability-linked bond where failure to achieve performance metrics causes the interest rate adjustment. Such a security likely is one where the SVO assigns an NAIC Designation or for which the security otherwise has a Credit Rating Provider (CRP) rating.
- There may be securities that do not qualify as bonds due to not having a substantive credit enhancement or meaningful cash flows for which the SVO assigns an NAIC Designation or for which the security otherwise has a CRP rating.

Without addressing RBC concurrently, ACLI understands such securities would default to a 30% RBC charge which can be punitive and inappropriate. For a security with an interest rate adjustment that is more than nominal, while maybe appropriate for disqualifying the security as a bond under the PBBD, it may still be relatively minor such that a 30% RBC charge would not be appropriate. Similarly, asset-backed securities that do not have a substantive credit enhancement or meaningful cash flows, have been likened to be more akin to collateral loans. The 30% RBC charge would be significantly more punitive than the 6.8% RBC charge that is currently assigned for collateral loans.

As a consequence, the ACLI believes the following would be appropriate actions by CATF:

- 1) Refer this exposure to the Risk-Based Capital Investment Risk and Evaluation WG (RBCIRE WG) recommending a project to determine the appropriate RBC charges for these security categories.
- 2) To the extent it is impractical to complete this work by the effective date of the PBBD, allow the continuance of both SVO assigned NAIC Designations and CRP ratings for purposes of RBC. Ensure the RBC infrastructure is in place until the RBCIRE WG can develop the appropriate risk commensurate for the RBC charges.
- 3) Work concurrently with the SVO to ensure a coordinated effort in utilizing SVO assigned NAIC Designations and CRP ratings. This could, for example, include ensuring the P&P Manual is updated, where appropriate, for the authority to utilize NAIC Designations and CRP ratings for these categories on Schedule BA.

The ACLI stands ready to assist in this process and help ensure the NAIC and the assignment of RBC charges continue to appropriately evolve and be refined for changes occurring elsewhere within the NAIC framework.

If you have any questions regarding this letter, please do not hesitate to contact us.

Sincerely,

Mike Monahan

Senior Director, Accounting Policy



Brian Bayerle

Chief Life Actuary



Cc: Eva Yeung, NAIC

Framework for Regulation of Insurer Investments – A Holistic Review

Executive Summary

- Recent initiatives to address gaps in the regulatory framework for insurer investments have received much attention by a variety of stakeholders.
- While the broader commentary has included many misconceptions around these initiatives, it has also included constructive feedback with themes and observations that many regulators have shared.
- At the most basic level, the question has arisen – **what is the most effective use of regulatory resources in the modern environment of insurance regulation for investments?**
- The historical focus of the SVO has been on risk assessment of individual securities, with filing exempt securities blindly reliant on credit rating providers (CRPs) for designations.
- The SVO currently lacks the tools to provide due diligence and assessment over the use and effectiveness of CRPs, or to conduct enterprise- or industry-wide risk analytics
- Rather than a framework that utilizes valuable SVO resources to prioritize synthesizing CRP functions, a more effective use of those resources would be to prioritize the establishment of a robust and effective governance structure for the due diligence of CRPs.
- Further, with investment in modern risk analytics tools, the SVO could provide invaluable risk analysis capabilities to better support the risk-focused approach to supervision, at both a micro- and macro-prudential level.
- This memo provides concrete proposals envisioning a modernization of the role and capabilities of the SVO in a way that correlates with the observed shift towards more complex and asset-intensive insurer business strategies.
- It also provides high-level guidelines for considering consistency of capital across assets as the investment RBC initiatives move forward, recognizing the practical limitations of absolute capital parity.

Background

There are several workstreams underway related to investments, which are meant to address a material, observable shift in insurer investment strategies – primarily but not limited to life insurance/reinsurance – toward more private assets, more structured assets and more complex assets. The workstreams are not meant to be punitive for the sake of being punitive, or to discourage innovation in insurers' investment strategies, but they recognize existing frameworks did not contemplate these investment strategies and will need to be enhanced to appropriately incorporate their characteristics into the regulatory framework.

While this goal is largely accepted by all interested parties as being necessary, the details of various proposals and the processes by which they have been undertaken have received an immense amount of attention from industry, other supervisory stakeholders and special interest groups, with stark divides in approval or disapproval of various initiatives. The collective commentary has included a significant amount of constructive feedback and valid critique, but has also been marked by misconceptions and competitive dynamics.

Recent comments have referred to these projects as “piecemeal” and “disjointed” and recommended a pause to all such workstreams. Others have suggested that these efforts are motivated by objectives other than enhancing regulators’ ability to protect policyholders. In reality, what is being observed is the natural strain that results from solving complex problems through open and democratic processes. A number of compounding factors contribute towards making these projects particularly challenging endeavors:

- (1) **Highly technical nature** – the ability to assess risk and design a regulatory framework for structured assets is highly dependent on the ability to model collateral performance through the capital structure of an extremely wide variety of securitization types. This requires highly specialized expertise. With experts from a divided group of stakeholders providing differing assessments of the modeled data, it is difficult for policy-making regulators to parse without conducting an impartial analytical study.
- (2) **Separate working groups** – the state-based framework has long utilized a “three-legged stool” approach to addressing accounting, risk assessment, and capital, which are governed by separate working groups. While all three legs of the stool have always needed to contemplate what the other legs were doing in order to have a cohesive regulatory framework, a project of this magnitude that spans all three legs requires a much more intensive level of coordination, which is further challenged by its exploratory nature.
- (3) **Exploratory nature** – assessing risk and capital is a balance between being too broad, and failing to appropriately capture material risks, and being too detailed, such that the framework is impractical to apply and too complex to be understood. Finding this balance is an iterative process of developing proposals, soliciting feedback, and adjusting or replacing proposals in response. This process inherently takes time and involves uncertainty around final outcome, but it also is not well understood by all stakeholders. This can result in disproportionately adverse reactions rather than the productive feedback that is necessary to reach what are often the common goals of all stakeholders. It also makes the coordination of working groups challenging, as the end state of each working group’s initiatives is unknown while in process.
- (4) **Capital parity** – as a number of stakeholders have pointed out, the capital framework should have a goal of assigning “equal capital for equal risk”. While this goal is likely non-controversial in the abstract, it doesn’t address the practical limitations of achieving this goal in absolute terms. First are the balancing considerations noted elsewhere here. But it also implies that all risks must be holistically evaluated at the same time, in order to prevent a change for one asset class from disadvantaging another by comparison. There is no question that these impacts are very important to consider as updates are made, and mitigating unequal treatment to the extent possible should be a goal. However, practical constraints may prevent this aspiration from being realized to the satisfaction of all parties.
- (5) **Limited resources** – just as the regulatory framework is a balance between being too broad and too detailed, so too is the use of regulatory resources a balance between impartiality and practicality. State regulators have at their disposal a valuable resource in the NAIC, and SVO specifically. However, these resources are not unlimited. There should be a deliberate evaluation of the best use of these limited resources. State regulators should not develop frameworks that prioritize using such resources in reperforming functions that can otherwise be satisfied using available market mechanisms, leaving no capacity for more impactful and macro-level risk assessment and analysis.

Purpose

While much of the characterization of these ongoing projects in the broader commentary is misplaced, it is prudent to reflect periodically on a holistic basis over the course of a complex project to evaluate potential areas for process improvement to the overall regulatory framework. **The intent of this memo is to highlight areas that regulators have identified where the insurance regulatory framework for investments could be enhanced based on reflections on the past several years of work on these issues, as well as comments on individual current initiatives and how they could be improved upon by addressing certain of the challenges described above.** This memo is not directly responsive to any particular feedback from stakeholders, but draws upon the experience of regulators involved in these workstreams, as well as comment letters written on current proposals, stakeholder communications not directly related to working group exposures, and ongoing conversations among regulators and stakeholders.

Proposed Regulatory Enhancements

A. Investment risk assessment / role of a centralized investment expertise function (e.g. SVO: IAO/SSG)

The current framework relies upon NAIC Designations for assets reported as bonds, with limited risk assessment for non-bond holdings. NAIC Designations currently are either provided directly by the SVO for filed securities or by a direct translation of a credit rating from a Credit Rating Provider (“CRP”) for those securities that are exempt from filing (“FE”). There is currently a “blind” reliance on the CRP rating, with no mechanism for overall due diligence around CRP usage, nor an ability to challenge an individual rating for not conforming to regulator expectations of how it was determined. Both of these issues are potentially addressed through current initiatives of the Valuation of Securities Task Force (“VOSTF”), with multiple challenges and concerns (both warranted and unwarranted) of how they may be implemented.

Proposed Framework to modernize the SVO:

- (1) Reduce/eliminate “blind” reliance on CRPs but retain overall utilization of CRPs **with the implementation of a strong due diligence framework**. This framework should be extremely robust with focused resources within the NAIC in its implementation and maintenance. This initiative should be a **primary** focus of the NAIC and **utilize an external consultant/resource to design & implement**. It is both inefficient and impractical for the SVO to effectively replicate the capabilities of CRPs on a large scale, and would not provide incremental benefit if the output is substantially similar. Rather, the SVO should focus primarily on holistic due diligence around CRP usage. That process must be vigorous and consequential (e.g. clear quantitative and qualitative parameters for CRPs utilized to provide ratings for use as NAIC designations).
- (2) **Retain ability** within the SVO to perform individualized credit assessment and utilize regulatory discretion when needed, **under well-documented and governed parameters**. This “backstop” should be embedded in the regulatory regime, but ideally would be rarely used if other governance is optimized.
- (3) **Enhance SVO’s portfolio risk analysis capabilities** with investment in a risk analytics tool and corresponding personnel, which could perform both company-specific risk analytics at the request of regulators, and industry-wide risk analytics for use in macroprudential efforts. **Review/increase staffing** to include analysts with investment actuarial and risk management backgrounds

that can provide dedicated investment-related support to risk-based capital and reserving teams, understanding the key functions of asset-liability management and resulting portfolio impacts.

- (4) **Enhance structured asset modeling capabilities** in line with #3 with less focus on individual designation production, but in support of the CRP due diligence function (can provide tools for validation of CRP designations), company and industry stress testing, and emerging risk identification. Provide additional resources to SSG to continue to build this capability, inclusive of **model governance** and validation of key parameters.
- (5) **Build out a broad policy advisory function** at the SVO that can consider and recommend future policy changes to regulators under a holistic lens, considering input from all impacted processes. If needed, **hire key external consultants** to be on retainer to provide key guidance on policy related issues, assess market impact and provide recommendations. This would be akin to the use of the Academy of Actuaries or similar for risk-based capital and reserving initiatives.
- (6) Consider establishing a **broad investment working group** under E committee that acts in an advisory capacity to various investment processes that would ultimately need more intensive regulator engagement and analysis on confidential basis (similar to FAWG/VAWG), including (1) review of bond reporting analysis under the principles-based bond definition, (2) challenges to individual designations provided by CRPs, (3) review of work provided by external consultants for investment-related projects for broad impacts to the framework (beyond the group that would have commissioned the review)
- (7) If the multitude of the above recommendations are implemented, rename the SVO and VOSTF to better reflect the responsibilities of the groups beyond securities valuation. **Empower SVO** to utilize the tools and analysis available to raise key issues to other applicable working groups, such as SAPWG or LATF (or RBC-IRE, but also noting key support for that group via an investment-focused actuarial team). **Reduce the size** of VOSTF membership or its successor to encourage active regulator engagement on core issues.

Impacts of Proposed Framework on Current Initiatives:

VOSTF:

- (1) CRP Due Diligence: Re-prioritize this initiative (currently in place with limited resources) and retain an external consultant to build out the framework. Allow for engagement with CRPs in its creation.
- (2) Regulatory Discretion over CRP designations: Continue deliberative process on this existing proposal to incorporate interested parties' constructive feedback on framework.
- (3) CLO/RMBS/CMBS Modeling: Review output in conjunction with the Academy of Actuaries and RBC-IRE to determine if (1) NAIC designations, (2) dynamic ad hoc modeling/stress capabilities or (3) a combination of both, are the most valuable use of SSG resources, noting the request above to provide additional resources to this group.

LATF:

- (1) SVO Staff enhanced as suggested above could be an additional resource in AG 53 type reviews, and may be able to provide validating analysis via its analytical tools.
- (2) Investment actuarial staff can provide key recommendations to enhancements to asset adequacy testing based on investment characteristics identified.

SAPWG:

- (1) No direct impact to implementation of the bond project outside of establishment of a working group that can assess specific assets for reporting purposes.

RBC-IRE:

- (1) Increased investment actuarial and risk management could provide key support to establishment of structured asset RBC factors given the cross-functional understanding of investments and RBC parameters.

B. Risk-Based Capital for Investments

The project to review RBC factors for investments remains in its infancy, but has made considerable strides with the formation for the RBC-IRE Working Group in 2022 and the engagement of the American Academy of Actuaries to begin developing factors for CLOs. As this project moves forward, the following guidelines should be considered:

- (1) Changes in RBC factors ***should consider market impacts and consistency across asset classes*** in determining when and how to implement such changes. While perfection under a principle of “Equal Capital for Equal Risk” is likely unachievable, it should nevertheless be a goal to create consistent standards to the highest degree practicable. For example, the current work at RBC-IRE is appropriately beginning with studying CLOs for developing RBC factors for structured securities. It is possible that new factors for CLOs would be available before a determination has been made for how to extrapolate a framework to other types of structured securities. As the phases of this project progress, care should be taken to consider the impacts of changing factors for an asset class while similar asset classes may remain unchanged. Factors to consider may include impacts to asset allocation and financial markets, in balance with the level of urgency of regulatory action.
- (2) The RBC-IRE Working Group should consider and address areas where inconsistencies in treatment across asset classes ***incentivize a particular legal form***. A key example of this is private credit funds, where the underlying assets are fixed income, but regulatory barriers frequently prevent them from receiving a fixed income capital charge, instead assigning an equity factor. This requires insurers to structure such investments into bond-form through securitization in order to receive a fixed income charge, which may ***“overcorrect”*** and lead to ***capital arbitrage***. Developing an avenue for such assets to receive a capital charge commensurate with the underlying asset risk would significantly reduce the need to form structured securities out of many types of private fixed income assets.