



AMERICAN ACADEMY of ACTUARIES

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November 17, 2022

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

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

Dear Ms. Hemphill,

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

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

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

Academy input on Treasury yields to implement the APF:

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

1. Obtain Treasury par yield curve rates for 10 on-the-run (OTR) maturities (3m, 6m, 1y, 2y, 3y, 5y, 7y, 10y, 20y, 30y) from either:
 - a. https://home.treasury.gov/resource-center/data-chart-center/interest-rates/TextView?type=daily_treasury_yield_curve&field_tdr_date_value=2022 ;
or
 - b. <https://www.federalreserve.gov/releases/h15/> ; (note on this page the Treasury par yield curve rates are labeled as “Treasury constant maturities”)

2. Utilize the “monotone convex spline” (MC) method to calculate par yield curve rates for the 32 swap spread maturities prescribed in VM-20, as such method has been adopted by the U.S. Treasury starting December 6, 2021, either A) by using a spreadsheet (e.g., a historical saved version is available by copy/pasting the following into an internet browser:
<http://web.archive.org/web/20180903055110/finmod.co.za/Monotone%20Convex%20Interpolation.xls>) created by Graeme West, who co-authored a paper titled “Methods for Constructing a Yield Curve” (as discussed below) or B) by using any mathematically equivalent approach:
 - a. Enter as percentages the par yield curve rates, for the 10 OTR maturities, into cells D1 to D10 of the “input” tab in the spreadsheet;
 - b. Click on the “Boot curve” button in the “input” tab in the spreadsheet; and
 - c. Extract from column B of the “curves” tab in the spreadsheet the Treasury par yield curve rates for the 32 maturities prescribed in VM-20 (which could be listed at the bottom of this tab via an Excel VLOOKUP formula or macro created by NAIC staff or the Academy).

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

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

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

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

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

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

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

Academy input for prescribed Long term swap spread calculations

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

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

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

The Academy recommends that:

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

Academy input on NAIC governance for prescribed swap spread calculations

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

Academy input on the Memo

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

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

Sincerely,

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