

SEATTLE

NAIC

**2023 SUMMER
NATIONAL MEETING**

NAIC Economic Scenario Generator Field Test: C3 Phase I Quantitative Results

Scott O'Neal, FSA, MAAA

August 11, 2023

NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS



Agenda

1. Background and Purpose
2. Limitations
3. Field Test Participation
4. High-Level Observations
5. Quantitative Results
 - A. Baseline Comparisons
 - B. Valuation Date Comparisons
 - C. Additional Metrics
6. Next Steps

Appendix: Field Test Run Descriptions

Background and Purpose

- The purpose of this presentation is to summarize quantitative information from the C3 Phase I field test participants to:
 - Understand the impact on capital,
 - Review the range of results across field test participants,
 - Compare the stability of results over time,
 - Evaluate the use of alternative metrics, and
 - Inform regulator decision-making on model and calibration choices.

C3 Phase I Background

Calculation Details

- Cash flow models that are used for asset adequacy analysis (or other consistent models) are used. The greatest present value of a deficiency at any point in the projection is calculated for each scenario.
- 50 or 12 interest rate scenarios generated from an older version of the Academy Interest Rate Generator (AIRG) are used in the calculations. The 50 or 12 scenarios are selected from a larger 200 set and are meant to contain the most adverse scenarios so that a tail measure metric can be calculated with a smaller number of scenarios.
- This version of the AIRG has a 6.55% interest rate mean reversion parameter (MRP) which does not change, compared with the current version of the AIRG which has a dynamic MRP that resets annually based on a weighted average of past interest rate levels.
- From the 50-scenario set, a weighted average centered around the 95th percentile scenario is determined, and that is the C3 RBC amount.
- In the C3 Phase I RBC worksheet, the scenario level and final results are also shown as a "C3 Factor" percentage, which is the capital amount divided by the statutory reserve at the start of the projection.

Product Scope

Deferred and Immediate Annuities

Guaranteed Separate Accounts*

Guaranteed Investment Contracts

Single Premium Life

Excludes Indexed and Variable Products

Limitations

- The NAIC took steps to review the quantitative results for reasonableness, including reviewing qualitative survey responses, sending questions to participants, and asking participants to confirm that the NAIC compilations matched their intended result submission. However, the accuracy and reliability of the results are ultimately dependent on the quality of participant submissions.
- The field test analytics (average C3 Factors, range of impacts, etc.) can be strongly dependent on a subset of the participants. Results shown today for the different field test runs will include varying numbers of participants corresponding to the levels of participation for that run. The lack of participation in some of the runs will limit their applicability to the overall industry.
- There are two basic types of comparisons of the field test results in this presentation; 1) comparisons of field test runs to their respective baseline run, and 2) comparisons of field test runs across the two tested valuation dates. These comparisons are limited to the participation of whichever run had the least participation. For example, as Baseline 2 (as of 12/31/19 + 200 BP) had significantly lower participation than run 2A, many of the 2A results will not be included in the baseline comparison.
- Some participants mentioned that they would assess the need for changes to their assumptions prior to implementation of the new Generator of Economic Scenarios (GOES) but had not done so for the field test.
- The C3 Phase I portion of the qualitative survey did not ask companies to specifically comment on the drivers of their results as was done for VM-21/C3 Phase II. Most participants did not comment on the drivers of their results.
- Detailed information on the products included in the C3 Phase I results was not asked for in the qualitative survey data. Therefore, it is not fully understood exactly what products were included in each participant's C3 Phase I submission.

Field Test Participation

- Looking at overall numbers for the industry, at the end of 2021 there were 752 legal entities that reported using the Life RBC blank. Of those 752, 613 legal entities reported industry C3 Phase I capital (line 33, LR027) less than or equal to \$1. That group of 613 companies includes both legal entities that are in scope for C3 Phase I (and determined their C3 Phase I capital to be zero) as well as companies that do not have products that are in scope for C3 Phase I.
- The total amount of industry C3 Phase I capital was approximately \$3 billion at the end of 2021. The largest ten legal entities (by C3 Phase I capital amount) accounted for over \$2 billion of this total. Of those ten legal entities, two of them participated in the field test.
- The chart below shows the number of legal entities that submitted C3 Phase I GOES Field Test results. It also shows the share of the 12/31/21 total industry C3 Phase I capital (line 33, LR027) that is reflective of the participation in each field test.
- C3 Phase I results will be shown for 24 legal entities that represent approximately 19% of the industry when looking at their share of the 2021 industry C3 Phase I capital.

C3 Phase I RBC Statistics (2021)

| | |
|---|---------------------|
| Total # of Life RBC Blank Filers | 752 |
| Life RBC Filers with Line 33 of LR027 <= \$1 | 613 |
| Total Industry Amount of C3 Phase I Capital | ~\$3 billion |
| Total C3 Phase I Capital: Top Ten Filers | ~\$2 billion |
| # of Top Ten Filers that Participated in GOES Field Test | 2/10 |

| Category | Baseline 1* | Baseline 2 | 1A* | 1B* | 2A* | 2B* | 7 |
|--|-------------|------------|------------|------------|------------|------------|------------|
| Number of Participants (Legal Entities) | 24 | 10 | 24 | 22 | 22 | 22 | 16 |
| Share of Industry C3 Phase I Capital | 19% | 13% | 19% | 19% | 19% | 19% | 14% |

High-Level Observations

- The field test results for the scenario sets produced from the Conning economic scenario generator (1A, 2A, 1B, 2B) showed significant increases on average compared to the respective 12/31/21 or 12/31/19 + 200 BP baseline. However, many of the field test participants held little to no C3 Phase I capital in their baseline runs.
- The participant results for field test 7 (200 scenarios from the latest version of the AIRG prescribed in VM-20 and VM-21) were mixed, with increases for some companies mostly offset by decreases for others.
- When producing capital results using a limited number of scenarios, outlier scenarios that are included in the scenario sets can have an outsized impact on the results – particularly with scenario sets that have increased volatility/broader distributions (e.g. 1A, 2A).

12/31/21 Baseline Comparisons

Field Test 1A: US Treasury Overview

- Field Test 1A (as of 12/31/21) included a recalibration of the Conning GEMS® US Treasury model that was designed to meet the acceptance criteria related to low for long, the prevalence of high interest rates, upper and lower bounds, initial yield curve fit, and yield curve shape. The frequency and severity of negative interest rates were controlled using a generalized fractional floor.
- The 1A UST scenario set as of 12/31/21 had a much higher prevalence of low UST rates, including negative interest rates, compared to the scenarios produced by the C3 Phase I Generator.
- The 1A UST scenario set included a frequency and severity of high 1-yr UST rates that was comparable at certain percentiles and projection periods but deviated in others. The limited number of scenarios typically used among field test participants for B1 and 1A may not be fully reflective of the distribution produced by either scenario generator with a greater number of scenarios.

Baseline 1 (B1): 50 C3 Phase I AIRG 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|-------|-------|-------|--------|--------|
| Min | 0.42% | 0.39% | 0.40% | 0.62% | 0.65% |
| 1% | 0.43% | 0.40% | 0.43% | 0.64% | 0.71% |
| 10% | 0.47% | 0.48% | 0.59% | 1.65% | 1.37% |
| 25% | 0.52% | 1.00% | 0.89% | 2.90% | 3.17% |
| 50% | 0.81% | 2.19% | 2.86% | 4.61% | 5.05% |
| 75% | 1.49% | 4.27% | 5.69% | 6.98% | 7.92% |
| 95% | 3.04% | 6.88% | 7.94% | 10.06% | 12.61% |
| 99% | 3.30% | 7.60% | 8.67% | 12.58% | 14.26% |
| Max | 3.44% | 7.98% | 9.04% | 13.98% | 14.35% |

1A: 200 Conning w/ GFF 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|--------|--------|--------|--------|--------|
| Min | -0.20% | -0.58% | -0.72% | -0.69% | -0.75% |
| 1% | -0.19% | -0.54% | -0.58% | -0.36% | -0.40% |
| 10% | 0.07% | -0.16% | -0.21% | -0.10% | -0.04% |
| 25% | 0.24% | 0.11% | 0.09% | 0.20% | 0.32% |
| 50% | 0.62% | 0.75% | 1.14% | 1.62% | 1.83% |
| 75% | 1.70% | 2.95% | 3.42% | 4.34% | 4.44% |
| 95% | 3.09% | 5.59% | 9.28% | 9.10% | 8.98% |
| 99% | 3.72% | 7.50% | 11.93% | 10.35% | 13.72% |
| Max | 4.29% | 14.36% | 14.57% | 15.71% | 14.39% |

1A – B1

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|--------|--------|--------|--------|--------|
| Min | -0.62% | -0.97% | -1.12% | -1.31% | -1.40% |
| 1% | -0.62% | -0.94% | -1.01% | -1.00% | -1.11% |
| 10% | -0.40% | -0.65% | -0.80% | -1.75% | -1.41% |
| 25% | -0.28% | -0.89% | -0.81% | -2.70% | -2.85% |
| 50% | -0.19% | -1.45% | -1.72% | -2.99% | -3.22% |
| 75% | 0.22% | -1.32% | -2.27% | -2.64% | -3.47% |
| 95% | 0.05% | -1.29% | 1.34% | -0.96% | -3.64% |
| 99% | 0.42% | -0.09% | 3.26% | -2.23% | -0.54% |
| Max | 0.85% | 6.38% | 5.53% | 1.73% | 0.04% |

Field Test 1B: US Treasury Overview

- Field Test 1B (as of 12/31/21) included a calibration of the Conning GEMS® US Treasury model that was designed to meet regulator acceptance criteria but placed additional emphasis on maintaining realistic term premiums throughout the projection. Towards that end, there was a significantly lower frequency of inversions (e.g. ~5% of 1B scenarios had 10 year/2year UST inversions at the end of year 30 compared to ~12% seen in 1A). The average level of inversion was also significantly lower (e.g. in 1B 10 year/2 year UST inversions average ~30 BP at the end of year 30, compared to ~90 BP average inversion level for 1A).
- The 1B UST scenario set as of 12/31/21 had a much higher prevalence of low UST rates, including negative interest rates, compared to the scenarios produced by the C3 Phase I Generator.
- The 1B UST scenario set included a frequency and severity of high 1-yr UST rates that was typically lower than that produced by the C3 Phase I scenario generator.

Baseline 1 (B1): 50 C3 Phase I AIRG 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|-------|-------|-------|--------|--------|
| Min | 0.42% | 0.39% | 0.40% | 0.62% | 0.65% |
| 1% | 0.43% | 0.40% | 0.43% | 0.64% | 0.71% |
| 10% | 0.47% | 0.48% | 0.59% | 1.65% | 1.37% |
| 25% | 0.52% | 1.00% | 0.89% | 2.90% | 3.17% |
| 50% | 0.81% | 2.19% | 2.86% | 4.61% | 5.05% |
| 75% | 1.49% | 4.27% | 5.69% | 6.98% | 7.92% |
| 95% | 3.04% | 6.88% | 7.94% | 10.06% | 12.61% |
| 99% | 3.30% | 7.60% | 8.67% | 12.58% | 14.26% |
| Max | 3.44% | 7.98% | 9.04% | 13.98% | 14.35% |

1B: 200 Alternative w/ Shadow Floor 1-yr UST Scenarios: Percentiles by Projection

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|--------|--------|--------|--------|--------|
| Min | -0.33% | -0.80% | -0.69% | -0.85% | -0.95% |
| 1% | -0.08% | -0.48% | -0.54% | -0.58% | -0.78% |
| 10% | 0.22% | -0.01% | -0.08% | -0.03% | 0.08% |
| 25% | 0.41% | 0.30% | 0.30% | 0.34% | 0.57% |
| 50% | 0.63% | 0.67% | 0.74% | 0.84% | 1.37% |
| 75% | 0.82% | 0.98% | 1.87% | 2.38% | 3.55% |
| 95% | 1.61% | 3.16% | 4.20% | 6.24% | 7.25% |
| 99% | 2.02% | 4.15% | 5.39% | 7.93% | 10.13% |
| Max | 2.34% | 5.62% | 9.36% | 10.24% | 14.31% |

1B – B1

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|--------|--------|--------|--------|--------|
| Min | -0.75% | -1.19% | -1.09% | -1.47% | -1.60% |
| 1% | -0.52% | -0.88% | -0.97% | -1.22% | -1.49% |
| 10% | -0.25% | -0.50% | -0.67% | -1.68% | -1.29% |
| 25% | -0.11% | -0.70% | -0.60% | -2.57% | -2.60% |
| 50% | -0.18% | -1.53% | -2.12% | -3.78% | -3.68% |
| 75% | -0.67% | -3.29% | -3.82% | -4.60% | -4.36% |
| 95% | -1.43% | -3.72% | -3.74% | -3.82% | -5.37% |
| 99% | -1.28% | -3.44% | -3.28% | -4.65% | -4.13% |
| Max | -1.10% | -2.36% | 0.32% | -3.74% | -0.04% |

Field Test 7: US Treasury Overview

- Field Test 7 (as of 12/31/21) was a C3 Phase I specific test designed to use the current version of the AIRG (prescribed in VM-20 and VM-21) to understand what the impact would be of moving to the latest version of the AIRG with a mean reversion parameter that is dynamic based upon historical data. For 12/31/21, the latest version of the AIRG had a mean reversion parameter of 3.25% compared to 6.55% for the C3 Phase I ESG.
- The field test 7 UST scenario set as of 12/31/21 had a much higher prevalence of low UST rates, but the current version of the AIRG has a soft floor of 1 BP, effectively eliminating negative interest rates.
- The field test 7 UST scenario set included a frequency and severity of high 1-yr UST rates that was much lower than those produced by the C3 Phase I generator, particularly at the later projection periods.

Baseline 1 (B1): 50 C3 Phase I AIRG 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|-------|-------|-------|--------|--------|
| Min | 0.42% | 0.39% | 0.40% | 0.62% | 0.65% |
| 1% | 0.43% | 0.40% | 0.43% | 0.64% | 0.71% |
| 10% | 0.47% | 0.48% | 0.59% | 1.65% | 1.37% |
| 25% | 0.52% | 1.00% | 0.89% | 2.90% | 3.17% |
| 50% | 0.81% | 2.19% | 2.86% | 4.61% | 5.05% |
| 75% | 1.49% | 4.27% | 5.69% | 6.98% | 7.92% |
| 95% | 3.04% | 6.88% | 7.94% | 10.06% | 12.61% |
| 99% | 3.30% | 7.60% | 8.67% | 12.58% | 14.26% |
| Max | 3.44% | 7.98% | 9.04% | 13.98% | 14.35% |

7: 200 VM-20 AIRG 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|-------|-------|-------|-------|-------|
| Min | 0.01% | 0.17% | 0.01% | 0.01% | 0.17% |
| 1% | 0.01% | 0.40% | 0.28% | 0.57% | 0.32% |
| 10% | 0.25% | 0.71% | 0.77% | 1.02% | 1.06% |
| 25% | 0.43% | 0.89% | 1.22% | 1.55% | 1.41% |
| 50% | 0.69% | 1.23% | 1.65% | 2.04% | 2.07% |
| 75% | 0.90% | 1.72% | 2.31% | 2.79% | 2.95% |
| 95% | 1.24% | 2.27% | 3.35% | 3.98% | 4.69% |
| 99% | 1.54% | 2.97% | 4.27% | 5.39% | 5.99% |
| Max | 1.57% | 4.01% | 5.28% | 7.45% | 6.95% |

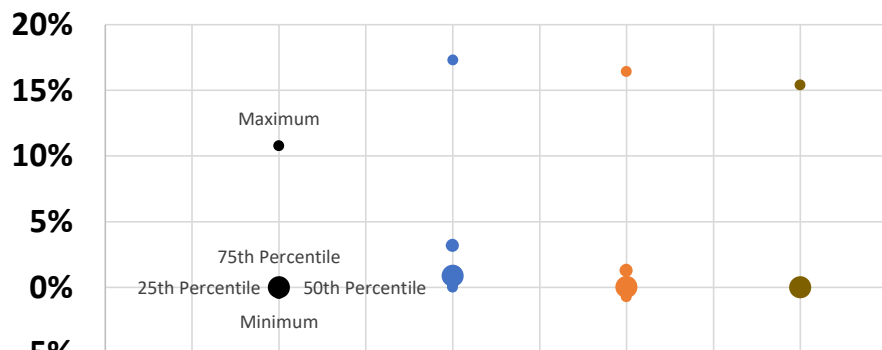
7 - B1

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|--------|--------|--------|--------|--------|
| Min | -0.41% | -0.22% | -0.39% | -0.61% | -0.49% |
| 1% | -0.42% | 0.00% | -0.16% | -0.07% | -0.39% |
| 10% | -0.22% | 0.23% | 0.19% | -0.63% | -0.31% |
| 25% | -0.09% | -0.11% | 0.32% | -1.35% | -1.76% |
| 50% | -0.12% | -0.96% | -1.21% | -2.57% | -2.98% |
| 75% | -0.59% | -2.55% | -3.37% | -4.19% | -4.96% |
| 95% | -1.81% | -4.61% | -4.59% | -6.08% | -7.92% |
| 99% | -1.75% | -4.62% | -4.40% | -7.19% | -8.27% |
| Max | -1.87% | -3.97% | -3.76% | -6.53% | -7.40% |

Change in Capital Amount by Legal Entity - 12/31/21

| Field Test | B1 | 1A | 1B | 7 |
|--------------------------------|-------|-------|-------|-------|
| Wtd. Average C3 Phase I Factor | 0.14% | 1.29% | 0.92% | 0.17% |
| Average % Change* | | 817% | 512% | 15% |
| # of Participants | 24 | 24 | 22 | 16 |

C3 Phase I Factor: Range and Percentile Statistics



NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

- For the 12/31/21 Baseline 1 (B1) field test run, approximately half of the participants had C3P1 RBC amounts (C3 factor * statutory reserve) close to zero. The 75th percentile for the Baseline 1 C3 factor was 0.23%, and the average C3 factor (weighted by statutory reserve) was 0.14%.
- For each of the 12/31/21 field test runs shown, there was an increase to the average C3 Factor, with 1A (Conning calibration with GFF) coming in at the highest followed by the 1B (Alternative with Shadow Floor).
- Both 1A and 1B saw a larger proportion of the field test participants with non-zero C3 Factors.
- Field test run 7 (200 Scenario VM-20 AIRG) had a small average C3 factor increase, with some participants seeing higher, lower, or no changes at all to their capital.

*Note, each of the Average % Change value is specific to the cohort that completed both the baseline and the respective field test run.

12/31/19 + 200 BP Baseline Comparisons

Field Test 2A: US Treasury Overview

- Field Test 2A (as of 12/31/19 + 200 BP) used the same calibration as 1A (Conning Calibration with a Generalized Fractional Floor) but with a 12/31/19 starting yield curve modified using a 200 BP increase across all maturities.
- Compared to the C3 Phase I generator with a 12/31/19 + 200 BP starting interest environment, the 2A scenario set has a much greater frequency and severity of low (and negative) UST rates. The 2A scenario set has a comparable severity of high 1-yr UST rates at the 95th percentile, but somewhat higher 1-yr UST rates at the 99th percentile.

Baseline 2 (B2): 50 C3 Phase I AIRG 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|-------|--------|--------|-------|--------|
| Min | 0.81% | 0.67% | 0.73% | 0.59% | 0.64% |
| 1% | 0.85% | 0.69% | 0.78% | 0.60% | 0.70% |
| 10% | 1.90% | 1.38% | 1.61% | 1.75% | 2.35% |
| 25% | 3.23% | 2.69% | 2.76% | 3.06% | 3.85% |
| 50% | 3.82% | 3.81% | 3.94% | 4.42% | 5.49% |
| 75% | 4.64% | 4.80% | 6.30% | 5.81% | 7.77% |
| 95% | 5.81% | 7.46% | 9.29% | 8.88% | 10.14% |
| 99% | 6.03% | 11.09% | 11.53% | 9.85% | 11.39% |
| Max | 6.18% | 12.29% | 13.42% | 9.91% | 11.88% |

2A: 200 Conning w/ GFF 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|--------|--------|--------|--------|--------|
| Min | -0.01% | -0.72% | -0.50% | -0.74% | -0.70% |
| 1% | 0.30% | -0.10% | -0.30% | -0.56% | -0.57% |
| 10% | 1.48% | 0.26% | -0.01% | 0.02% | -0.02% |
| 25% | 2.47% | 0.76% | 0.42% | 0.49% | 0.37% |
| 50% | 3.53% | 2.89% | 2.68% | 2.48% | 2.51% |
| 75% | 4.65% | 5.30% | 5.45% | 5.59% | 5.29% |
| 95% | 6.55% | 8.68% | 10.02% | 11.22% | 10.88% |
| 99% | 7.68% | 10.55% | 12.97% | 14.28% | 13.77% |
| Max | 9.12% | 12.16% | 14.50% | 15.29% | 23.43% |

2A – B2

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|--------|--------|--------|--------|--------|
| Min | -0.82% | -1.39% | -1.23% | -1.33% | -1.34% |
| 1% | -0.55% | -0.79% | -1.08% | -1.16% | -1.27% |
| 10% | -0.42% | -1.12% | -1.63% | -1.73% | -2.37% |
| 25% | -0.76% | -1.93% | -2.34% | -2.56% | -3.48% |
| 50% | -0.29% | -0.93% | -1.26% | -1.95% | -2.98% |
| 75% | 0.01% | 0.50% | -0.86% | -0.22% | -2.48% |
| 95% | 0.74% | 1.22% | 0.73% | 2.35% | 0.74% |
| 99% | 1.66% | -0.54% | 1.44% | 4.43% | 2.38% |
| Max | 2.94% | -0.13% | 1.08% | 5.38% | 11.55% |

Field Test 2B: US Treasury Overview

- Field Test 2B (as of 12/31/19 + 200 BP) used the same calibration as 1A (Conning Calibration with a Generalized Fractional Floor) but with a 12/31/19 starting yield curve modified using a 200 BP increase across all maturities
- Compared to the C3 Phase I generator with a 12/31/19 + 200 BP starting interest environment, the 2B scenario set has a much greater frequency and severity of low (and negative) UST rates. The 2B scenario set has a comparable severity of high 1-yr UST rates at the 95th percentile but has higher or lower severity depending on the projection period at the 99th percentile level.

Baseline 2 (B2): 50 C3 Phase I AIRG 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|-------|--------|--------|-------|--------|
| Min | 0.81% | 0.67% | 0.73% | 0.59% | 0.64% |
| 1% | 0.85% | 0.69% | 0.78% | 0.60% | 0.70% |
| 10% | 1.90% | 1.38% | 1.61% | 1.75% | 2.35% |
| 25% | 3.23% | 2.69% | 2.76% | 3.06% | 3.85% |
| 50% | 3.82% | 3.81% | 3.94% | 4.42% | 5.49% |
| 75% | 4.64% | 4.80% | 6.30% | 5.81% | 7.77% |
| 95% | 5.81% | 7.46% | 9.29% | 8.88% | 10.14% |
| 99% | 6.03% | 11.09% | 11.53% | 9.85% | 11.39% |
| Max | 6.18% | 12.29% | 13.42% | 9.91% | 11.88% |

2B: 200 Conning w/ GFF 1-yr UST Scenarios: Percentiles by Projection Month

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|-------|--------|--------|--------|--------|
| Min | 0.34% | -0.10% | -0.25% | -0.30% | -0.49% |
| 1% | 0.70% | 0.23% | -0.07% | -0.27% | -0.40% |
| 10% | 1.44% | 0.71% | 0.47% | 0.32% | 0.34% |
| 25% | 2.22% | 1.32% | 0.92% | 0.90% | 0.93% |
| 50% | 3.25% | 2.76% | 2.78% | 2.57% | 2.54% |
| 75% | 4.04% | 4.36% | 4.60% | 5.28% | 5.41% |
| 95% | 5.53% | 6.58% | 9.26% | 9.50% | 9.61% |
| 99% | 6.28% | 7.74% | 11.19% | 10.58% | 13.54% |
| Max | 6.93% | 10.41% | 12.18% | 18.69% | 19.49% |

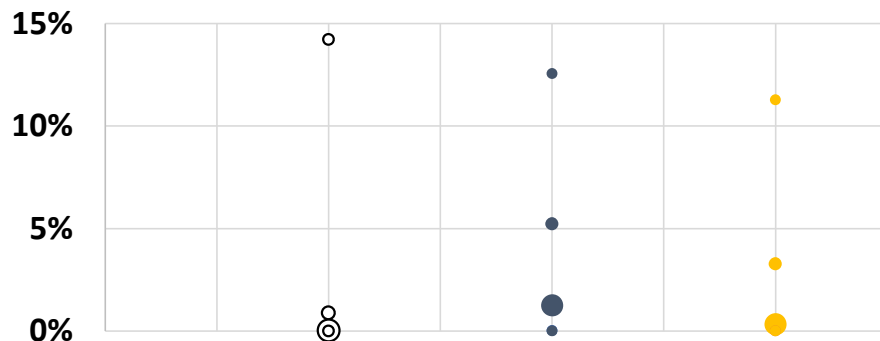
2B – B2

| Percentile | 12 | 60 | 120 | 240 | 360 |
|------------|--------|--------|--------|--------|--------|
| Min | -0.47% | -0.77% | -0.98% | -0.89% | -1.13% |
| 1% | -0.15% | -0.47% | -0.85% | -0.87% | -1.10% |
| 10% | -0.46% | -0.67% | -1.15% | -1.44% | -2.01% |
| 25% | -1.01% | -1.37% | -1.84% | -2.16% | -2.92% |
| 50% | -0.57% | -1.05% | -1.16% | -1.85% | -2.96% |
| 75% | -0.60% | -0.45% | -1.70% | -0.53% | -2.36% |
| 95% | -0.28% | -0.88% | -0.03% | 0.63% | -0.53% |
| 99% | 0.25% | -3.35% | -0.34% | 0.73% | 2.15% |
| Max | 0.75% | -1.88% | -1.24% | 8.78% | 7.61% |

Change in Capital Amount by Legal Entity - 12/31/19 + 200 BP

| Field Test | B2 | 2A | 2B |
|--------------------------------|-------|-------|-------|
| Wtd. Average C3 Phase I Factor | 0.46% | 1.50% | 0.93% |
| Average % Change | | 226% | 103% |
| # of Participants | 10 | 10 | 10 |

C3 Phase I Factor: Range and Percentile Statistics



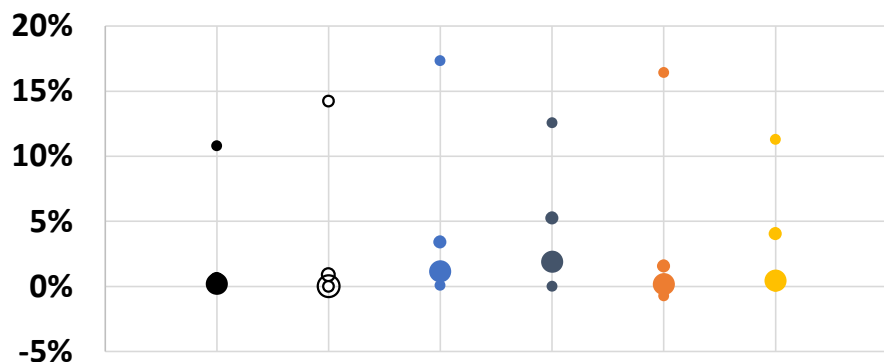
- There was more limited participation for the optional Baseline 2 run.
- For the 12/31/19 + 200 BP Baseline 2 (B2) field test run, approximately half of the participants had C3P1 RBC amounts (C3 factor * statutory reserve) close to zero. The 75th percentile for the Baseline 2 C3 factor was 0.87%, and the average C3 factor (weighted by statutory reserve) was 0.46%.
- A similar pattern to the 12/31/21 field test runs holds for the 12/31/19 + 200 BP field test baseline comparisons, where the Conning Calibration w/ GFF (2A) has the largest increase to capital from the baseline with the Alternative Calibration with a Shadow Floor (2B) representing a significant but smaller increase.
- Both 2A and 2B saw a larger proportion of the field test participants with non-zero C3 Factors.

Valuation Date Comparisons

Change in Capital Amount by Legal Entity - 12/31/19 + 200 BP compared to 12/31/21

| Field Test | B1 | B2 | 1A | 2A | 1B | 2B |
|---------------------------------------|-------|-------|-------|-------|-------|-------|
| Wtd. Average C3 Phase I Factor | 0.14% | 0.46% | 1.35% | 1.72% | 1.01% | 1.15% |
| Average % Change | | 229% | | 28% | | 15% |
| # of Participants | 10 | 10 | 22 | 22 | 20 | 20 |

C3 Phase I Factor: Range and Percentile Statistics



NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

- For each of the valuation date comparisons, the average C3 Factor increased from 12/31/21 (low interest environment) to 12/31/19 + 200 BP (higher interest environment).
- There was more limited participation for the optional Baseline 2 run, limiting the comparison between valuation dates. The average % change in the C3 Factor between valuation dates was the greatest for the baseline runs.
- Of the field test runs, the Conning calibration w/ GFF showed a higher average % change between valuation dates (28%), compared to the smaller (15%) change for the alternative calibration with shadow floor.
- Because of the large difference in legal entity cohorts between the baseline and field test runs, it is hard to conclude that the field test scenario sets produce more stable results than the C3 Phase I generator used in the baseline runs.

Additional Metrics

Additional C3 Phase I Metrics

- The table below shows the range statistics and weighted average of the legal entity results for C3 Phase I factors (C3 Phase I Capital Amount/Statutory Reserve) computed using different metrics.
- The results for the "C3 Phase I Weighted Average" are for 24 legal entities, whereas the results shown for the other metrics are only for 23 legal entities. One of the legal entities was removed due to one scenario out of their C3 Phase I calculation producing a very large C3 Phase I factor (e.g. 3,000%) that distorted the metrics. This scenario result was not included in the C3 Phase I weighted average or the range statistics.
- Once the outlier was removed, the CTE 90 metric had very similar results to the C3 Phase I metric. However, the 25% * (CTE 98 - CTE 70) metric produced smaller C3 Factors overall.

| Range Statistic/Average | C3 Phase I Metric | | CTE90 | | Mean Factor | | Max Factor | | 25% * (CTE98 - CTE70) | |
|-----------------------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------------|--------------|
| | B1 | 1A | B1 | 1A | B1 | 1A | B1 | 1A | B1 | 1A |
| Minimum | -0.49% | 0.00% | -0.34% | 0.00% | -0.62% | -0.62% | 0.00% | 0.00% | 0.00% | 0.00% |
| 25 th Percentile | 0.00% | 0.11% | 0.00% | 0.02% | 0.00% | 0.00% | 0.00% | 0.33% | 0.00% | 0.02% |
| Median | 0.00% | 0.87% | 0.00% | 1.14% | 0.00% | 0.13% | 0.13% | 3.56% | 0.04% | 0.67% |
| 75 th Percentile | 0.23% | 3.18% | 0.36% | 3.09% | 0.15% | 0.85% | 1.27% | 4.60% | 0.15% | 0.68% |
| Maximum | 10.78% | 17.32% | 10.80% | 17.82% | 10.52% | 15.85% | 11.09% | 29.91% | 0.70% | 0.80% |
| Wtd. Average Factor | 0.14% | 1.29% | 0.20% | 1.39% | 0.08% | 0.63% | 0.62% | 8.35% | 0.03% | 0.40% |

(a) For the 50 scenario set, the C-3 scores are multiplied by the following series of weights:

C3 Phase I Metric →

| ----- Weighting Table ----- | | | | | | | | | | | | | |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Scenario Rank: | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 |
| Weight: | 0.02 | 0.04 | 0.06 | 0.08 | 0.10 | 0.12 | 0.16 | 0.12 | 0.10 | 0.08 | 0.06 | 0.04 | 0.02 |

Next Steps

Next Steps

- The Generator of Economic Scenarios (GOES) (A) Subgroup will develop recommendations to LATF for reserve and capital framework-specific implementation issues and a GOES model governance framework.
- A more comprehensive set of GOES acceptance criteria will be reviewed by regulators and exposed in September. Once regulators decide on a new set of acceptance criteria, additional candidate scenario sets will be produced that are designed to meet the acceptance criteria.
- Regulators and the NAIC are considering how model office testing can supplement and/or replace components of industry field testing to efficiently evaluate the new scenario sets. A second-round industry field test of the new scenarios would occur no sooner than Spring of 2024.



Appendix: Field Test Run Descriptions

Field Test Run Descriptions

Note: Bold = Required Run

| Run # | Description | Purpose of Run |
|--------------------|---|---|
| Baseline #1 | Scenario set(s) the company used for 12/31/21 statutory reporting | Baseline used as comparative basis for 12/31/21 runs |
| Baseline #2 | ESG the company used for 12/31/21 statutory reporting of reserves and RBC, but modified to produce scenario sets with a 12/31/19 yield curve modified using a 200 BP increase across all maturities | Baseline used as comparative basis for 12/31/19 + 200 BP runs |
| Test #1a | GEMS Baseline Equity and Corporate model scenarios as of 12/31/21, and Conning Treasury model calibration with generalized fractional floor as of 12/31/21 | Tests Conning Treasury model w/ GFF and Baseline Equity at YE 2021 |
| Test #1b | Same as Test #1a, but with Alternative Treasury model calibration with shadow floor as of 12/31/21 | Tests Alternative Treasury model with shadow floor and Baseline Equity at YE 2021 |
| Test #2a | Same as Test #1a, but with Equity, Corporate, and Treasury models with a 12/31/19 starting yield curve modified using a 200 BP increase across all maturities. All other initial market conditions are unchanged. The Equity model parameters would be adjusted from #1a so that the year 30 median Large Cap Equity gross wealth factors remain consistent with #1a. | Stresses the starting Treasury rates using the same calibration as 1a to evaluate whether the model produces appropriate results in different economic environments |
| Test #2b | Same as Test #2a, but with the Alternative Treasury model calibration with shadow floor instead of the Conning Treasury model calibration with generalized fractional floor | Same as 2a, but designed to stress the 1b calibration |
| Test #7 | 12/31/21 scenarios from the ESG prescribed in VM-20 with a Mean Reversion Parameter (MRP) set to 3.25% | Attribution analysis to understand the impact of moving from the current C3 Phase I MRP of 6.55% to a lower MRP that incorporates recent UST history. |