Conference Call

LONGEVITY RISK (A/E) SUBGROUP
Wednesday, July 17, 2019
2:00 p.m. ET / 1:00 p.m. CT / 12:00 p.m. MT / 11:00 a.m. PT

ROLL CALL

Rhonda Ahrens, Chair        Nebraska
Mike Yanacheak               Iowa
John Robinson                Minnesota
Seong-min Eom                New Jersey
William Carmello             New York
Peter Weber                  Ohio

AGENDA

1. Discuss Comments Received on the American Academy of Actuaries’ (Academy) Longevity Risk Task Force Proposal—Rhonda Ahrens (NE)
   - Academy Proposal
   - Subgroup Questions
   - Academy Comment Letter
   - American Council of Life Insurers’ Comment Letter
   - One America Comment Letter
   - Talcott Resolution Comment Letter
   - Attachment 1
   - Attachment 2
   - Attachment 3
   - Attachment 4
   - Attachment 5
   - Attachment 6

2. Discuss Any Other Matters Brought Before the Subgroup—Rhonda Ahrens (NE)

3. Adjournment

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Longevity Risk Task Force (LRTF) Update

Paul Navratil, MAAA, FSA
Chairperson, Longevity Risk Task Force
American Academy of Actuaries
Discussion Topics

☐ Preliminary Factor Proposal
☐ Objectives & Analysis Approach
☐ Field Study Results & Longevity Factor Calibration
☐ Next Steps
Preliminary Proposal Summary

- Recommend capital structure with longevity C-2 factors applied to base Statutory Reserves
  - Factor applied to present value of benefits for longevity reinsurance
- Propose that updated C-2 mortality factors (e.g., C-2a) and new C-2 longevity factors (e.g., C-2b) be implemented concurrently along with a covariance adjustment within C-2.
- Anticipated factors (working version below) vary with the total size of company reserves for in scope products, where reserves are a proxy for the credibility and volatility of company-specific longevity

<table>
<thead>
<tr>
<th>Total Reserves (in scope products)</th>
<th>C-2 Longevity After-Tax Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to $250M</td>
<td>1.35%</td>
</tr>
<tr>
<td>next $250M</td>
<td>0.85%</td>
</tr>
<tr>
<td>next $500M</td>
<td>0.75%</td>
</tr>
<tr>
<td>over $1B</td>
<td>0.70%</td>
</tr>
</tbody>
</table>
Objective & Philosophy

- The objective of our work is to develop a recommended method to incorporate longevity risk into the NAIC’s Life Risk-Based Capital (LRBC) formula.
- The scope of our work is LRBC. Statutory Reserves reflect longevity risk through prescribed mortality assumptions and asset adequacy testing requirements.
- Our proposal was developed in line with the overall objective of LRBC as being a tool for regulators to identify potentially weakly capitalized companies.
  - We took a practical approach in developing an initial longevity risk factor for LRBC that is not intended to precisely reflect all drivers nor align to an internal view of economic capital for all companies.
- We balanced several competing objectives in developing a longevity risk factor within LRBC:
  - Clear linkage of the calculation to statutory financial statements & regulatory ability to audit calculation
  - Accuracy and reasonability of the charge as a measure of longevity risk at the company level
  - Simplicity of the calculation
  - Consistency with the existing RBC framework
Overall Approach

- Scope to include longevity risk to payout annuity products and pension risk transfers. Other products such as variable annuities (VA), long-term care (LTC), and traditional deferred accumulation annuities are out of scope at this time. (Additional scope detail in Appendix)
- Based on discussions with the National Association of Insurance Commissioners (NAIC) Longevity Risk Subgroup, our analysis begins with the premise that LRBC is intended to cover tail risk in excess of the risk covered by Statutory Reserves.
  - Our work assumes Statutory Reserves adequately fund moderately adverse risk measured at the 85\textsuperscript{th} percentile and that LRBC covers longevity risk from the 85\textsuperscript{th} percentile to the 95\textsuperscript{th} percentile level
  - Our work assumes LRBC covers longevity risk over the lifetime of the policy
- RBC is intended to cover losses from increased longevity over the policy lifetime, summarized into two components for analysis:
  - Mortality Trend Risk—risk that future mortality improvements are greater than anticipated
  - Mortality Level Risk—error in initial mortality assumptions, including credibility of starting mortality rate assumption and volatility of individual company longevity outcomes
- Losses due to longevity risk are measured as the impact on reserves from stressed longevity assumptions.
- Loss amounts are expressed as a capital factor to be applied to the Statutory Reserves.
Field Study Results (Summary)

- Academy Field Study asked participating companies to run the impact of level and trend stresses to actual company reserves to confirm the calibration of the longevity risk charge. (Additional detail in Appendix)
- Results reflected the combined impact of the requested trend and level stresses, assuming independence.
- Results confirmed many expectations from our cell testing and resolved some outstanding questions with a combined impact that was comparable across products and ages (detail not included below).
- Field study indicated low prevalence of contingent deferred annuities where no benefits are payable if annuitant does not survive to benefit commencement. Our cell testing indicated greater risk as a percentage of reserves for this structure, and is a potential future enhancement.
- Red lines show recommended pre-tax LRBC factors.

Note: Error bars show result from 25th and 75th percentile responses.

“Cell Model” reflects expected study result derived from a simple reserve cell testing model constructed by the LRTF and shown for comparison. Cell model error bars are based on sensitivity tests of different assumed age distributions.

Field study requested mortality level shocks of 1% and 6% to represent companies with high and low credibility of mortality experience data.
Preliminary Factor Implementation

- Factors to be applied to Statutory Reserves for products in scope to determine C-2b longevity risk amount
- Factors and breakpoints were chosen to closely match total risk derived from the Field Study calibration
  - Simple approach with four factors shown provides results which closely match calibration from Field Study
  - Each factor applies at the margin to reserves in excess of the breakpoint, avoiding discontinuities in total C-2b for companies with reserves just above vs. below a breakpoint

<table>
<thead>
<tr>
<th>Reserve Level ($,M)</th>
<th>Calibrated Field Study Results</th>
<th>Marginal C-2b Factor</th>
<th>Total C-2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>1.35%</td>
<td>1.35%</td>
<td>1.35%</td>
</tr>
<tr>
<td>500</td>
<td>1.09%</td>
<td>0.85%</td>
<td>1.10%</td>
</tr>
<tr>
<td>1,000</td>
<td>0.92%</td>
<td>0.75%</td>
<td>0.92%</td>
</tr>
<tr>
<td>2,500</td>
<td>0.80%</td>
<td>0.70%</td>
<td>0.79%</td>
</tr>
<tr>
<td>5,000</td>
<td>0.75%</td>
<td>0.70%</td>
<td>0.74%</td>
</tr>
<tr>
<td>7,500</td>
<td>0.73%</td>
<td>0.70%</td>
<td>0.73%</td>
</tr>
<tr>
<td>10,000</td>
<td>0.72%</td>
<td>0.70%</td>
<td>0.72%</td>
</tr>
<tr>
<td>25,000</td>
<td>0.70%</td>
<td>0.70%</td>
<td>0.71%</td>
</tr>
<tr>
<td>50,000</td>
<td>0.69%</td>
<td>0.70%</td>
<td>0.70%</td>
</tr>
</tbody>
</table>

C-2 Calibration by Reserve Level ($,M)
**Sample Company Impacts**

- Introduction of “C-2b” charge is effective in identifying companies with concentrated exposure to longevity risk, and has appropriately smaller impact on companies with balanced risk exposures.
- Illustration shown using distribution of RBC amounts from aggregate 2017 Life RBC (additional calculation details provided in Appendix)
- Sample impacts shown for companies with Concentrated Longevity exposure (C-2b 3x greater than C-2a), Balanced Longevity exposure (C-2b equal to C-2a), and Low Longevity exposure (C-2a 5x greater than C-2b)
- Sample impacts also shown under a range of covariance assumptions between longevity and mortality

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Concentrated Longevity</th>
<th>Balanced Longevity</th>
<th>Low Longevity Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C2a Mortality/Other Insurance Risk</strong></td>
<td>25.1</td>
<td>25.1</td>
<td>25.1</td>
<td>25.1</td>
</tr>
<tr>
<td><strong>C2b Longevity Insurance Risk</strong></td>
<td>n/a</td>
<td>75.4</td>
<td>75.4</td>
<td>25.1</td>
</tr>
<tr>
<td><strong>Longevity - Mortality Correlation</strong></td>
<td>n/a</td>
<td>0%</td>
<td>-25%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>C-2 Insurance Risk</strong></td>
<td>25.1</td>
<td>79.5</td>
<td>73.3</td>
<td>25.1</td>
</tr>
<tr>
<td><strong>Calculated CAL RBC Ratio</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

517% 393% 407% 423% 496% 506% 517% 516% 518% 521%
Longevity Reinsurance

- This is a recurring premium product where a reinsurer is responsible for annuity payments based on actual longevity of covered lives in exchange for a premium stream (generally representing expected payments plus a fee).

- There were not enough Field Study responses from companies with Longevity Reinsurance for the LRTF to receive results.

- Although the product structure might not be common, we recommend it remaining in scope for longevity C-2 because the longevity risk is the same as a traditional single premium annuity product.

- There are two important adjustments needed to capture the longevity C-2 consistently with single premium annuities:
  1. **Capital Factor must be applied to the Present Value of annuity benefits under Statutory assumptions**
     - Under a net premium reserve methodology which reflect future premiums, reserves are zero at inception and remain much lower over time than reserves for a comparable Single Premium Immediate Annuity (SPIA)
     - The Statutory Reserve for a SPIA equals the full present value (PV) of benefits, so this is the comparable basis applicable for this product
  2. **Premium amounts excluded from Statutory Reserves should be netted against C-2 capital**
     - A net premium reserve methodology typically excludes a portion of future premiums to prevent a negative initial reserve
     - These excluded premiums are a source of funding for adverse longevity outcomes more severe than provided for in reserves
     - This allows for consistency with funded products where assets from the initial premium are available to fund capital
     - It is appropriate for future fees to fund reserves and capital because claims are only due if premiums are paid
Covariance

- The LRTF together with the Academy C-2 Mortality Work Group plan to develop an approach to reflect the correlation between mortality and longevity risk within C-2.

- The LRTF plans to limit the scope of this effort to mortality and longevity risk.
  - The correlation between longevity and mortality is significant and we believe should be considered concurrent with the implementation of a longevity risk charge.

- The covariance proposal will take into consideration the specific risks (i.e., basis/credibility, volatility, trend) considered in both the development of the longevity risk factors as well as by the Academy C-2 Mortality Work Group.
LRTF Next Steps

- Complete recommendation of covariance between C-2 mortality and C-2 longevity
- Complete more detailed documentation of analysis and recommendations
- Address questions & feedback from regulators and interested parties
Key Assumptions

- **Statutory Reserves** are adequate and cover risks at the 85th percentile.
- **Discount rate** of 5% (pre-tax) is used to calculate the present value loss amount from increased longevity. 5% rate was chosen to be consistent with the discount rate applied elsewhere in RBC (C-1 Bond Factors). Sensitivity analysis has been provided to illustrate the impact of a 4% discount rate.
- **Tax rate** of 21% used to calculate after-tax capital factors from pre-tax loss amounts. Tax adjustment applied to both the loss amount as well as the discount rate.
- **Mortality distribution** for future insured annuitants can be represented by the distribution of historical population mortality.
  - No differences in the volatility and probability distribution shape for insured mortality compared to the general population
  - Volatility and distribution of possible future improvements is consistent with the volatility of post-WWII historical improvements
  - Mortality improvements are normally distributed; this normal distribution was used to determine the 85th and 95th percentiles
  - 20 years is an appropriate period of time to calibrate an improvement stress that is applied for the entire lifetime of policies
  - Overlapping 20-year historical periods were assumed independent in developing the distribution of 20-year mortality improvements
Key Assumptions (Continued)

- **Independence** between Trend Risk and Level Risk, and among Level Risk components (Credibility, Population Volatility and Historical Trend). Each component was separately quantified then combined assuming the components were independent.

- **Old Age Calibration** showed similar absolute level of improvement rate volatility as younger ages. Mortality improvement stress was assumed to be a multiplicative factor of the baseline mortality improvement, resulting in a larger multiple (1.40x vs 1.16x) for older ages because the baseline mortality improvement is lower.

- **Policy Size Distribution** based on a 2009–2013 Individual Payout Annuity Mortality study by the Society of Actuaries (SOA) was used to adjust the volatility of deaths on a count basis to volatility on a dollar reserve basis.

- **Average reserve per policy** of $50,000 and **average block mortality rate** of 2% were assumed in scaling factors derived from the number of company experience period deaths to a total company reserve basis. This does not impact the overall quantification of longevity risk on a life count exposure basis, just the approach to scaling the factor from a life count to a Statutory Reserves basis.
Trend Stress Calibration

- Based on 20-year historical population improvement data.
  - Field study calibration originally based on data 1900–2013; subsequently adjusted to reflect recent population volatility post-WWII 1946–2013 (to exclude war impacts and reflect that total population mortality volatility has declined as population size has increased).
  - Data fit to a normal distribution to determine stresses for 85th and 95th percentiles (Based on regulator input and preference for normal distribution considering the limited number of non-overlapping 20-year historical periods. Use of CTE70 vs CTE90 levels would result in very similar stresses.)

- Multiplicative stress applied to valuation mortality improvement scale.
  - Greater stress used for older (>85) ages to reflect similar absolute trend volatility on a smaller average level of trend
  - Recommendation reflects 80% of Field Study requested trend stress after adjusting to 1946+ calibration
    - 16% stress to mortality improvement for ages <85 (resulting in a 1.16x multiple to improvement rates)
    - 40% stress to mortality improvement for ages 85+ (resulting in a 1.40x multiple to improvement rates)

<table>
<thead>
<tr>
<th>Avg AA/G2</th>
<th>1900-2013 Calibration (95th - 85th)</th>
<th>1946 - 2013 Calibration (95th - 85th)</th>
<th>Field Study Stress</th>
<th>Final Stress Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ages 35+</td>
<td>1.17%</td>
<td>1.27%</td>
<td>1.49%</td>
<td>1.31%</td>
</tr>
<tr>
<td>Ages 35 - 84</td>
<td>1.19%</td>
<td>1.41%</td>
<td>1.63%</td>
<td>1.45%</td>
</tr>
<tr>
<td>Ages 85+</td>
<td>0.59%</td>
<td>1.00%</td>
<td>1.28%</td>
<td>1.09%</td>
</tr>
</tbody>
</table>
Starting Mortality Level Stress Calibration

- Total Mortality Level Stress varies with the size and credibility of company mortality experience.
  - Larger companies with more insured lives will have less variability in company-specific outcomes
  - There remains fundamental population volatility that does not diversify away with size
- Overall mortality level stress varies between 0.7% and 6.0% of initial mortality rates.
- Mortality Level Stress was quantified using three largely independent components:
  1. Credibility Risk – captures credibility and volatility of insurer population specific mortality
  2. Volatility of Population Mortality – underlying volatility that is not diversified with larger blocks
  3. Trend Adjustment – impact of error in trend applied from experience period to valuation date

<table>
<thead>
<tr>
<th># Exp Yrs:</th>
<th>5</th>
<th>5</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td># Deaths</td>
<td>500</td>
<td>2,100</td>
<td>100,000</td>
</tr>
<tr>
<td>A. Credibility</td>
<td>5.8%</td>
<td>2.8%</td>
<td>0.4%</td>
</tr>
<tr>
<td>B. Pop Volatility</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>C. Trend Shift</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Total Level Stress</strong></td>
<td><strong>5.8%</strong></td>
<td><strong>2.9%</strong></td>
<td><strong>0.7%</strong></td>
</tr>
</tbody>
</table>
We’ve estimated life expectancy impacts of the capital stresses to provide further insight into the calibration results.

For Age 70 annuitants, the capital provides for an additional 0.3-0.4 years of life expectancy beyond reserve mortality.

This is in addition to 0.7-0.8 additional years of life expectancy beyond reserve mortality relative to 2012 Individual Annuity Mortality (IAM) Basic Table.

Reserve life expectancy comparison estimated under the assumption that IAM Basic table is an appropriate best estimate; actual best estimates will vary by block of business.
After-Tax Capital Factor

Two adjustments were made to convert from pre-tax to after-tax factors:
1. Loss amount was multiplied by 0.79 (1-21% tax rate)
2. Discount rate was also multiplied by 0.79 factor (5% pre-tax rate adjusted down to 3.95%)

The baseline recommendation reflects a 5% pre-tax discount rate to be consistent with the discount rate applied elsewhere in LRBC (e.g., recommended C-1 Bond factors).

Because the impact of longevity risk is increased in a low-interest-rate environment, it may be appropriate to consider a lower discount rate (such as 4%) for longevity risk capital. Note: stochastic modeling of interest rates was considered but not used as the basis for a recommendation due to the model complexity it would have required.

<table>
<thead>
<tr>
<th>Capital Factor</th>
<th>5% Discount Rate</th>
<th>4% Discount Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Tax</td>
<td>After-Tax</td>
</tr>
<tr>
<td>High Credibility</td>
<td>0.80%</td>
<td>0.71%</td>
</tr>
<tr>
<td>Low Credibility</td>
<td>1.55%</td>
<td>1.37%</td>
</tr>
</tbody>
</table>
Factor Scaling

- Recommend factor that varies by total Statutory Reserves for in-scope products
  - Size of in-scope product reserves used as a proxy for credibility and volatility of company mortality experience; a better measure would be total annual deaths, however this is not available in statutory statements
  - A key assumption in scaling risk based on total annual deaths to a reserve basis is the average reserve per policy which will vary considerably across blocks of business; $50,000 amount used below is used to illustrate a scaling approach and is not necessarily an average
  - Chart below shows the total capital calibrated from the Field Study stresses (first and last columns) mapped to corresponding total Statutory Reserve levels. Additional calibration points were added based on the relative total risk calculated from the cell testing model to calibrate at other reserve levels

<table>
<thead>
<tr>
<th># Exp Yrs:</th>
<th>5</th>
<th>5</th>
<th>5</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td># Deaths</td>
<td>475</td>
<td>1,000</td>
<td>10,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Total Level Stress</td>
<td>6.00%</td>
<td>4.15%</td>
<td>1.43%</td>
<td>1.01%</td>
</tr>
<tr>
<td>Calibrated Total After Tax Capital</td>
<td>1.37%</td>
<td>1.09%</td>
<td>0.75%</td>
<td>0.71%</td>
</tr>
<tr>
<td>Avg Qx</td>
<td>2.0%</td>
<td>2.0%</td>
<td>2.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td># Life Exposures</td>
<td>4,750</td>
<td>10,000</td>
<td>100,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Avg Reserve/policy</td>
<td>$ 50,000</td>
<td>$ 50,000</td>
<td>$ 50,000</td>
<td>$ 50,000</td>
</tr>
<tr>
<td>Total Reserve Level ($,M)</td>
<td>$ 238</td>
<td>$ 500</td>
<td>$ 5,000</td>
<td>$ 12,500</td>
</tr>
</tbody>
</table>
Products In and Out of Scope

Scope includes annuity products with life contingent payments where benefits are expected to be distributed in the form of an annuity.

- It does not include annuity products for which payments are certain only (non-life contingent).
- It does not include deferred annuities that have an annuitization option, but are not required to annuitize.
- It does not include variable annuities or contingent deferred annuities which are captured in C3 Phase 2 testing.

Product in scope include:

- **Single Premium Immediate Annuities (SPIAs) and Other Payout Annuities**: Annuities issued to individuals (not groups) in which a single premium is paid and a benefit payment is paid periodically during the time the person is alive, including deferred annuities that have moved to a payout stage.

- **Structured Settlements**: Annuities issued to individuals as part of a legal settlement in which a single premium is paid and benefit payments are paid periodically during the time the person is alive. Many structured settlement contracts involve substandard mortality.

- **Longevity Reinsurance**: A product offered to pension plan sponsors (or direct writers) in which the insurer (or reinsurer) makes payments to the pension plan sponsor (or direct writer) in the event that actual mortality experience of the pensioners is better (i.e., they live longer) than a defined level of experience per the contract (or, for a longevity swap, the payments are also made in the opposite direction in the event that actual mortality experience of the pensioners is worse, and may be based on a defined index). In exchange for these payments, the insurer or reinsurer may receive a periodic fee.

- **Group Immediate Annuities**: Annuities issued to groups in which a single premium is paid (in cash or in-kind assets) and benefit payments are paid to specified members of the group periodically during the time they are individually alive.

- **Deferred Payout Annuities (DPAs)**: Annuities issued to individuals in which premiums or deposits are made over a specified deferral period. At the end of the deferral period, benefit payments are paid to the individual periodically during the time the person is alive.

- **Group Deferred Payout Annuities**: This product is defined as annuities issued to groups in which premiums or deposits are made over a specified deferral period. At the end of the deferral period, benefit payments are paid to members of the group periodically during the time the person is alive.
Field Study Overview

- Conducted by the Academy Research Task Force (ARTF) (now Research Committee).
- LRTF developed instructions and a template completed by participating companies.
- Tested the impact to Statutory Reserves of stresses in base mortality rates and mortality improvement rates for policies in force on December 31, 2017.
- Field Study template was at a granular level to understand how drivers such as product type, valuation discount rate, policy duration, age, and gender impact risk.
- Results were submitted to ARTF from 19 companies.
- Company data kept confidential, only aggregated results with average, 25th, and 75th percentile responses for each requested cell shared with the LRTF.
Field Study Details

Run A – 2017 CARVM Valuation Basis (assumed to be 85th percentile)
  - 2012 IAM Table (1994 Group Annuity Reserving (GAR) Table)
  - Projection Scale G2 (Projection Scale AA for Group business)

Run B/C – 95th Percentile Stress – basis and volatility risk
  - 2012 IAM Table (1994 GAR for Group business), all rates adjusted for our defined basis risk stress event (99% factor for run B high credibility/large block or 94% factor for run C low credibility/small block)
  - Projection Scale G2 (Projection Scale AA for Group business)

Run D – 95th Percentile Stress – trend risk
  - 2012 IAM Table (1994 GAR for Group business)
  - Projection Scale G2 (Projection Scale AA for Group business), all improvement factors adjusted for our defined trend stress event (0.20%/0.50% stress for under/over age 85)

Capital = [(Run B/C - Run A)² + (Run D – Run A)²]¹/²
Sample Company Impacts Detail

Illustrated distribution of RBC risk based on aggregate 2017 Life RBC

Existing Formula: CAL RBC = C0 + [(C1o+C3a)^2 + (C1cs+C3c)^2 + (C2)^2 + (C3b)^2 + (C4b)^2]^{1/2} + C4a

Illustrated Formula Update: C2 = [C2a^2 + C2b^2 + 2*C2a*C2b*Corr_{a,b}]^{1/2}

<table>
<thead>
<tr>
<th></th>
<th>2017 Aggregated Life RBC($,B)</th>
<th>Concentrated Longevity Exposure Company Example</th>
<th>Balanced Longevity Exposure Company Example</th>
<th>Low Longevity Exposure Company Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-0 Asset Risk Affiliates</td>
<td>21.5</td>
<td>21.5</td>
<td>21.5</td>
<td>21.5</td>
</tr>
<tr>
<td>C-1cs Asset Risk - Common Stock</td>
<td>29.9</td>
<td>29.9</td>
<td>29.9</td>
<td>29.9</td>
</tr>
<tr>
<td>C-1o Asset Risk - All Other</td>
<td>43.7</td>
<td>43.7</td>
<td>43.7</td>
<td>43.7</td>
</tr>
<tr>
<td>C-2a Mortality/Other Insurance Risk</td>
<td>25.1</td>
<td>25.1</td>
<td>25.1</td>
<td>25.1</td>
</tr>
<tr>
<td>C-2b Longevity Insurance Risk</td>
<td>75.4</td>
<td>75.4</td>
<td>75.4</td>
<td>5.0</td>
</tr>
<tr>
<td>Longevity - Mortality Correlation</td>
<td>0%</td>
<td>-25%</td>
<td>-50%</td>
<td>-25%</td>
</tr>
<tr>
<td>C-2 Insurance Risk</td>
<td>25.1</td>
<td>79.5</td>
<td>73.3</td>
<td>25.1</td>
</tr>
<tr>
<td>C-3a Interest Rate Risk</td>
<td>16.3</td>
<td>16.3</td>
<td>16.3</td>
<td>16.3</td>
</tr>
<tr>
<td>C-3b Health Credit Risk</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>C-3c Market Risk</td>
<td>2.3</td>
<td>2.3</td>
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<td>526.6</td>
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<td>517%</td>
<td>393%</td>
<td>407%</td>
<td>423%</td>
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</table>
Questions?

Additional Questions, contact:

Paul Navratil, MAAA, FSA
Chairperson, Longevity Risk Task Force (LRTF)

Ian Trepanier
Life Policy Analyst
American Academy of Actuaries
trepanier@actuary.org
TO: Members, Interested Regulators and Interested Parties of the Longevity Risk (A/E) Subgroup  
FROM: Rhonda Ahrens (NE), Chair, Longevity Risk (A/E) Subgroup  
DATE: March 25, 2019  
RE: Comments Requested on Proposed Approach to Address Longevity Risk  

The Longevity Risk (A/E) Subgroup is interested in feedback around the following specific questions as well as any other merits or concerns about the American Academy of Actuaries’ (Academy) proposed approach to incorporating a longevity risk charge in the life risk-based capital formula:

1. Is the Academy’s proposed approach appropriate if the covariance factor with mortality is not adopted?
2. Would it be feasible to adopt or consider an adjustment to the C-2 factors presented based on the potential that some issue years of past business have reserves that may not meet the 85th percentile risk coverage assumed by the Academy field study?
3. Are the break points in the proposed approach appropriate and should they have been based on a proxy for size of individual exposure rather than an assumption of number of deaths through an average size of 50,000?
4. These factors could be adopted in 2019 (or early in 2020 at the latest) and be effective for all inforce business as of 2020 year-end. To the extent C-2 factors are needed sooner rather than later for the current longevity risk exposure which currently has no C-2 factor, what are the merits of fine tuning this proposed approach versus contemplating a maintenance plan every 5 years in order to address whether these factors continue to be appropriate and whether new product innovation needs to additionally be addressed?
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May 22, 2019

Ms. Rhonda Ahrens
Chair, Longevity Risk (A/E) Subgroup
National Association of Insurance Commissioners

Via email: Dave Fleming (dfleming@naic.org)

Re: Exposure of proposed approach to incorporating an RBC charge for longevity risk

Dear Rhonda,

On behalf of the Longevity Risk Task Force of the American Academy of Actuaries,¹ I am providing additional comments and clarifications in response to the questions from the Longevity Risk Subgroup included with the exposure of the preliminary proposal on a longevity risk factor made by the Task Force.

1. Is the Academy’s proposed approach appropriate if the covariance factor with mortality is not adopted?

We believe it is necessary to consider covariance between longevity and mortality concurrent with the implementation of a C-2 Longevity factor and that it would not be appropriate to adopt a proposed C-2 Longevity factor without also reflecting covariance with mortality risk.

If the longevity factor were adopted and applied additively to existing mortality C-2, it would represent an implicit 100% correlation between longevity and mortality risks. This would express the view that a stress 95th percentile longevity outcome where annuitants are living longer than expected would, with 100% certainty, occur concurrent with a stress 95th percentile mortality outcome where insureds are dying sooner than expected. We do not believe this to be a plausible view of how longevity and mortality risk are related.

From a practical perspective, an implicit 100% correlation would result in a total C-2 amount that does not represent a consistent level of statistical safety across companies. This implicit 100% correlation would result in a much more stringent level of statistical safety for companies with a mix of both longevity and mortality risk relative to companies concentrated in either

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.
mortality or longevity risk. This inconsistency may reduce the value of RBC as a tool to identify potentially weakly capitalized companies.

The sample company impacts included on page 8 of the exposure showed a range of correlation between 0% and -50% where 0% correlation reflects the covariance benefit if mortality and longevity risk are assumed to be independent. For clarity, below are the same examples with an additional sensitivity showing the result under 100% correlation between mortality and longevity, which reflects the absence of any covariance benefit. Consistent with page 8 of the exposure, three sample company impacts are shown corresponding to companies with concentrated, balanced, and low levels of longevity risk exposure.

We recognize the gap in RBC from the absence of a longevity risk charge and support the 2020 targeted timeline for implementation. The Longevity Risk Task Force is working on an analysis with the goal of a proposal in 2019 on the correlation between mortality and longevity risk. We believe that a reasonable approach to correlation can be considered in that targeted 2020 timeline, even if further review of correlation becomes necessary once mortality C-2 updates are more certain or to more broadly consider correlation with other risks beyond mortality and longevity.

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<tr>
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<td><strong>Change vs Baseline</strong></td>
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<td>Longevity - Mortality Correlation</td>
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<tr>
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<td><strong>Change vs Baseline</strong></td>
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<td>-9%</td>
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</table>
2. Would it be feasible to adopt or consider an adjustment to the C-2 factors presented based on the potential that some issue years of past business have reserves that may not meet the 85th percentile risk coverage assumed by the Academy field study?

We do not believe it is necessary to adjust capital factors to compensate for circumstances where prescribed statutory reserves may not be consistent with the 85th percentile assumption for reserve level.

We do not believe it is appropriate or consistent with the RBC framework for changes in capital requirements to be made to compensate for perceived inadequacy of reserves for the following reasons:

- Existing Asset Adequacy Testing requirements are the mechanism for ensuring that aggregate statutory reserves are held at an appropriate level even in circumstances where the prescribed reserving basis is no longer current. The fact that asset adequacy testing is conducted at an aggregate rather than product level does not diminish its efficacy in ensuring overall reserves are appropriate.
- We do not believe increasing capital requirements to compensate for any perceived deficiency in prescribed statutory reserves is appropriate. Any concerns with reserving should be addressed directly in the reserve requirements.

We continue to believe that longevity C-2 capital requirements, calculated as a percentage of prescribed reserves, result in a reasonable capital amount.

- We considered varying the factor by a number of variables including product type and average policyholder age, but ultimately recommend varying the factor only by size. The nature of a factor-based calculation inherently requires approximations, and field study results suggest that the overall accuracy factor when applied to any particular company block of business is within 20%. Adjusting the capital factor by reserve era would increase complexity without meaningfully impacting the overall accuracy of the factor.
- There is an existing capital factor (within C-3) applied to Asset Adequacy Reserves

3. Are the break points in the proposed approach appropriate and should they have been based on a proxy for size of individual exposure rather than an assumption of number of deaths through an average size of 50,000?

We believe that the number of individual exposures is a better proxy for scaling longevity risk than the dollar size of reserves and would support such an approach if it is judged to be feasible to implement within RBC.

We developed our preliminary proposal, which is scaled to the dollar size of reserves, as a simplification to more easily align to existing statutory reported values. We believe that a $50,000 reserve per policy is a reasonable assumption, though do expect that this average reserve would vary significantly across companies and blocks of business.
We used two key data points to establish $50,000 as a reasonable assumption:

i. Individual Payout Annuities
   - Based on SOA Individual Payout Annuity Mortality Experience Report
   - For experience years 2009-2013, average annual exposure benefit amount was $4,621
   - Average benefit-weighted age of ~79 supports a 10x rule of thumb for reserve/annual benefit
   - Indicates an average reserve per policy in the range of $46,000

ii. Pension Benefits
   - Based on 2017 PBGC Annual Report
   - PBGC reportedly insures almost 40 million people with nearly $3 trillion in PV Benefits
   - Indicates an average PV of Benefits per person of roughly $75,000
   - Much of the Pension Risk Transfer activity has been associated with either older age retirees or small benefit plan carve-outs, so average reserve per policy for life insurer pension risk transfer amounts are likely to be smaller than this PGBC figure, so we believe $50k to be a reasonable assumption for PRT as well

4. These factors could be adopted in 2019 (or early in 2020 at the latest) and be effective for all inforce business as of 2020 year-end. To the extent C-2 factors are needed sooner rather than later for the current longevity risk exposure which currently has no C-2 factor, what are the merits of fine tuning this proposed approach versus contemplating a maintenance plan every 5 years in order to address whether these factors continue to be appropriate and whether new product innovation needs to additionally be addressed?

In developing the preliminary factor proposal, we have balanced accuracy, simplicity, and consistency with the existing RBC framework to result in a practical approach to incorporating longevity risk in RBC. We have made simplifications and limitations to product scope with the objective of arriving more quickly at a proposal that can address the most immediate concerns around the growth of longevity risk in payout annuities and pension risk transfers.

The key risk of pursuing further work to fine-tune the proposal before implementation is continued delay and extended regulatory uncertainty in a growing market for products with longevity risk.

Risks of moving to implement quickly include:

- Implementing a simplified factor that overstates the risk and is subsequently lowered with future refinement creating unnecessary volatility in regulatory capital levels, especially if correlation between longevity and mortality is excluded.
- Inconsistency created between products in scope for this proposal, and other products that contain some longevity risk and are not in currently in scope.
We believe periodic review of the longevity risk factors is appropriate under either path. We suggest that review and possible revision of the Longevity C-2 factor should be undertaken in the following situations:

A. When review of C-2 Mortality Factors is completed
   • To ensure consistency between mortality and longevity risk and their correlation to ensure final C-2 mortality recommendation does not depart materially from the preliminary analysis.

B. To expand scope to other products with Longevity Risk
   • We believe it would be appropriate to consider expanding the scope of longevity C-2 to other products with longevity risk such as VA, FIA and LTC.

C. When key assumptions or approach change
   • Tax rate changes
   • Long term view of interest rates changes materially
   • Historical volatility in mortality improvement no longer seen as adequately representative of possible future volatility of improvement
   • Better information becomes available on volatility or distribution of mortality outcomes, such as between the insured vs general populations
   • We begin to see material older age (90+) mortality improvements where there has been minimal improvement in the past

D. New products become prevalent with different longevity risk profile
   • Contingent Deferred Annuities, which we expect will have greater longevity risk as a percentage of reserves relative to immediate payout annuities

E. Change to structure or purpose of RBC framework which would require a different overall approach

*****

Should you have any questions or comments regarding this letter, please contact Ian Trepanier, life policy analyst at the Academy (trepanier@actuary.org).

Sincerely,

Paul Navratil, MAAA, FSA
Chairperson, Longevity Risk Task Force
American Academy of Actuaries
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Brian Bayerle  
Senior Actuary

May 23, 2019

Ms. Rhonda Ahrens  
Chair, NAIC Longevity Risk (A/E) Subgroup

Re: Longevity RBC Exposure

Dear Rhonda:

The American Council of Life Insurers (ACLI)\(^1\) is pleased to submit the following comments regarding the exposed longevity RBC proposal. We have several questions about the methodology:

1. Factor construction: Longevity risk events would not be expected to play out as a shock event like most of the other risks captured in the RBC framework. Was there any contemplation around constructing the charge in a different manner, or whether this risk would be better captured in alternate analysis such as cashflow testing?

2. Double counting: Was analysis performed to determine if there is potential double-counting of the risk in the C-3 charge? That is, is longevity risk already captured to some degree in C-3 charge for payout annuities?

3. Methodology: We would appreciate additional background into the development of the methodology. In particular, we have the following questions and comments:
   - The methodology assumes credibility, volatility, and trend are independent distributions. Is it appropriate to combine 85\(^{th}\) percentiles without correlation?
   - It is difficult to tell from the Academy report how the components were combined to derive the factors. Can additional detail be provided?
   - As far as the adjustment for some issue years, there will be a need to assure that the information is available and if it materially improves the risk quantification.

In response to the questions posed with the exposure, we have the following responses:

Q1. Is the Academy’s proposed approach appropriate if the covariance factor with mortality is not adopted?

ACLI response: If the NAIC is going to add a C-2 longevity risk component to the RBC formula, ACLI believes it is inappropriate to not reflect a covariance factor between longevity risk and mortality risk. ACLI also believes that to avoid unnecessary fluctuation in RBC ratios, the covariance factor should be implemented concurrently with the longevity risk factors. The RBC requirements should reflect risk appropriately, including offsetting risks. Furthermore, reflecting an appropriate covariance encourages

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\(^1\) The American Council of Life Insurers (ACLI) advocates on behalf of 280 member companies dedicated to providing products and services that promote consumers’ financial and retirement security. 90 million American families depend on our members for life insurance, annuities, retirement plans, long-term care insurance, disability income insurance, reinsurance, dental and vision and other supplemental benefits. ACLI represents member companies in state, federal and international forums for public policy that supports the industry marketplace and the families that rely on life insurers’ products for peace of mind. ACLI members represent 95 percent of industry assets in the United States. Learn more at www.acli.com.
sound company management towards a balanced profile of naturally offsetting risks, whereas excluding covariance could lead to greater risk concentration.

Events that would likely cause an impact worthy of longevity capital should be systemic enough in the population to impact life as well as annuity populations. Assuming that all annuitants live a lot longer than expected at the same time as all life insurance policyholders live a lot shorter than expected, as is implied by implementing the stress without correlation (i.e., an implicit 100% correlation), is an implausibly extreme stress, and far beyond that contemplated by the RBC framework.

We strongly encourage the Academy workgroups (Academy C-2 Mortality Work Group and Longevity Risk Task Force) to work diligently on a recommendation for the covariance factor, to allow regulators time to consider the full picture related to this charge.

Q2. Would it be feasible to adopt or consider an adjustment to the C-2 factors presented based on the potential that some issue years of past business have reserves that may not meet the 85th percentile risk coverage assumed by the Academy field study?

**ACLI response**: LATF took up this issue in 2017 as part of the work done by the Longevity Risk (A/E) Workgroup. While it is difficult to demonstrate reserves are at the 85th percentile of risk coverage, additional requirements were inserted into VM-30 to address longevity/mortality improvement concerns for annuity business to be at the “moderately adverse” level.

If cross subsidization is made between reserves and capital, then capital would need to be recalibrated every time reserve updates are made. It would be better to keep the issues separate.

Q3. Are the break points in the proposed approach appropriate and should they have been based on a proxy for size of individual exposure rather than an assumption of number of deaths through an average size of 50,000?

**ACLI response**: The proposed break points seem reasonable provided the reserve basis used is appropriately adjusted to exclude non-life contingent benefits. For example, structured settlements may be certain only, life contingent only, or a combination of certain and life contingent benefits; of these, only the reserves for the life contingent benefits should be in scope for C-2. ACLI recommends adding an explicit clarification that the portion of a contract’s reserve for the non-life contingent benefits are excluded from the reserve basis.

Q4. These factors could be adopted in 2019 (or early in 2020 at the latest) and be effective for all inforce business as of 2020 year-end. To the extent C-2 factors are needed sooner rather than later for the current longevity risk exposure which currently has no C-2 factor, what are the merits of fine tuning this proposed approach versus contemplating a maintenance plan every 5 years in order to address whether these factors continue to be appropriate and whether new product innovation needs to additionally be addressed?

**ACLI response**: ACLI believes any longevity risk factor proposal should be thoroughly vetted before implementation to avoid unintended consequences. Consistent with the Procedures of the Financial Condition (E) Committee, an impact analysis of any factors is required before implementation. We note specifically this impact analysis is not the same as the field study previously performed. We would support a maintenance plan to review the factors beginning every five years after the initial implementation of the factors. The impact and need for changes to the C-2 factor should be considered when other material changes arise as well.
We look forward to a discussion of these issues. Thank you.

Sincerely,

[Signature]

cc Dave Fleming, NAIC
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May 23, 2019

Rhonda Ahrens  
Chair, Longevity Risk (A/E) Subgroup  
National Association of Insurance Commissioners  
VIA Email Transmission: dfleming@naig.org

RE: Comments Requested on Proposed Approach to Address Longevity Risk

OneAmerica appreciates the opportunity to comment on the March 25, 2019 proposed NAIC Longevity Risk factor proposal. We are in support of the proposal for the addition of risk factors to address longevity risk in insurance companies.

In response to the first question that the Longevity Risk (A/E) Subgroup was requesting feedback for, we believe that the Academy should reflect a mortality and longevity correlation that is non-zero. As noted in the proposal, the correlation between longevity and mortality is significant; by assuming mortality and longevity risk are independent, there is a risk that the total capital required for these two risks could be overstated.

In addition, we believe it is prudent for the proposal to include instruction around longevity reinsurance as it relates to the ceding company. Specifically, for a company that has ceded their longevity risk via longevity reinsurance, the ceding company should be able to net out the ceded reserve when applying the longevity risk factors.

In conclusion, we appreciate the opportunity to contribute to the discussions surrounding the proposed longevity risk factors and support the inclusion of longevity risk factors in the NAIC RBC formula. We thank you for your consideration of these comments on this matter.

Sincerely,

David Brentlinger

Senior VP, Chief Actuary and Chief Risk Officer
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May 23, 2019

Ms. Rhonda Ahrens
Chair, NAIC Longevity Risk (A/E) Subgroup

Re: Longevity RBC Exposure

Dear Ms. Ahrens:

Talcott Resolution is pleased to offer the following responses to the exposure questions posed in your NAIC March 25, 2019 document regarding the RBC longevity RBC proposal.

1. **Is the Academy’s proposed approach appropriate if the covariance factor with mortality is not adopted?**

   We support the Academy’s recommendation contained in the proposal summary which recommends implementing the C-2 longevity factors concurrently with the mortality factors and with a covariance adjustment.

   Mortality, unlike policyholder behavior, is non-elective in nature. For tail events such as pandemics, for example, there is a clear offset between longevity and mortality risk. To adopt the factors without a covariance adjustment ignores such offsets.

2. **Would it be feasible to adopt or consider an adjustment to the C-2 factors presented based on the potential that some issue years of past business have reserves that may not meet the 85th percentile risk coverage assumed by the Academy field study?**

   We would not recommend such an adjustment. The proposed calculation is not a “Total Asset Requirement” approach where the RBC amount would reflect the impact of the reserve level. Note that there may also be issue years where reserves may exceed the 85th percentile.

3. **Are the break points in the proposed approach appropriate and should they have been based on a proxy for size of individual exposure rather than an assumption of number of deaths through an average size of 50,000?**

   We believe the assumption made by the Academy is reasonable.

4. **These factors could be adopted in 2019 (or early in 2020 at the latest) and be effective for all inforce business as of 2020 year-end. To the extent C-2 factors are needed sooner rather than later for the current longevity risk exposure which currently has no C-2 factor, what are the**
merits of fine tuning this proposed approach versus contemplating a maintenance plan every 5 years in order to address whether these factors continue to be appropriate and whether new product innovation needs to additionally be addressed?

We would support a 2020 year-end effective date. Other than the choice of a covariance factor, we are not aware of any other fine tuning that is required at this point.

Thank you for allowing us the opportunity to comment on the proposal.

Please don’t hesitate to contact me should you have any questions.

Sincerely,

John B. Brady, F.S.A., M.A.A.A.
Vice President & Chief Actuary
Talcott Resolution Life and Annuity Insurance Company
One Griffin Road North
Windsor, CT 06095
(860) 547-3632
john.brady@talcottresolution.com