NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS

Date: 2/18/26

Virtual Meeting

RISK-BASED CAPITAL INVESTMENT RISK AND EVALUATION (E) WORKING GROUP
Monday, March 2, 2026
3:00 – 4:30 p.m. ET / 2:00 – 3:30 p.m. CT / 1:00 – 2:30 p.m. MT / 12:00 – 1:30 p.m. PT

ROLL CALL

Philip Barlow, Chair	District of Columbia	Tadd Wegner	Nebraska
Thomas Reedy, Vice Chair	California	Jennifer Li	New Hampshire
Wanchin Chou	Connecticut	Bob Kasinow/William B. Carmello	New York
Carolyn Morgan	Florida	Dale Bruggeman/Tom Botsko	Ohio
Matt Cheung	Illinois	Rachel Hemphill	Texas
Roy Eft	Indiana	Doug Stolte	Virginia
Carrie Mears/Kevin Clark	Iowa	Steve Drutz/Katy Bardsley	Washington
Fred Andersen	Minnesota	Amy Malm	Wisconsin
William Leung/Danielle Smith	Missouri		

NAIC Committee Support: Julie Gann/Maggie Chang

AGENDA

1. Consider Adoption of its Dec. 15, 2025, Minutes—*Philip Barlow (DC*) — Attachment 1

2. Hear Comments on the American Academy of Actuaries (Academy) Dec. 15, 2025, Presentation
   A. American Council of Life Insurers (ACLI) — Attachment 2
   B. American Investment Council (AIC) — Attachment 3
   C. Alternative Credit Council, AIC, and Loan Syndications and Trading Association (LSTA) Joint Letter — Attachment 4

3. Hear an Update from the Academy on the Collateralized Loan Obligations (CLO) Risk-Based Capital (RBC) Project—*Philip Barlow (DC)* — Attachment 5

4. Receive Comments on Proposal 2025-22-IRE CLO RBC Structure *Philip Barlow (DC)* — Attachment 6
   A. ACLI — Attachment 7

5. Discuss Any Other Matters Brought Before the Working Group —*Philip Barlow (DC)*

6. Adjournment

Draft: 12/18/25

Risk-Based Capital Investment Risk and Evaluation (E) Working Group
Virtual Meeting
December 15, 2025

The Risk-Based Capital Investment Risk and Evaluation (E) Working Group of the Capital Adequacy (E) Task Force met Dec. 15, 2025. The following Working Group members participated: Philip Barlow, Chair (DC); Thomas Reedy, Vice Chair (CA); Wanchin Chou (CT); Carolyn Morgan (FL); Carrie Mears and Kevin Clark (IA); Matt Cheung (IL); Roy Eft (IN); Fred Andersen (MN); William Leung and Danielle Smith (MO); Tadd Wegner (NE); Jennifer Li (NH); Bob Kasinow and William B. Carmello (NY); Dale Bruggeman and Tom Botsko (OH); Jamie Walker and Rachel Hemphill (TX); Doug Stolte (VA); Steve Drutz and Katy Bardsley (WA); and Amy Malm (WI).

1. Adopted its Nov. 4 Minutes

The Working Group met Nov. 4 and took the following action: 1) adopted its Sept. 8 minutes; 2) discussed comment letters received on proposal 2025-12-IRE (Securities Valuation Office [SVO] Fund Alignment Project); 3) adopted its 2026 working agenda.

Eft made a motion, seconded by Botsko, to adopt the Working Group's Nov. 4 minutes (Attachment XX). The motion passed unanimously.

2. Heard an Update from the Academy on the CLO RBC Project

Stephen Smith (American Academy of Actuaries—Academy) presented a collateralized loan obligation (CLO) C-1 factors modeling update (Attachment XX). Smith emphasized that this update is grounded in preliminary analysis performed with six CLO deals and, therefore, is just an interim update. A more comprehensive analysis will be performed of the entire CLO universe, and the results will be reported in early 2026. The Academy is working toward the goal of implementing changes to the CLO risk-based capital (RBC) methodology effective 2026. Therefore, any proposed factors need to be exposed by April 30, 2026. Smith said the key focus of this presentation is to provide updates on sensitivity testing on various modeling choices, as per the Working Group's request during its Sept. 8 meeting. At a high level, the Academy performed a total of nine sensitivity tests, and each has shown a significant impact. Smith concluded that this illustrated an important point: decisions on assumptions and/or methodology greatly impact the end results. The Academy provided recommendations to these decisions as summarized in the "Summary of Sensitivity Testing" page. The Academy's recommendations are influenced by whether there are any significant differences between CLOs and senior unsecured bonds, as well as consideration of time/resource constraints.

Smith then discussed the details of each sensitivity test. Tests 1, 2, and 3 tested different degrees of correlation of defaults among collaterals, with a baseline of 10% correlation, and employed the Gaussian copula model (aligned with the C-1 bond model). The Academy tested the following scenarios: Test 1 (5% correlation, Gaussian copula); Test 2 (20% correlation, Gaussian copula); and Test 3 (10% correlation, Clayton copula). Test 1 may be justifiable by academic literature that states below-investment-grade investments (such as CLO collaterals) have higher idiosyncratic risks than investment-grade investments (such as bonds). Test 2 was inspired by other academic literature that suggested a possible correlation ranging from 2% to 50%. Test 3 employed a more conservative copula model, which leads to fatter tails. Ultimately, the Academy recommended retaining the baseline, as deviation from the C-1 bond model assumption is not justifiable. Test 4 has to do with the correlation between default rates and severity, and the C-1 bond model assumed none. Smith said there is literature that supported the existence of such correlations, but the Academy recommended retaining the baseline for CLOs to

be consistent with the C-1 bond model. A future correlation study can be conducted, and the change, if recommended, should be made to both the bond and CLO C-1 models.

Reedy sought clarification regarding whether: 1) the impacts presented are standalone test results for tests 1 through 4; and 2) there is an analysis of compounding effects. Smith confirmed that the results are from a standalone test; the Academy is not presenting compound impact, as its recommendation to retain the baseline is not based on quantification of impact.

Test 5 tested the impact of lowering recoveries. The baseline assumption used by the Academy was sourced from S&P Global Ratings' (S&P Global's) average loss given default (LGD) data, which provides deciles and allows worst-case scenarios. That being said, the Academy was aware of other data sets (e.g., Moody's) that suggested lower recoveries for senior secured loans. The difference between S&P Global's and Moody's data likely stemmed from different methodologies to get to the concept of loss. The Academy believes that Moody's methodology is more appropriate, as it uses a trading price closer to the day of default, which reflects the reality of active trading by CLO managers. As shown on the "Sensitivity – Recovery Average" page, the use of lower recovery data as per Moody's resulted in higher RBC charges. However, Smith cautioned that his sensitivity test has extrapolated Moody's data, as Moody's does not publish decile information. While the Academy would love to work with Moody's to obtain decile information, the process would take months and jeopardize 2026 implementation.

Smith then discussed Tests 6 and 7, which tested the impact of altering prepayment and repurchase price assumptions. The Academy used the baseline assumptions that underlying collaterals in CLOs never prepay and the repurchase price is always at par (i.e., no discount). Smith acknowledged that these assumptions are conservative in light of historical data (e.g., in reality, prepayment exists, even in the worst market environment; discounts are common and can get even steeper in times of market stress). As such, the Academy set up Test 6 to assume stress case prepayment rates and repurchase price (conditional tail expectation [CTE] 10, average of the lowest 10%). Test 7 is just for academic comparison, as it assumes the lowest, deepest-tail data points (VaR 0.5). As seen in the results captured on the "Sensitivity – Collateral Repurchase Price and Prepayment" page, the RBC charge results are very low, even for the below-investment-grade tranche. Another problem is that, as shown on the "Sensitivity #6 – Widely Varying Results Across Deals and Sensitivity #7 – Widely Varying Results Across Deals" page, there was a huge variation from one deal to the next across the six CLO deals, depending on whether the CLO had recently reset and entered a new investment period. Smith said the assumption of ultra-low repurchase price for the entire period of projection (as in Tests 6 and 7) is unrealistic. To conclude, the Academy would need time to come up with reasonable assumptions for the prepayment rate and repurchase price/discount, likely a middle road between the conservative assumptions used in the baseline and the aggressive assumptions used in Tests 6 and 7.

Finally, Smith said he used Tests 8 and 9 to estimate the compound impact of changes made to multiple assumptions. As summarized on the "Sensitivity – Recovery, Prepayment, and Repurchase Price" page, the compound impact suggested an increase in RBC charges for Baa3 and Ba3 tranches. Smith said one should ignore results for the Baa2 tranche, as only one out of the six CLO deals has a Baa2 tranche. The increase in RBC suggested that the impact of lower recovery assumptions outweighed the impact of recalibrated prepayment and repurchase price assumptions.

Smith sought guidance from the Working Group to determine the trade-off between precision and expediency, as each decision made to deviate from the baseline would require time for recalibration. Barlow did not support a delay in light of the Academy's observation that further calibration produced offsetting impacts and would likely put the Working Group in the same position as when baseline assumptions were used.

Cheung expressed his struggle with the correlation assumptions. He observed that the Academy tested correlation among CLO collaterals, but currently, there is no correlation from a broader C-1 perspective within the RBC framework. Smith responded that the C-1 bond model has a correlation assumption, but it was not widely discussed at the time the model was vetted. Smith acknowledged that there is no explicit correlation assumption for asset classes like equity and real estate, but CLOs are more akin to corporate bonds, which have a correlation assumption built into the bond C-1 model. Smith said that the Academy re-ran the corporate bond model under each of the sensitivity tests and noted that the correlation assumptions matter more for CLOs than for corporate bonds.

Smith then reported that the NAIC Structured Securities Group (SSG) is currently running the full universe of CLO cash flows against the baseline assumptions, with results expected within the week. The Academy plans to convert the results to C-1 factors. Smith referred to the "Scope of Full Universe of CLO Deals" page and clarified that the Academy is modeling over the combined collateral pool of that full CLO universe to give the biggest possible sample size. However, to develop RBC factors, the Academy is only running cash flows on CLOs owned by insurance companies in the U.S., not the full universe of CLOs. Smith concluded his presentation by referring to the Appendix. He specifically highlighted the "Relationship of Last 12-Month Default Rate and Loan Price" page, wherein the charts give good visual representations of the relationship between loan prices and default rates.

Frank Tallerico (Structured Finance Association—SFA) asked whether the collateral cash flows are sourced from CDONet. Smith confirmed that they are.

Nakul Nayyar (Guardian Life) asked whether the Academy is going to model for residual tranches in the future. He observed that the assumptions used by the Academy will likely have a dramatic effect on residual tranche charges. Smith confirmed that the Academy is working on residual tranches and plans to have an update in early 2026. He also agreed that the residual tranche charges will be very sensitive to the assumptions, and so will the lower-rated tranches, such as the Ba3 tranche in the presentation. Smith added that there is a nuance for residual tranches, being the accounting election: allowable earned yield method versus practical expedient method. The Academy expected the election to have a meaningful impact on the residual tranches' RBC and expects to present an update based on both election scenarios.

Barlow said he would like to solicit feedback on the Academy's presentation. Smith said he is especially interested in hearing suggestions for calibrating the discount/purchase price assumption. Tallerico welcomed the idea and stated that SFA members are especially interested in the discount/ purchase price assumption topic. Barlow stated that any comments gathered will be received during the Working Group's next open meeting and should not hinder the Academy's progress on comprehensive analysis or any other planned work.

Hearing no objection, Barlow exposed the Academy's presentation (Attachment XX) for a 45-day public comment period ending Jan. 29, 2026.

3. Exposed Proposal 2025-22-IRE (CLO RBC Structure)

Barlow said that in order to effectuate changes to CLO RBC with effect from 2026, a formal proposal 2025-22-IRE was drafted for the life RBC formula (Attachment XX). This is a structural change only, and no factor changes are proposed. In addition, if the Academy ultimately proposes a different methodology for assessing CLO risk change, the proposal will need to be modified. Finally, the residual tranche RBC methodology is currently subject to review by the Academy and, therefore, is not scoped into this proposal. Smith said he expects that the Academy will have a recommendation for the residual tranche in early 2026, so the Working Group should have enough time to refine the proposal for any potential structural changes resulting from the Academy's recommendation.

Maggie Chang (NAIC) reminded the Working Group that the draft asset valuation reserve (AVR) proposal (Attachment XX) is under the purview of the Blanks (E) Working Group. The proposal is needed to facilitate the breakout of CLOs in RBC blanks. If there is support from the Working Group, the AVR proposal will be referred to the Blanks (E) Working Group for concurrent exposure. Stolte expressed his state's support for the 2026 implementation of both debt and residual tranches of CLOs.

Hearing no objection, Barlow exposed proposal 2025-22-IRE (Attachment XX) for a 45-day public comment period ending Jan. 29, 2026

4. Discussed Other Matters

Barlow announced that after further corroboration with the American Council of Life Insurers (ACLI), it was agreed that now is not the right time to move forward with the adoption of proposal 2025-12-IRE (SVO Bond Fund Alignment Project) for the life RBC formula. Barlow said that the Property and Casualty Risk-Based Capital (E) Working Group and Health Risk-Based Capital (E) Working Group are going through their due processes, respectively. As such, the Working Group will not make any updates to its working agenda or recommendations regarding the Valuation of Securities Task Force/Statutory Accounting Principles (E) Working Group referral until all the RBC working groups have a chance to discuss the issue.

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

SharePoint/NAIC Support Staff Hub/Committees/E CMTE/CADTF/2026-1-Spring/IRE/RBCIREWG 12-15-25 Minutes TPR'd.docx

January 29, 2026

Mr. Philip Barlow, Chair
Risk-Based Capital Investment Risk and Evaluation (E) Working Group
National Association of Insurance Commissioners
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197

Re: American Academy of Actuaries' Presentation Titled C-1 Subcommittee Update on CLO C-1 Factors Modeling

Submitted Electronically

Dear Chair Barlow:

The American Council of Life Insurers (ACLI) appreciates the opportunity to comment on the exposed American Academy of Actuaries' C-1 Subcommittee's (the "Academy") recent update on its ongoing work to modernize and rationalize the capital framework applied to structured securities, including calibration of CLO C-1 factors, which we strongly support. We thank the Academy and NAIC staff for their continued engagement and wish to offer constructive input while reserving judgment on the interim conclusions until the Academy completes its analysis and provides more detail on its modeling results and proposed factors.

ACLI strongly supports aligning CLO C-1 factors with the NAIC's RBC principles adopted at the 2025 NAIC Fall National Meeting by the NAIC RBC Model Governance (EX) Task Force, including the principles of equal capital for equal risk (Principle 4), accuracy (Principle 6), and transparency (Principle 9). We value the Academy's sustained work to develop a coherent, internally consistent approach anchored to the C-1 bond framework and their effort to evaluate comparable attributes that may be appropriate for assigning CLO factors. Our goal is to help ensure the calibration ultimately achieves consistency across economically comparable risks and produces a durable long-term solution. As always, our priority is getting this right in a timely manner to secure the long-term integrity of our structured securities modeling framework.

We recognize that the exposed Academy presentation reflects an update on in-progress work and the sensitivity testing presented is based on a limited sample of six CLOs. These early results are informative, given that the potential impact on RBC outcomes can be material for certain tranches of CLOs, but they are not yet sufficient to assess fully the suitability of any specific calibration. Additional work remains to ensure the approach appropriately reflects the full universe of broadly syndicated loan CLOs, which we understand the Academy is working on now, and their unique characteristics relative to corporate bonds. ACLI suggests concentrating additional effort on the assumption levers identified by the Academy that may have a significant impact on factor determination but may not be fully accounted for in the model.

The sensitivity test results in the exposed Academy presentation suggested that there may be a large range of outcomes depending on the assumptions. Given the importance of assumptions in producing the model results, ACLI requests the Academy provide robust documentation such that the model can be assessed and validated. Such documentation will help ACLI identify key assumptions for further discussion and offer additional analysis to move this effort forward expeditiously towards methodologically sound and well-supported results.

Thank you for considering these comments. We look forward to reviewing the Academy's complete model results, proposed comparable attribute(s), recommended CLO C-1 factors, and relevant documentation, and we will plan to provide additional comments then. We appreciate the collaborative process and look forward to working with the Academy and the Risk-Based Capital Investment Risk and Evaluation (E) Working Group to ensure a well-supported, accurate, and enduring CLO C-1 framework.

Sincerely,

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Chief Life Actuary
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January 29, 2026

VIA ELECTRONIC SUBMISSION

National Association of Insurance Commissioners ("NAIC")
Risk-Based Capital Investment Risk and Evaluation (E) Working Group
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197

Re: American Academy of Actuaries' Presentation titled *C-1 Subcommittee Update on CLO C-1 Factors Modeling*

Dear Members of the Risk-Based Capital Investment Risk and Evaluation (E) Working Group ("**Working Group**"):

The American Investment Council ("**AIC**") appreciates the opportunity to comment on the American Academy of Actuaries' ("**Academy**") Presentation titled *C-1 Subcommittee Update on CLO C-1 Factors Modeling* ("**Presentation**") that was presented to the Working Group at its December 15, 2025 meeting and exposed for public comment.[1]

We commend the Working Group and the Academy for the deliberate, transparent, and methodical approach in developing a long-term risk-based capital ("**RBC**") framework for collateralized loan obligations ("**CLO**"). We particularly support the establishment of a clear procedural framework – including the development of the *C-1 Modeling Framework Flowchart*[2] – and broader reforms implemented by the NAIC, such as the formation of the Risk-Based Capital Model Governance (EX) Task Force ("**Task Force**") and the adoption of the *Principles for RBC Requirements* document ("**RBC Principles**").[3] These steps represent meaningful progress toward a consistent, analytically sound RBC framework and we are hopeful that this process will serve as a model as the Working Group considers other RBC-related enhancements in the future.

I. Individual CLO Modeling Is Neither Necessary nor Appropriate

AIC has long raised concerns about the appropriateness of financially modeling CLO investments on an individual basis. As the Academy advances its CLO modeling initiative, AIC reiterates its position that: (a) there is a sufficient level of CLO market data, and (b) there are sufficiently comparable attributes among CLO structures to support the

[1] The Presentation is *available at*: https://content.naic.org/sites/default/files/inline-files/Attn2%20Life-Presentation-CLOUpdate%20PDF_1.pdf.
[2] See slide 7 of the Presentation.
[3] The RBC Principles, as adopted, are available at: https://content.naic.org/sites/default/files/national_meeting/05_Minutes-RBCMGTF.pdf.

development of new C-1 factors without requiring individual modeling of CLOs.[4] The Academy's ongoing work and public presentations suggest that it may reach the same conclusions. **Consistent with the C-1 Modeling Framework Flowchart, these considerations demonstrate that individual CLO modeling is neither warranted nor appropriate**. Moreover, by increasing the RBC factor for residual interests from 30% to 45%, state insurance regulators have already implemented an interim solution that can remain until the updated CLO RBC framework is in place.[5]

II. The Academy Needs Adequate Time to Produce an Accurately Calibrated CLO Model

The Academy has indicated that it *may* recommend changes to certain of the baseline assumptions – namely (a) CLO recovery rates, and (b) prepayments and collateral reinvestment discounts – that are in the current version of the modeling framework "if more time were available to better specify these assumptions."[6] The current baseline approach for recoveries relies on historical data from S&P[7] and the current model does not appropriately account for prepayments or repurchase discounts.[8]

In both cases, the Academy's sensitivity testing confirms that refining these assumptions would materially improve the model's accuracy. However, because the sensitivity testing indicates that the baseline approach for recoveries is likely to artificially *reduce* the ultimate RBC charge relative to actual risk and the baseline approach for prepayments and repurchase discounts is likely to artificially *increase* the ultimate RBC charge relative to actual risk (i.e., the factors "run in opposite directions"), it has been suggested the model retain the baseline approaches on the basis that they roughly offset. The "offset" proposal appears to be proffered in recognition of time constraints rather than a lack of empirical support or a limitation on the Academy's modeling capabilities. **Such an approach risks embedding distortions into the final model despite clear evidence that refinements are both feasible and justified.** This creates quantitative distortions and a troublesome precedent for the planned review of other structured security asset classes.

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[4] See e.g., Section IV of this Letter and the FTI white paper referenced therein.

[5] The NAIC is also considering enhanced reporting requirements for CLOs which, if adopted, would provide an additional level of comfort to regulators to permit the Academy to conduct the work necessary to develop a proper model. *See e.g.,* Agenda Item 2025-22, which would require insurers to classify long term bonds as either "CLO" or "all other long term bonds", available at: https://content.naic.org/sites/default/files/call_materials/RBC%20IRE%2012-15-25%20Agenda%20%26%20Materials.pdf.

[6] See slide 9 of the Presentation.

[7] See slide 16 of the Presentation.

[8] See slide 17 of the Presentation.

III. AIC's Long-Standing Position on Recovery, Prepayment, and Reinvestment Assumptions

AIC and its members have consistently emphasized the importance of properly accounting for recoveries, prepayments and reinvestments throughout the Working Group's public comment process and the development of a CLO model by NAIC staff. As noted in our July 15, 2022 and February 17, 2023 submissions to the Valuation of Securities (E) Task Force ("**VOSTF**")[9], failure to include these key variables materially misstates CLO performance, particularly given the role of active management and historical evidence across market cycles. For example, our February 2023 letter noted that a "no pre-pay and no discount" assumption:

> "would grossly distort outputs as it does not reflect the reality of how CLOs actually function. To the contrary, prepayments and reinvestments are among the key reasons that CLO equity demonstrates higher returns after experiencing a financial crisis than after a bull market, and have occurred in every economic environment since the inception of the leveraged loan index. We believe a prepayments assumption should be included in line with historical experience."[10]

This remains equally true today.[11]

The recently adopted RBC Principles reinforce the need for greater precision. The "Accuracy" principle requires RBC requirements to be "sufficiently precise to assess solvency risk, while avoiding unnecessary complexity," and the principle of "Equal Capital for Equal Risk" ("**ECER**") requires RBC factors to "reflect measurable risks and the mitigating effects of risk management." **The RBC Principles directly support refining the model to better account for recoveries, prepayments, and reinvestments, rather than relying on incomplete data and generalized assumptions. Further, the Working Group engaged the Academy to increase precision, not only in CLO modeling, but for structured security RBC charges more broadly.**

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[9] AIC Letter to VOSTF dated July 15, 2022, titled *Comments regarding the IAO Issue Paper on the Risk Assessment of Structured Securities – CLOs*, available at: https://www.investmentcouncil.org/wp-content/uploads/2022/12/AIC-NAIC-CLO-Issue-Paper-Comment-Letter-Dated-July-15-2022.pdf; AIC Letter to VOSTF dated February 17, 2023, titled *Comments regarding the Proposed Methodology for Modeling CLOs*, available at: https://www.investmentcouncil.org/wp-content/uploads/2023/02/AIC-CLO-Methodology-Comment-Letter-to-VOSTF-2.17.2023-1.pdf.

[10] See pg. 7 of the February 17, 2023 Letter.

[11] AIC's subsequent letters to the NAIC provide additional supporting detail on the need to properly account for these features. See e.g., AIC Letter to VOSTF dated July 12, 2023 titled *CLO Modeling Ad Hoc Technical Group Assessment of Pre-Payment and Discount Assumptions in Potential CLO Financial Model*, available at: https://www.investmentcouncil.org/wp-content/uploads/2023/07/AIC-CLO-Ad-Hoc-Group-Letter-Regarding-Pre-Pay-and-Purchase-Discount-Assumptions-1.pdf and AIC Letter to the Financial Condition (E) Committee dated October 9, 2023, titled *Framework for Regulation of Insurer Investments – A Holistic Review*, available at: https://www.investmentcouncil.org/wp-content/uploads/2023/10/AIC-Comment-Letter-to-E-Committee-re-Holistic-Framework.pdf.

IV. FTI Analysis Supports Further Refinement of CLO Modeling Assumptions

A 2023 white paper commissioned by the AIC and written by FTI Consulting ("**FTI**") provides an independent, empirically grounded critique of earlier NAIC modeling efforts and supports a more granular approach to recoveries, prepayments, and reinvestments. Among other refinements, FTI recommends:

- Using median recovery rates from S&P, Moody's, and Fitch;
- Calibrating prepayment rates based on observed leverage loan data; and
- Using market observed purchase price discount data for reinvestments.

We encourage the Working Group and the Academy to consider and incorporate these recommendations as they evaluate further refinements to the model. The full FTI white paper is attached to this letter for reference.

V. Conclusion and Recommendation

While we recognize the desire to finalize a CLO model for year-end implementation – and we understand and respect the NAIC procedures and deadlines around structural changes – the timeline should not come at the expense of analytical soundness or the RBC Principles, particularly those related to "Accuracy" and "Equal Capital for Equal Risk." **We therefore respectfully request that the Working Group, in coordination with its parent committees, defer voting on CLO-related structural changes to the extent possible under their respective deadlines to provide the Academy additional time to hone the model's recovery, prepayment, and reinvestment assumptions and recommend more precise CLO RBC factors.** The FTI white paper may help to streamline the Academy's review and assist the Academy and the Working Group in meeting their deadlines. Should the Working Group determine that additional time is not possible, we respectfully request that the proposed "offset" approach be adopted strictly on an interim basis, with a clear commitment to replace it once the Academy finalizes a more precise model. We look forward to continuing to collaborate with you on this important issue.

Sincerely,

/s/ Rebekah Goshorn Jurata
General Counsel
American Investment Council

Encl.

February 2024

AIC | FTI Consulting White Paper

REVIEW OF NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS' PROPOSED METHODOLOGY FOR MODELING COLLATERALIZED LOAN OBLIGATIONS AND STRESS TEST SCENARIOS

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Disclaimer

The American Investment Council ("AIC") has engaged FTI Consulting ("FTI") to prepare an objective, unbiased study on the collateralized loan obligation ("CLO") modeling methodology and stress test scenarios presented by the National Association of Insurance Commissioners ("NAIC"). This study serves an educational purpose, providing background, context, and analytical results related to CLO modeling. This study is not intended to provide, and shall not be relied upon for, accounting, legal, or investment recommendations. Any accounting, legal, or investment recommendations described in this presentation are a general statement and shall only be used as a guide.

FTI has not subjected the information contained herein to an audit in accordance with generally accepted auditing or attestation standards or the Statement on Standards for Prospective Financial Information issued by the AICPA. Further, the work involved did not include a detailed review of data used by rating agencies or industry participants, and cannot be expected to identify errors or irregularities that may exist. Accordingly, FTI cannot express an opinion or any other form of assurance on, and assume no responsibility for, the accuracy or correctness of the historical information or the completeness of the published data, information, and assessments upon which this study references.

This study is intended for general information purposes only and should not be construed as advice or opinions on any specific facts or circumstances. The comments in this summary are based on FTI's preliminary analysis of publicly available information. FTI disclaims any legal liability to any person or organization for loss or damage caused by or resulting from any reliance placed on that content. FTI reserves all rights to the content of this study. No part of this study may be reproduced, stored, or transmitted by any means without the express written consent of FTI.

I. Executive Summary

1.1. On behalf of AIC, FTI conducted an objective study analyzing the CLO modeling proposed by NAIC to evaluate the risk of CLOs for determining risk-based capital charges. Based on our analysis, professional training, market experience, and review of available materials, we have reached the following conclusions:

- The Proposed Methodology fails to account for important CLO features, such as the active and dynamic role of managers shaping the risk profile of CLO assets. CLOs have historically strong performance even during severe market stress and substantially lower default rates than comparably rated debt instruments. The consistent outperformance of CLOs reflects the benefits of dynamic credit enhancement mechanisms and active management. Given the demonstrated effectiveness of these features in limiting the risks of rated CLO notes, any CLO modeling effort will need to capture them to approximate the risk profile of CLO notes reasonably. All three big rating agencies – S&P, Moody's, and Fitch – incorporate these key features in their assessment of CLO risk. In contrast, the Proposed Methodology omits qualitative assessments of important CLO features, oversimplifies prepayment and purchase price assumptions, and leaves out some critical quantitative factors that can significantly alter the risk profile of the CLO notes. In particular, the Proposed Methodology does not model the impact of default correlation nor the interaction between default and recovery during business cycles, when both these factors can drastically change the risk of CLO notes. Although the Proposed Methodology acknowledges that certain factors are intentionally omitted to simplify the modeling, oversimplification can result in unreasonable and unrealistic modeling outcomes that could impose unjustified costs and distort risk assessment.

- The proposed three stress test scenarios (A, B, C) correspond to (A) historical average default and recovery rates, (B) intermediate stress with step-down recovery, and (C) a stress scenario with heightened default rate and step-down recovery. By design, there is generally no loss to any CLO notes (excluding the equity tranche) in Scenario A, partial or complete loss to the most junior tranche in Scenario B, and complete loss to the most junior tranche and additional losses to the tranche above it in Scenario C. However, a stress scenario that simply stacks worst-case assumptions across all factors would result in over-conservative capital charges. For stress tests to be meaningful, one must consider the interactions among the modeling assumptions such that the combinations of assumptions are plausible. Scenario C assumes simultaneous and persistent distressed defaults and losses, which contradict the empirical loan performance during economic cycles that always involve patterns of peaks and throughs. Moreover, in the stress tests, NAIC SSG utilized default and recovery rates based on below-investment-grade credit issued globally, which can differ significantly from default and recovery rates of CLOs' underlying assets (i.e., U.S. leveraged loans) – primarily a result of different regulatory regime and the highly diversified nature of the U.S. economy. In 2022, for example, the global issuer default rates were negatively affected by the defaults of Russian companies due to sanctions related to the Ukraine war. This event, however, did not adversely impact the leveraged loans issued by U.S. companies.
- The proposed stress scenarios are static. The lack of information on the likelihood of the proposed scenarios means that one cannot estimate an expected level of risk based on these scenarios. To assess the risk associated with CLOs and other structured products, the industry and rating agencies have long ago moved away from static stress scenarios and adopted other models such as the Binomial Expansion Technique ("BET") and Monte Carlo simulation involving copula models and stochastic recovery rate variables. These are well suited to account for default correlation and to present an analysis of the expected loss under different default, recovery, and correlation assumptions. In our view, any proposed CLO modeling and stress scenarios will need to, at the minimum, account for default correlation to properly assess CLO credit risk. Considering the high sensitivity of the analysis outcome to modeling assumptions, the Proposed Methodology lacks sufficient technical sophistication to account for factors that can materially alter the credit profile of CLO notes for a reasonable assessment of CLO risks.

II. Introduction

II.A. Assignment

2.1. In a May 2022 memorandum, NAIC outlined a potential regulatory issue associated with risk-based capital ("RBC") charges on CLOs.[1] In the same memorandum, NAIC states that its Structured Securities Group ("SSG") can model CLO investments and evaluate all tranche level losses under stress scenarios to assign NAIC Designations for the RBC.[2] From November 2022 through July 2023, the NAIC Valuation of Securities Task Force ("VOSTF") published several memorandums and updates that describe its Proposed Methodology, as well as assumptions of its three stress test scenarios.[3] On October 5, 2023, NAIC published a CLO Modeling Scenario Proposal that includes seven additional stress test scenarios beyond what was originally disclosed (the "October 5 Presentation).[4] The detailed stress test scenarios assumptions and model results were published in November and December 2023.[5]

2.2. SSG consulted with interested parties (the "Ad Hoc Working Group") in preparing the Proposed Methodology. According to NAIC, the Proposed Methodology will assess the credit risk of CLOs for setting the related capital charges, which are meant to ensure insurance companies fulfill their financial obligations to policyholders without distorting or disrupting the broader capital markets.[6] NAIC also selected six CLO "test deals" and provided their calculated collateral and tranche cash flows under the proposed stress scenarios.[7]

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1 NAIC Risk Assessment of Structured Securities – CLOs, May 25, 2022.

2 Currently, NAIC permits insurers to utilize credit ratings of nationally recognized statistical rating organizations ("NRSROs") to determine CLOs tranches' proper NAIC designation category and the associated RBC factor.

3 Including: (i) NAIC CLO Stress Tests Methodology dated November 2022, (ii) NAIC SSG Proposed Methodology for Modelling CLOs dated December 12, 2022, (iii) NAIC SSG CLO Ad Hoc Group Beta Test Scenarios ABC, (iv) CLO Exposure Methodology dated May 17, 2022, (v) CLO Exposure Methodology Update dated May 31, 2023, (v) CLO Methodology Update dated July 14, 2023, which explains NAIC's decision not to implement voluntary prepayment and discount purchase assumptions, (vi) CLO Methodology as of 7.19-vs-5.31 changes, and (vii) CLO Exposure Methodology Draft Updated dated July 19, 2023.

4 NAIC, CLO Modeling Proposal Presentation, October 5, 2023.

5 See "Economy Files (CDOnet) Scenarios (11-07-23)," "CLO Default Recovery Scenarios 2023 1109," "CLO Preliminary Results by Scenario Updated 2023 1110.xlsb," and "CLO CashFlow updated 12-08-23." We note that the stress scenario results in the December 2023 file differ from the results presented in the November 2023 files. NAIC does not explain the reasons for the changes in the results.

6 NAIC, Risk-Based Capital, June 1, 2023, available at https://content.naic.org/cipr-topics/risk-based-capital. See also, NAIC 2023 Summer National Meeting, Valuation of Securities (E) Task Force, August 14, 2023, Attachment Six-A, available at https://content.naic.org/sites/default/files/national_meeting/VOSTF%20Summer%208.14.2023%20Materials_1.pdf.

7 The six CLO test deals are available on NAIC's webpage: https://content.naic.org/industry/structured-securities/collateralized-loan-obligations.

2.3. FTI was engaged by AIC to review and comment on NAIC's proposed methodology for modeling CLOs and NAIC's stress test scenario assumptions. Our evaluation focuses on whether the CLO modeling in the Proposed Methodology properly accounts for all material factors that affect the creditworthiness of a CLO. In particular, FTI has analyzed how the Proposed Methodology models CLO features that affect the credit risk CLOs, including features commonly analyzed by credit rating agencies, industry groups, market participants, and academic researchers. FTI also has analyzed the sensitivity of the test CLO deal performance under NAIC's proposed stress scenarios.

2.4. We understand that NAIC may supplement and update its proposed methodology, and, as such, some of the modeling issues may be addressed later.[8] This White Paper reflects our analysis based on the most updated NAIC methodology available as of the end of September 2023. We note that although this White Paper does not provide detailed analyses of the additional stress test scenarios contained in the October 5 Presentation, our views expressed in this White Paper are responsive to the discussions contained in the October 5 Presentation.

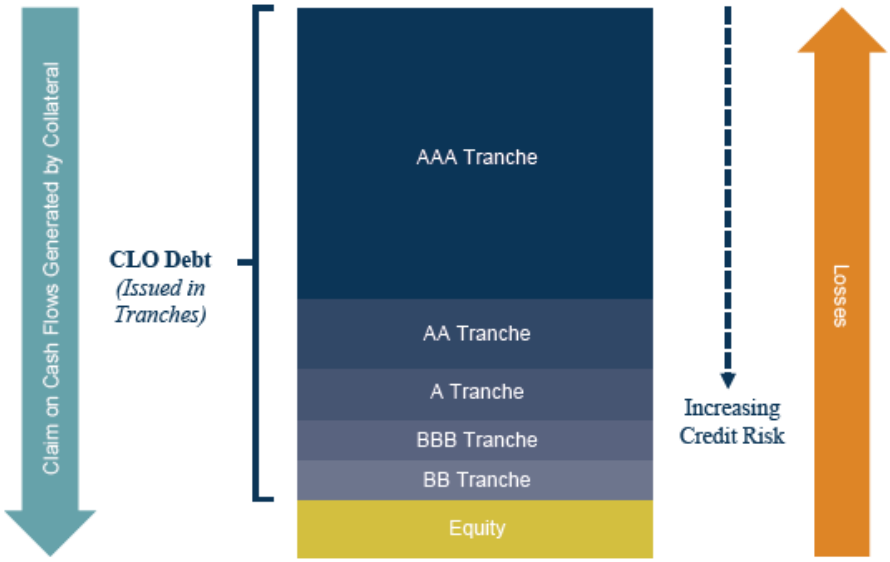
2.5. The remainder of this white paper is organized as below. **Section II.B** provides an overview of CLOs, including their underlying assets, structure features, historical performance, and the role of rating agencies. **Section III** summarizes the Proposed Methodology's CLO modeling, compares it with rating agencies' modeling, and evaluates the modeling assumptions on the underlying loan portfolio and cash flow assumptions. **Section IV** presents our findings related to the proposed stress test scenarios and the results of the sensitivity analysis using the six test CLO deals identified by NAIC. **Section V** concludes.

[8] See, e.g., NAIC CLO Exposure Methodology Draft, updated July 19, 2023, available at https://content.naic.org/sites/default/files/industry-ssg-clo-CLO-Exposure-Methodology-Draft-Updated-7.19.23.pdf.

II.B. CLO Overview

2.6. CLOs are actively managed securitization collateralized by a pool of loans made to corporate borrowers. To finance the purchase of the collateral loan pool, CLOs issue tranches of floating- or fixed-rate notes with varying risk-return characteristics. Cash from the underlying assets is distributed to the multiple tranches based on a hierarchical "waterfall," such that the most senior tranches are paid first, and any losses to the underlying collateral impair the most junior tranche first (namely, the equity tranche). In other words, payments received from collateral assets are paid to CLOs' tranches from the top down, and losses are absorbed from the bottom up. Generally speaking, the CLO structure is divided into four categories of tranches – equity, mezzanine, junior, and senior – in increasing seniority. The equity tranche (or tranches) absorbs initial losses until it is depleted, and additional loss is absorbed by the mezzanine tranche before the more senior tranches are affected. Under certain circumstances, cash flows from more junior tranches may be diverted to more senior tranches.[9] As a result, the most senior tranche of a CLO can gain an 'AAA' credit rating, indicating the highest level of creditworthiness. The equity tranche does not have credit ratings and receives cash flows only after all debt tranches. Allocating cashflows into hierarchical tranches provides economic value to CLO investors by differentiating the risks and returns of each note. **Figure 1** below shows the direction of cash flow and loss waterfalls over a typical CLO structure.[10]

Figure 1. Typical CLO Tranche Structure with Cash Flows and Losses Waterfalls



[9] The most junior tranche before the equity tranche is sometimes referred to as the junior tranche.

[10] Source: Oaktree Capital Management, "CLO Myth-Busting: The Top Three Misconceptions," 2023, available at https://www.oaktreecapital.com/insights/insight-commentary/education/clo-myth-busting-the-top-three-misconceptions.

II.B.1. Underlying Assets – Leveraged Loans

2.7. The underlying collaterals to CLOs are leveraged loans, particularly in this document, types of loans that are broadly syndicated loans made to non-investment grade U.S. companies.[11] Leveraged loans are senior secured loans that sit at the top of the corporate capital structure, meaning that they will be the first to receive payment before any other creditors and shareholders in the event of bankruptcy. These loans are typically secured by all of the company's collateral. A fully-ramped CLO typically comprises loans from 150 to 1000 loan issuers to achieve loan portfolio diversification.[12]

2.8. Companies typically issue leveraged loans to finance their operations, such as facilitating M&A activities (e.g., leveraged buyouts) or project finance, refinancing existing debt, or obtaining additional funding. More than half of corporate issuers in the U.S. are non-investment grade, including some of the well-known companies such as Delta Airline, Athena Health, and Hilton Hotels.[13, 14] Leveraged loans that collateralize CLOs are also known as "institutional term loans" because they are typically sold to institutional investors such as CLOs, mutual funds, and insurance companies. As of April 2022, 64% of the non-investment grade loans have been securitized as part of a CLO.[15] **Figure 2** below illustrates the position of leveraged loans (i.e., institutional term loans) in the corporate capital structure.

[11] According to NAIC, Commercial real estate ("CRE") CLOs, re-securitization, asset-backed securities ("ABS"), collateralized debt obligations ("CDOs") and trust preferred securities ("TruPS") CDOs are out of scope. Middle-market CLOs are excluded in this analysis. See, e.g., CLO Exposure Methodology Draft Updated July 19, 2023, available at https://content.naic.org/sites/default/files/industry-ssg-clo-CLO-Exposure-Methodology-Draft-Updated-7.19.23.pdf.

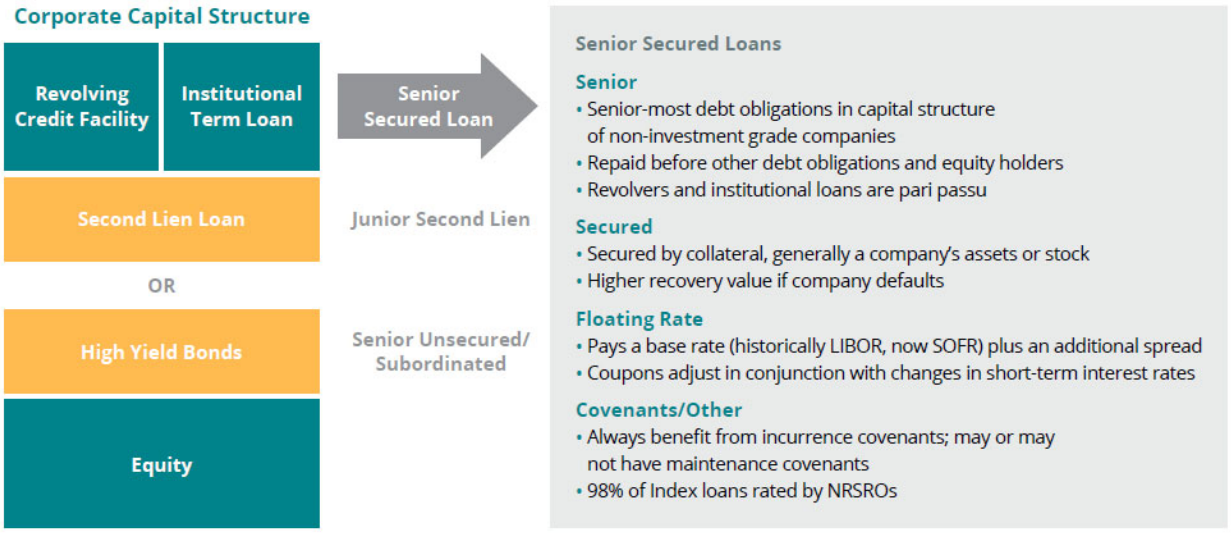
[12] Credit Investments Group, Introduction to Collateralized Loan Obligations, Credit Suisse, 2022, p. 6, available at https://am.credit-suisse.com/content/dam/csam/docs/us/cig/cig-white-paper-collateralized-loan-obligations.pdf. See also indentures of the six test CLO deals.

[13] As of January 2019, approximately 57% of rated U.S. corporate issuers are non-investment grade by issuer count, and approximately 28% of U.S. corporate debt is speculative grade by debt amount. S&P, U.S. Corporate Debt Market: The State Of Play In 2019, May 17, 2019, available at https://www.spglobal.com/en/research-insights/articles/u-s-corporate-debt-market-the-state-of-play-in-2019#:~:text=Investment%2Dgrade%20companies%20account%20for,to%20meet%20their%20financial%20obligations. (NOTE FIND MORE RECENT UPDATE)

[14] The U.S. CLO Market, Loan Syndications and Trading Association, April 2022, available at https://www.lsta.org/content/the-u-s-clo-market-white-paper/.

[15] *Id*.

Figure 2. Illustration of Corporate Capital Structure



Source: Credit Suisse

2.9. The creation of a CLO starts with the CLO manager, who works with the "arranger" (typically an investment bank) to help structure and capitalize the CLO vehicle. Each CLO has a defined lifecycle during which collateral is purchased, managed, and redeemed. The CLO manager actively manages the portfolio of underlying loans throughout the life cycle of the CLO.[16] Specifically,

- During the *warehousing and ramp-up* period, the CLO manager purchases the collateral loans for the original CLO and ensures the collateral loan pool complies with pre-determined criteria such as average credit quality, issuer diversity, and maturity.
- In the following 1-5 years of *reinvestment* period, the CLO manager actively manages the underlying loan portfolio by buying and selling loans and reinvesting the proceeds from prepayment toward new loans. At the same time, the CLO manager performs various tests to continuously monitor that cash flows from the underlying loan portfolio can cover the principal and interest payments of the CLO tranches and ensure that new loans comply with the deal documentation specifying multiple requirements affecting the risk profile of the CLO's asset portfolio.[17] CLO managers can also extend the reinvestment period – the life of the CLO deal can be extended multiple times before the CLO vehicle ultimately winds down.
- In the last *amortization* stage, the CLO manager pays interest accruals and outstanding balances of the CLO notes based on the waterfall priorities with cash flow from the underlying loan collateral. Because the underlying loans tend to be prepaid before the legal maturity date, this period typically ends before the legal maturity date of the CLO notes.

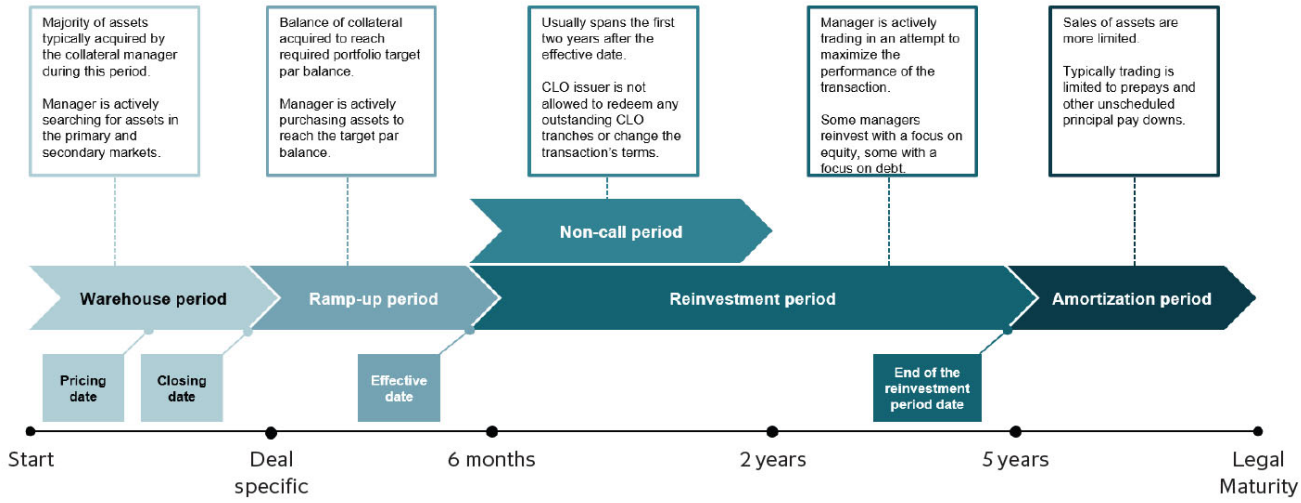
[16] *Id*.

[17] The first 0.5 to 2 years of the reinvestment period is also referred to as the "non-call period." After the non-call period, the equity tranche holder or issuer can call or refinance the CLO deal (i.e., pay debt holders in full and reissue debt at a lower spread).

2.10. In return for their services, CLO managers are paid (i) management fees and (ii) an incentive fee based on the returns of the equity tranche. **Figure 3** below shows the life cycle of a typical CLO deal, which has a 5-year reinvestment period (with the first few years as a non-call period) followed by a 3-year amortization period. The legal maturity of a CLO is usually approximately 12-13 years after closing.[18]

2.11. It is worth noting that each CLO includes several quantitative criteria or tests that measure the quality of the collateral. The CLO manager's trading and reinvestment activities are restricted if these tests fail. Some of the collateral quality tests relate to the minimum or maximum (i.e., floor or ceiling) of certain metrics, such as minimum diversity score,[19] minimum weighted average coupon, and maximum weighted average life. Others include measures that are tracked numerically, such as diversification rules (industry level and issuer level), leverage, and number of loans with liquid quotes. These tests and measurements track different aspects of the collateral quality and set boundaries on CLO managers' reinvestment activities.

Figure 3. Illustration of the Life Cycle of a CLO



Source: S&P Global Ratings

II.B.2. Structure Features

2.12. CLO tranches are designed to have different risk-return profiles to suit diverse investor needs. The differentiated risk-return profiles are achieved through "credit enhancement," including subordination, overcollateralization, excess interest, portfolio diversification, and performance-based cash flow diversions.

[18] Credit Investments Group, Introduction to Collateralized Loan Obligations, Credit Suisse, December 31, 2021, at p. 8.

[19] Diversity score is a metric that measures the diversity of the underlying loan portfolio, see discussions in **Section III.D.2** below.

2.13. Subordination means that each tranche of the CLO provides protection from losses to the tranches senior to it and receives protection for losses from the tranches junior to it. Each quarter, the cash received from the underlying loan pool flows downward through the tranches, with each tranche receiving cash only after the tranches senior to it have received their full payments for the month, including interest due plus any return of principal. When underlying loans default, losses are absorbed first by the subordinate tranches before flowing through to the senior tranches. The amount of subordination for each tranche is pre-determined by the CLO's contractual document, known as the indenture, which lays out the cash flow allocation, or "waterfall," across tranches. A typical 'AAA' rated CLO tranche has par subordination of 35-40% to protect against losses.[20] This means that the 'AAA' rated CLO tranche would not incur loss until the loan portfolio loses at least 35% of its value. At a conservative loss-given-default rate of 50%, this means 70% of loans cumulatively must default for the 'AAA' rated tranche to absorb any principal loss.

2.14. CLOs benefit from the diversification of the underlying loan portfolio, with the loan portfolio typically diversified across 150-450 distinct borrowers in 20-30 industries and with limits on how much assets can be invested in the loans of any single issuer.[21] Diversification reduces the risk of loans defaulting at the same time, making CLOs more resilient to market shocks. Portfolio diversification requirements and limits on certain types of risky collateral are specified in CLO indentures and provide additional credit enhancement to CLOs.

2.15. CLOs are often "overcollateralized," meaning that the underlying loans' total principal value exceeds the CLO tranches' total principal value. CLOs are also protected by "excess interest" or "excess spread," i.e., the total interest payment of the underlying loan pool exceeds that of total interest paid to CLO tranches above equity. Overcollateralization ("OC") and excess interest serve to protect the principal and interest payments on the CLO tranches against potential underlying loan defaults such that even if the underlying loans default, CLO tranches can still make their contractual payments with the additional loan collateral and interest payments. These protection mechanisms make owning the CLO underlying loan portfolio different from owning the entire CLO structure.

2.16. CLO indentures further specify the thresholds of performance test results (also known as trigger tests) under which cash flows from the underlying loan principal and interest payments are further diverted to protect the senior tranches. For example, interest payments due to subordinate tranches may be "diverted" towards principal recovery for the senior tranches (i.e., to make up for any principal losses) if the underlying loans' performance deteriorates beyond specified levels.[22] **Figure 4** shows an illustrative cash flow waterfall and diversion based on the results of performance tests.

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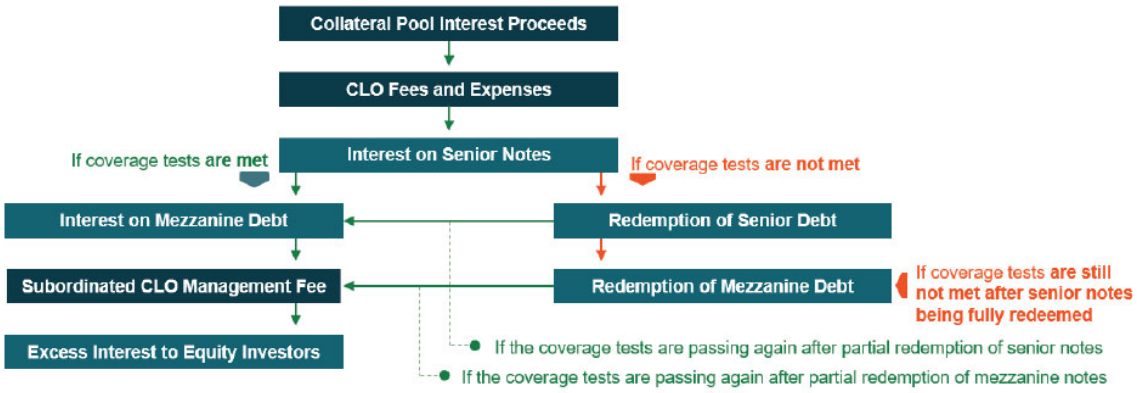
[20] S&P, "Get to Know CLOs," July 15, 2020, available at https://www.spglobal.com/ratings/en/about/blog/get-to-know-clos. See also, Credit Suisse, Introduction to Collateralized Loan Obligations, 2022, available at https://am.credit-suisse.com/content/dam/csam/docs/us/cig/cig-white-paper-collateralized-loan-obligations.pdf.

[21] PineBridge Investments, Seeing Beyond the Complexity: An Introduction to Collateralized Loan Obligations, January 2022, p. 7.

[22] Other examples of performance tests include over-collateralization (O/C) and interest coverage (I/C) tests for different CLO

Figure 4. Illustrative CLO Cashflow Waterfall



Source: Morgan Stanley, ICG

2.17. Additionally, CLO managers can replace the loans that have deteriorated in credit before a default. Rules such as “bucket of loans priced below 70” and “bucket of loans CCC-rated” would in fact require managers to act before even a significant accumulation of credit risk in the underlying portfolio.

tranches. The trigger levels that determine whether the test passes or fails are specified in the indenture of each CLO deal. For example, for the Carlyle deal, the SuperSenior O/C ratio trigger is 121.58% and the SuperSenior I/C ratio trigger is 120.00%.

2.18. The credit enhancement mechanisms discussed above are contractually specified for each CLO deal. These unique specificities determine the credit risk of a CLO tranche. To illustrate the effect of credit enhancements, **Figure 5** below shows the results of a CLO case study by Ares.[23] In this example, the 'AAA' rated tranche has an asset coverage of 155%, which means that every dollar of debt through that tranche is backed by $1.55 of collateral. The 'BB' rated tranche has an asset coverage of 109%, meaning that every dollar of debt through that tranche is backed by $1.09 of collateral. Ares also shows that the 'AAA' rated tranche has a constant annual default rate ("CADR," or the "break-even default rate") of 30.1% – in other words, the underlying portfolio can withstand a constant 30.1% default rate over the life of the CLO before the tranche would be at risk of losing $1 of principal. The 'BB' rated tranche has a CADR of 7.5%, meaning that it takes a constant 7.5% default rate over the life of the CLO for this tranche to be at risk of losing principal. For context, according to S&P and Moody's, the long-run average default rate for speculative-grade credit is less than 3% per annum. As **Figure 6** below shows, even during the 2007-2009 Great Financial Crisis, the default rate of leveraged loans is approximately 10%, which is a fraction of what the 'AAA' rated tranche is designed to withstand.[24] Over the most recent 10-year period, the average default rate of leveraged loans is less than 2%,[25] which is substantially lower than the 7.5% break-even default rate for the most junior 'BB' rated tranche. Under the assumption of a constant 60% recovery rate, the CADR reported in **Figure 5** would translate into cumulative loss rates as high as 10.5%, 15.2%, and 20.4% for 'BB', 'BBB', and 'A' rated tranches, respectively, before they experience any principal or interest shortfall. Excess spread (i.e., the difference between the interests received from the loans versus those paid out to the tranches) provides an extra buffer against credit losses. By comparison, the 1993-2019 cumulative loss and impairment rates for all rated CLO notes are 4.9%, 5.8%, 2.9%, and 0.1% for 'B', 'BB', 'BBB', and 'A' rated tranches.[26] Through multiple market cycles, CLO losses have reached the 'A'-level impairment only for a few select instances, involving CLOs with highly non-diversified collateral.

[23] Ares Management Corporation, Understanding Investments in Collateralized Loan Obligations ("CLOs"), at p. 7, available at https://www.aresmgmt.com/sites/default/files/2020-02/Understanding-Investments-in-Collateralized-Loan-ObligationsvF.pdf

[24] The 10% figure is calculated based on the total dollar amount outstanding. Based on the number of issuers, the default rate figure is 8%. See Slok, Torsten, "A Default Cycle Has Started," Apollo Academy, July 25, 2023, available at https://apolloacademy.com/a-default-cycle-has-started-2/

[25] Morningstar Perspective, "Three Chapter 11 Filings Push Leveraged Loan Default Rate to Two-Year High," May 16, 2023, available at https://indexes.morningstar.com/insights/perspective/bltd2a954fcda26cea8/three-chapter-11-filings-push-leveraged-loan-default-rate-to-two-year-high

[26] CLO impairment and loss given default (LGD) rates by original rating and based on 10-year cumulative data over 1993-2019, as of January 22, 2021. See PineBridge Investments, "Seeing Beyond the Complexity: An Introduction to Collateralized Loan Lobligations," January 2022, available at https://www.pinebridge.com/en/insights/clo-beyond-the-complexity.

Figure 5. Ares Case Study on Default Reduction of Credit Enhancements on CLO Notes

Credit enhancements substantially reduce the chances of default for CLO Debt Securities

Case Study: 2018 Vintage CLO

With 9%, 14%, and 22% credit enhancement respectively, the double-B, triple-B, and single-A CLO Debt Securities can withstand constant annual default rates of over 7%, 11%, and 17% within the underlying CLO Loan Portfolio without suffering a principal loss on the investment.

Tranche	Asset Coverage(1)	Default Resiliency(2)
AAA	155%	30.1 CADR
AA	130%	21.9 CADR
A	**122%**	**17.3** CADR
BBB	**114%**	**11.6** CADR
BB	**109%**	**7.5** CADR

As with any investment there is risk, including the loss of principal. For illustrative purposes only. Asset coverage and default resiliency characteristics will vary across all CLO securities.

1. Asset Coverage: measures the excess collateral in the fund to cover the given tranche. If a tranche has an asset coverage ratio of 115%, then for every dollar of debt through that tranche, there is $1.15 of collateral.
2. Default Resiliency: measures the constant annual default rate within the underlying portfolio that a given CLO tranche can withstand before losing $1 of principal. Also known as the "break-even default rate." If a tranche has a 19% break-even default rate, the underlying portfolio can experience 19% annual defaults for the life of the CLO before the tranche would be at risk of losing $1 of principal. By comparison, according to Moody's and S&P, the long-run average default rate for speculative-grade credit is less than 3% per annum.

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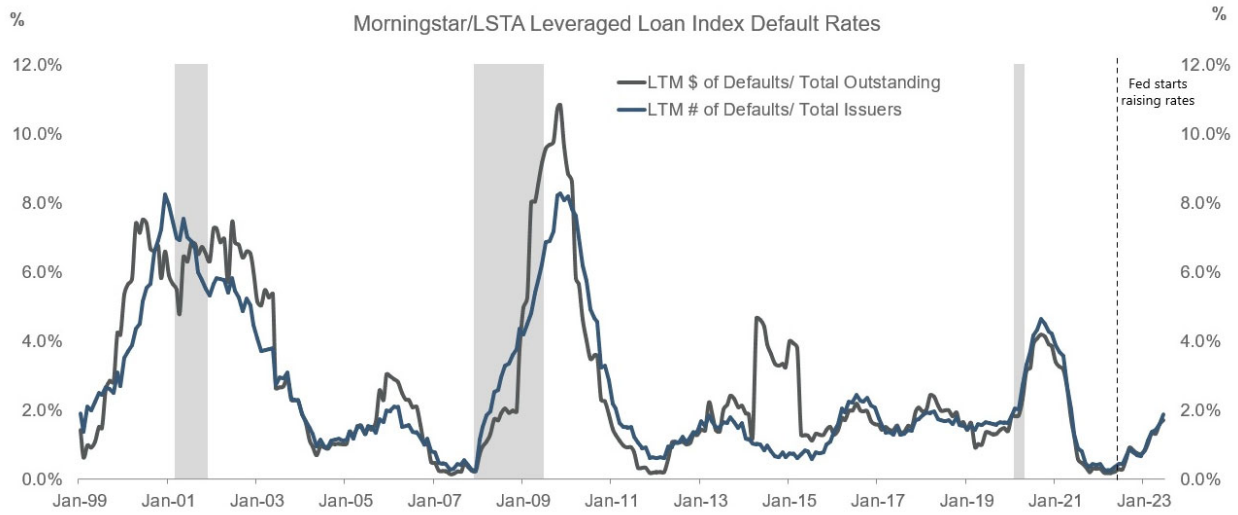
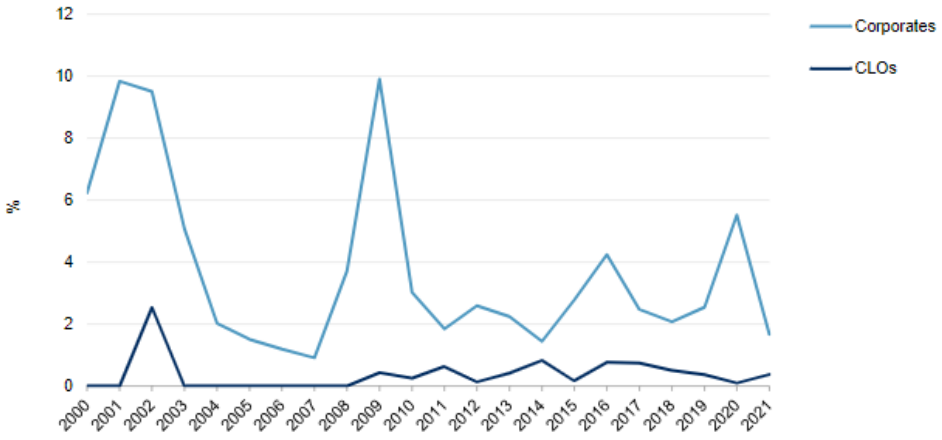
Figure 6. Morningstar/LSTA Leveraged Loan Index Default Rates



II.B.3. Historical Performance

2.19. Historically, CLOs have performed well, with substantially lower default rates than comparably rated debt. **Figure 7** below shows that the annual default rate for speculative-grade CLO tranches is substantially lower than that of speculative-grade corporate entities.[27] Between 2000 and 2021, the highest default rate for speculative-grade CLOs was 2.5%, while the highest default rate for speculative-grade corporate entities was approximately 10%. Since 2003, the annual default rate for speculative-grade CLOs has held below 1% each year (including the 2007-2009 Great Financial Crisis), well below the default rate of speculative-grade corporate debt. **Figure 7** also shows that CLO defaults tend to lag corporate credit defaults. In 2021, the speculative-grade CLO default rate rose to 0.38%, from 0.10% in 2020, after the speculative-grade corporate default rate jumped to 5.5% in 2020. The lag is consistent with CLO's structural features – CLOs can defer interest payments on junior tranches and temporarily absorb market shocks.

Figure 7. Annual Global Speculative-Grade Default Rates, Corporate vs. CLOs

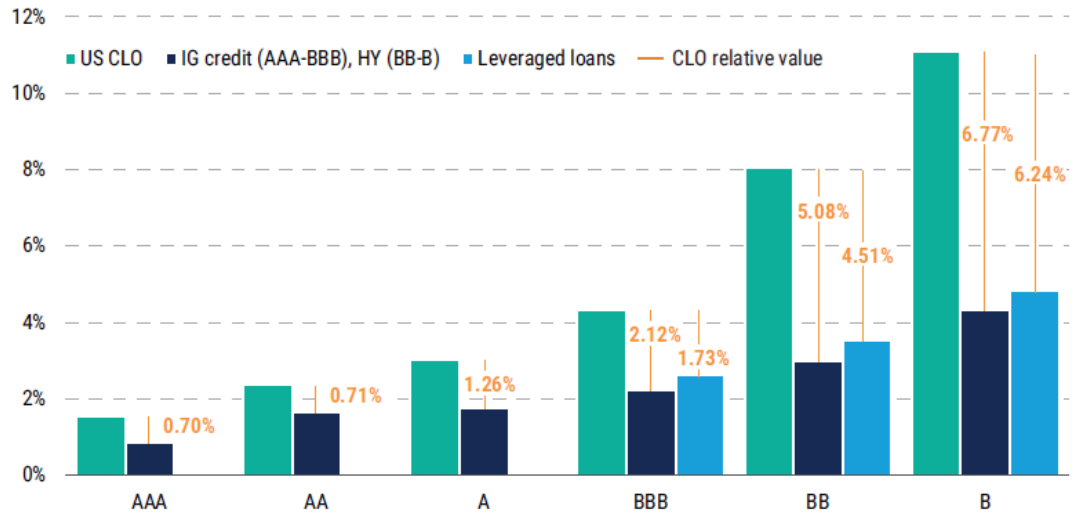


Sources: S&P Global Ratings Credit Research & Insights and S&P Global Market Intelligence's CreditPro®.

2.20. Compared with comparably rated corporate bonds and leveraged loans, CLOs have wider spreads, which reflect CLOs' greater complexity, lower liquidity, and regulatory requirements. As **Figure 8** below shows, the spread for BBB-rated CLO was 2.12 percentage points higher than corporate bonds and 1.73 percentage points higher than leveraged loans as of 2021. The spread of B-rated CLO was even wider – 6.77 percentage points higher than corporate bonds and 6.24 percentage points higher than leveraged loans.

[27] S&P, Default, Transition, and Recovery: 2021 Annual Global Leveraged Loan CLO Default And Rating Transition Study, October 31, 2022, at Chart 9, available at https://www.spglobal.com/ratings/en/research/articles/221031-default-transition-and-recovery-2021-annual-global-leveraged-loan-clo-default-and-rating-transition-study-12535652.

Figure 8. CLO Spreads versus Comparably Rated Leveraged Loans and Corporate Bonds



Source: JP Morgan, Bloomberg, and S&P/LCD, as of 31 August 2021. US CLO debt represented by the JP Morgan CLOIE Index; IG credit: Bloomberg US Credit Index; High yield bonds: Bloomberg US Corporate High Yield Bond Index; Leveraged loans: S&P/LSTA Leveraged Loan Index.

2.21. Even when compared with other similarly rated structured finance products, CLOs have historically performed well. **Table 1** below shows Moody's estimated multi-year cumulative default/impairment rates for different structured products by cohort rating.[28] Compared with other structured products, impairment rates for CLOs have been substantially lower across all rating cohorts.

Table 1. Moody's Cumulative Default/Impairment Rates by Cohort Rating, 1993-2021

	US ABS ex HEL	US RMBS	US CMBS	Global CDO	Global CLO	US ABS ex HEL	US RMBS	US CMBS	Global CDO	Global CLO
	1-Year Horizon					5-Year Horizon				
Aaa	0.03%	0.63%	0.02%	3.56%	0.00%	0.38%	12.13%	0.84%	20.89%	0.00%
Aa	0.21%	4.80%	0.08%	5.68%	0.00%	1.80%	27.03%	4.03%	27.64%	0.00%
A	0.18%	5.56%	0.28%	8.57%	0.01%	3.09%	33.04%	8.28%	30.35%	0.03%
Baa	0.52%	9.46%	0.87%	11.04%	0.06%	5.87%	42.47%	15.51%	37.30%	0.95%
Ba	2.43%	12.29%	3.72%	11.84%	0.19%	12.37%	32.53%	28.41%	29.02%	2.54%
B	6.05%	14.48%	7.85%	15.46%	0.54%	22.04%	31.38%	40.75%	29.47%	6.18%
Caa	16.25%	19.39%	24.34%	18.71%	2.93%	47.18%	48.53%	56.58%	33.19%	8.21%

[28] Moody's, Impairment and loss rates of global CLOs: 1993-2021, June 30, 2022 and 2022.06.30 – Moody's - Impairment and Loss of Structured Finance spreadsheet. The cumulative impairment rates shown in **Table 1** are adjusted by rating withdrawals. According to Moody's, withdrawal-adjusted default rates estimate the share of rated issuers expected to default assuming the presence of default risk over the entire measurement horizon (see Moody's, Measuring Structured Finance Original Rating Impairment Rates: Supplementing Withdrawal-Adjusted Metrics, May 8, 2018, available at https://www.moodys.com/research/doc--PBS_1113739.)

2.22. CLOs that originated after the Great Financial Crisis are commonly referred to as CLO 2.0s, in contrast to the CLOs that originated previously (i.e., CLO 1.0). CLO 2.0s are required to have increased credit support, stricter limits on the portfolio composition, and further diversified asset portfolios (with tests and limitations to prevent high concentration to certain sectors). For example, the 'AAA' tranche typically comprised 75% of CLO 1.0s, but only 60-65% of CLO 2.0s.[29] As **Table 2** below shows, the default rates for CLO tranches are substantially lower than those of corporate debt with the same credit rating. CLO 1.0 has experienced a low, but non-zero, default rate for CLO notes rated A or below.[30] Although the tally is not yet completed, CLO 2.0's have so far experienced a cumulative default rate of 0% across all ratings. The stellar performance of CLO 2.0 coincides with the low corporate loan default rate, which declined persistently from the peak of 7.5% in 2010 to below 2% since the end of 2016. The low corporate loan default rate likely contributed to the low CLO default rate in addition to the structural enhancements in CLO 2.0.[31]

Table 2. Default Rates for CLO Tranches and Corporate Bonds

Panel A: CLO 1.0 Era (1997-2009)

	CLO Tranches		Corporate Bonds	
Rating	Default Rate (%)	Num. Issues	Default Rate (%)	Num. Issues
AAA	0	1,250	0.28	352
AA	0	531	0.29	1,377
A	0.30	661	2.75	3,568
BBB	1.62	680	3.48	4,892
BB/B	3.33	481	9.31	7,391

Panel B: CLO 2.0 Era (2010-2019)

	CLO Tranches		Corporate Bonds	
Rating	Default Rate (%)	Num. Issues	Default Rate (%)	Num. Issues
AAA	0	4,779	0	150
AA	0	3,671	0	775
A	0	3,122	0.41	3,906
BBB	0	2,769	0.76	5,675
BB/B	0	3,134	6.16	5,471

[29] ICG Capital Market Strategy, An Introduction to Collateralized Loan Obligations (CLOs), June 2020, at p. 5.

[30] See Table 7 of Cordell, Larry, Michael R. Roberts, and Michael Schwert, "CLO Performance," Federal Reserve Bank of Philadelphia working paper 20-48, November 2021. Also published in the Journal of Finance, Volume 78, Issue 3, June 2023, pp. 1235-1278. Default Rate is the percentage of issues with an initial rating in a given category that defaulted. Num. Issues is the number of individual bonds (i.e., CUSIPs) issued in a given category during the sub-period.

[31] Delinquency rate on all loans, all commercial banks, Federal Reserve Bank of St. Louis, available at https://fred.stlouisfed.org/series/DRALACBN

2.23. Some market participants referred to CLOs issued after 2015 as CLO 3.0s, which became even more conservative to comply with regulatory changes imposed by the Volcker Rule that limited CLOs' investments in high-yield bonds. Although the Volcker Rule was amended in 2020 to allow investments in high-yield bonds, CLO 3.0s continue capping the exposure to high-yield bonds in their structure.[32] Despite of their relatively short history that coincides with a generally tempered economic cycle, the credit improvement in CLO 3.0s is evidenced by their superior performance compared with the performance of CLOs with less diverse pools and thinner credit cushions.[33]

II.B.4. The Role of Rating Agencies

2.24. Credit rating agencies (or rating agencies) are for-profit, registered legal entities that assess borrowers' ability to meet principal and interest payments on their debts, as well as the likelihood of default.[34] Rating agencies may rate the creditworthiness of debt issuers and debt instruments, and their assessments are summarized in credit ratings.[35] Rating agencies were considered indispensable by structurers, issuers, investors, traders, and regulators—including the Securities Exchange Commission and the International Organization of Securities Commissions ("IOSCO").[36]

2.25. Typically, the arrangers of the CLOs retain one or more rating agencies to provide preliminary ratings to the CLO notes at the pricing stage. Rating agencies model CLO cash flows based on the legal deal structure and analyze the underlying loan collaterals and deal-specific credit enhancements. They then assign credit ratings to CLO tranches based on the expected probability of default and recovery rates.

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[32] PineBridge Investments, "Seeing Beyond the Complexity: An Introduction to Collateralized Loan Obligations," January 2022, available at https://www.pinebridge.com/_assets/pdfs/insights/2022/pinebridge-investments_clo-primer.pdf

[33] S&P Research, "CLO Spotlight: The Dirty (Almost) Dozen: What Separates Defaulting U.S. CLO 2.0 Tranches From The Rest," July 7, 2022.

[34] A nationally recognized statistical rating organization ("NRSRO") is a credit rating agency that is registered with and approved by the SEC. The NRSROs are required to file an annual certification with the SEC.

[35] Rating agencies registered with the Securities and Exchange Commission ("SEC") are referred to as nationally recognized statistical rating organizations ("NRSROs") and are overseen by the SEC.

[36] SEC, "Updated Investor Bulletin: The ABCs of Credit Ratings," October 12, 2017, available at https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins/updated-8. See also, IOSCO, "Code of Conduct Fundamentals for Credit Rating Agencies," March 2015, available at https://www.iosco.org/library/pubdocs/pdf/IOSCOPD482.pdf.

2.26. After CLO issuance, rating agencies maintain credit risk assessment models that they update periodically with new surveillance data and continue monitoring the credit quality of the CLO notes throughout the life of CLOs. The assumptions fed into these models are based on surveillance of the underlying loans' actual performance, which the trustee of the deal provides. Rating agencies periodically evaluate the CLO performance and update their assessments. The models used by the rating agencies are also frequently updated to reflect newer academic and risk practitioner insights. Rating agencies update credit ratings periodically and publish their assessment for the overall market. Along with market prices, these rating assessments are monitored by CLO investors to update their views of their investment performance.

2.27. While rating agencies' informational and risk assessment advantages provide them a substantial commercial benefit for their long-term viability, rating agencies must maintain a reputation for scrupulous business practices and independent, credible ratings. Because of this, rating agencies' credit assessment does not diverge significantly from market prices or assessments of other market participants for long periods[37] – it would otherwise create a persistent arbitrage opportunity that damages rating agencies' business model over the long term.

[37] Besides the credit risk factor, market prices involve risk factors such as liquidity risk, market risk, interest rate risk, volatility risk, funding risk, and counterparty risk.

III. CLO Modeling Methodology

3.1. The purpose of the Proposed Methodology and stress test scenarios is to evaluate the creditworthiness of CLO notes held by insurance companies for determining capital charges. The modeling for CLO tranche credit risk comprises two parts: (i) a portfolio model that assesses the overall credit risk of the underlying loan pool using the data on the individual loans in the portfolio and (ii) a cash flow model that assesses the default probabilities and expected losses to CLO tranches resulting from the performance of the underlying loans. The Proposed Methodology relies on Moody's Analytics CDOnet ("CDOnet") software platform to obtain data on the underlying loan portfolio and to model the CLO waterfalls.[38]

3.2. Despite the multiple updates, NAIC's published CLO modeling methodology leaves out many critical assumptions as median- and long-term issues.[39] For the assumptions that are included, the Proposed Methodology also does not provide sufficient details on the treatment of different data issues.[40] In contrast to the limited documentation of the Proposed Methodology,[41] rating agencies publish detailed and lengthy descriptions of their CLO modeling and rating methodologies. For example, Moody's Investors Service ("Moody's") provides a 75-page rating methodology document to explain its approach to rating CLOs.[42] Fitch Ratings ("Fitch") publishes a 54-page rating criteria for CLOs and an accompanying portfolio credit model as a tool to assess rating factors of CLOs, both of which are periodically updated.[43] Standard & Poor's Global Ratings ("S&P") similarly made available a lengthy guidance on its methodology and assumptions for CLO ratings.[44] All three rating agencies provide additional documents totaling hundreds of pages that detail the assumptions and rationales behind their modeling. These documents are publicly available through many channels. The rating agencies' voluminous methodology description reflects the complexity of CLO modeling and the necessary details for understanding and implementing modeling assumptions.

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[38] CDOnet was first developed in 2006 and is still maintaining some of the antiquated functions and documentation. As a result, analysis on CDOnet tends to be time-consuming and inflexible. It also requires the user to constantly close out and reopen application windows to ensure the models can run accurately.

[39] For example, in the CLO Exposure Methodology Draft Updated dated July 19, 2023 (available at https://content.naic.org/sites/default/files/industry-ssg-clo-CLO-Exposure-Methodology-Draft-Updated-7.19.23.pdf), NAIC SSG categorizes reinvestment assumptions and Caa default vectors as "medium term issue" that it will provide clarification. It also categorizes initial conditions, use of issuer ratings, and recovery categories as "long term issues."

[40] For example, the Proposed Methodology does not explain how it treats underlying loans with no credit ratings from the big three rating agencies.

[41] NAIC's Proposed Methodology is contained in a 3-page document with a separate 8-page modeling discussion. See NAIC, CLO Exposure Methodology, dated July 19, 2023, and NAIC SSG CLO Stress Test Methodology, dated November 2022.

[42] Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021.

[43] CLOs and Corporate CDOs Rating Criteria, Fitch Rating, March 30, 2023. Fitch's portfolio credit model is available at https://www.fitchratings.com/fitch-portfolio-credit-model.

[44] S&P, Global Methodology and Assumptions for CLOs and Corporate CDOs, October 14, 2022, available at https://disclosure.spglobal.com/ratings/en/regulatory/article/-/view/sourceId/11005168.

3.3. **Table 3** below provides a high-level overview that summarizes the CLO features contained in the Proposed Methodology versus the CLO rating methodologies used by rating agencies. As this table shows, the Proposed Methodology includes limited quantitative factors that affect CLO risk, and does not consider qualitative factors. Given its limited scope of analysis, the Proposed Methodology lacks the depth and thoroughness of the risk assessment by the credit rating agencies. In this section, we review CLO modeling and discuss the significant limitations of the Proposed Methodology based on the most updated information available as of the end of September 2023.[45]

[45] We note that the October 5 Presentation does not provide additional details to the CLO modeling assumptions except high-level comparisons to the rating agencies' methodologies.

Table 3. Comparison of CLO Features in the Proposed Methodology versus Rating Agencies' Methodologies[46]

CLO Features Analyzed	Proposed Methodology	Moody´s	S&P	Fitch
Qualitative Factors, including:				
- CLO manager	No	Yes	Yes	Yes
- CLO legal structure	No	Yes	Yes	Yes
- Document review	No	Yes	Yes	Yes
- Operational risk review	No	Yes	Yes	Yes
- Macroeconomic / sector outlook	No	Yes	Yes	Yes
- Counterparty risk analysis	No	Yes	Yes	Yes
- Model risk	No	Yes	Yes	Yes
Quantitative Factors				
Underlying Loan Portfolio:				
- Default rate	Yes	Yes	Yes	Yes
- Recovery rate	Yes	Yes	Yes	Yes
- Amortization	Yes	Yes	Yes	Yes
- Default correlation[47]	No	Yes	Yes	Yes
- Concentration tests	No	Yes	Yes	Yes
- Prepayment	Yes (0%)	Yes	Yes	Yes
- Purchase discount	Yes (0%)	Yes	Yes	Yes
- Loan Seasoning	No	Yes	Yes	Yes
- Default timing	Yes	Yes	Yes	Yes
- Default volatility	No	Yes	Yes	Yes
- Recovery timing	Yes	Yes	Yes	Yes
- Stressed model inputs	No	Yes	Yes	Yes
- Foreign exchange and sovereign risk	No	Yes	Yes	Yes
Cash Flow Assumptions:				
- Waterfall structure	Yes	Yes	Yes	Yes
- Interest rate volatility	No	Yes	Yes	Yes
- Reinvestment assumptions	No	Yes	Yes	Yes
- Trading limitation	No	Yes	Yes	Yes

[46] **Table 3** does not present a comprehensive list of factors that could affect CLO risk. Other factors can include the liquidity of the underlying loans, as well as the correlation between the default rate and recovery rate. Notably, even rating agencies' models do not incorporate all risk factors in their evaluation of CLOs. For example, Moody's states that their modeling does not account for the liquidity risk. We note that the identification of the factors analyzed by rating agencies is based on their published rating methodologies, documents referenced in their rating methodologies, and their publications on CLO performance and analysis.

[47] A more detailed discussion of the default correlation assumption in the Proposed Methodology is contained in **Section III.D.2** below.

III.A. Rating Agencies Follow Different Methodologies in Evaluating the Credit Risk of CLOs

3.4. In the U.S., three leading rating agencies – S&P, Moody's, and Fitch – account for approximately 95% of all bond ratings.[48] Each agency has its proprietary rating methodology and may offer different ratings for the same issuer or security.

3.5. Specifically, Moody's assesses the credit risk of a CLO tranche based on its **expected loss** estimated using a default distribution of the underlying loan portfolio and a cash flow model to derive the cash flows received by the CLO tranche in a default scenario.[49] To determine the credit rating of a CLO tranche, Moody's compares the tranche's expected loss to its predetermined benchmarks.[50]

3.6. In contrast to Moody's approach, S&P and Fitch evaluate the credit risk of CLO tranches based on value-at-risk ("VaR") measures, which quantify the extent of possible losses of a CLO tranche to adverse market movements. Specifically, S&P compares two key metrics to determine the credit risk of a CLO tranche. The first metric is referred to as the Scenario Default Risk ("SDR"), which is equivalent to the value-at-risk of the underlying portfolio's default distribution. The second metric is referred to as the Breakeven Default Rate ("BDR"), which represents the share of the collateral pool that must default before the tranche holder is unlikely to be made whole. Credit ratings are determined by comparing a CLO's rating contingent SDRs and tranche-specific BDRs. To receive a particular rating, the collateral pool's expected default rate in an extreme circumstance (i.e., SDR) must not exceed what the tranche can withstand (i.e., BDR). For example, S&P considers that 'AAA' rated tranches should be able to withstand extreme macroeconomic stress without defaulting, such as during the Great Depression, while 'BBB' rated tranches can withstand moderate stress that is informed by the observed maximum corporate default rates since 1981.[51] **Figure 9** below illustrates S&P's methodology for CLO and Corporate CDO ratings.[52]

[48] S&P, Moody's, and Fitch are commonly called the "big three." Other well-known rating agencies include DBRS, Egan-Jones, Kroll, and A.M. Best.

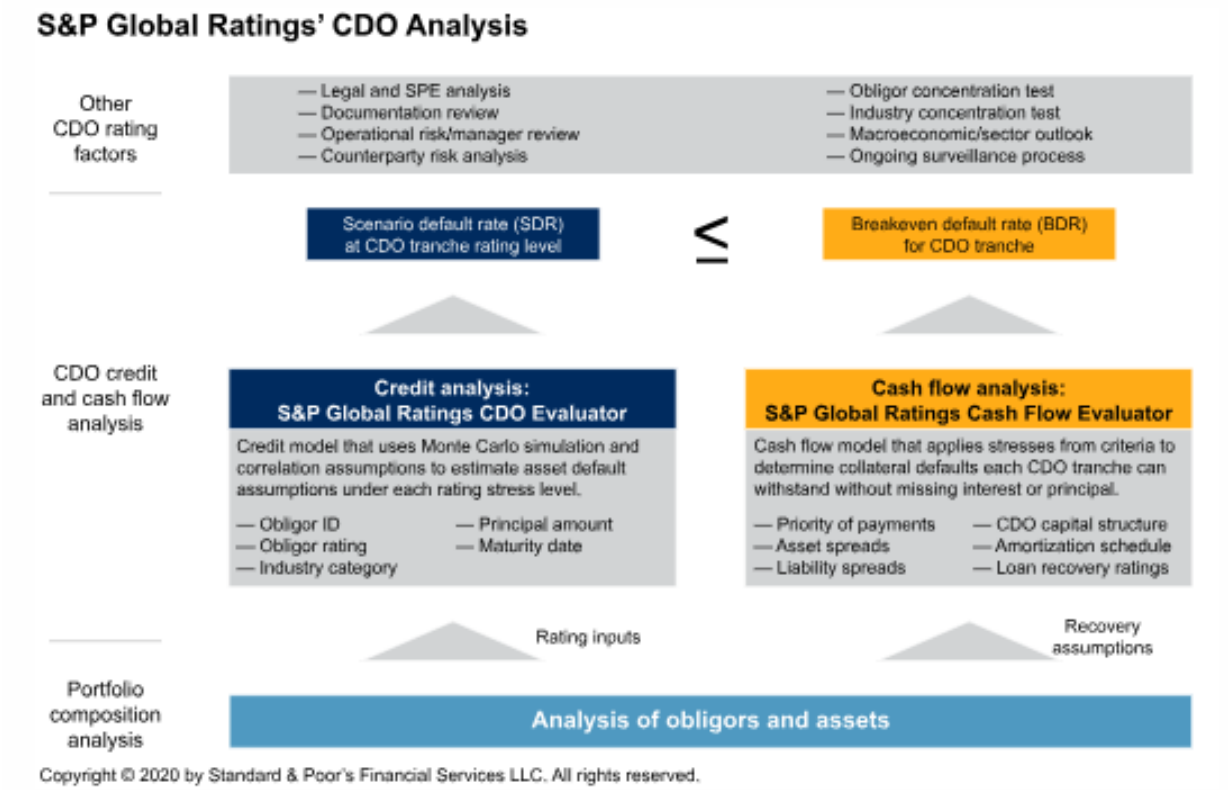
[49] Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, p. 1.

[50] *Id*. at p. 2.

[51] S&P, Global Methodology And Assumptions For CLOs And Corporate CDOs, June 21, 2019, available at https://disclosure.spglobal.com/ratings/en/regulatory/article/-/view/sourceId/11020014.

[52] *Ibid*.

Figure 9. S&P CLO and Corporate CDO Rating Methodology



3.7. Although Fitch also utilizes value-at-risk measures in its CLO rating methodology, it analyzes the probability of exceeding a certain level of portfolio losses instead of breakeven default rates like S&P. In particular, Fitch uses CLO target default rates to determine the risk tolerance for each rating level. For example, to get an 'AAA' rating, the target default rate over one year is 0.01%, corresponding to a 99.99% confidence level. The target CLO default rate over one year for a 'BB' rating is 1.05%, corresponding to a confidence level of 98.95%.[53]

[53] Fitch Ratings, CLOs and Corporate CDOs Rating Criteria, March 30, 2023,

3.8. The Proposed Methodology differs from the approaches of the big three rating agencies and relies on CDOnet for data input and cashflow modeling. Because of its reliance on CDOnet, the Proposed Methodology implicitly defaults to Moody's framework, assumptions (where applicable), and input data.[54] The Proposed Methodology does not explain why the regulatory capital charges should be primarily determined based on Moody's CLO modeling when other reputable and well-regarded rating agencies, such as S&P and Fitch, evaluate the credit risk of CLO notes based on different methodologies and assumptions. The methodological differences have potential implications on the credit risk assessment and, thereby, the associated capital charges. Studies have shown that CLO ratings can vary due to slight differences in parameter inputs or modeling.[55] Given the far-reaching implications, a systematic review of CLO model risks and their potential impact would be necessary to justify the selection of one rating agency's model over the models by other reputable rating agencies.

3.9. One important feature that is considered by the rating agencies but not by the Proposed Methodology is the impact of interest rates on CLO performance. The level and volatility of the interest rates impact cashflows. Even when both the debt and liabilities of a CLO are based on floating-rate indices, the levels and volatility of interest rates have a secondary impact on correlations, as well as default and recovery rates. Rating agencies consider interest rate volatility and account for different interest rate scenarios. Such an analysis is missing from the Proposed Methodology.

III.B. Evaluation of CLOs Requires Qualitative Assessments of Various CLO Risks and Not Only Algorithmic Modeling

3.10. The Proposed Methodology relies only on a prescribed set of algorithmic modeling, ignoring the issues of data and limitations of model simplifications. It also lacks important qualitative considerations that all three big three rating agencies incorporate in confirming the CLO credit ratings based on quantitative measurements (see **Table 3**). Specifically, rating agencies analyze qualitative factors of CLO deals to account for various known risk factors that cannot be possibly incorporated into quantitative models but are nevertheless essential determinants of CLO performance. To identify features or incentives that could result in significant differences in CLO performance from their quantitative modeling, rating agencies review all deal-related documents to evaluate factors that could affect CLO performance but are not captured in the quantitative modeling. These factors include risks associated with underwriter self-dealing, conflicting incentives between potential classes of buyers, the clarity and reach of local bankruptcy law, and CLO managers' ability to acquire certain types of assets or rules for trading.

[54] While the CDOnet software allows custom input data, many of its modeling assumptions follow Moody's methodology and with Moody's data as the default option.

[55] See, e.g., ESMA Report on Trends, Risks and Vulnerabilities, Model risk in CLOs, No. 2, 2020 and Leveraged loans, CLOs – trends and risks, No. 2, 2019.

3.11. For example. Moody's states in its CLO rating methodology that: "[I]n addition to these quantitative assessments, our rating committees also consider other various qualitative and quantitative factors."[56] To take into account the "unique characteristics of each transaction," Moody's "review[s] numerous documents including, as applicable, the indenture, collateral management agreement, trust deed, swap agreements, and other agreements, as well as a number of legal opinions that law firms provide to the issuer and the arranger."[57] Moody's further states that:[58]

> *In our review of the CLO's documents and opinions, we seek to identify any features, ambiguities, or incentives that could result in the CLO performing in a manner that is not consistent with our rating analysis. Our rating analysis depends on the adequate understanding of the actual functioning of a CLO, as the legal documentation describes. If the documentation is vague or allows wide latitude for amendments that could change key attributes of the transaction, we may adopt a more conservative reading of the document to ensure that alternative interpretations do not render our analysis inadequate.*

3.12. S&P incorporates qualitative factors in assessing the credit risk of CLO tranches, including event risk and model risk that may be present in the transaction, any additional risks or risk mitigants specific to the transaction, a forward-looking view of the credit quality of the portfolio, and factors such as the collateral manager's ability to make trades that may lower these metrics. According to S&P, qualitative factors could result in adjustments to its quantitative modeling assumptions. Moreover, using qualitative tests in conjunction with modeling provides "a more robust analysis than using only simulation models."[59]

3.13. Similarly, Fitch states, "While the cash flow model analysis is an important consideration in determining the final rating, ratings are ultimately assigned by a Fitch rating committee that also considers other quantitative and qualitative factors."[60] In particular, Fitch lists 11 example conditions under which its rating committees may decide on a rating different from the model-implied rating, the highest rating at which the note passes all stress scenarios in the modeling.[61] In particular,[62]

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[56] Moody's, Moody's Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, p. 1.

[57] *Id*. at p. 2.

[58] *Id*. at p. 30.

[59] S&P, Global Methodology And Assumptions For CLOs And Corporate CDOs, July 21, 2023, available at: https://disclosure.spglobal.com/ratings/en/regulatory/article/-/view/sourceId/11020014.

[60] Fitch Ratings, CLOs and Corporate CDOs Rating Criteria, March 30, 2023, at p. 17.

[61] *Id*. at pp. 3-4, 17. Examples where the committee can assign ratings that are different from model-implied ratings include: "The committee believes there is a significant likelihood that a rating action may be reversed in the near term due to potentially volatile performance."

[62] *Id*. at p. 24.

> *Fitch's criteria are designed to be used with experienced analytical judgment exercised through a committee process. […] A rating committee may adjust the application of these criteria to reflect the risks of a specific transaction or entity […] where the risk, feature, or other factor relevant to the assignment of a rating and the methodology applied to it are both included within the scope of the criteria but where the analysis described in the criteria requires modification to address factors specific to the particular transaction or entity.*

3.14. It is worth noting that rating agencies' qualitative considerations also include loan covenants, which have been an important part of loan underwriting criteria. During periods of economic booms, underwriters may have relaxed their loan underwriting criteria, expanding "cov-lite" loans. The spread of cov-lite loans has often been cited as a factor in increasing the risk of bank loans and, consequently, CLOs. However, rating agencies evaluate the cov-lite loans as part of their rating analysis. Therefore, one cannot simply assume that increasing cov-lite loans means rating agencies' credit risk assessment is no longer reliable.

3.15. Because of the importance of these qualitative assessments, all three rating agencies assign their final CLO ratings through rating committees, which evaluate qualitative factors to confirm ratings derived from quantitative model tests. In other words, unlike the Proposed Methodology, none of the big three rating agencies assign CLO ratings by quantitative modeling alone, even though their modeling methodologies are substantially more complex and comprehensive compared with the Proposed Methodology.

III.C. Evaluation of CLOs Should Account for Active Management by CLO Managers

3.16. Unlike other securitized products, CLOs' collateralized loan pools are dynamic. CLO managers actively manage the portfolio of underlying loans throughout the life cycle of CLOs – including sourcing the underlying loans in the warehouse and ramp-up period, reinvesting during the 4-5 years reinvestment period and limiting the number of distressed loans in the collateral through trades and substitutions. This important role of managers enhances the operational risk as well affecting CLO liabilities across all levels. Rating agencies, therefore, consider the operational and risk management capabilities of the CLO managers in confirming the ratings based on quantitative analysis.

3.17. Through active management, CLO managers may add significant value to CLOs. For example, CLO managers may avoid problematic industries or issuers when sourcing loans and reinvesting. Consistent with prudent active management, Griffin and Nickerson's (2023) study finds that "CLO managers repositioned their collateral pools to dampen the negative credit shock" when analyzing the performance of CLOs during the COVID-19 pandemic in 2020.[63]

3.18. CLO managers' ability to trade underlying loans in an active secondary market also enables them to take advantage of loan price volatility to make trading gains. To differentiate themselves, CLO managers must exercise prudent credit risk evaluation and trading decisions. The importance of CLO managers' ability to trade is demonstrated in the factors used to evaluate CLO managers. For example, the market has progressively adopted various quantitative criteria to evaluate CLO managers, including "weighted-average portfolio price," "below 70 price bucket," and "CCC bucket."[64]

3.19. In addition to the tests and other quantitative criteria designed to track the credit quality of a CLO, CLO managers also actively manage the risk by following their own set of rules, such as:

- Diversification rules at the industry level
- Diversification rules at the issuer level
- Rules on loan covenants and step-in rights
- Rules on leverage (LTM Debt/EBITDA)
- Rules on the magnitude of the EBITDA of issuers
- Rules on the percentage of loans that are illiquid[65]

3.20. Depending on CLO managers' style and investment philosophy, the amount of trading by individual CLO managers can differ substantially. To illustrate, **Figure 10** shows a broad spectrum of portfolio turnover rates (i.e., the rate at which the manager purchases and sells the underlying loans) across different CLO managers.[66] For example, CBAM and King Street have an average of approximately 36% turnover rates for 2022, while NY Life has a turnover rate of close to 0%. The drastic difference in portfolio turnover rates by CLO managers means that two otherwise identical CLOs may still perform differently because of the difference in CLO managers.

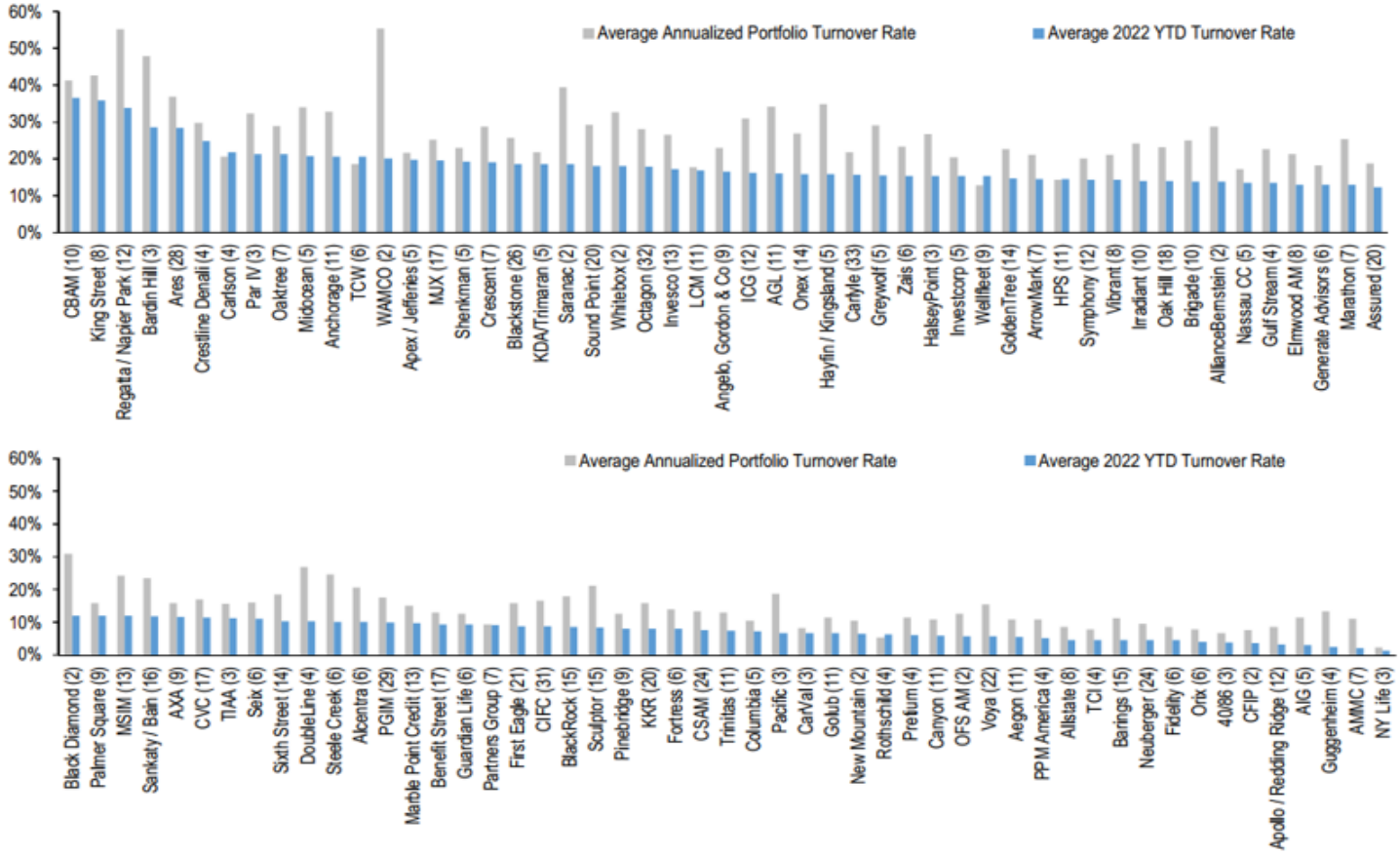
[63] Griffin and Nickerson, "Are CLO Collateral and Tranche Ratings Disconnected?" The Review of Financial Studies 36 (2023), 2319-2360.

[64] Other quantitative factors include weighted-average spread, weighted-average rating factor, Moody's diversity score, median leverage, over-collateralization cushion, lowest 2nd liens, median equity NAV, median BB MVOC, average bid depth, price-adjusted par build, and notional par build. See Wells Fargo Securities | The US CLO Manager Style Guide: March 2023. Note that "below 70 price" is sometimes substituted by "below 80 price" criteria.

[65] This metric can be measured by the number of dealers quoting a loan.

[66] J.P. Morgan Global Credit Research, Plugging Loan Liquidity, Sep 20, 2022

Figure 10. Average US CLO Manager 2022YTD Sales Turnover Rate vs. Average Annualized Sales Turnover Rate since Dear First Pay Date



Source: J.P. Morgan, INTEX. Based on 1,030 US 2.0 CLO portfolios (excluding MM, Static, and Enhanced CLOs) with a first pay date prior to January 1st, 2022 and in reinvestment period as of September 28th, 2022, and a deal factor >=95%. Excludes managers with only 1 CLO in the sample. Based on trades available as of September 26th, 2022 (reporting date may vary).

3.21. The amount of discretion afforded to CLO managers' active management is further demonstrated in **Table 4** below, which shows the 25th percentile, median, and 75th percentile of CLO performance measures by CLO managers.[67] For example, for the weighted average rating factor ("WARF"),[68] the CLO manager ranked at the 25th percentile has a WARF of 2895 for its managed CLOs, while the CLO manager ranked at the 75th percentile has a WARF of 2768. The percent of second liens in the underlying portfolios is 1.2% for the 25th percentile ranked CLO manager, and 0.4% for the 75th percentile ranked CLO manager. The ranges of these performance measures show that CLO managers have substantial discretion on the underlying loan composition, which in turn affects the risk associated with CLO notes. In other words, even for CLOs with the same performance parameters outlined in the indentures, their risk profile can differ substantially depending on the discretion of their CLO managers.

[67] Data from Intex as of March 30, 2023.

[68] WARF is an aggregate measure of the credit ratings of the underlying loan portfolio. A higher credit rating maps to a lower rating factor, and a lower credit rating maps to a higher rating factor.

Table 4. The 25th Pct, Median, and 75th Pct of CLO Manager Performance Measures

Manager	Weighted Avg. Spread ("WAS")	Weighted Avg. Rating Factor ("WARF")	Moody's Diversity Score	CLO Structure Leverage	Minimum OC	% Moody's Caa Holdings	% S&P's CCC Ratings	% of 2nd Liens
Manager 25th Pct.	352	2895	77	10.3	413	4.7	5.6	1.2
Manager Median	357	2825	82	10.6	468	3.9	4.6	1.0
Manager 75th Pct.	365	2768	86	11.0	513	3.4	3.8	0.4

3.22. Because the capacity and effectiveness of CLO managers can influence the performance of CLOs, rating agencies evaluate CLO managers when assessing CLO notes' credit profiles to confirm credit ratings implied by quantitative factors. For example, Moody's states in its CLO rating methodology that:[69]

> *Given the manager's important role and potential impact on CLO performance, we assess in our rating analysis the manager's ability to manage the CLO. […] We base our assessment on a number of factors […]. These factors include the performance of the manager's existing transactions and information we gather from our operations review of the manager. This assessment is part of our qualitative analysis and sometimes leads us to adjust our quantitative analysis to appropriately capture our expectations for the manager's performance.*

3.23. Similarly, Fitch states that in analyzing the credit risk of CLO tranches, it assesses the CLO manager's operational capability, reviewing, among other areas, the manager's organization, portfolio management, and loan investment process, procedures, and controls. The importance of CLO managers is further evidenced by Fitch's publishing of the CLO Asset Manager Handbook each year beginning in 2012. Fitch's annual handbook provides key manager facts and attributes of more than one hundred CLO managers to "provide investors a consistent framework for evaluating and comparing operational capabilities and resources across the active CLO manager universe."[70]

[69] Moody's, Moody's Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, pp. 30-31. Moody's further states that: "Our operations review of the manager includes a discussion about a range of topics, including the amount of corporate assets under management, its overall credit strategy, its credit decision process, and its performance relative to objective benchmarks, as well as unusual transaction features and the performance of the manager's existing CLO transactions. In addition, we discuss the manager's history, organization, staffing, policies and internal controls, systems, software, and business continuity plans. We also seek information related to any audits or regulatory investigations of the manager, such as whether any irregularities were discovered."

[70] See, e.g., CLO Asset Manager Handbook 12th Edition, Fitch Ratings, April 2023, available at https://www.fitchratings.com/research/structured-finance/clo-asset-manager-handbook-april-2023-26-04-2023.

3.24. Despite the importance of CLO managers and how this market functions, NAIC's proposed methodology does not account for the active management of CLOs and effectively assumes that CLO managers play no role.[71] NAIC states that one of its reasons for not taking manager choice into consideration when assessing the risk of CLOs is that "manager trading choices may be a zero-sum game for the CLO market as a whole." However, insurers will be charged based on the CLO notes they own as opposed to some sort of market average. Therefore, even if the performance of CLO managers ends up having, on average, a zero impact on the performance of CLOs across the market, it does not mean that the performance of specific CLOs held by a particular insurer is not influenced by CLO managers.

III.D. Proposed Modeling of Underlying Loan Portfolio

III.D.1. Default and Recovery Rate of Underlying Loans Based on Ratings Assigned by Rating Agencies

3.25. To model the default and recovery rates of CLOs' underlying loans, the Proposed Methodology adopts the issuer ratings of the loans from rating agencies,[72] specifically the ratings from Moody's. The use of issuer rating is listed as one of the longer-term issues: "Most of the deals we have modeled have Moody's Issuer rating populated and, as a result, we did not have to make any changes. We have learned through this process that this is not the case for other platforms […] We will work on an arrangement where the mapping of the loan ratings is consistent and transparent."[73] The Proposed Methodology does not specify the modeling assumption for loans that are not rated.[74]

[71] NAIC states that: "We did not model manager choices due to the difficulty of the task. We may revisit this assumption in the future." See Appendix of NAIC SSG CLO Stress Testing Methodology, dated November 2022.

[72] NAIC, CLO Exposure Methodology, dated July 19, 2023, p. 2. If issuer rating is not available from rating agencies, the Proposed Methodology uses an issue rating from rating agencies with adjustment by loan type, or NAIC Designation Category. The Proposed Methodology further assumes that a loan is "partially default until its maturity" based on the rating of the loan, and the principal is recovered six months after default.

[73] NAIC, CLO Exposure Methodology, dated July 19, 2023, p. 1.

[74] Additional issues include the rating distinctions between issuer, issue, and corporate financial rating ("CFR"), as well as the treatments of the "PR" or "WR" ratings.

3.26. As an initial matter, the reliance on rating agencies' issuer ratings is inconsistent with NAIC's proposal to replace rating agencies' CLO tranches' ratings. Credit ratings of the underlying loan collateral are one of the most important inputs to the CLO modeling, as they determine the default and recovery rate of the underlying loans and, thereby, the total amount of cash flows received by the CLO structures. The Proposed Methodology suggests that although rating agencies' issuer ratings are trustworthy, their ratings of CLO tranches are not. The Proposed Methodology does not take issues with rating agencies' CLO rating methodology, but simply asserts that rating agencies' CLO tranches' ratings are unreliable because, based on those ratings, the risk-based capital is lower than that of 'B' rated corporate loans. This analogy oversimplifies the CLO structures and tranches and fails to account for CLOs' credit enhancements (as discussed in **Section II.B** above), which contributed to CLOs' persistently low default rate even during the Great Financial Crisis.

3.27. Some market analysts argue that CLOs benefit from what they term "regulatory risk arbitrage" because CLO structuring transforms a pool of lower-rated loans into a set of various rated and unrated notes, including 'AAA' rated notes. The so-called "regulatory risk arbitrage" is a misnomer. The criteria used to rate CLO liabilities is no different than the criteria used to rate underlying loans; they both depend on expected default or loss rates. CLO structuring does not change the risk of the underlying loans but actively pushes the risk down the structure, distributing it first to the equity tranche and later to the tranches at the bottom of the structure. This hierarchical loss allocation is done not by just CLOs, but also all other structured products, including ABS, CMBS, and CDOs. In addition to the reverse sequential allocation of losses, CLOs incorporate mechanisms like excess spread and internal rules that, upon being triggered, divert cash flows toward higher-rated tranches to maintain buffers. Additionally, CLOs risk is dynamically managed by to keep the risk profile of the collateral limited through active trading and reinvestment. All these mechanisms contribute to the performance difference between structured products and direct loan ownership.

3.28. The major rating agencies have different methodologies to map their criteria into ratings and may assign different ratings for the same issuers or debt issues. To illustrate this phenomenon, **Table 5** below compares the long-term issuer ratings by S&P and Moody's in 2018.[75] The figures in the main diagonal correspond to the number of companies evaluated to have the same credit ratings by S&P and Moody's. The green figures show the number of issuers that received higher S&P ratings relative to Moody's ratings, while the red figures show the opposite. **Table 5** shows that only 406 (or 52.2%) of the 788 companies analyzed received the exact credit ratings from both S&P and Moody's. Furthermore, Moody's tends to provide lower ratings than S&P. For example, of the 118 companies that received a 'BBB+' rating from S&P, 42 were rated one notch lower, two were rated two notches lower, and one was rated as 'Ba' by Moody's. Only 14 of these 118 companies received one notch higher rating from Moody's. Of the 788 companies analyzed, 245 received Moody's ratings lower than S&P's ratings, while 127 received S&P ratings lower than Moody's.[76]

3.29. Despite the known discrepancies between the ratings from different rating agencies, the Proposed Methodology has not explained why Moody's loan issuer ratings should be prioritized over those of other rating agencies (e.g., S&P and Fitch). It also has not explained the treatment when the issuer ratings for underlying loans differ across different rating agencies.

[75] Caridad, L., Núñez-Tabales, J., Seda, P., & Arencibia, O., Do Moody's and S&P Firm's Ratings Differ? Economics and Sociology, 2020, 13(4), 173-186. doi:10.14254/2071-789X.2020/13-4/11.

[76] It is noteworthy that given rating agencies' different rating methodologies, it is natural to observe rating agencies issuing different ratings for the same entity or issues. However, it is standard market practice to treat the alphanumeric rating levels across different rating agencies to be equivalent and substitutable.

Table 5. Comparison of Long-Term Issuer Ratings by S&P and Moody's

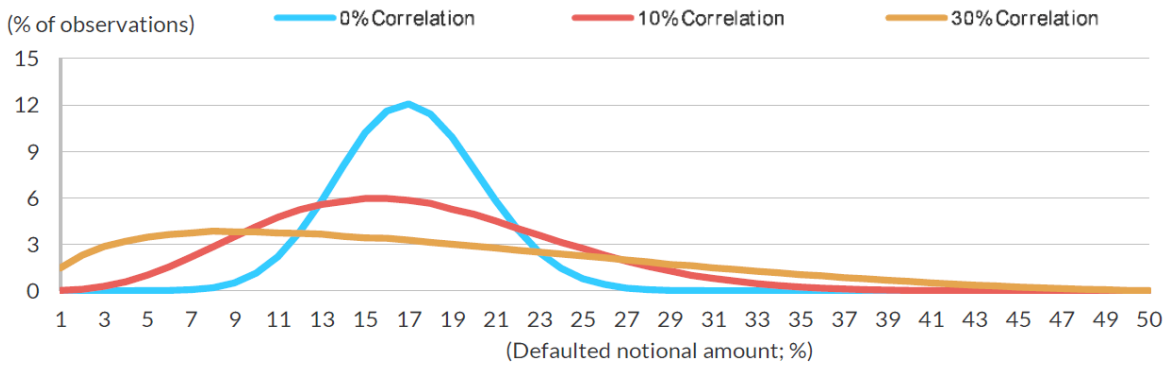
The figures in the main diagonal (bold font) correspond to the number of companies evaluated to have the same level of credit risk by S&P and Moody's. The figures in green show the number of issuers that received higher S&P ratings relative to Moody's ratings, while the figures in red show the number of issuers that received higher Moody's ratings relative to S&P's ratings.

2018		Moody's																				Total
		Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca	
S&P	AAA	**3**																				3
	AA+		**1**	1																		2
	AA			**3**	2	2																7
	AA-			1	**6**	8	2	1														18
	A+				2	**20**	9	3	1													35
	A					3	**30**	10	3													46
	A-					2	9	**34**	27	6												78
	BBB+							14	**59**	42	2	1										118
	BBB							1	22	**86**	32	3										144
	BBB-								1	18	**51**	11	2									83
	BB+										5	**26**	23	1								55
	BB										1	9	**23**	18	5							56
	BB-											1	10	**18**	12	2						43
	B+												5	5	**11**	4	1					26
	B													2	5	**15**	8					30
	B-															3	**11**	2				16
	CCC+															1	2	**5**				8
	CCC																	2	**1**		1	4
	CCC-																		2	**0**		2
	D																	1			**3**	4
Total		3	1	5	10	35	50	63	113	152	91	51	63	44	33	25	22	10	3	0	4	778

III.D.2. Correlation

3.30. One of the crucial assumptions in modeling the underlying loan portfolio is the correlation of the loan defaults, i.e., how likely defaults co-occur among the loans in the CLO's underlying portfolio. A higher default correlation likely raises the total loss in the portfolio, which in turn impacts the cash flows to various CLO tranches. **Figure 11** below shows the correlation effect on the underlying loan portfolio default distribution presented in Fitch's CLO rating methodology. As this figure shows, increasing default correlation flattens the default distribution curve, so the likelihood of the extreme loss "right tail" increases substantially.

Figure 11. Impact of Correlation Assumption on Default Distribution



Source: Fitch Ratings

3.31. The Proposed Methodology, however, does not explicitly model portfolio correlation and simply states that the more advanced correlation modeling is "beyond the scope of this project and may overfit the data available to us."[77] This comment about loan default correlation being "beyond the scope" is perplexing, as how likely defaults co-occurring among the loans is commonly recognized as one of the most important factors that resulted in the defaults of the 'AAA' rated mortgage-backed structured products during the Great Financial Crisis. Default correlation is also the focus of other regulators in analyzing the risk of CLOs.[78] The Proposed Methodology, therefore, has thus far failed to clarify the reason for not including default correlation modeling or its statement that modeling default correlation could have "overfit the data.".[79]

[77] In the NAIC SSG CLO Stress Testing Methodology document dated November 2022, NAIC states: "We did not explicitly model portfolio correlations. Each CLO has a unique portfolio which can be diversified across a number of underlying industries. We believe that more advanced correlation modeling is beyond the scope of this project and may overfit the data available to us."

[78] See, e.g., ESMA Report on Trends, Risks and Vulnerabilities, Model Risk in CLOs, No. 2, 2020.

[79] We note that the October 5 Presentation suggests that it may take into account loan default correlation in its scenario analysis, stating that "For a pool of corporate credits, the distribution has a mean based on the historical default mean and a distribution shaped by correlation." (See p. 2.) However, the Presentation provides no explanation of how it proposes to model default correlation. Moreover, the October 5 Presentation also states that the proposed methodology calculates the "sum of RBC [risk-based capital] on collateral plus threshold term." A simple sum of the collateral pool risk-based capital effectively assumes that loans are defaulted simultaneously (effectively 100% correlation of defaults) and thereby does not account for the credit risk reduction in the loan pool through diversification. The October 5 Presentation's discussion on the proposed methodology of the loan default correlation is therefore ambiguous at best or inconsistent with the preceding statements. (See p. 7.)

3.32. Given the importance of default correlation in assessing the risk of CLO notes, all the big three rating agencies devote a long description of the default correlation assumption in their rating methodologies. Specifically, Moody's models the default correlation based on the Binomial Expansion Technique ("BET").[80] Fundamentally, BET models the underlying loan portfolio using a hypothetical portfolio of uncorrelated loans with the identical and independent stochastic distribution of default rates as the actual portfolio. Moreover, loans in the hypothetical portfolio are assumed to have equal weight, such that the number of loans in the hypothetical portfolio implicitly captures the default correlation of the actual loan portfolio. The number of loans in the hypothetical portfolio is called the "diversity score." The higher the diversity score, the lower the default correlation, meaning there is a lower likelihood of extreme losses (i.e., a narrower right tail of the default distribution). In general, the diversity score is higher when the number of assets in the portfolio is higher, the assets in the portfolio are more widely distributed across industries, or the par amounts of the assets in the portfolio are more evenly distributed. In short, Moody's uses the diversity score to build a hypothetical portfolio of uncorrelated and homogeneous loans that will mimic the default behavior of the original loan portfolio.[81] The calculation of the diversity score imposes implicit assumptions on the default correlations of the underlying loan portfolio, such as the correlation of default rates for loans in different industries.

3.33. In contrast, S&P and Fitch assume that defaults of the underlying loans follow the "Gaussian copula."[82] Generally speaking, a copula is a statistical method that separates the marginal distributions of a set of jointly distributed random variables from the dependency structure of a given multivariate distribution. The Gaussian copula is the copula of multivariate normal distributions. Using the Monte Carlo simulation technique, the Gaussian copula model estimates the distributions of defaults and losses for the underlying loan portfolio. Specifically, the Gaussian copula model simulates the performance of the underlying loan portfolio using information about the portfolio composition, individual loans' default and recovery rates, and correlation among loan defaults. The distribution of possible portfolio performance is created by repeating this simulation a substantially large number of times with varying model inputs.

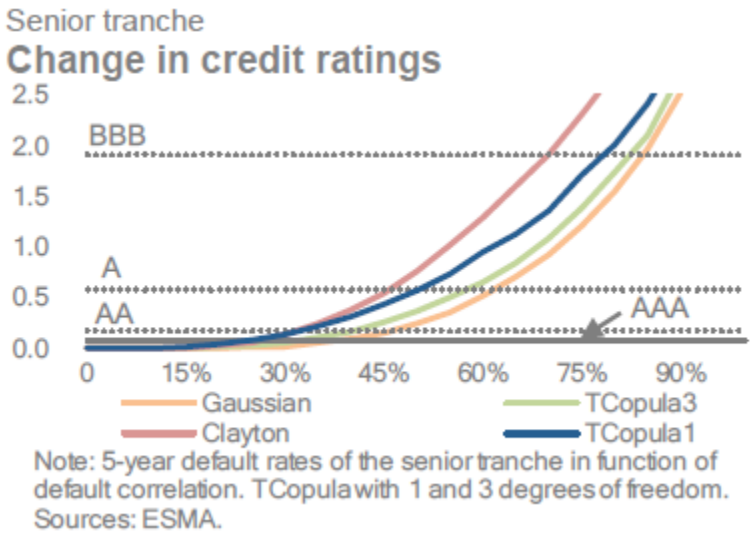
[80] Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, p. 7.

[81] According to Moody's, The portfolio's diversity score is calculated based on the number of assets and the par value of each asset in the underlying portfolio, and intends to present the number of independent, identical assets in the original underlying loan portfolio. *Ibid*.

[82] Fitch Ratings, CLOs and Corporate CDOs Rating Criteria, March 30, 2023, p. 2. S&P, User Guide for the CLO Community, p. 14, available at https://www.spglobal.com/ratings/es/products/easset_upload_file37542_2781690_e.pdf.

3.34. The Gaussian copula model provides the advantage of analytical tractability. However, it assumes a constant loan default correlation across all market conditions, so the likelihood of loans defaulting together remains unchanged in distressed markets as in normal times. Other copula models, such as the Student copula (or T copula) and Clayton copula, integrate more complex structures that account for the possibility of large simultaneous loan defaults during periods of market stress. For example, a 2020 European Securities and Markets Authority ("ESMA") report analyzes the impact of different copula models on the default rates of a hypothetical senior CLO tranche and finds that for a given level of correlation, the Gaussian copula generates the lowest default rates and thereby the highest credit rating.[83] As **Figure 12** shows, for a correlation of 60%, the Gaussian copula results in a tranche default rate of less than 0.5%, the Student T copula results in a default rate of 0.5-1%, and the Clayton copula results in a default rate between 1-1.5%. Conversely, to obtain an 'A' rating with a Gaussian copula model, the default correlation can be as high as 60%. For the Student and Clayton copula models, however, the default correlation has to be lower than 45-50% for the tranche to have a sufficiently low default rate that qualifies for an 'A' rating.

Figure 12. Impact of Default Correlation Modeling on the 5-Year Default Rates of CLO Tranches



3.35. Although default correlation is a critical determinant in CLO credit risk, the Proposed Methodology does not clarify how it plans to model default correlation, if at all, nor does it specify inputs to use under different stress scenarios. The lack of information on correlation modeling renders the Proposed Methodology critically incomplete and significantly undermines market participants' ability to assess the reasonableness of its proposed CLO modeling.

[83] ESMA is European Union's financial markets regulator and supervisor (https://www.esma.europa.eu/about-esma). See ESMA Report on Trends, Risks and Vulnerabilities, Leveraged Loans, CLOs – Trends and Risks, No. 2, 2019.

III.E. Proposed Cash Flow Assumptions

3.36. The output of the underlying loan portfolio model (based on inputs of individual loans, including default rates, expected recoveries, and default correlation) informs how the portfolio as a whole might perform. A cash flow model then takes the distribution of possible portfolio outcomes to evaluate the cash flow received by each CLO tranche. In modeling the cash flows to the CLO deals, the Proposed Methodology makes the following crucial assumptions: (i) no prepayment of underlying loans and (ii) reinvestment collateral is purchased at par (i.e., no purchase price discount).[84] It reiterates the no prepayment and no purchase price discount assumptions on the July 14, 2023 update, stating, "NAIC staff has decided not to implement voluntary prepayment and discount purchase assumptions in our modeling framework." According to NAIC, it reaches this decision because "any benefit" of implementing different assumptions is "outweighed by the added uncertainty and cash flow volatility which would be required."[85]

3.37. As detailed in this subsection, the no prepayment and no purchase price discount assumptions above contradict empirical evidence and industry practice. Moreover, contrary to NAIC's claims, rating agencies explicitly consider prepayment and purchase price discounts in their CLO modeling. These assumptions in the Proposed Methodology can significantly alter the risk profile of CLO tranches, resulting in a distorted assessment of the credit risk and the corresponding capital charges.

[84] See NAIC CLO Exposure Methodology, dated July 19, 2023. The Proposed Methodology also includes the following cash flow assumptions: (i) interest rates and proceeds, (ii) non-defaulting portions of each loan mature based on the legal maturity, (iii) reinvestment timing and rating, and (iv) event timing. Additionally, because the Proposed Methodology relies on Moody's Analytics CDOnet software platform, NAIC effectively adopts Moody's cash flow model of each CLO deal.

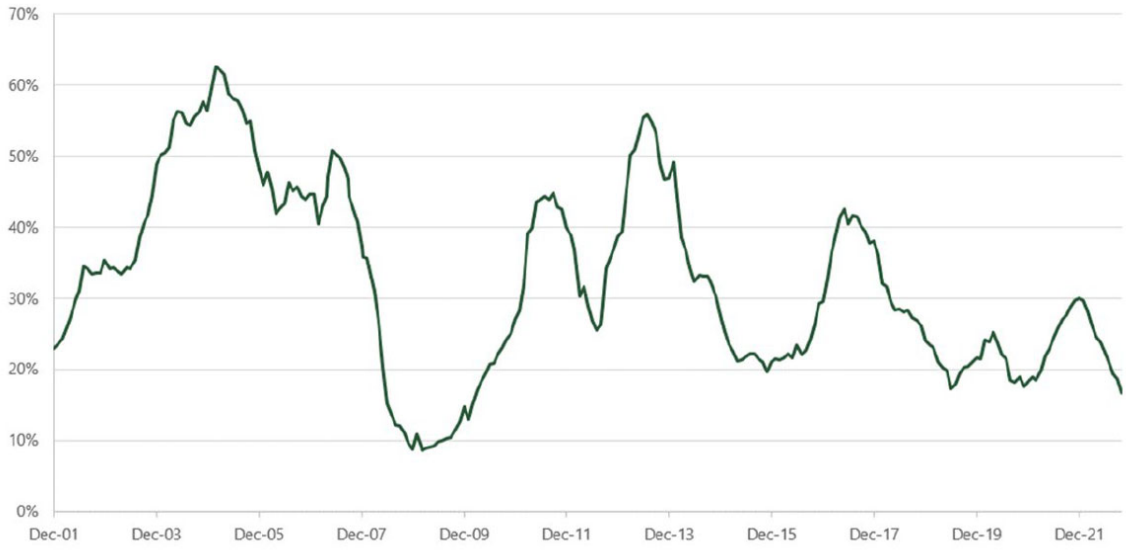
[85] NAIC, CLO Methodology Update, July 14, 2023. Additional modeling assumptions of the Proposed Methodology include: (i) (no post-reinvestment period reinvestment, (ii) reinvestment occurs before payment date, (iii) reinvestment has a rating equal to the transaction's weighted average rating factor (WARF), (iv) reinvestment tracked per reinvestment bucket, and (v) collateral defaults on its interest payment date (prior to paying interest or principal). Rating agencies' methodologies can also differ from the Proposed Methodology in these assumptions. For example, Moody's states: "Defaults can occur at any point during a CLO payment period. Depending on the type of default (bankruptcy filing vs. payment default), interest might or might not be paid prior to the default. For modeling purposes, we assume that defaults that occur during a CLO's payment period take place midway through the period. Thus, the CLO will have collected half the interest payable on defaulted securities." (See Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, at p. 11)

III.E.1. Zero Prepayment of Underlying Loans

3.38. The Proposed Methodology's zero prepayments assumption contradicts real-world evidence. Leveraged loans prepay for many reasons, including refinancings, acquisitions, carve-out or asset sales, or reorganizations. The proposed zero prepayment rate essentially assumes that all borrowers are cash-strapped, so there is zero refinancing under any market conditions. The proposed zero prepayment rate also contradicts the mandatory prepayment provision standard for leveraged loans. As S&P explains: "Leveraged loans usually require a borrower to prepay with proceeds of excess cash flow, asset sales, debt issuance, or equity issuance." Mandatory prepayments are only waived "if the issuer meets a present financial hurdle."[86]

3.39. As **Figure 13** below shows, from December 2001 to 2022, prepayment rates of leveraged loans range between approximately 10% to over 60%.[87] Even at the lowest point during the Great Financial Crisis of 2007-2009, the 12-month average leveraged loan prepayment rate was close to 10%. During the COVID-19 pandemic, the prepayment rate was approximately 20%. During the past two decades since 2001, there was no 0% prepayment rate for leveraged loans. In contrast, the prepayment rate exceeded 50% in 2004 and 2005. The substantial prepayment is consistent with the observation that CLOs are typically issued with a legal maturity of 12-13 years, but with a substantially shorter weighted average life of 6-10 years.[88]

Figure 13. US Leveraged Loan Trailing 12-Month Prepayment Rate



[86] Leveraged Commentary & Data (LCD): Leveraged Loan Primer ("LCD Loan Primer"), S&P Global Market Intelligence, p. 11. Available at: https://www.lcdcomps.com/d/pdf/LCD%20Loan%20Primer.pdf

[87] Attachment C-5, February 21, 2023, VOSTF Materials, p. 10. Source: S&P LCD Leveraged Loan Prepayment Rates based on monthly data from 2001-October 2022.

[88] PineBridge Investments, Seeing Beyond the Complexity: An Introduction to Collateralized Loan Obligations, January 2022, p. 13.

3.40. Prepayments do not directly lead to credit losses, but they impact CLO tranches in various ways, most importantly changing their life/duration. The effect of prepayments on the credit risk of tranches can be positive or negative, depending on a set of interacting factors such as the amount of premium and discount priced loans in the portfolio, the correlation between enhanced credit risk and ability to prepay of loan borrowers, cushions and trigger levels of the CLO. For these reasons, CLO investors and rating agencies evaluate the performance of CLO notes under a variety of prepayment assumptions and scenarios chosen to be consistent with the CLO collateral and prevailing rates and financing environments, rather than a single, pre-determined prepayment rate assumption.

3.41. NAIC states that its review of rating agencies' methodologies relating to the amortization and purchase price discount assumptions shows only a few references to such discussions.[89] According to NAIC, to the extent such assumptions apply, rating agencies also "err on the conservative side of assumption setting – with fixed amortization schedules and no discount purchase par building."[90] While rating agencies usually do not model prepayments during the reinvestment period and have an amortization curve that starts after the end of the reinvestment period, their methodology documents nevertheless discuss how prepayments are taken into account in their assessment.

3.42. For example, S&P and Moody's follow a fixed amortization schedule over the loan portfolio's weighted average life ("WAL"), which reflects loan prepayment and default.[91] S&P describes its "amortization curves" as based on historical amortization profile:[92]

> *Based on our observations of the historical amortization profile, we have therefore derived standardized amortization curves that we use in our cash flow analysis for portfolios with a weighted-average maturity ranging from four to seven years.*

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[89] NAIC, CLO Methodology Update, dated July 14, 2023, p. 4. NAIC summarizes its review of five rating agencies, including S&P, Moody's, Fitch, DBRS, and KBRA.

[90] NAIC, CLO Methodology Update, dated July 14, 2023, p. 2. NAIC further states that "This comports to the recollection of NAIC staff who worked on CLOs in their former jobs at CRPs (Moody's and S&P)." To support its assumption of no prepayment, NAIC quotes the following text from Moody's methodology: "We typically do not model amortization during the reinvestment period on the assumption that the manager will reinvest all amortization proceeds it receives during the reinvestment period in assets that mature after the reinvestment period." (See Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, p. 10.) However, although this statement discusses Moody's typical assumption during the reinvestment period – because any prepayment would have been reinvested – it cannot be generalized as an unconditional assumption of no prepayment during the entire life of CLOs.

[91] See, e.g., S&P, Global Methodology and Assumptions for CLOs and Corporate CDOs, October 14, 2022. At 12: "We would then use this portfolio's weighted-average maturity, adjusted as per the paragraph above as appropriate, for those aspects of the criteria that refer to the portfolio's weighted-average maturity, for example, to determine the default patterns and the pool's modeled amortization profile." At 27: "Based on our observations of the historical amortization profile, we have therefore derived standardized amortization curves that we use in our cash flow analysis for portfolios with a weighted-average maturity ranging from four to seven years. We will typically apply these curves such that the weighted-average maturity using this amortization profile will be as close as possible to the portfolio's weighted-average maturity that was determined to assess credit risk using the CDO Evaluator." Available at: https://www.spglobal.com/ratings/en/research/articles/190621-guidance-criteria-structured-finance-cdos-global-methodology-and-assumptions-for-clos-and-corporate-cdos-11005168.

[92] S&P, Global Methodology And Assumptions For CLOs And Corporate CDOs, July 21, 2023, at 27, available at: https://disclosure.spglobal.com/ratings/en/regulatory/article/-/view/sourceId/11020014.

3.43. Although Moody's states that in calculating the WAL, "the lives of the individual assets are based on scheduled principal payments, without any assumptions regarding prepayments," it clarifies that there are exceptions to this assumption:[93]

> *If a CLO relies on the exercise date of a put option associated with a given asset to determine the asset's contribution to the CLO's WAL calculation or its compliance with the CLO's limits on long-dated assets, we would consider in our analysis the risks associated with the reliance on such date, rather than on the asset's scheduled maturity date.*

3.44. Moody's further clarifies that for long-dated assets, expected prepayments are taken into account:[94]

> *For example, **we may consider the expected prepayment rates of such long-dated assets** and the manager's track record and strategy concerning such assets. We may also consider the flexibility that the CLO structure affords the manager to participate in loan amendments that extend maturities.*

3.45. Additionally, Fitch's CLO rating methodology explains that it considers prepayments in its cash flow modeling:[95]

> *When conducting cash flow analysis, Fitch's cash flow model first **projects the portfolio scheduled amortisation proceeds and any prepayments for each reporting period** of the transaction life assuming no defaults and no voluntary terminations, when applicable. In each rating stress scenario, these scheduled amortisation proceeds and prepayments are then reduced by a scale factor equivalent to the overall percentage of loans that are not assumed to default or to be voluntarily terminated, when applicable.*

3.46. Fitch further states that it expects near-term prepayments can counter credit deterioration and should be taken into account in assessing the credit risk of CLOs:[96]

> *The committee expects near-term **asset pre-payments** to counter credit deterioration, maintaining the rating above the MIR. The committee would base the rating decision on sensitivity analysis that incorporates, for example, **historically observed pre-payment spikes**.*

[93] Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, pp. 3-4 and FN 8.

[94] Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, p. 34.

[95] Fitch Ratings, CLOs and Corporate CDOs Rating Criteria, p. 18. Emphasis added.

[96] Fitch Ratings, CLOs and Corporate CDOs Rating Criteria, March 30, 2023, at p. 4. Emphasis added.

3.47. In addition to considerations regarding prepayments, rating agencies also evaluate the possibility of a CLO reset, which is a reissue of CLO debt with a longer reinvestment period and new debt structures. Reset increases the risk to CLO investors as it could lead to a reduction in returns and even in credit ratings of CLO notes depending on the economics of the prepaid loans. The evaluation of reset risk is not part of the proposed algorithmic CLO modeling analysis.

III.E.2. Zero Purchase Price Discount

3.48. The proposed zero purchase discount assumption contradicts real-world practice or empirical observation. As we explained above, the active management of CLOs is a critical feature that reduces credit risk and improves performance. A primary focus of CLO managers is to acquire loans with good credit risk at a discount using the cash received from loan repayments, a strategy commonly referred to as "par build." Par build aims to improve the over-collateralization ("O/C") ratios, thereby enhancing the credit support for tranches. One effective method for building par is to acquire loans with suitable credit quality at discounted prices, using the cash received from loan repayments. As King Street states: "[C]onsistent par build has allowed us to offset potential future credit losses and defaults, and provides increased flexibility and structural cushion to navigate through credit cycles" and "strong par build is also key in enhancing CLO debt credit enhancement levels to provide downside protection to CLO debt investors."[97] Ares Capital Management, who managed one of the test CLO deals identified by NAIC, similarly states:[98]

> *Investors and CLO trading desks spend a lot of time and effort focused on relative subordination levels among CLO tranches. Trading spreads tend to reflect these judgments. Accordingly, a trend toward par erosion or par creation can have a material impact on tranche liquidity and relative value.*

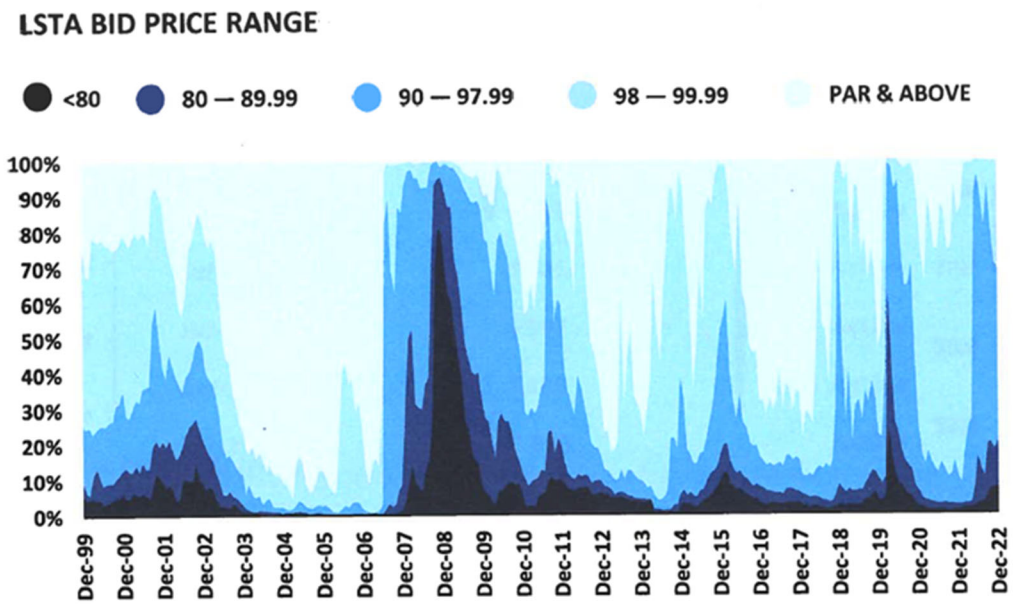
3.49. The Proposed Methodology's zero purchase discount assumption means that CLO managers always purchase underlying loans at a 100% purchase price, which directly contradicts market practice and underestimates the significant impact of reinvestments on the portfolio by acquiring discounted loans.

[97] King Street, CLO Presentation, May 2023.

[98] Ashton, Keith, Ares Capital Management, "Investing in CLOs", 2020 Spring/Summer. Available at https://www.aresmgmt.com/sites/default/files/2020-06/Ares_Investing%20in%20CLOs%20White%20Paper_2020_0.pdf

3.50. **Figure 14** below shows the bid price range of the 100 constituent loans underlying the S&P/LSTA Leveraged Loan index — an index commonly used by market participants to track the performance of leveraged loans — from 1999 to 2022.[99] The darkest blue region denotes the percentage bid prices below $80, and the lightest blue area denotes the percentage bid prices at par. As this figure shows, over the 23 years from December 1999 to December 2022, there is no instance when bid prices are only at par. There is always a percentage of bid prices below par, including those substantially below par. **Figure 14** also shows that during periods of market stress, such as during the Great Financial Crisis in 2008-2009 and the COVID-19 pandemic of 2020, more loans were purchased at less than 80% of par. This suggests that the purchase price discount assumption can become more critical when evaluating CLO performance in a highly stressed market.

Figure 14. Bid Price of Constituent Loans Underlying LSTA US Leveraged Loan 100 Index



3.51. In its July 14, 2023 updated discount purchase methodology analysis, NAIC claims that: "In addition, our review of credit rating providers (CRP) methodologies has shown that they do not assume any par-building discount purchases."[100] It also states that purchase price discounts are "not found" in S&P's and Moody's rating methodologies and, based on that, suggests the assumption of zero purchase price discount is reasonable.

[99] CLO Management, Bain Capital Credit, Q4 2022, p. 46.

[100] NAIC, CLO Methodology Update, dated July 14, 2023, p. 34.

3.52. Purchase discount is considered a form of credit enhancement and has implications for credit risk. CLO indentures often have specific rules for treating discounted purchases in over-collateralization ("OC") tests. S&P and Moody's explain that CLOs permit managers to purchase loans at a discounted price (i.e., below par) and describe their specific treatment for the loans purchased at a "deep discount." For example, S&P states that "most [CLO] transactions permit some portion of the collateral pool to be purchased at significant discounts from par," and S&P may adjust its modeling to reflect the potential risk associated with these deeply discounted assets (e.g., below 80% of par).[101] In discussing par maintenance, S&P also discusses that the par amount could be improved:[102]

> *After the reinvestment period, if the collateral manager chooses to reinvest rather than pay down the notes, we generally expect proceeds from credit-improved sales and unscheduled amortizations to be reinvested such that the* ***new asset par amount after reinvestment is maintained or improved****.*

3.53. Regarding purchase price discount, Moody's states, "If a CLO's indenture does not adequately address the risks associated with deep discount obligation substitution, we may model the CLO as if the OC tests were not present."[103] Furthermore, when discussing its weighted average spread ("WAS") treatment for underlying loans with deep discounts, Moody's states:[104]

> *Some CLOs permit adjustments to the calculation of WAS when testing for compliance with the WAS covenant.* ***Such adjustments may occur based on the purchase of a given asset at a price below par.*** *CLOs that permit the manager to determine the contribution of an asset's spread to the WAS calculation by dividing the nominal spread by the purchase price can substantially overstate the portfolio's WAS. However, such CLOs typically incorporate several features to mitigate the risk of such treatment, including carrying the asset at its purchase price in the OC tests.* ***If the manager has the ability to apply such treatment to assets that are deep discount obligations*** *or if the typical restrictions noted above are absent, we may adjust our modeling analysis to use a portfolio WAS assumption that is lower than the WAS covenant.*

[101] S&P, Global Methodology And Assumptions For CLOs And Corporate CDOs, July 21, 2023, at 123, available at: https://disclosure.spglobal.com/ratings/en/regulatory/article/-/view/sourceId/11020014.

[102] S&P, Global Methodology And Assumptions For CLOs And Corporate CDOs, July 21, 2023, at 73, available at: https://disclosure.spglobal.com/ratings/en/regulatory/article/-/view/sourceId/11020014.

[103] Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, p. 18.

[104] Moody's, Global Approach to Rating Collateralized Loan Obligations, December 21, 2021, pp. 17, 23. Emphasis added.

IV. Stress Test Scenarios

IV.A. The Proposed Stress Test Methodology Lacks Critical Information

4.1. To evaluate the credit risk of the CLO notes, three stress test scenarios (A, B, and C) are proposed with varied default rate and recovery rate assumptions for the underlying collateral loans and their corresponding issuer rating from rating agencies.[105] In particular, Scenario A assumes that the default rate of the underlying loans follows the average historical default rate for the given issuer rating, and the recovery rate follows the historical recovery rate by loan type (senior secured loan, second lien loan, senior unsecured bond, and others). Scenario B makes the same historical default rate assumption but "steps down" the corresponding loan priority in mapping the recovery rate. Scenario C increases the default rate by one standard deviation of the historical default rate and applies the same "stepdown" loan priority in the recovery rate.[106] **Table 6** summarizes these three scenarios.

Table 6. NAIC Stress Test Scenarios

NAIC Stress Test Scenarios	Default Rate Assumption	Recovery Rate Assumption
A	Historical from Moody's (1970-2009)	Historical Priority Position
B	Historical from Moody's (1970-2009)	Stepdown Priority Positioin
C	Historical plus one standard deviation	Stepdown Priority Positioin

4.2. Importantly, the proposed stress test scenarios lack the critical assumption about the likelihood that these scenarios would occur. Because of this, the only output NAIC provides from its stress tests is the estimated cash flows for the six test CLO deals' underlying collateral and tranches under the three stress test scenarios.[107] While the information about the cash flows of a CLO tranche can inform a CLO trader of the trading decisions, it does not inform the expected loss for the CLO tranches. Put differently, even if the cash flow to a tranche is low under certain stress assumptions, if the likelihood of the particular scenario is extremely low, the contemplated market scenario would have little impact on assessing the CLO tranche's riskiness as a whole.

[105] In the August 2023 NAIC meeting, NAIC refers the stress test scenarios as "dummy scenarios" and states, "Please note that staff are not suggesting that these scenarios will be used in the future. They are out there for everyone to implement to tie-out the transactions." See NAIC 2023 Summer National Meeting, Valuation of Securities (E) Task Force, August 14, 2023, at pp. 7-8, available at https://content.naic.org/sites/default/files/national_meeting/VOSTF%20Summer%208.14.2023%20Materials_1.pdf

[106] NAIC SSG CLO Stress Tests Methodology dated November 2022.

[107] NAIC presents the cash flows for the six test CLO deals' underlying collateral and tranches as the results of its stress tests. See "7-31-23-All-6-CLO-deals-cf-updates.xlsx".

4.3. Another important consideration of a stress test is the interactions among the various factors such that the combinations of assumptions are plausible for stress tests to be meaningful. During market-wide stress, the stress will manifest first in loan prices declining and then in the slowdown of prepayments. Potential defaults and associated recoveries would only come into play much later. As a result, even during extreme market stress, the increase in default rates lags behind the decline in prepayments by a few quarters. In other words, historical data informs that a rock-bottom prepayment rate and a sky-high default rate did not co-occur. The proposed stress Scenario C, however, assumes simultaneous and persistent worst-case defaults and losses, which contradict the effects of the economic cycles.[108]

IV.B. Default Rate Assumptions for Underlying Loans

4.4. The stress test scenarios A and B use historical default rates based on the issuer ratings of the underlying loans. However, instead of using historical default rates published by rating agencies, the proposed scenarios calculate the average cumulative default rates by rating across 40 annual cohorts between 1970 and 2009.[109] To get the cumulative default rate by alphanumeric rating, the default rate for each rating level is then "scaled" by the historical ratio between the alphanumeric rating (e.g., B3) over that of the rating level (e.g., B).[110] This proposed default rate calculation obtains a longer series of default rates with alphanumeric ratings (starting in 1970 instead of 1983)[111] and enables the calculation of default rate standard deviations.

[108] NAIC stated that it would provide more detailed information in the "Scenario" portion of the process "following the setting of the methodology." This sequential piecemeal approach, however, risks setting modeling assumptions that are unrealistic and unreasonable compared with real-world experiences. In **Section IV.E** below, we discuss the updated stress test scenarios described in NAIC's October 5, 2023 presentation and in the materials published in November and December 2023.

[109] According to NAIC, it does not include cohorts after 2019 because they do not contain at least 10 years of data.

[110] The ratios are calculated as the cumulative default rate of an alphanumeric rating (e.g., B3) over that of the rating (e.g., B). The scaling, however, could result in a non-monotonic cumulative default rate for Ca-C rating, and NAIC manually adjusted such ratings to avoid data anomaly.

[111] In the 2019 Moody's annual default rate study, Moody's reports the cumulative default rate by alphanumeric rating from 1983-2018. See Moody's Annual Default Study: Defaults will Rise Modestly in 2019 amid Higher Volatility, February 1, 2019, Exhibit 44 and accompanying "Data_Report-Corporates-Global-Annual-15Feb2019.xls".

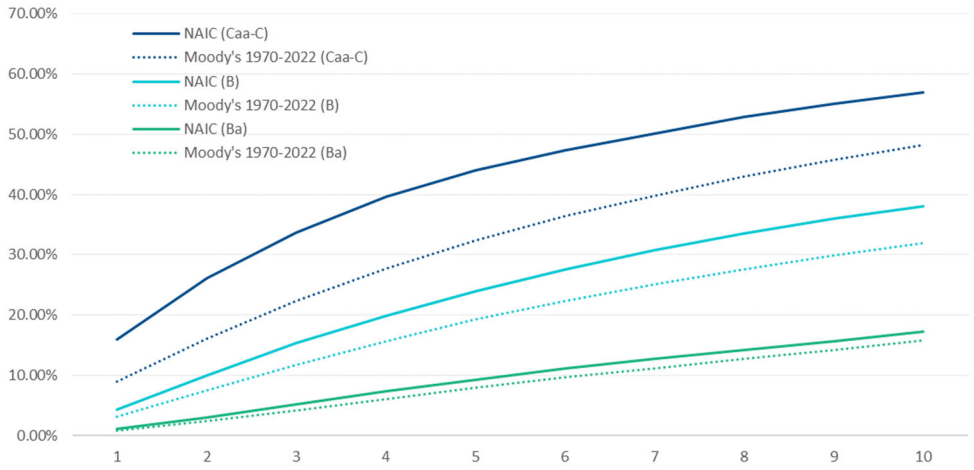
4.5. However, the proposed calculation results in cumulative default rates substantially higher than those reported by Moody's, particularly for the lower-rated issuers. **Table 7** below compares the cumulative default rates derived based on the Proposed Methodology against those reported by Moody's.[112] As this table shows, cumulative default rates derived based on the Proposed Methodology are consistently higher than those reported by Moody's (regardless of analysis horizons). This phenomenon is particularly pronounced for lower-rated issuers. For example, for 'B' rated issuers, the cumulative default rate is approximately 19% over five years and 32% over ten years. In contrast, the cumulated default rate derived by the Proposed Methodology is approximately 24% over five years (or 5 percentage points higher than what Moody's reports) and 38% over ten years (or 6 percentage points higher than what Moody's reports), respectively. **Figure 15** illustrates this finding. Notably, NAIC's substantially higher default rates for the Caa-C issuers result in data anomalies such that NAIC has to manually adjust its scaled default rates for 'C' rated issuers to ensure that the corresponding cumulative default rates increase monotonically over time (such that it does not result in unrealistic negative marginal default rates).

Table 7. Cumulative Default Rates by Rating: NAIC's Methodology vs. Reported by Moody's

Rating \ Tenor	1	2	3	4	5	6	7	8	9	10
NAIC (Baa)	0.23%	0.55%	0.94%	1.40%	1.84%	2.26%	2.65%	3.09%	3.57%	4.07%
Moody's 1920-2022 (Baa)	0.24%	0.67%	1.17%	1.72%	2.29%	2.85%	3.39%	3.98%	4.61%	5.21%
Moody's 1970-2022 (Baa)	0.17%	0.42%	0.74%	1.11%	1.47%	1.86%	2.23%	2.66%	3.14%	3.64%
Moody's 1983-2022 (Baa)	0.17%	0.43%	0.74%	1.10%	1.45%	1.82%	2.17%	2.57%	2.99%	3.43%
NAIC (Ba)	1.16%	3.10%	5.16%	7.33%	9.33%	11.18%	12.75%	14.24%	15.74%	17.24%
Moody's 1920-2022 (Ba)	1.18%	2.81%	4.60%	6.46%	8.31%	10.08%	11.72%	13.28%	14.81%	16.43%
Moody's 1970-2022 (Ba)	0.91%	2.46%	4.24%	6.11%	7.94%	9.65%	11.21%	12.71%	14.22%	15.82%
Moody's 1983-2022 (Ba)	0.90%	2.50%	4.37%	6.32%	8.13%	9.82%	11.38%	12.83%	14.24%	15.71%
NAIC (B)	4.37%	9.96%	15.36%	19.96%	24.01%	27.54%	30.76%	33.51%	35.98%	38.09%
Moody's 1920-2022 (B)	3.26%	7.48%	11.77%	15.73%	19.26%	22.37%	25.17%	27.64%	29.91%	31.92%
Moody's 1970-2022 (B)	3.26%	7.48%	11.77%	15.73%	19.26%	22.37%	25.17%	27.64%	29.91%	31.92%
Moody's 1983-2022 (B)	3.21%	7.70%	12.36%	16.63%	20.52%	24.02%	27.15%	29.92%	32.44%	34.64%
NAIC (Caa-C)	15.96%	26.20%	33.76%	39.64%	44.00%	47.34%	50.16%	52.84%	55.11%	56.86%
Moody's 1920-2022 (Caa-C)	9.08%	16.19%	22.11%	27.16%	31.52%	35.24%	38.38%	41.17%	43.78%	46.02%
Moody's 1970-2022 (Caa-C)	9.02%	16.17%	22.33%	27.68%	32.38%	36.38%	39.80%	42.93%	45.80%	48.18%
Moody's 1983-2022 (Caa-C)	8.96%	16.09%	22.25%	27.62%	32.32%	36.31%	39.71%	42.83%	45.72%	48.18%

[112] Moody's only reports the default rates for corporate issuers by alphanumeric ratings using analysis period starting 1983.

Figure 15. Comparison of NAIC's and Moody's Historical Corporate Debt Default Rates by Rating



4.6. The proposed default rates are also substantially different from those published by S&P and Fitch. **Figures 16A-C** compare the cumulative default rates used in the proposed stress scenarios and those published by Moody's, S&P, and Fitch. As these figures show, for 'Ba2' and 'B2' rated issuers, cumulative default rates published by S&P and Fitch are substantially lower than the proposed default rates. For 'Caa-C' rated issuers, the proposed default rates increase much faster than those of S&P and Fitch, such that despite the lower initial proposed default rate, its cumulative default rate for 'Caa-C' rated issuers is higher than those of S&P and Fitch over a 10-year horizon.

4.7. In addition, the proposed default rate is stressed by adding a one-standard deviation on top of the historical default rate. This approach, however, assumes that the heightened default rate would persist through the whole 10-year period when market stresses typically last less than a few years. An alternative approach is to "notch" the loan rating down by one or two notches to increase the default rate – an approach utilized by rating agencies in stress testing.

Figure 16A. Cumulative Default Rates for Ba2/BB Rated Issuers

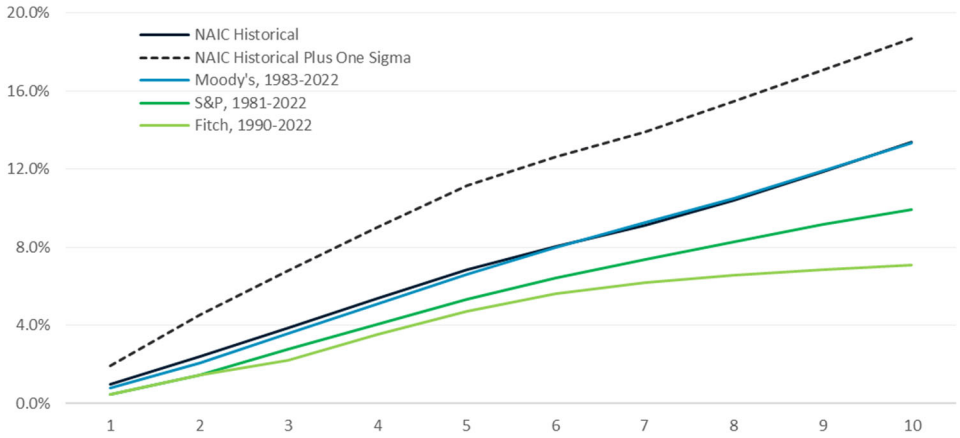


Figure 16B. Cumulative Default Rates for B2/B Rated Issuers

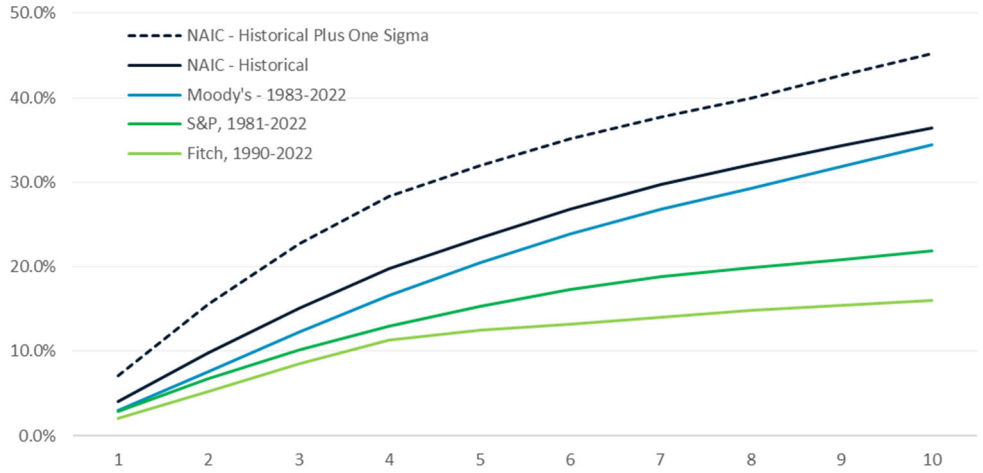
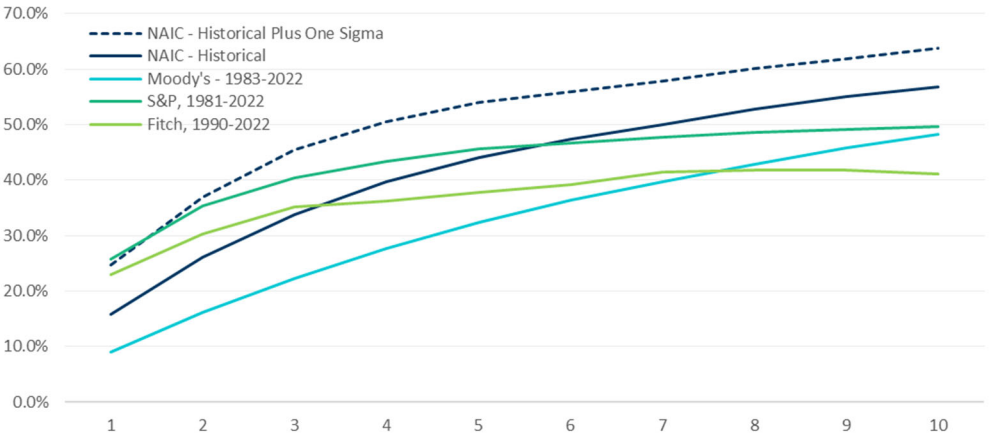


Figure 16C. Cumulative Default Rates for CCC-C Rated Issuers



IV.C. Recovery Rate Assumptions for Underlying Loans

4.8. NAIC proposes two recovery rate assumptions for the underlying collateral. First, the recovery rate is based on the loan type, and second, the recovery rate corresponds to a "stepdown" of the priority position. **Table 8** below summarizes NAIC's recovery rate assumptions. We note that the proposed stress test scenario recovery likely contains typos in the mapping for the collateral in the "Other" category. In the Proposed Methodology, the Other collateral type is labeled as "Sr. Subordinated Bond" in the Stepdown priority position (as opposed to "Jr. Subordinated Bond"), which would have resulted in a higher recovery rate relative to the historical priority position. In the sensitivity analysis, we adjusted the recovery rate assumption for the Other collateral type to "Sr. Subordinated Bond" in the historical scenario and "Jr. Subordinated Bond" in the stepdown scenario.

Table 8. NAIC's Stress Test Scenarios Recovery Rate Assumptions

	NAIC - Historical Priority Position		NAIC - Stepdown Priority Position	
Collateral Label	Historical Priorty Position	Moody's 2019 Report	Stepdown Priority Position	Moody's 2019 Report
Senior Secured Loan	1st Lien Bank Loan	67.19%	Sr. Unsecured Bank Loan	45.75%
Second Lien Loan	2nd Lien Bank Loan	32.27%	Sr. Subordinated Bond	31.08%
Senior Unsecured Bond	Sr. Unsecured Bond	38.15%	Subordinated Bond	31.98%
Other	Sr. Subordinated Bond	31.08%	Jr. Subordinated Bond	23.67%

4.9. An alternative way to the proposed "stepdown" priority approach is to apply a rating-conditional recovery rate assumption – where a haircut is applied to the recovery rate with a greater haircut to tranches target a higher rating. Under this alternative approach, the higher-rated CLO tranches are designed to withstand more severe stress. For example, S&P's recovery rate assumption follows this approach. **Table 9** below shows that the recovery rate for the senior secured first-lien loans is 79% when applying to a 'B' or 'CCC' rated tranche, but is reduced to 50% when applying to an 'AAA' rated tranche.[113] Notably, S&P applies different expected recovery rates for loans from different jurisdictions (e.g., North America versus Asia), reflecting differences in standard loan documentation, laws, and court systems. The figures in **Table 9** reflect S&P's expected recovery rate for loans originated in North America and Western Europe.

Table 9. S&P Global Ratings Corporate Asset Recovery Rates For CDOs

	CDO liability rating (%)					
Instrument	AAA	AA	A	BBB	BB	B/CCC
Senior secured first-lien loans	50	55	59	63	75	79
Senior secured covenant-lite loans/senior secured bonds	41	46	49	53	63	67
Mezzanine/second-lien/senior unsecured loans/senior unsecured bonds	18	20	23	26	29	31
Subordinated loans/subordinated bonds	8	8	8	8	8	8

IV.D. Sensitivity Analysis of Test CLO Deals

4.10. In this section, we demonstrate the sensitivity of the CLO tranche cash flows with different modeling assumptions. We find that the results of the stress tests are sensitive to the modeling assumptions, which in turn affect the determination of risk-based capital charges.

[113] S&P, "Guidance | Criteria |Structured Finance |CDOs: Guidance: Global Methodology and Assumptions For CLOs and Corporate CDOs," October 14, 2022, Table 4, available at https://www.spglobal.com/ratings/en/research/articles/190621-guidance-criteria-structured-finance-cdos-global-methodology-and-assumptions-for-clos-and-corporate-cdos-11005168.

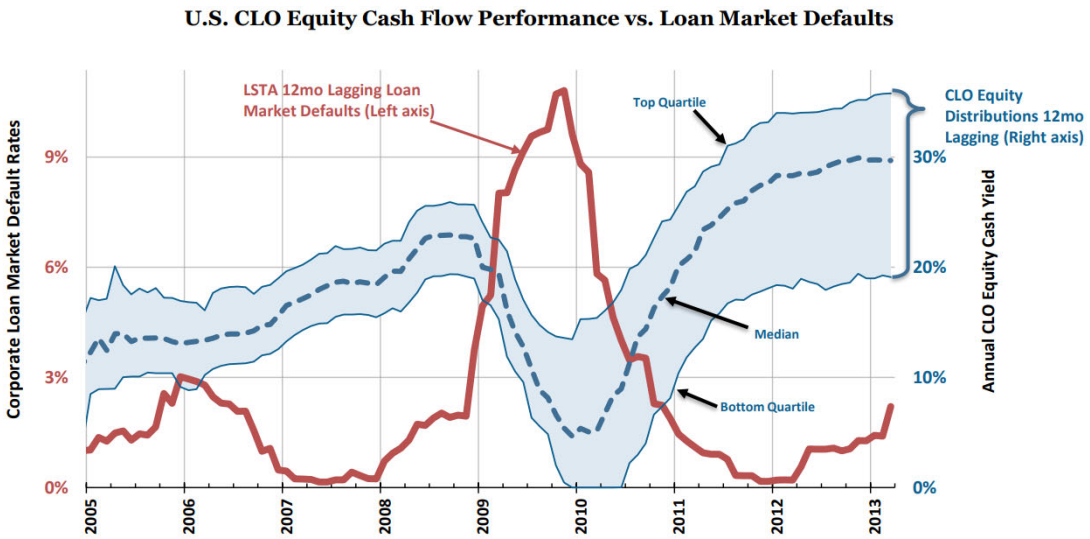
4.11. Specifically, we examine the effect of the proposed stress test scenarios (see **Table 6**) of varying default and recovery rates on each of the six test CLO deals. In this analysis, we focus on the two lowest-rated tranches of NAIC's identified test CLO deals (those rated 'Ba3/BB-' or 'Baa3/BBB-') because these tranches are most suspect to potential cash flow erosion.[114] When discussing the test CLO deals in aggregate, we refer to these two most junior tranches as Tranche D and Tranche E.[115] We note that under all three of the proposed stress test scenarios (A, B, and C), the equity tranches of all six test CLO deals will suffer complete losses. However, based on historical CLO performance, a complete equity loss across all CLOs is highly unlikely. As **Figure 17** below shows, CLO equity continued to perform even during the Great Financial Crisis, with the median CLO continuing to make distributions to CLO equity through the peak of the market stress. [116]

[114] Although the Ares CLO notes are not rated, their original pricing implies the same rating scale.

[115] These include Tranches C and D of the Carlyle 2021-1 CLO, Tranches ER and DR of Ares LII, Magnetite XXVII, and OHA Credit Funding CLOs.

[116] **Figure 17** also shows that other than the two-year period immediately following the 2008 Financial Crisis from 2009 to 2011, the default rate ranged between zero and 3%. It is important to note that the peak of loan default rate during the past two decades is approximately 10% and that peak default rate lasted only for a short period. In other words, the observed historical rates are less "severe" compared to the proposed stress test scenarios in which default rates are assumed to be persistently elevated. See also Figure 6. Source: Ares Management Corporation, Understanding Investments in Collateralized Loan Obligations ("CLOs"), at p. 17, available at https://www.aresmgmt.com/sites/default/files/2020-02/Understanding-Investments-in-Collateralized-Loan-ObligationsvF.pdf

Figure 17. U.S. CLO Equity Cash Flow Performance vs. Loan Market Defaults



IV.D.1. Default and Recovery Rate Assumptions for Underlying Loans

4.12. **Table 10** below summarizes NAIC's stress test scenario results. For Scenario A, NAIC shows a complete loss of equity tranches, but no principal loss to any of the rated tranches, with the exception of the OHA Credit Funding's E tranche. For Scenario B, NAIC shows a complete or nearly complete loss of the most junior E tranches across the test CLO deals. Note that a loss of greater than 100% denotes interest loss in addition to principal loss.[117] For Scenario C, the loss extends to Tranche D and even more senior tranches.

Table 10. Test CLO Tranches D and E Loss by Scenarios, As Reported by NAIC

CLO Deal	Tranche	Original Bond Balance ($M)	Scenario A		Scenario B		Scenario C	
			Bond Losses ($M)	Loss (%)	Bond Losses ($M)	Loss (%)	Bond Losses ($M)	Loss (%)
Anchorage Capital CLO 17 Ltd.	D	31.50	0.00	0.00%	0.00	0.00%	31.50	100.00%
Anchorage Capital CLO 17 Ltd.	E	26.44	0.00	0.00%	26.44	100.00%	26.44	100.00%
Ares LII CLO Ltd.	DR	29.75	0.00	0.00%	0.00	0.00%	21.65	72.77%
Ares LII CLO Ltd.	ER	17.75	0.00	0.00%	15.63	88.03%	36.80	207.32%
Carlyle US CLO 2021-1 Ltd.	C	36.00	0.00	0.00%	0.00	0.00%	44.23	122.86%
Carlyle US CLO 2021-1 Ltd.	D	24.00	0.00	0.00%	43.33	180.53%	53.82	224.26%
Magnetite XXVII Ltd.	DR	30.00	0.00	0.00%	0.00	0.00%	38.03	126.78%
Magnetite XXVII Ltd.	ER	22.50	0.00	0.00%	39.62	176.07%	51.83	230.37%
OHA Credit Funding 3 Ltd.	DR	42.00	0.00	0.00%	31.58	75.19%	74.81	178.13%
OHA Credit Funding 3 Ltd.	ER	26.50	25.00	94.35%	55.75	210.38%	62.28	235.02%
Strata CLO II Ltd.	D	26.00	0.00	0.00%	0.00	0.00%	21.29	81.88%
Strata CLO II Ltd.	E	16.00	0.00	0.00%	13.80	86.25%	42.92	268.22%

[117] Specifically, when any deferred interest that is added to the tranche's balance is included in the loss calculation, these losses can exceed 100% of the original tranche balance).

4.13. Our replication of NAIC's results shows a similar outcome, even though our principal loss figures do not completely match, despite our using the same modeling assumptions and the CDOnet software platform for the underlying loan data and cash flow modeling.[118] As **Table 11A** below shows, there is a 68% partial loss in Tranche E for OHA Credit Funding in Scenario A and smaller partial losses for this tranche (12 and 24%, respectively) for Carlyle and Magnetite deals. Scenario B shows a significant or complete loss of the principal balance of Tranche E and Scenario C shows a complete loss for Tranche E and a partial loss for Tranche D. Our calculated partial losses are less severe than those reported by NAIC. For example, we calculated 49% and 53% Tranche E losses for Ares and Strata in Scenario B, compared with 88% and 86% calculated by NAIC. In Scenario C, we calculated 17% and 5% Tranche D losses for Ares and Strata, respectively, which compares to 73% and 82% Tranche D losses calculated by NAIC.

Table 11A. Test CLO Tranches D and E Loss by Scenarios, Replication #1

CLO Deal	Tranche	Original Bond Balance ($M)	Scenario A		Scenario B		Scenario C	
			Bond Losses ($M)	Loss (%)	Bond Losses ($M)	Loss (%)	Bond Losses ($M)	Loss (%)
Anchorage Capital CLO 17 Ltd.	D	31.50	0.00	0.00%	0.00	0.00%	6.20	19.67%
Anchorage Capital CLO 17 Ltd.	E	26.44	0.00	0.00%	26.44	100.00%	26.44	100.00%
Ares LII CLO Ltd.	DR	29.75	0.00	0.00%	0.00	0.00%	4.95	16.63%
Ares LII CLO Ltd.	ER	17.75	0.00	0.00%	8.74	49.25%	34.17	192.48%
Carlyle US CLO 2021-1 Ltd.	C	36.00	0.00	0.00%	0.00	0.00%	3.33	9.24%
Carlyle US CLO 2021-1 Ltd.	D	24.00	2.86	11.94%	19.75	82.30%	46.30	192.91%
Magnetite XXVII Ltd.	DR	30.00	0.00	0.00%	0.00	0.00%	2.31	7.68%
Magnetite XXVII Ltd.	ER	22.50	5.36	23.80%	20.58	91.46%	47.26	210.05%
OHA Credit Funding 3 Ltd.	DR	42.00	0.00	0.00%	0.00	0.00%	20.57	48.97%
OHA Credit Funding 3 Ltd.	ER	26.50	17.97	67.82%	36.45	137.56%	51.65	194.89%
Strata CLO II Ltd.	D	26.00	0.00	0.00%	0.00	0.00%	1.39	5.34%
Strata CLO II Ltd.	E	16.00	0.00	0.00%	8.48	52.97%	32.85	205.31%

4.14. We investigated the potential drivers of the discrepancies between our results and those reported by NAIC, which occur despite our using the same modeling assumptions and the CDOnet software platform for the underlying loan data and cash flow modeling. **Table 11B** below shows the results with adjusted reinvestment assumptions (i.e., reinvestment into the current deal as opposed to reinvestment into separately tracked collateral buckets with specified rating and minimum weighted average rating factor ("WARF") requirements), but keeping all other modeling assumptions unchanged. In **Table 11B**, we find partial or complete loss to Tranche E only in Scenario B. In Scenario C, Tranche E experiences a complete loss, and Tranche D experiences partial loss across all test CLO deals.

[118] To ensure our replication appropriately applies the assumptions in the Proposed Methodology in the CDOnet software platform, we worked closely with CDOnet's support team and technical team. We also reviewed all available documents. In December 2023, NAIC published the CDOnet economy files that accompany the stress scenario results for the first time. A review of the economy files shows that the default/recovery rates are overrides for each scenario, defined at the investment label. However, this information is not provided. Additionally, NAIC assumes global reinvestment, while we used deal current reinvestment. NAIC also assumes no recovery delay, while we assume a 6-month recovery delay per NAIC's CLO Exposure Methodology published on May 17, 2022, at p. 3 ("Principal is recovered 6 months (2 periods) after default."). Finally, we included realized losses, while NAIC did not.

Table 11B. Test CLO Tranches D and E Loss by Scenarios, Replication #2

CLO Deal	Tranche	Original Bond Balance ($M)	Scenario A		Scenario B		Scenario C	
			Bond Losses ($M)	Loss (%)	Bond Losses ($M)	Loss (%)	Bond Losses ($M)	Loss (%)
Anchorage Capital CLO 17 Ltd.	D	31.50	0.00	0.00%	0.00	0.00%	14.12	44.82%
Anchorage Capital CLO 17 Ltd.	E	26.44	0.00	0.00%	26.29	99.45%	26.44	100.00%
Ares LII CLO Ltd.	DR	29.75	0.00	0.00%	0.00	0.00%	9.58	32.21%
Ares LII CLO Ltd.	ER	17.75	0.00	0.00%	6.63	37.33%	34.17	192.48%
Carlyle US CLO 2021-1 Ltd.	C	36.00	0.00	0.00%	0.00	0.00%	14.09	39.15%
Carlyle US CLO 2021-1 Ltd.	D	24.00	0.00	0.00%	17.54	73.09%	46.27	192.81%
Magnetite XXVII Ltd.	DR	30.00	0.00	0.00%	0.00	0.00%	13.32	44.41%
Magnetite XXVII Ltd.	ER	22.50	0.00	0.00%	15.98	71.04%	47.26	210.05%
OHA Credit Funding 3 Ltd.	DR	42.00	0.00	0.00%	0.00	0.00%	26.99	64.26%
OHA Credit Funding 3 Ltd.	ER	26.50	0.00	0.00%	23.79	89.76%	48.00	181.14%
Strata CLO II Ltd.	D	26.00	0.00	0.00%	0.00	0.00%	9.26	35.60%
Strata CLO II Ltd.	E	16.00	0.00	0.00%	4.00	25.02%	33.85	211.59%

4.15. Besides the reinvestment assumptions, several other factors could also contribute to the numerical differences in the CLO tranche losses. For example, the Proposed Methodology does not explain what default and recovery rates are used for loans with no rating or withdrawn rating.[119] The Proposed Methodology also does not specify whether it accounts for loan "seasoning" and, if so, how the seasoning of default curves is used. The seasoning of the loans refers to the amount of time that has passed since the underlying loans were originated. Particularly for the lower-rated loans, the default rate in the first year of the loan life is substantially higher than the default rate later in the loan life. For example, for 'Caa-C' rated loans, NAIC shows a historical default rate of 16% in the first year of the loan life, which reduces to 6% from year three to year four (see **Table 7**). In other words, the historical default rate of seasoned loans can be substantially lower than that of unseasoned loans, which should be properly taken into consideration.

4.16. There are several additional modeling assumptions required to be input in CDOnet, which the Proposed Methodology does not explain what input it uses.[120] Note that these do not include the stated default-rate vectors, recovery rate vectors, recovery delay, interest-rate curve, and currency rates that are also part of the economic environment modeled for the deals. The CDOnet's results may change depending on these assumptions in select cases.

[119] An additional source of discrepancy is the stepdown recovery rate assumption for the Other collateral type. As discussed in Section IV.C, NAIC's published stress test scenarios denotes a higher recovery rate for the Other collateral type in the stepdown priority position relative to historical priority position.

[120] There are various modeling assumptions CDOnet asks the user. Generally, these are deal specific assumptions that require a careful examination of the deal prospectus. Some of these are:

- Prepay and default frequency
- Whether defaults occur before/after amortization
- Whether defaults/prepay follow bond accrual calendar
- Whether non-performing loans default
- Whether to ignore the rule on buying non defaulted assets
- Force recovery of defaults at maturity/call
- Haircut reinvested assets
- CCC Migration

4.17. The internal rate of returns ("IRR") of the CLO tranches shows a similar picture as to how the test scenarios affect the tranche performance. As **Tables 12A-B** show, applying historical default rates and recovery rates as in Scenario A does not change the cash flow schedules of these most junior tranches. The IRR for Tranche D ranges between 6% and 8%, while the IRR for Tranche E ranges between 9% and 11%. In other words, an investor can expect to earn market-rate returns under observed historical default and recovery rates. Investors should expect below-market returns for Tranche E assuming further stressed (step-down) recovery/loss rates as in Scenario B. Only in Scenario C, where highly stressed default rates and stressed recovery rates are present simultaneously throughout the life of these deals, should the investor expect Tranche E will have substantial losses (getting only some interest payment) and Tranche D will earn below-market-rate of returns.

Table 12A. Tranche D IRR (%) by Stress Test Scenarios

IRR Tranche D	Scenario A	Scenario B	Scenario C
Anchorage Capital CLO 17 Ltd.	6.68	6.69	2.70
Ares LII CLO Ltd.	6.63	6.64	3.62
Carlyle US CLO 2021-1 Ltd.	5.95	5.96	2.66
Magnetite XXVII Ltd.	6.23	6.23	1.88
OHA Credit Funding 3 Ltd.	6.20	6.21	-0.77
Strata CLO II Ltd.	7.81	7.81	4.64

Table 12B. Tranche E IRR (%) by Stress Test Scenarios

IRR Tranche E	Scenario A	Scenario B	Scenario C
Anchorage Capital CLO 17 Ltd.	10.17	1.22	-74.10
Ares LII CLO Ltd.	9.81	6.71	-77.58
Carlyle US CLO 2021-1 Ltd.	9.16	3.58	-59.75
Magnetite XXVII Ltd.	9.37	2.91	-75.23
OHA Credit Funding 3 Ltd.	9.58	0.41	-76.59
Strata CLO II Ltd.	11.50	9.66	-70.23

- Prepay & default frequency
- Treat PR rating as a given rating
- Repurchase price discount
- Whether stop reinvestment if WAL test breached
- Reinvest monthly
- Reinvest monthly only if OC/IC/IDT tests pass
- Include/exclude any realized payment
- Reinvestment default lockout period
- PIK par mode
- Set call date override
- Excess par to interest or principal
- Set swap term override
- Liquidate collateral on EOD
- Liquidation value of equity assets to principal/interest

4.18. The impact on tranche returns of these scenarios can be tied directly to the marginal loss increments of these scenarios. Scenario B reduces the recovery rate of collateral assets by approximately a factor of 1/3, from roughly 60% to 40%. For the six test CLO deals examined in this study, collateral assets have an average maturity of 7-9 years and an average rating between B2 and B3 (closer to B2). For this set of assets, reducing the recovery rates by about 1/3 is equivalent to stating that their cumulative rating would be slightly worse than Caa1 at the original recovery rate (i.e., only then would they have the same expected loss at the original recovery rate). The increase in expected loss is just enough to prevent full payment of principal and interest to Tranche E, which will effectively default during the life of the CLO. As **Table 12A** shows, the IRR for Tranche D in Scenario B is effectively the same as the IRR in Scenario A. However, the IRR for Tranche E is reduced substantially, meaning that the impact of a lower recovery rate on the defaulted loans starts to affect the scheduled cash flows of Tranche E (see **Table 12B**).

4.19. Similarly, Scenario C effectively increases the cumulative default rate by a factor of 25% for a portfolio of loans of average rating of B2-B3 with 7-9 year maturity. Combined with the one-third reduction in the recovery rate described above, Scenario C would have, on average, an additional 37% cumulative loss. This additional expected loss substantially reduces the cash flows to Tranche E such that it effectively receives some interest payments for a period but will not repay its principal balance, as indicated by its large negative IRRs. The reduction in cash flow also affects Tranche D so that its IRR reduces substantially. As discussed above, Tranche E is a performing high-yield rated bond (Ba3/BB- rated), and Tranche D is a performing investment-grade rated bond (Baa3/BBB- rated). This makes it clear that Scenario C is a drastic scenario where even a currently investment-grade rated bond will default. In other words, it takes substantially higher default rates *and* loss rates than historical averages for Tranche D to experience a loss.

4.20. We can also compare these expected loss increases to the internal credit enhancement or subordination limits for each tranche. As **Table 13** below shows, for the six test CLO deals, Tranche E's balance is approximately 4-6% of the collateral balance, and Tranche D and E combined is 10-13% of the collateral balance. Generally speaking, for loans with an average B2/B3 rating and 7-9 years maturity (which represent the majority of the underlying collateral), going from Scenario A to Scenario B increases the cumulative loss by approximately 6-8%,[121] and going from Scenario B to Scenario C increases the cumulative loss by approximately 11-14%.[122] Comparing these figures with the percentage of Tranches D and E balances over the collateral balance, it is not surprising that Scenario B triggers losses on Tranche E but not Tranche D, while Scenario C generates substantial collateral losses to cause a principal loss in both Tranche E and Tranche D.

[121] This figure reflects the impact on expected loss from a reduction in the recovery rate from approximately 60% to 40% when the recovery rate is stepped down from Scenario A to Scenario B.

[122] This figure reflects the additional impact of default rate increase by one-standard deviation (i.e., one-sigma).

Table 13. Balances of D&E Tranches as a Percent of Collateral Balance

CLO Deal	Collateral Balance (October 2022)	Tranche	Original Bond Balance ($M)	D&E Tranche Balances as % of Collateral Balance
Anchorage Capital CLO 17 Ltd.	442.71	D	31.50	13%
		E	26.44	6%
Ares LII CLO Ltd.	496.23	DR	29.75	10%
		ER	17.75	4%
Carlyle US CLO 2021-1 Ltd.	610.43	C	36.00	10%
		D	24.00	4%
Magnetite XXVII Ltd.	497.45	DR	30.00	11%
		ER	22.50	5%
OHA Credit Funding 3 Ltd.	663.86	DR	42.00	10%
		ER	26.50	4%
Strata CLO II Ltd.	388.05	D	26.00	11%
		E	16.00	4%

4.21. Another way to understand how much collateral loss is necessary to cause losses to the junior tranches is through CLO deals' performance metrics and test results. For example, **Tables 14A-B** show the October 2022 results of overcollateralization (O/C), interest coverage (I/C), and interest diversion test (IDT) for the Anchorage deal and compare them to its trigger threshold value. For Tranche E, the overcollateralization ratio is required to be at least 104.20%. When collateral loss increases, the CLO would divert the cash flows from equity to Tranche E. If loss further increases, cash flows would divert from Tranche E and equity to Tranche D as needed to satisfy these performance tests. As a result, there is only a partial loss for Tranche D in Scenario C and a partial loss for Tranche E in Scenario B.[123]

Table 14A. Overcollateralization (O/C) Ratios for Anchorage Deal, as of October 2022

Tranche	Criteria	Current	Trigger	Test Pass/Fail
A/B	Senior O/C Ratio	135.68%	126.06%	Pass
C	Mezzanine 1 O/C Ratio	126.03%	118.38%	Pass
D	Mezzanine 2 O/C Ratio	115.79%	110.11%	Pass
E	Junior O/C Ratio	108.39%	104.20%	Pass

Table 14B. Interest Coverage (I/C) Ratios for Anchorage Deal, as of October 2022

Tranche	Criteria	Current	Trigger	Test Pass/Fail
A/B	Senior IC Ratio	184.27%	120.00%	Pass
C	Mezzanine 1 I/C Ratio	168.96%	110.00%	Pass
D	Mezzanine 2 I/C Ratio	150.47%	105.00%	Pass
	Interest Diversion Test	108.39%	104.70%	Pass

[123] For the six test CLO deals, Tranche E (Junior/BB-) O/C ratio test limits range from 3.2%-7.5%, and Tranche D (Mezzanine/BBB-) O/C ratio test limits range from 7%-10%.

IV.D.2. Prepayment Rate Assumptions for Underlying Loans

4.22. The Proposed Methodology assumes no prepayment of the underlying loan collateral. However, the prepayment rate of the underlying loans could significantly change the weighted average life and yield of the CLO tranche. To evaluate how changes in the prepayment rate affect the CLO notes, we consider eight scenarios in which the conditional prepayment rate ("CPR") increases from 0% to 70% with 10% increments, where a CPR of 20% means that 20% of the pool's outstanding principal will be paid off prematurely in a given year.

4.23. To illustrate how CPR affects CLO tranches, we consider the most junior tranche of the test CLO deals. **Tables 15A-B** summarize the weighted average life and price yield for Tranche E of the test CLO deals when prepayment increased from 0% to 70%. As these tables show, the impact of prepayment can differ substantially from deal to deal. As **Table 15A** below shows, increasing CPR shortens Tranche E's weighted average life for Ares, but lengthens Tranche E's weighted average life for Carlyle. For OHA, Magnetite, and Strata, Tranche E's weighted average life initially decreases, but increases as CPR further increases. A longer weighted average life increases the risk of the tranche because the principal loss is more likely to occur.[124]

Table 15A. Weighted Average Life (years) of Tranche E by Conditional Prepayment Rate

CPR Scenarios	Anchorage Capital CLO 17 Ltd.	Ares LII CLO Ltd.	Carlyle US CLO 2021-1 Ltd.	Magnetite XXVII Ltd.	OHA Credit Funding 3 Ltd.	Strata CLO II Ltd.
0 CPR	6.88	6.71	7.09	6.91	6.78	6.64
10 CPR	6.83	6.62	7.07	6.88	6.63	6.59
20 CPR	6.74	6.40	7.10	6.82	6.50	6.51
30 CPR	6.71	5.94	7.25	6.75	6.34	6.40
40 CPR	6.95	5.41	7.46	6.97	6.36	6.31
50 CPR	7.14	4.74	7.99	7.32	6.47	6.32
60 CPR	8.53	4.16	8.32	7.65	6.62	6.61
70 CPR	0.00	3.65	8.36	8.73	6.63	6.99

4.24. **Table 15B** below reports Tranche E's price yield when CPR increases from 0% to 70%. Consistent with the reduction of the average weighted life, the yield of Ares's Tranche E increases as CPR increases. Tranche E's yield for Carlyle, Magnetite, and OHA declines substantially when CPR increases beyond 50%. This nonlinearity further demonstrates that the effect of prepayment rate changes not only across CLO deals but within the same tranches, depending on the actual value of the prepayment rate.

[124] The zero years weighted average life for Anchorage E tranche indicates that this tranche would experience 100% loss under the scenario with a 70% CPR. We note that the yield table of the CDOnet appears to be following different assumptions from the Economy modeling environment that specifies Loss Rates and Reinvestment Rules.

Table 15B. Yield (price at 100, in %) of Tranche E by Conditional Prepayment Rate

CPR Scenarios	Anchorage Capital CLO 17 Ltd.	Ares LII CLO Ltd.	Carlyle US CLO 2021-1 Ltd.	Magnetite XXVII Ltd.	OHA Credit Funding 3 Ltd.	Strata CLO II Ltd.
0 CPR	10.89	10.49	10.00	10.01	10.28	12.09
10 CPR	10.89	10.49	10.00	10.01	10.28	12.09
20 CPR	10.89	10.50	9.99	10.01	10.28	12.09
30 CPR	10.89	10.53	9.99	10.00	10.27	12.10
40 CPR	10.68	10.56	9.96	9.99	10.27	12.10
50 CPR	8.38	10.61	8.42	7.21	10.25	12.10
60 CPR	4.72	10.68	2.89	1.95	8.72	12.06
70 CPR	-0.10	10.75	-8.63	-6.97	1.22	8.98

IV.D.3. Correlation Assumptions

4.25. As discussed in **Section III.D.2** above, correlation is one of the most important parameters in assessing the credit risk of CLO's loan pool. It affects how many assets are defaulting together in any given time period. However, the proposed stress scenarios A, B, and C do not analyze correlation – in these scenarios, cash flows of the collateral are calculated by assuming that a given fraction of the portfolio assets would default at the same time.

4.26. To analyze correlation, one can utilize the copula functions or the BET models. For copula functions, a Monte Carlo simulation is applied to draw from the default rates correlation factors between different assets to simulate the number of loans defaulting at any given time. The BET models utilize the concept of diversity score, which represents the number of uncorrelated (i.e., zero correlation) assets in a portfolio that effectively represents the portfolio of loans in interest. Specifically, BET takes into account multiple risk factors such as (i) diversity score for correlation, (ii) interest-rate volatility, (iii) change in the default curves over the first six years, and (iv) a multiplier distinct for each targeted rating. In this way, CDOnet's BET analysis inherently accounts for an increase in historical loss rates due to different default vectors. It is a more comprehensive analysis compared to the proposed static stress scenarios that consider only changes in default and recovery rates.

4.27. **Tables 16A-16B** below show the expected loss percentage for Tranche D and Tranche E of these six deals using BET analysis and the targeted rating of these tranches as of October 2022. BET analysis considers five different interest-rate scenarios (a base curve and other stressed interest rate curves where the curve increases or declines by one and two times the standard deviation (sigma). As these tables show, the BET analysis indicates that targeted ratings of 'Baa3' and 'Ba3' for Tranche D and E, respectively, were met for all CLO deals as of the October 2022 evaluation date, except for OHA Credit Funding CLO. For this particular CLO, the BET analysis would recommend a one-notch downgrade for both Tranches D and E. For other deals, the BET analysis indicates that the current ratings of 'Baa3' and 'Ba3' were justifiable. Even a one-notch upgrade may be considered in some cases (e.g., Ares CLO's Tranche E would comfortably pass the 'Ba2' rating criteria).

Table 16A. Expected Loss % by BET Analysis for Tranche D

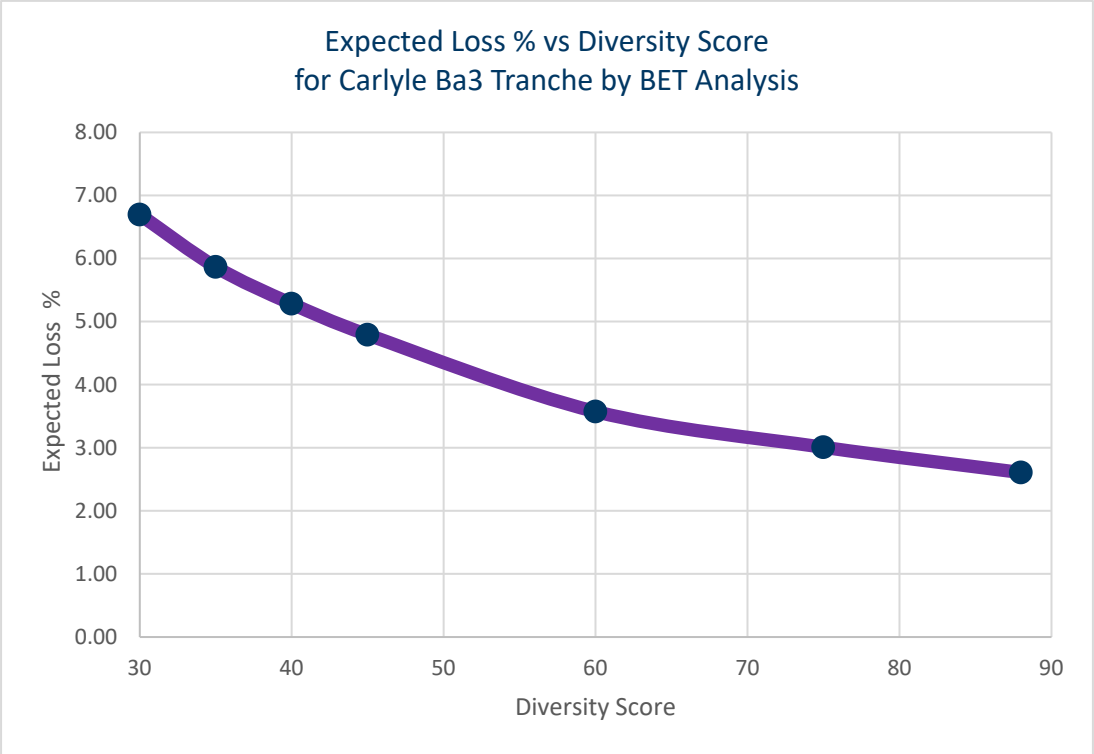
DEAL	TRANCHE	Target Rating	-2 SIGMA	-1 SIGMA	BASE	+1 SIGMA	+2 SIGMA	TRIGGER	PASS/ FAIL
Anchorage Capital CLO 17 Ltd.	D/Baa3	Ba3	0.37	0.40	0.44	0.49	0.54	**3.02**	Pass
Ares LII CLO Ltd.	DR/NR	Ba3	0.65	0.66	0.68	0.71	0.73	**2.22**	Pass
Carlyle US CLO 2021-1 Ltd.	C/Baa3	Ba3	0.77	0.84	0.93	1.04	1.18	**3.07**	Pass
Magnetite XXVII Ltd.	DR/Baa3	Ba3	1.08	1.15	1.23	1.36	1.52	**3.51**	Pass
OHA Credit Funding 3 Ltd.	DR/Baa3	Ba3	6.95	7.06	7.19	7.35	7.53	**3.53**	Fail
Strata CLO II Ltd.	D/Baa3	Ba3	2.39	2.49	2.62	2.80	3.01	**2.81**	Pass

Table 16B. Expected Loss % by BET Analysis for Tranche E

DEAL	TRANCHE	Target Rating	-2 SIGMA	-1 SIGMA	BASE	+1 SIGMA	+2 SIGMA	TRIGGER	PASS/ FAIL
Anchorage Capital CLO 17 Ltd.	E/Ba3	Ba3	3.22	3.38	3.60	3.88	4.24	**9.75**	Pass
Ares LII CLO Ltd.	ER/NR	Ba3	1.14	1.15	1.18	1.20	1.22	**7.79**	Pass
Carlyle US CLO 2021-1 Ltd.	D/Ba3	Ba3	4.47	4.60	4.76	4.98	5.32	**9.75**	Pass
Magnetite XXVII Ltd.	ER/Ba3	Ba3	1.27	1.37	1.53	1.73	2.01	**10.47**	Pass
OHA Credit Funding 3 Ltd.	ER/Ba3	Ba3	20.10	20.04	19.99	19.96	19.96	**10.29**	Fail
Strata CLO II Ltd.	E/Ba3	Ba3	6.25	6.41	6.63	6.92	7.27	**9.24**	Pass

4.28. **Figure 18** below shows how the diversity score influences the expected loss under the BET method for a particular CLO deal and tranche (in this example, we use Carlyle 'Ba3' rated Tranche). Specifically, we calculated the expected loss for different levels of DS, with the highest (i.e., 87) being the current DS score of the Carlyle deal and the lowest (i.e., 30) the Carlyle deal's DS trigger. As this figure shows, the expected loss increases faster than a linear rate as the diversity score decreases.

Figure 18. Expected Loss for Carlyle 'Ba3' Rated Tranche



4.29. Another modeling approach that takes into account default correlation is a Monte Carlo analysis with copula models, which further captures the effects of other stochastic variables through a simulation. In contrast to the proposed ad-hoc, static stress test scenarios, the results of the Monte-Carlo models are much more indicative of the possible outcomes and the associated risk for a CLO deal and tranches. For example, the Monte-Carlo models report the breakeven probability, which provides a probabilistic view of whether a specific CLO tranche will experience loss. For example, a breakeven probability of 70% means that the likelihood that the tranche does not experience any impairment is 70%. **Table 17** below shows the findings for Tranches D and E for the test CLO deals.[125] As this table shows, Tranche D would have positive returns in the majority of cases.

[125] A Student-T copula with 3 degrees of freedom is used to derive the results in **Table 16**.

Table 17. Breakeven Probability for Tranches D&E of the Test CLO Deals

CLO Deal	Tranche	Breakeven Probability
Anchorage Capital CLO 17 Ltd.	D	63%
	E	39%
Ares LII CLO Ltd.	DR	62%
	ER	44%
Carlyle US CLO 2021-1 Ltd.	C	59%
	D	31%
Magnetite XXVII Ltd.	DR	68%
	ER	35%
OHA Credit Funding 3 Ltd.	DR	57%
	ER	28%
Strata CLO II Ltd.	D	60%
	E	40%

4.30. However, the loss rates expected for these tranches are highly skewed. To illustrate this, **Figures 19A-B** show for the Magnetite deal both the cumulative collateral loss and the yield distribution for Tranches E and D. These figures further demonstrate the flexibility and versatility of the Monte-Carlo models to incorporate stochastic modeling assumptions and provide informative metrics for risk assessment.

Figure 19A. Cumulative Collateral Loss of the Magnetite Deal

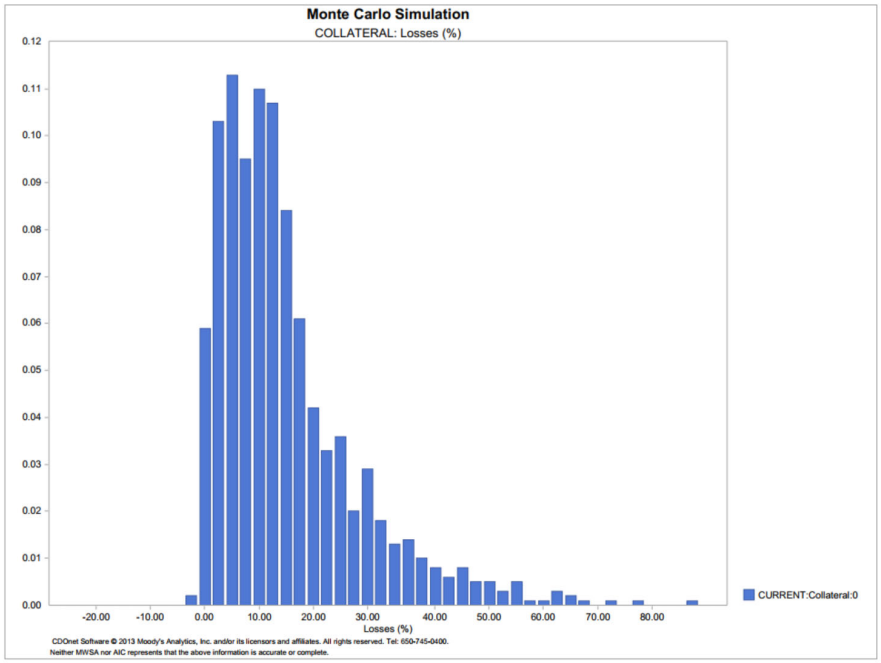
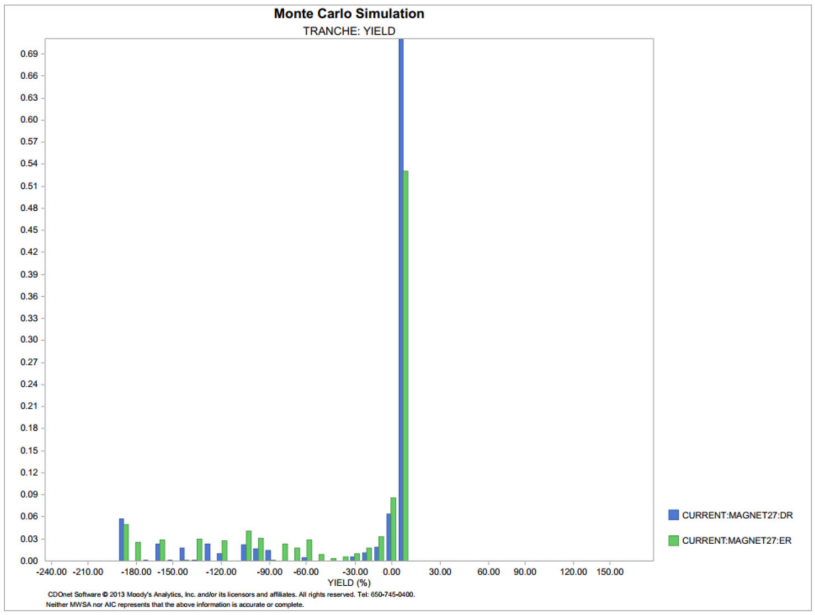


Figure 19B. Yield Distribution for Tranches D&E of the Magnetite Deal



4.31. Monte Carlo analysis is a powerful tool that can incorporate various sets of assumptions, such as asset-level default rates, loan-level correlations of defaults, recovery rate volatility, and recovery rate correlations. It can also incorporate the correlation between asset default rates and recovery rates, in addition to the correlation between asset defaults. As high default rates and low recovery rates are typically observed at times of heightened economic sensitivity or during recessions, the correlation between defaults and loss rates given default may increase during market stress, which can affect the credit risk of the CLO notes.[126] To illustrate the effect, we used 10% for this correlation. A different value will result in different results in the expected losses and breakeven probability for each CLO tranche. For example, when this correlation changes to 90%, Magnetite Tranche D's breakeven probability (i.e., the likelihood that the tranche does not experience any impairment) declines from 68% to 63%, while Magnetite Tranche E's breakeven probability increases from 35% to 44%. Similarly, the expected loss for Magnetite Tranche D increases by approximately 4%, while the expected loss for Magnetite Tranche E decreases by 3%. Overall, the Monte-Carlo simulation will generate a higher probability of large losses when the correlations increase. Using empirical values for these correlations and volatilities would result in more realistic valuations and risk assessment of tranche risk-return profiles.

[126] For example, a study has estimated the correlation between default rates and loss given default to be 80% for subordinated debt and 45% for senior debt. See Frye, Jon, "Collateral damage", Risk, 91-4, April 2000, available at https://www.bis.org/bcbs/events/oslo/frye.pdf.

IV.E. Updated Stress Test Scenarios

4.32. In the October 5 Presentation, NAIC included seven additional stress test scenarios, with four scenarios assuming a substantially higher default rate (i.e., increasing the default rate by two standard deviations of the historical default rate) and two scenarios further reducing the recovery rate below the "stepdown" recovery rate.[127] The updated stress test scenarios result in some marginal changes in the magnitude and timing of expected losses, but they do not change the overall theme that losses affect lower tranches and spread upward to higher tranches as the severity of the stress test increases. For any given scenario, we observe the rankings between different deals behave as expected as well: Deals with weaker collaterals and lower credit enhancements are expected to experience higher losses. Unsurprisingly, in the updated stress scenarios, the further increased stress results in partial to complete losses to the mezzanine tranches,[128] meaning that under these scenarios even CLO notes rated as investment grade are expected to suffer loss, including a complete loss. These results demonstrate that one can always design a stress scenario in which even the highest quality credit asset can incur losses. However, the critical consideration in accessing risk is not whether the notes will lose value in a designed scenario, but whether the designed scenario appropriately captures the relevant factors and how likely that scenario would occur. Despite the increased number of stress test scenarios, the October 5 Presentation still provides no critical assumption about the likelihood that each of its assumed stress scenarios would occur, nor does it provide any evidence and economic basis to support its assumptions.[129] As a result, the October 5 Presentation, and the companion files published in November and December 2023 continue to lack critical information for a rigorous evaluation of the proposed stress test scenarios.[130]

[127] The stress test scenarios A, B, and C correspond to Scenarios 3, 6, and 7 in the October 5 Presentation. Specifically, in the October 5 Presentation, scenarios 5, 8, 9, and 10 increase the default rate by two standard deviations of the historical default rate, and scenarios 9 and 10 further reduce the recovery rate to 75% and 50% of the "step down" recovery rate, respectively.

[128] See "CLO Preliminary Results by Scenario Updated 2023 1110.xlsb" and "CLO CashFlow updated 12-08-23."

[129] The October 5 Presentation notes that the combined probability for the "tail scenarios" 7, 8, 9, and 10 is expected to be less than 2%. As an initial point, we disagree with the suggestion that scenarios 5 and 6, which assume the default rate is two standard deviations above the historical mean and a step-down recovery rate, respectively, are not "tail scenarios" under severe stress. We also object to the 2% probability assumption, of which the October 5 Presentation provides no analysis or evidence to support its reasonableness.

[130] In its most recent October 2023 CLO analysis, Fitch "assessed the impact of sensitivity scenarios" of the most vulnerable U.S. leveraged loan issuers. In its two stress scenarios, Fitch assumes 5% and 10.8% default rates, respectively, for CLOs with a median exposure to stressed assets. These assumptions are substantially milder than the stress assumptions proposed by the NAIC. See Fitch Ratings, "US CLO Ratings Resilient Under Stress Scenarios," October 14, 2023, available at https://www.fitchratings.com/research/structured-finance/us-clo-ratings-resilient-under-stress-scenarios-14-10-2022

4.33. Furthermore, the Proposed Methodology prescribes a set of stress test scenarios and evaluates the performance of CLOs under these different default and recovery rate assumptions. These proposed scenarios, however, do not coincide with the actual experience of CLOs since their inception. Rather, they rely on an expanded set of corporate debt, including corporate bonds and debt issued by non-U.S. issuers. In November 2023, NAIC further updated its default and recovery rate assumptions for the stress test scenarios. Although not explicitly stated, NAIC's November 2023 updated stress test assumptions now rely on the global issuer defaults in Moody's 2023 annual default study as opposed to the 2019 annual default study that it relied on previously.[131] The effect of this update is that the proposed default and recovery rate assumptions become affected by the substantial increase in defaults in 2022, which was largely driven by the Russia-Ukraine war and China's property sector downturn[132] – events that were not expected to affect the U.S. leveraged loans underlying the CLOs at issue. Without counting Russian defaults, global issuer defaults in 2022 would have been 91 as opposed to 151. According to Moodys', the drivers of the Russian and China defaults are "risks that are rare globally." It is unreasonable to assume that these issuers' defaults should be used to infer the performance of CLO's underlying U.S. leveraged loans.[133]

4.34. The inclusion of Russian defaults also impacted the recovery rate for certain types of bonds. Specifically, the recovery rate for senior unsecured bonds was 31.1% in 2022 including Russian defaults, but 35.1% without Russian defaults. The recovery rate for subordinated bonds was 18.2% in 2022 including Russian defaults, versus 24.8% without Russian defaults.[134] The inclusion of the 2022 global issuer defaults, therefore, both increases the default rates and lowers the recovery rates by Russian defaults that are not expected to impact the underlying loans of CLOs.

4.35. In addition to the reliance on Moody's 2023 report, NAIC also switched the recovery rate metrics to a dollar-weighted recovery rate from the issuer-weighted recovery rate. NAIC does not explain the reason for this change. It is noteworthy, however, that the historical default rates that NAIC uses are issuer-weighted and not dollar-weighted. In addition to the issue of consistency, dollar-weighted metrics are susceptible to the outcome of a few large issuers, which can differ substantially from the issuer composition of CLOs' underlying portfolios.

[131] See CDO Default Recovery Scenario, published on November 9, 2023.

[132] See Moody's Annual Default Study: Corporate Default Rate Will Rise in 2023 and Peak in Early 2024, March 13, 2023, at p. 1.

[133] See Moody's Annual Default Study: Corporate Default Rate Will Rise in 2023 and Peak in Early 2024, March 13, 2023, at pp. 1, 4. Similarly, in its 2019 annual default study, Moody's discussed the rise in default rate in onshore markets in China, as well as Argentina and Turkey's financial market sell-offs. Moody's Annual Default Study: Defaults will Rise Modestly in 2019 amid Higher Volatility, February 1, 2019, at p. 2.

[134] Moody's Annual Default Study: Corporate Default Rate Will Rise in 2023 and Peak in Early 2024, March 13, 2023, at p. 9.

4.36. As a result of the inclusion of the 2022 default data and the change of recovery rate metrics, the assumed recovery rates decrease across collateral types. As **Table 18A** below shows, for the proposed historical priority position recovery scenario, the assumed recovery rate for Senior Secured Loans declined from 67.19% (based on Moody's 2019 Report issuer-weighted recovery rate) to 63.22% (based on Moody's 2023 Report dollar-weighted recovery rate). For the 'Other' type of collateral (which the proposed methodology mapped to junior subordinated bonds), the assumed recovery rate declined from 23.67% to 13.46%. Similar declines are shown in recovery rate assumptions for the stepdown priority position recovery scenario, as **Table 18B** shows.

Table 18A. Comparison of Recovery Rate Assumptions, Historical Priority Position

Collateral Label	Historical Priorty Position	Moody's 2019 Report Issuer-Weighted Recovery Rate	Moody's 2023 Report Issuer-Weighted Recovery Rate	Moody's 2023 Report Dollar-Weighted Recovery Rate
Senior Secured Loan	1st Lien Bank Loan	67.19%	65.68%	**63.22%**
Second Lien Loan	2nd Lien Bank Loan	32.27%	33.28%	**29.88%**
Senior Unsecured Bond	Sr. Unsecured Bond	38.15%	37.67%	**33.56%**
Other	Jr. Subordinated Bond	23.67%	22.26%	**13.46%**

Table 18B. Comparison of Recovery Assumptions, Stepdown Priority Position

Collateral Label	Historical Priorty Position	Moody's 2019 Report Issuer-Weighted Recovery Rate	Moody's 2023 Report Issuer-Weighted Recovery Rate	Moody's 2023 Report Dollar-Weighted Recovery Rate
Senior Secured Loan	Sr. Unsecured Bank Loan	45.75%	37.67%	**43.86%**
Second Lien Loan	Sr. Subordinated Bond	31.08%	31.00%	**26.57%**
Senior Unsecured Bond	Subordinated Bond	31.98%	31.99%	**27.77%**
Other	Jr. Subordinated Bond	23.67%	22.26%	**13.46%**

V. Conclusion

5.1. CLOs have historically performed well, including during periods of extreme market stress, and have substantially lower default rates than other comparably rated asset classes, including corporate bonds and other structured finance products, such as consumer loan-backed ABS notes or commercial real-estate-backed mortgages. The consistent outperformance of CLOs reflects the benefits of multiple levels of static and dynamic credit enhancement mechanisms (such as portfolio diversification, subordination, overcollateralization, excess spread, and performance-based cash flow diversions), as well as the active management of CLO managers that repositions collateral pool to dampen adverse market shocks. Credit structures of CLOs were further improved even after their exceptional performance during the 2007-2009 Great Financial Crisis. As a result, the CLOs originated after 2009 (referred to as CLO 2.0s) further benefit from increased credit support, stricter limits on the portfolio composition, reduced reinvestment periods, and further diversified asset portfolios. CLO structures became even more conservative starting around 2014 and 2015 in order to comply with regulatory changes such as the Volcker Rule, which limited CLOs' investments in high-yield bonds (referred to as CLO 3.0s). Although the Volcker Rule was later amended to allow high-yield bond investments, CLO 3.0s continue capping their exposure to high-yield bonds.[135] The strong credit performance of CLO 3.0s is attributable to the more benign economic cycles post 2015, as well as their more conservative structures, which outperformed CLOs with less diverse pools and thinner credit cushions.[136]

[135] PineBridge Investments, "Seeing Beyond the Complexity: An Introduction to Collateralized Loan Obligations," January 2022, available at https://www.pinebridge.com/_assets/pdfs/insights/2022/pinebridge-investments_clo-primer.pdf

[136] S&P Research, "CLO Spotlight: The Dirty (Almost) Dozen: What Separates Defaulting U.S. CLO 2.0 Tranches From The Rest," July 7, 2022.

5.2. Given the demonstrated effectiveness of credit enhancements and active management for CLOs, a CLO modeling must capture these features to approximate the risk profile of CLO notes reasonably. In other words, an analysis of CLO risk should include assessments of CLO structure and manager capability, in addition to assessments of the credit enhancement mechanisms. The Proposed Methodology, however, adopts an oversimplified, algorithmic approach that does not capture qualitative assessments of CLO risks and only considers a subset of quantitative modeling assumptions. For example, the Proposed Methodology oversimplifies assumptions regarding loan prepayment and reinvestment purchase prices. As NAIC itself indicated, these assumptions would affect the risk profile of CLO notes, sometimes in unexpected directions. In our view, to evaluate CLO risk, these assumptions need to properly reflect empirical evidence, industry practice, and the active management feature of CLOs. Additionally, the Proposed Methodology disregards the default correlation and the interaction between default and recovery – features that are critical to CLO performance and can have disparate impacts across CLOs and their tranches. In contrast to the Proposed Methodology, the big three rating agencies – S&P, Moody's, and Fitch – analyze qualitative factors of CLO deals to account for various known risk factors that cannot be incorporated into quantitative models but are nevertheless essential determinants of CLO performance. All three rating agencies also explicitly take into account portfolio default correlation, loan prepayment, and purchase price discount in assessing CLO risk.

5.3. Additionally, in the actual implementation, the Proposed Methodology adopts Moody's CDOnet software platform and, as a result, follows Moody's CLO modeling framework and utilizes Moody's input data and assumptions. The Proposed Methodology does not explain why the regulatory capital charges should be primarily determined based on Moody's CLO modeling framework when other reputable and well-regarded rating agencies, such as S&P and Fitch, evaluate the credit risk of CLO notes based on different methodologies and assumptions.

5.4. Although NAIC describes its proposed stress test scenarios, the proposal thus far lacks the critical assumption about the likelihood that each stress test scenario is expected to occur, which severely limits the risk assessment based on the proposed scenarios. It is important to note, however, that the default and recovery assumptions under stress test Scenarios B and C result in marginal loss increments that prevent full payment of principal and interest to Tranche D (investment grade tranche) and Tranche E (high yield tranche). Specifically, Scenario C is a highly drastic scenario with simultaneously higher default rates and higher loss rates than historical averages under which a currently investment-grade rated bond is expected to default. In other words, these stress test scenarios are designed to increase capital charges above the current level. Furthermore, instead of the static stress test scenarios proposed by the NAIC, the industry and rating agencies have long moved away from static stress scenarios (such as the proposed stress test scenarios) and adopted models that can capture correlation and stochastic recovery rates. Considering the high sensitivity of the analysis outcome, the Proposed Methodology lacks sufficient technical sophistication to account for factors that can materially alter the credit profile of CLO notes, which could result in unfairly biased risk-based capital determination. The Proposed Methodology's omissions and oversimplifications of important CLO features can result in significantly altered risk profiles of CLO tranches, leading to a distorted assessment of the credit risk and the corresponding capital charges.

5.5. In summary, a comprehensive evaluation and more advanced modeling beyond what NAIC currently proposes are required to ensure a fair and reasonable assessment of CLO risk. We have shown that Monte-Carlo-type simulations can account for some of the complexities of the CLO modeling that are important for CLO performance, such as the stochastic variability of both default rates and recovery rates. We have also shown that stress test assumptions need to reflect the interactions across different economic factors over market cycles for the test meaningful assessment of risk. Additionally, the range of the possible default and recovery rates and correlations under various stress scenarios must be verified against both the historical and current market prices of the underlying loans and CLO notes, as well as other historical observations of default and recovery rates in past recessions. The additional modeling and stress test assumptions discussed in this white paper would transform the analysis of CLOs into a more complex study than what is currently proposed, but they are required for obtaining a more precise and fair assessment of CLO risk.

January 29, 2026

Risk-Based Capital Investment Risk and Evaluation Working Group
Capital Adequacy (E) Task Force
National Association of Insurance Commissioners
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197

Via Email

Re: Comments on American Academy of Actuaries' December 15, 2025, Presentation titled C-1 Subcommittee Update on CLO C-1 Factors Modeling

Dear Members of the Risk-Based Capital Investment Risk and Evaluation (RBC-IRE) Working Group:

We appreciate the opportunity to provide comments on the AAA's December 15, 2025, presentation to regulators regarding the ongoing development of C-1 factors for Collateralized Loan Obligations (CLOs). We commend the AAA C-1 Subcommittee, chaired by Stephen Smith, for its collaborative efforts with the NAIC's Structured Securities Group (SSG) to refine a modeling approach that better reflects the risk characteristics of CLOs held by insurers. This work represents a significant improvement over prior methodologies, and we support its continued advancement.

AAA vs SSG CLO Model: The Academy model uses a large-scale stochastic simulation with 10,000 equally weighted economic scenarios. This generates robust default vectors for the underlying loans, which are then fed through detailed waterfall mechanics (via CDO-Net) to simulate tranche performance. It explicitly measures tail risk using a Conditional Tail Expectation (CTE-90) approach, averaging losses across the worst 10% of outcomes, translating to 17 scenarios.

In contrast, the SSG approach relies on only 10 deterministic scenarios, which are artificially probability-weighted and back-solved primarily to enforce strict equivalence between the CLO's vertical slice RBC charges and the weighted-average charges of the underlying loan pool. This limits visibility into genuine tail risk, reduces emphasis on stochastic variation, and can mask tranche-specific sensitivities by scaling results to loan-pool averages.

We believe the AAA framework is "largely there" and represents the best path forward for establishing fair and accurate capital charges. Therefore, we urge the Working Group not to

revert to less sophisticated models, such as the SSG approach or a uniform fallback percentage, as these would not adequately capture the diversified and structured nature of CLOs.

Recommendations on Assumptions and Refinements: We note the Academy model's sensitivity to key assumptions, some of which still need adjustments to be fully calibrated, which can significantly influence outcomes. In particular:

- *Loss Given Default (LGD)*: The proposed adjustment from 27% to 36% represents a notable increase that could materially impact capital charges. We appreciate the Academy's transparency in highlighting assumption dependencies and look forward to further details in the February 10, 2026, presentation, including the appendix on underlying assumptions.
- *Prepayments*: We appreciate the Academy's sensitivity analysis regarding prepayment speeds given prepayments occur across all market conditions, including stressed conditions and periods of elevated defaults. We recommend the Academy consider a more moderate prepayment assumption that reflects historical floors observed during stressed periods to avoid overstating tail risk and capital charges.
- *Reinvestment Price*: Assumptions around reinvestment should be reviewed to align with market realities, ensuring they do not unduly penalize CLO structures. Notably, the par assumption departs materially from market realities. We suggest incorporating real-world data to refine these elements, recognizing the assumption-dependent nature of the model (as noted with at least five key variables that could alter results).
- *Probability of Default (PD)*: While not highlighted in the December 15 presentation, we believe there could be significant improvements in PD modeling. We encourage the AAA to couple consideration of changes to recoveries with revisions to the Academy's current probability of default assumptions. These are currently based on US corporates of all seniorities. Using historical experience of US BSL loans, which have exhibited lower relative defaults than bonds, would be more appropriate and realistic.

Anticipated Next Steps and Collaboration: We eagerly await the early 2026 presentation of residual tranche results, portfolio adjustment factors, model refinements, and potential comparable attributes. The full application of the model to the broader universe of CLOs owned by life insurers, as planned for February 10, 2026, will provide greater certainty and enable more precise feedback. In the interim, we are prepared to offer technical input from our CLO subject matter experts as well as data to support assumptions that align with observable market dynamics.

Thank you for your dedication to developing risk-based capital standards that promote a stable and competitive insurance industry. We stand ready to engage further and provide any additional information needed.

Sincerely,

ALTERNATIVE INVESTMENT
MANAGEMENT ASSOCIATION

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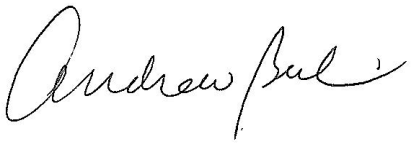

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AMERICAN INVESTMENT COUNCIL

//s// Rebekah Jurata
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ATTACHMENT FIVE

PENGING

Update on CLO C-1 Factors Modeling – American Academy of Actuaries

Capital Adequacy (E) Task Force
RBC Proposal Form

☐ Capital Adequacy (E) Task Force
☐ Catastrophe Risk (E) Subgroup
☐ Variable Annuities Capital. & Reserve (E/A) Subgroup
☐ Health RBC (E) Working Group
☐ P/C RBC (E) Working Group
☐ Economic Scenarios (E/A) Subgroup
☐ Life RBC (E) Working Group
☐ Longevity Risk (A/E) Subgroup
☒ RBC Investment Risk & Evaluation (E) Working Group

DATE:	**11/11/2025**
CONTACT PERSON:	**Maggie Chang**
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EMAIL ADDRESS:	**mchang@naic.org**
ON BEHALF OF:	**Risk-Based Capital Investment Risk and Evaluation (E) Working Group**
NAME:	**Philip Barlow, Chair**
TITLE:	**Associate Commissioner of Insurance**
AFFILIATION:	**District of Columbia**
ADDRESS:	**1050 First Street, NE Suite 801**
	Washington, DC 20002

FOR NAIC USE ONLY

Agenda Item # 2025-22-IRE
Year 2026 or later

DISPOSITION

ADOPTED:
☐ TASK FORCE (TF) _____
☐ WORKING GROUP (WG) _____
☐ SUBGROUP (SG) _____

EXPOSED:
☐ TASK FORCE (TF) _____
☐ WORKING GROUP (WG) _____
☐ SUBGROUP (SG) _____

REJECTED:
☐ TF ☐ WG ☐ SG _____

OTHER:
☐ DEFERRED TO _____
☐ REFERRED TO OTHER NAIC GROUP
☐ (SPECIFY) _____

IDENTIFICATION OF SOURCE AND FORM(S)/INSTRUCTIONS TO BE CHANGED

☐ Health RBC Blanks
☐ Health RBC Instructions
☐ Health RBC Formula
☐ Property/Casualty RBC Blanks
☐ Property/Casualty RBC Instructions
☐ Property/Casualty RBC Formula
☒ Life and Fraternal RBC Blanks
☒ Life and Fraternal RBC Instructions
☒ Life and Fraternal RBC Formula
☐ OTHER _____

DESCRIPTION/REASON OR JUSTIFICATION OF CHANGE(S)

This proposal incorporates a more granular reporting of Long-Term Bonds into two buckets: i) collateralized loan obligations (CLOs) and ii) all other Long-Term Bonds on the LR002 Bonds page. The expanded presentation of bonds is a result of the work of Risk-Based Capital Investment Risk and Evaluation (E) Working Group under Working Agenda item: Evaluate the appropriate RBC treatment of Asset-Backed Securities (ABS), including Collateralized Loan Obligations (CLO), collateralized fund obligations (CFOs), or other similar securities carrying similar types of tail risk (Complex Assets).

Please note that this proposal does not contemplate any changes to factors. Any changes of factors, if deemed necessary, will be dealt with by a separate proposal. Likewise, residual tranche structural changes, if any, are to be contemplated in separate proposal form.

The accompanying changes proposed to the instructions and blanks of the AVR – Default Component & Equity and Other Invested Asset Component tables are under purview of NAIC Blanks (E) Working Group. As such, the proposed changes to "Annual Statement Source" in LR002 are contingent on the adoption of such Blanks proposal.

Additional Staff Comments:

** **This section must be completed on all forms.** **Revised 2-2023**

BONDS

LR002

Basis of Factors

The bond factors are based on cash flow modeling using historically adjusted default rates for each bond category. For each of 2,000 trials, annual economic conditions were generated for the 10-year modeling period. Each bond of a 400-bond portfolio was annually tested for default (based on a "roll of the dice") where the default probability varies by designation category and that year's economic environment. When a default takes place, the actual loss considers the expected principal loss by category, the time until the sale actually occurs and the assumed tax consequences.

Actual surplus needs are reduced by incorporating anticipated annual contributions to the asset valuation reserve (AVR) as offsetting cash flow. Required surplus for a given trial is calculated as the amount of initial surplus funds needed so that the accumulation with interest of this initial amount and subsequent cash flows will not become negative at any point throughout the modeling period. The factors chosen for the proposed formula produce a level of surplus at least as much as needed in 92% of the trials by category and a 96% level for the entire bond portfolio.

The factor for NAIC 6 bonds recognizes that the book/adjusted carrying value of these bonds reflects a loss of value upon default by being marked to market.

Specific Instructions for Application of the Formula

Lines (1) through (7)

The book/adjusted carrying value of all bonds, excluding collateralized loan obligations ~~and related fixed income investments~~ should be reported in Column (1). The bonds are split into seven different risk classifications. For long-term bonds, these classifications are found on Lines A1 through A7 of the Asset Valuation Reserve Default Component~~, Page 30~~ of the annual statement.

The book/adjusted carrying value of all collateralized loan obligations should be reported in Column 2. The collateralized loan obligations are split into six different risk classifications. These classifications are found on Lines A9.1 through A14 of the Asset Valuation Reserve Default Component~~, Page 30~~ of the annual statement.

Line (8)

The total should equal long-term bonds ~~and other fixed income instruments~~ reported on Page 2, Column 3, Line 1 plus Schedule DL Part 1, Column 6, Line 2009999999 of the annual statement.

Lines (9) through (15)

The book/adjusted carrying value of all short-term and cash equivalent bonds ~~and related fixed income investments~~ should be reported in Column (1). The bonds are split into seven different risk classifications. For short-term bonds, these classifications are found on Lines ~~18~~ C1 through ~~24~~ C7 of the Asset Valuation Reserve Default Component, ~~Page 30~~ of the annual statement. For cash equivalent bonds, these classifications are found in Footnotes to Schedule E, Part 2.

Line (16)

The total should equal short-term bonds reported on Schedule DA, Part 1, Column 6 Line 0509999999 plus Schedule DL Part 1, Column 6, Line 9509999999 plus Schedule E, Part 2, Column 7, Line 0509999999.

Line (22)

Class 1 bonds (highest quality) issued by a U.S. government agency that are not backed by the full faith and credit of the U.S. government should be reported on this line. The loan-backed securities of the Federal National Mortgage Association (FNMA) and the Federal Home Loan Mortgage Corporation (FHLMC) would be examples of the securities reported on this line. Line (22) should not be larger than the sum of Lines (2) and (10). Exempt obligations should not be included on this line.

Line (24)

Bonds should be aggregated by issuer (the first six digits of the CUSIP number can be used). Exempt U.S. government bonds and bonds reported on Line (22) are not counted in determining the size factor. The RBC for those bonds will

not be included in the base to which the size factor is applied. If this field is left blank, the maximum size factor adjustment of 2.40 will be used.

Line (25)
The size factor reflects the higher risk of a bond portfolio that contains relatively fewer bonds. The overall factor decreases as the portfolio size increases. The size factor is based on the weighted number of issuers. (The calculation shown below will not appear on the RBC filing software but will be calculated automatically.)

Line (25)	Source	(a) Number of Issuers (for bonds, excluding CLOs)				(b) Weighted Issuers (for bonds, excluding CLOs)
First 50	Company Records		X	2.40	=	
Next 50	Company Records		X	1.53	=	
Next 100	Company Records		X	0.85	=	
Next 300	Company Records		X	0.85	=	
Over 500	Company Records		X	0.82	=	
(i) Total Numbers of Issuers from Line (23) Column (1)						
(ii) Total Weighted Issuers (for bonds, excluding CLOs)						

	Source	(a) Number of Issuers (for CLOs)				(b) Weighted Issuers (for CLOs)
First XX*	Company Records		X	TBD	=	
Next XX*	Company Records		X	TBD	=	
Next XXX*	Company Records		X	TBD	=	
Next XXX*	Company Records		X	TBD	=	
Over XXX*	Company Records		X	TBD	=	
(iii) Total Number of Issuers from Line (23) Column (2)						
(iv) Total Weighted Issuers (for CLOs)						
Size Factor = Total Weighted Issuers (ii)+(iv) Divided by Total Number of Issuers (i) + (iii)						

* Total number of breakpoints, as well as weights assigned to each, are subject to American Academy of Actuaries' recommendation and Working Group's review.

BONDS

Company Name

Cocode: 00000

BONDS

	SVO Bond Designation Category	Annual Statement Source	(1) Non-CLOs Book / Adjusted Carrying Value	Factor	(2) CLOs Book / Adjusted Carrying Value	Factor		(3) RBC Requirement
	Long Term Bonds							
(1)	Exempt Obligations	C(1) AVR Default Component Column 1 Line A1	$0	0.00000	XXX	XXX	=	$0
		C(1) AVR Default Component Column 1 Line A2.1						
(2.1)	NAIC Designation Category 1.A	C(2) AVR Default Component Column 1 Line A9.1	$0	0.00158	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A2.2						
(2.2)	NAIC Designation Category 1.B	C(2) AVR Default Component Column 1 Line A9.2	$0	0.00271	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A2.3						
(2.3)	NAIC Designation Category 1.C	C(2) AVR Default Component Column 1 Line A9.3	$0	0.00419	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A2.4						
(2.4)	NAIC Designation Category 1.D	C(2) AVR Default Component Column 1 Line A9.4	$0	0.00523	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A2.5						
(2.5)	NAIC Designation Category 1.E	C(2) AVR Default Component Column 1 Line A9.5	$0	0.00657	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A2.6						
(2.6)	NAIC Designation Category 1.F	C(2) AVR Default Component Column 1 Line A9.6	$0	0.00816	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A2.7						
(2.7)	NAIC Designation Category 1.G	C(2) AVR Default Component Column 1 Line A9.7	$0	0.01016	$0	TBD	=	$0
(2.8)	Subtotal NAIC 1	Sum of Lines (2.1) through (2.7)	$0		$0			$0
		C(1) AVR Default Component Column 1 Line A3.1						
(3.1)	NAIC Designation Category 2.A	C(2) AVR Default Component Column 1 Line A10.1	$0	0.01261	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A3.2						
(3.2)	NAIC Designation Category 2.B	C(2) AVR Default Component Column 1 Line A10.2	$0	0.01523	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A3.3						
(3.3)	NAIC Designation Category 2.C	C(2) AVR Default Component Column 1 Line A10.3	$0	0.02168	$0	TBD	=	$0
(3.4)	Subtotal NAIC 2	Sum of Lines (3.1) through (3.3)	$0		$0			$0
		C(1) AVR Default Component Column 1 Line A4.1						
(4.1)	NAIC Designation Category 3.A	C(2) AVR Default Component Column 1 Line A11.1	$0	0.03151	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A4.2						
(4.2)	NAIC Designation Category 3.B	C(2) AVR Default Component Column 1 Line A11.2	$0	0.04537	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A4.3						
(4.3)	NAIC Designation Category 3.C	C(2) AVR Default Component Column 1 Line A11.3	$0	0.06017	$0	TBD	=	$0
(4.4)	Subtotal NAIC 3	Sum of Lines (4.1) through (4.3)	$0		$0			$0
		C(1) AVR Default Component Column 1 Line A5.1						
(5.1)	NAIC Designation Category 4.A	C(2) AVR Default Component Column 1 Line A12.1	$0	0.07386	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A5.2						
(5.2)	NAIC Designation Category 4.B	C(2) AVR Default Component Column 1 Line A12.2	$0	0.09535	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A5.3						
(5.3)	NAIC Designation Category 4.C	C(2) AVR Default Component Column 1 Line A12.3	$0	0.12428	$0	TBD	=	$0
(5.4)	Subtotal NAIC 4	Sum of Lines (5.1) through (5.3)	$0		$0			$0
		C(1) AVR Default Component Column 1 Line A6.1						
(6.1)	NAIC Designation Category 5.A	C(2) AVR Default Component Column 1 Line A13.1	$0	0.16942	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A6.2						
(6.2)	NAIC Designation Category 5.B	C(2) AVR Default Component Column 1 Line A13.2	$0	0.23798	$0	TBD	=	$0
		C(1) AVR Default Component Column 1 Line A6.3						
(6.3)	NAIC Designation Category 5.C	C(2) AVR Default Component Column 1 Line A13.3	$0	0.30000	$0	TBD	=	$0
(6.4)	Subtotal NAIC 5	Sum of Lines (6.1) through (6.3)	$0		$0			$0
		C(1) AVR Default Component Column 1 Line A7						
(7)	NAIC 6	C(2) AVR Default Component Column 1 Line A14	$0	0.30000	$0	TBD	=	$0
(8)	Total Long-Term Bonds	Sum of Lines (1) + (2.8) + (3.4) + (4.4) + (5.4) + (6.4) + (7)	$0		$0			$0
	(Column (1) + Column (2) should equal Page 2 Column 3 Line 1 + Schedule DL Part 1 Column 6 Line 2009999999)							
	Short Term and Cash Equivalent Bonds							
(9)	Exempt Obligations	AVR Default Component Column 1 Line C1 + Schedule E, Part 2, Column 7, Line 0019999999	$0	0.000	XXX	XXX	=	$0
(10.1)	NAIC Designation Category 1.A	AVR Default Component Column 1 Line C2.1 + Schedule E, Part 2, Footnote L000001A, Amount 1 - Schedule E, Part 2, Column 7, Line 0019999999	$0	0.00158	XXX	XXX	=	$0

=ROUND(MAX(0,D10)*F10 + MAX(0,G10)*I10,0)

		AVR Default Component Column 1 Line C2.2 +						
(10.2)	NAIC Designation Category 1.B	Schedule E, Part 2, Footnote L000001A, Amount 2	$0	X	0.00271	XXX	XXX =	$0
		AVR Default Component Column 1 Line C2.3 +						
(10.3)	NAIC Designation Category 1.C	Schedule E, Part 2, Footnote L000001A, Amount 3	$0	X	0.00419	XXX	XXX =	$0
		AVR Default Component Column 1 Line C2.4 +						
(10.4)	NAIC Designation Category 1.D	Schedule E, Part 2, Footnote L000001A, Amount 4	$0	X	0.00523	XXX	XXX =	$0
		AVR Default Component Column 1 Line C2.5 +						
(10.5)	NAIC Designation Category 1.E	Schedule E, Part 2, Footnote L000001A, Amount 5	$0	X	0.00657	XXX	XXX =	$0
		AVR Default Component Column 1 Line C2.6 +						
(10.6)	NAIC Designation Category 1.F	Schedule E, Part 2, Footnote L000001A, Amount 6	$0	X	0.00816	XXX	XXX =	$0
		AVR Default Component Column 1 Line C2.7 +						
(10.7)	NAIC Designation Category 1.G	Schedule E, Part 2, Footnote L000001A, Amount 7	$0	X	0.01016	XXX	XXX =	$0
(10.8)	Subtotal NAIC 1	Sum of Lines (10.1) through (10.7)	$0					$0
		AVR Default Component Column 1 Line C3.1 +						
(11.1)	NAIC Designation Category 2.A	Schedule E, Part 2, Footnote L000001B, Amount 1	$0	X	0.01261	XXX	XXX =	$0
		AVR Default Component Column 1 Line C3.2 +						
(11.2)	NAIC Designation Category 2.B	Schedule E, Part 2, Footnote L000001B, Amount 2	$0	X	0.01523	XXX	XXX =	$0
		AVR Default Component Column 1 Line C3.3 +						
(11.3)	NAIC Designation Category 2.C	Schedule E, Part 2, Footnote L000001B, Amount 3	$0	X	0.02168	XXX	XXX =	$0
(11.4)	Subtotal NAIC 2	Sum of Lines (11.1) through (11.3)	$0					$0
		AVR Default Component Column 1 Line C4.1 +						
(12.1)	NAIC Designation Category 3.A	Schedule E, Part 2, Footnote L000001C, Amount 1	$0	X	0.03151	XXX	XXX =	$0
		AVR Default Component Column 1 Line C4.2 +						
(12.2)	NAIC Designation Category 3.B	Schedule E, Part 2, Footnote L000001C, Amount 2	$0	X	0.04537	XXX	XXX =	$0
		AVR Default Component Column 1 Line C4.3 +						
(12.3)	NAIC Designation Category 3.C	Schedule E, Part 2, Footnote L000001C, Amount 3	$0	X	0.06017	XXX	XXX =	$0
(12.4)	Subtotal NAIC 3	Sum of Lines (12.1) through (12.3)	$0					$0
		AVR Default Component Column 1 Line C5.1 +						
(13.1)	NAIC Designation Category 4.A	Schedule E, Part 2, Footnote L000001D, Amount 1	$0	X	0.07386	XXX	XXX =	$0
		AVR Default Component Column 1 Line C5.2 +						
(13.2)	NAIC Designation Category 4.B	Schedule E, Part 2, Footnote L000001D, Amount 2	$0	X	0.09535	XXX	XXX =	$0
		AVR Default Component Column 1 Line C5.3 +						
(13.3)	NAIC Designation Category 4.C	Schedule E, Part 2, Footnote L000001D, Amount 3	$0	X	0.12428	XXX	XXX =	$0
(13.4)	Subtotal NAIC 4	Sum of Lines (13.1) through (13.3)	$0					$0
		AVR Default Component Column 1 Line C6.1 +						
(14.1)	NAIC Designation Category 5.A	Schedule E, Part 2, Footnote L000001E, Amount 1	$0	X	0.16942	XXX	XXX =	$0
		AVR Default Component Column 1 Line C6.2 +						
(14.2)	NAIC Designation Category 5.B	Schedule E, Part 2, Footnote L000001E, Amount 2	$0	X	0.23798	XXX	XXX =	$0
		AVR Default Component Column 1 Line C6.3 +						
(14.3)	NAIC Designation Category 5.C	Schedule E, Part 2, Footnote L000001E, Amount 3	$0	X	0.30000	XXX	XXX =	$0
(14.4)	Subtotal NAIC 5	Sum of Lines (14.1) through (14.3)	$0					$0
		AVR Default Component Column 1 Line C7						
(15)	NAIC 6	Schedule E, Part 2, Footnote L000001F, Amount 1	$0	X	0.300	XXX	XXX =	$0
(16)	Total Short-Term and Cash Equivalent Bonds	Sum of Lines (9) + (10.8) + (11.4) + (12.4) + (13.4) + (14.4) + (15)	$0					$0
	(Column (1) should equal Schedule DA Part 1 Column 6 Line 0509999999 + Schedule DL Part 1 Column 6 Line 9509999999 + Schedule E Part 2 Column 7 Line 0509999999)							
(17)	Total Long-Term and Short-Term Bonds (pre-MODCO/Funds Withheld)	Line (8) + (16)	$0			$0		$0
(18)	Credit for Hedging	LR014 Hedged Asset Bond Schedule Column (13) Line (0399999)						$0
(19)	Reduction in RBC for MODCO/Funds Withheld Reinsurance Ceded Agreements	LR045 Modco or Funds Withheld Reinsurance Ceded - Bonds C-1o Column (4) Line (9999999)						$0
(20)	Increase in RBC for MODCO/Funds Withheld Reinsurance Assumed Agreements	LR046 Modco or Funds Withheld Reinsurance Assumed - Bonds C-1o Column (4) Line (9999999)						$0
(21)	Total Long-Term and Short-Term Bonds (including MODCO/FundsWithheld and Credit for Hedging adjustments.)	Lines (17) - (18) - (19) + (20)	$0			$0		$0
(22)	Non-exempt U.S. Government Agency Bonds	Schedule D Part 1 Section 1 and Section 2, Schedule DA Part 1 and Schedule E Part 2, in part†	$0	X	0.00158		=	$0
(23)	Bonds Subject to Size Factor	Line (21) - Line (1) - Line (9) - Line (22)	$0			$0		$0
(24)	Number of Issuers	Company Records	$0			$0		
(25)	Size Factor for Bonds							2.4
(26)	Bonds Subject to Size Factor after the Size	Line (23) x Line (25)						$0

Formula subjects to change once breakpoints & weights are finalized

	Factor is Applied		
(27)	Total Bonds	Line (22) + Line (26)	$0

† Only investments in-U.S. Government agency bonds previously reported in Lines (2.8) and (10.8), net of those included on Line (19), plus the portion of Line (20) attributable to ceding companies' Lines (2.8) and (10.8) should be included on Line (22). No other bonds should be included on this line. Exempt U.S. Government bonds shown on Lines (1) and (9) should not be included on Line (22). Refer to the bond section of the risk-based capital instructions for more clarification.

CALCULATION OF TAX EFFECT FOR LIFE AND FRATERNAL RISK-BASED CAPITAL

Company Name

Cocode: 00000

CALCULATION OF TAX EFFECT FOR LIFE AND FRATERNAL RISK-BASED CAPITAL

		Source	(1) RBC Amount		Tax Factor		(2) RBC Tax Effect	
	ASSET RISKS							
	Bonds							
(001)	Long-term Bonds – NAIC 1	LR002 Bonds Column (3) Line (2.8) + LR018 Off-Balance Sheet Collateral Column (3) Line (2.8)	$0	X	0.1680	=	$0	
(002)	Long-term Bonds – NAIC 2	LR002 Bonds Column (3) Line (3.4) + LR018 Off-Balance Sheet Collateral Column (3) Line (3.4)	$0	X	0.1680	=	$0	
(003)	Long-term Bonds – NAIC 3	LR002 Bonds Column (3) Line (4.4) + LR018 Off-Balance Sheet Collateral Column (3) Line (4.4)	$0	X	0.1680	=	$0	
(004)	Long-term Bonds – NAIC 4	LR002 Bonds Column (3) Line (5.4) + LR018 Off-Balance Sheet Collateral Column (3) Line (5.4)	$0	X	0.1680	=	$0	
(005)	Long-term Bonds – NAIC 5	LR002 Bonds Column (3) Line (6.4) + LR018 Off-Balance Sheet Collateral Column (3) Line (6.4)	$0	X	0.1680	=	$0	
(006)	Long-term Bonds – NAIC 6	LR002 Bonds Column (3) Line (7) + LR018 Off-Balance Sheet Collateral Column (3) Line (7)	$0	X	0.2100	=	$0	
(007)	Short-term Bonds – NAIC 1	LR002 Bonds Column (3) Line (10.8)	$0	X	0.1680	=	$0	
(008)	Short-term Bonds – NAIC 2	LR002 Bonds Column (3) Line (11.4)	$0	X	0.1680	=	$0	
(009)	Short-term Bonds – NAIC 3	LR002 Bonds Column (3) Line (12.4)	$0	X	0.1680	=	$0	
(010)	Short-term Bonds – NAIC 4	LR002 Bonds Column (3) Line (13.4)	$0	X	0.1680	=	$0	
(011)	Short-term Bonds – NAIC 5	LR002 Bonds Column (3) Line (14.4)	$0	X	0.1680	=	$0	
(012)	Short-term Bonds – NAIC 6	LR002 Bonds Column (3) Line (15)	$0	X	0.2100	=	$0	
(013)	Credit for Hedging - NAIC 1 Through 5 Bonds	LR014 Hedged Asset Bond Schedule Column (13) Line (0199999)	$0	X	0.1680	=	$0	†
(014)	Credit for Hedging - NAIC 6 Bonds	LR014 Hedged Asset Bond Schedule Column (13) Line (0299999)	$0	X	0.2100	=	$0	†
(015)	Bond Reduction - Reinsurance	LR002 Bonds Column (3) Line (19)	$0	X	0.2100	=	$0	†
(016)	Bond Increase - Reinsurance	LR002 Bonds Column (3) Line (20)	$0	X	0.2100	=	$0	
(017)	Non-Exempt NAIC 1 U.S. Government Agency	LR002 Bonds Column (3) Line (22)	$0	X	0.1680	=	$0	
(018)	Bonds Size Factor	LR002 Bonds Column (3) Line (26) - LR002 Bonds Column (3) Line (21)	$0	X	0.1680	=	$0	

Company Name | Cocode: 00000

CALCULATION OF AUTHORIZED CONTROL LEVEL RISK-BASED CAPITAL

		Source	(1) RBC Requirement
	Insurance Affiliates and Misc. Other Amounts (C-0)		
(1)	Directly Owned Health Insurance Companies or Health Entities	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (1)	$0
(2)	Directly Owned Property and Casualty Insurance Affiliates	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (2)	$0
(3)	Directly Owned Life Insurance Affiliates	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (3)	$0
(4)	Indirectly Owned Health Insurance Companies or Health Entities	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (4)	$0
(5)	Indirectly Owned Property and Casualty Insurance Affiliates	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (5)	$0
(6)	Indirectly Owned Life Insurance Affiliates	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (6)	$0
(7)	Affiliated Alien Insurers - Directly Owned	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Lines (9) + (10) + (11)	$0
(8)	Affiliated Alien Insurers - Indirectly Owned	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Lines (12) + (13) + (14)	$0
(9)	Off-Balance Sheet and Other Items	LR017 Off-Balance Sheet and Other Items Column (5) Line (34)	$0
(10)	Total (C-0) - Pre-Tax	Sum of Lines (1) through (9)	$0
(11)	(C-0) Tax Effect	LR030 Calculation of Tax Effect for Life and Fraternal Risk-Based Capital Column (2) Line (122)	$0
(12)	Net (C-0) - Post-Tax	Line (10) - Line (11)	$0
	Asset Risk – Unaffiliated Common Stock and Affiliated Non-Insurance Stock (C-1cs)		
(13)	Schedule D Unaffiliated Common Stock	LR005 Unaffiliated Common Stock Column (5) Line (21) + LR018 Off-Balance Sheet Collateral Column (3) Line (16)	$0
	Schedule BA Unaffiliated Common Stock/ Equity Interests and Affiliated Non-Insurance Stock (C1-cs), excluding		
(14)	Residual Tranches or Interests	LR008 Other Long-Term Assets Column (5) line (49) - (45)	$0
(15)	Total Residual Tranches or Interests	LR008 Other Long-Term Assets Column (5) line (45)	$0
(16)	Common Stock Concentration Factor	LR011 Common Stock Concentration Factor Column (6) Line (6)	$0
(17)	Holding Company in Excess of Indirect Subs	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (7)	$0
(18)	Affiliated Non-Insurers	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Lines (19) + (20) + (21)	$0
(19)	Total (C-1cs) - Pre-Tax	Sum of Lines (13) through (18)	$0
(20)	(C-1cs) Tax Effect	LR030 Calculation of Tax Effect for Life and Fraternal Risk-Based Capital Column (2) Line (134)	$0
(21)	Net (C-1cs) - Post-Tax	Line (19) - Line (20)	$0
	Asset Risk - All Other (C-1o)		
(22)	Bonds after Size Factor	LR002 Bonds Column (3) Line (27) + LR018 Off-Balance Sheet Collateral Column (3) Line (8)	$0
(23)	Mortgages (including past due and unpaid taxes)	LR004 Mortgages Column (6) Line (31)	$0
(24)	Unaffiliated Preferred Stock	LR005 Unaffiliated Preferred and Common Stock Column (5) Line (10) + LR018 Off-Balance Sheet Collateral Column (3) Line (15)	$0
(25)	Investment Affiliates	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (8)	$0
(26)	Investment in Upstream Affiliate (Parent)	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (15)	$0
(27)	Directly Owned Health Insurance Companies or Health Entities Not Subject to RBC	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (16)	$0
(28)	Directly Owned Property and Casualty Insurance Companies Not Subject to RBC	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (17)	$0
(29)	Directly Owned Life Insurance Companies Not Subject to RBC	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (18)	$0
(30)	Publicly Traded Insurance Affiliates	LR042 Summary for Affiliated/Subsidiary Stocks Column (4) Line (22)	$0
(31)	Separate Accounts with Guarantees	LR006 Separate Accounts Column (3) Line (7)	$0
(32)	Synthetic GIC's (C-1o)	LR006 Separate Accounts Column (3) Line (8)	$0
(33)	Surplus in Non-Guaranteed Separate Accounts	LR006 Separate Accounts Column (3) Line (13)	$0
(34)	Real Estate (gross of encumbrances)	LR007 Real Estate Column (3) Line (13)	$0
(35)	Schedule BA Real Estate (gross of encumbrances)	LR007 Real Estate Column (3) Line (25)	$0
(36)	Other Long-Term Assets	LR008 Other Long-Term Assets Column (5) Line (57) + LR018 Off-Balance Sheet Collateral Column (3) Line (17) + Line (18)	$0

January 29, 2026

Mr. Philip Barlow, Chair
Risk-Based Capital Investment Risk and Evaluation (E) Working Group
National Association of Insurance Commissioners
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197

Re: RBC Formula structure changes to accommodate proposed revised factors for CLOs

Submitted Electronically

Dear Chair Barlow:

The American Council of Life Insurers (ACLI) appreciates the opportunity to comment on the exposed item from the Risk-Based Capital Investment Risk and Evaluation (E) Working Group (RBC IRE WG) on more granular reporting of Collateralized Loan Obligations (CLO) on the LR002 – Bonds page of the Life and Fraternal RBC Blank and related Instructions.

In order to support the changes to the Life RBC Blank, the Blanks (E) Working Group (BWG) exposed item #2025-27BWG concurrently to modify the Asset Valuation Reserve (AVR) pages. The BWG exposure highlights that all CLOs (as reported in Schedule D–Part 1–Section 2 – Asset-Backed Securities) would be included in the data being fed to the Life RBC Blank. Based on that assumption, ACLI is interpreting that any changes in the factors for the CLOs would apply to all types of CLOs (e.g., BSL, MML), CBOs and CDOs.

As stated in the RBC IRE WG exposure to modify the LR002 – Bonds page, the proposed changes to the 'Annual Statement Source' are contingent on the adoption of the related BWG proposal. After reviewing both exposures, the 'Line Number' column was changed for all sections in the AVR pages. ACLI suggests revising all lines in the Life RBC Blank that are sourced from the AVR pages upon adoption of the exposed BWG proposal.

We welcome the opportunity to discuss our comments further and to support RBC IRE WG's continued work in this area.

Sincerely,

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