C1SC Update on CLO C-1 Factors Modeling

September 8, 2025

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Chairperson, Academy C-1 Subcommittee

American Academy of Actuaries

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Introduction

- The C1 Subcommittee & the NAIC's Structured Securities Group (SSG) have collaborated to build a working model for CLO C-1.
- CUSIP-level *hypothetical* C-1 factors are shown, but these are only generated as an intermediate step—the ultimate goal is to produce factors based on comparable attributes, not to model each individual CLO on an ongoing basis.
- These early results are broadly consistent with work done by SSG in the CLO Ad Hoc group, showing low risk for senior tranches but potential cliff risk for junior tranches.
- Key modeling decisions are still under review, and we are showing six deals—results are likely to evolve as the model is refined and applied to the broader universe of CLOs owned by life insurers.

Methodology Summary

- Objective: define several risk buckets for CLOs according to comparable attributes and then assign a C-1 factor to each bucket.
- CLO collateral credit modeling is largely consistent with C-1 corporate bond modeling.
- Projection of CLO cash flows is largely consistent with SSG modeling in the CLO Ad Hoc group, with the primary exception being the CLO collateral credit modeling.
- Conversion of CLO cash flows into C-1 factors is consistent with C-1 corporate bond methodology where possible, with additional modeling to address the fact that missed payments on CLOs do not necessarily trigger defaults.

Summary of Results* for 6 Sample CLOs

After-Tax C-1 / Tranche Rating	Average	Minimum	Maximum
AAA	0.00%	0.00%	0.00%
AA	0.00%	0.00%	0.00%
A	0.12%	0.00%	0.26%
BBB-	2.09%	0.47%	3.50%
BB-	25.93%	14.61%	35.17%

*Results are preliminary and subject to change. This presentation discusses modeling choices that are being reviewed. This is only 6 deals—results may change when all CLOs held by life insurers are included.

Anticipated Project Timeline

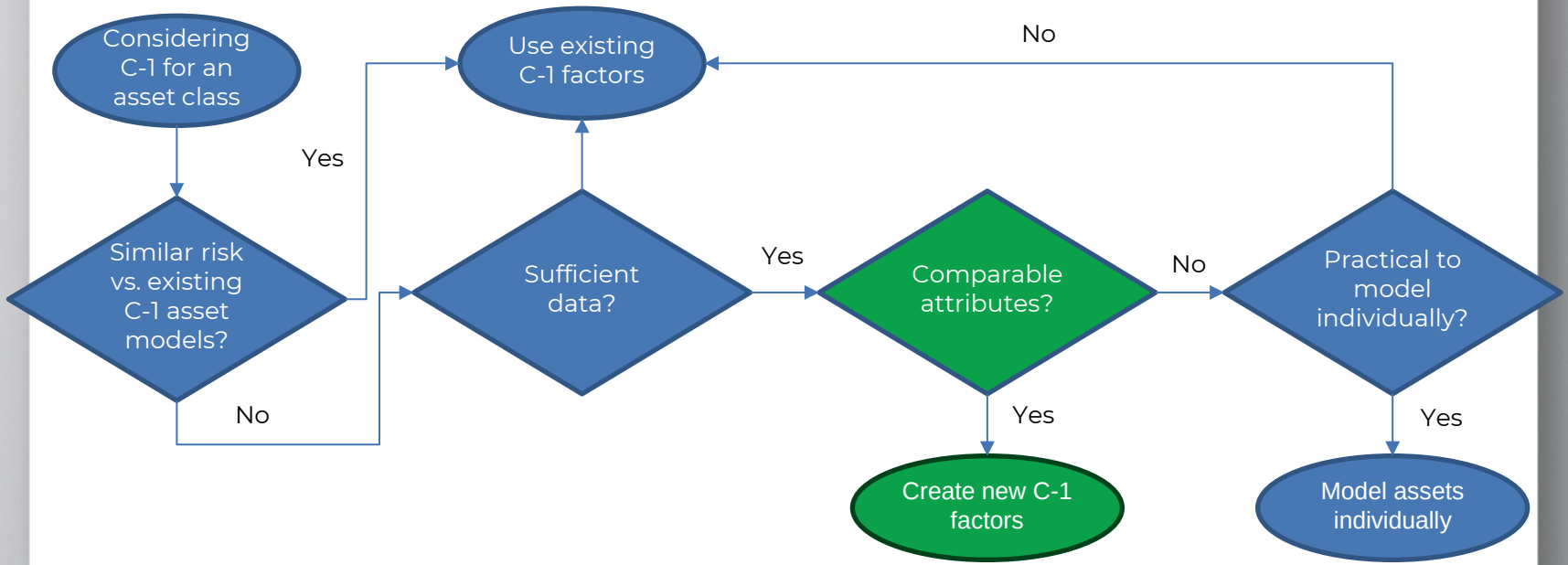
- Sept. 8, 2025—initial presentation of model
- Late 2025/Early 2026—presentation of portfolio adjustment factor, model refinements, identification of potential comparable attributes, and resulting factors
- Q1 2026—incorporation of modifications requested by regulators, if any
  - Expectation is that any structural RBC changes required would be known at the time that comparable attributes are identified (Late 2025/Early 2026)
- Q2 2026—If significant changes are not requested by regulators, expectation is for final factors to be available for exposure by April 30, 2026

Acknowledgments

- ACLI—use of C-1 corporate bond model developed by Moody's for ACLI
- Moody’s—access to CLO deal data, collateral data, historical default rate data, and CDOnet
- S&P—historical recovery data and frequent discussions with structured finance analytical professionals
- Bridgeway Analytics—frequent discussions on credit modeling, structured finance, and help in understanding the ACLI & Moody's corporate bond model
- SSG—modeling advice and running CDOnet
- NAIC accounting staff—guidance on CLO statutory accounting

Overview of Modeling Framework

C-1 Modeling Framework Flowchart



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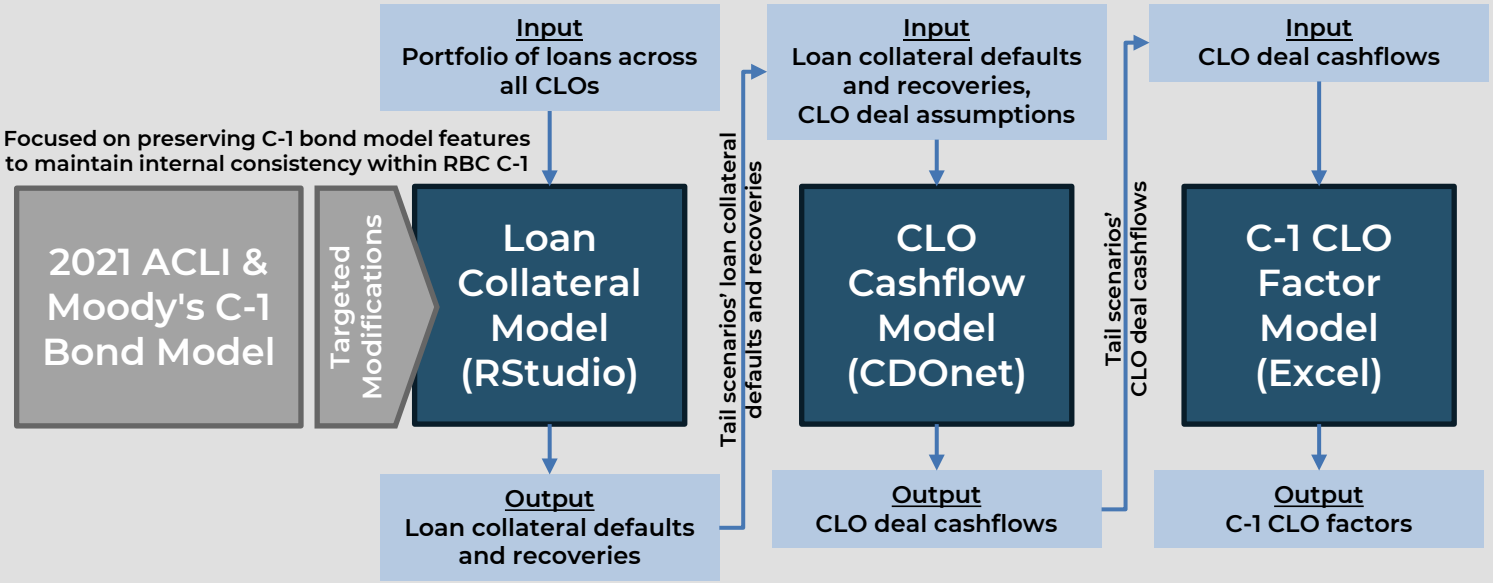
Overview of C-1 CLO Factors Approach

Create new C-1 factors



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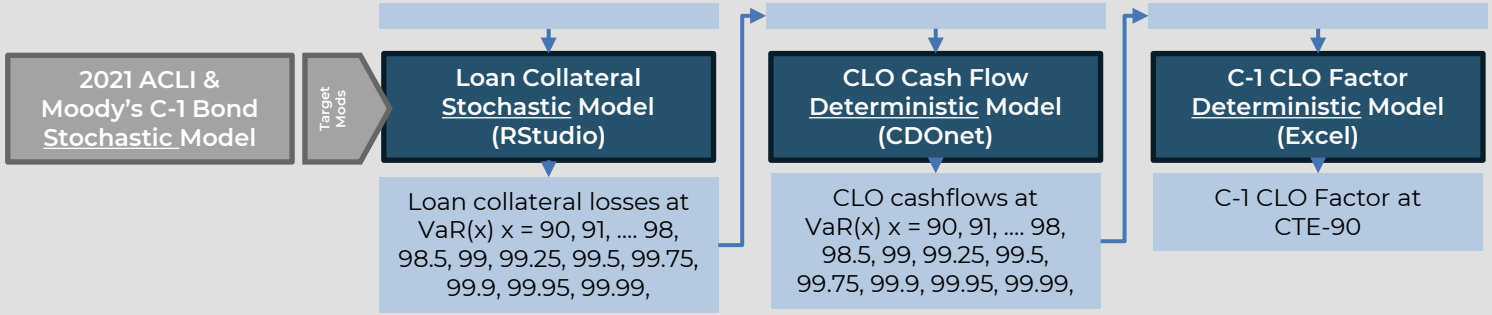
CTE-90 Tail Metric for C-1 CLO Factors

Create new C-1 factors



The CLO cash flow and the C-1 CLO Factor Models use deterministic inputs; CTE is estimated from VaR metrics selected using a scenario compression method to manage computational time

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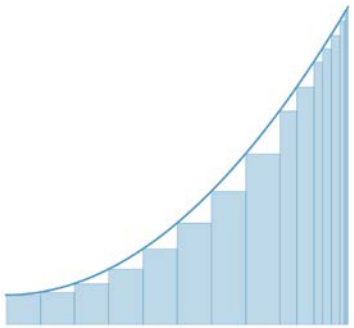
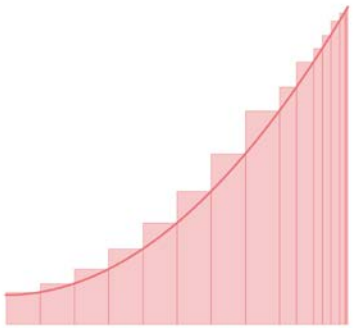
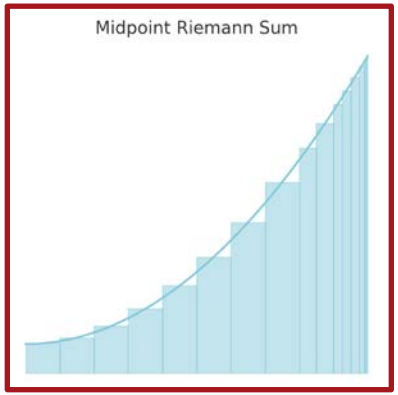
Scenario Compression for CTE-90 Estimation

- Breaks percentiles into 16 buckets
- Percentiles get closer together at the right tail as the RBC charges increase more steeply







Approach used

	Weights		
Percentile	Left	Right	Midpoint
99.99	0.5%		0.3%
99.95	0.5%	0.5%	0.5%
99.90	1.5%	0.5%	1.0%
99.75	2.5%	1.5%	2.0%
99.50	2.5%	2.5%	2.5%
99.25	2.5%	2.5%	2.5%
99.00	5.0%	5.0%	3.8%
98.50	5.0%	5.0%	5.0%
98.00	10.0%	10.0%	7.5%
97.00	10.0%	10.0%	10.0%
96.00	10.0%	10.0%	10.0%
95.00	10.0%	10.0%	10.0%
94.00	10.0%	10.0%	10.0%
93.00	10.0%	10.0%	10.0%
92.00	10.0%	10.0%	10.0%
91.00	10.0%	10.0%	10.0%
90.00		10.0%	5.0%

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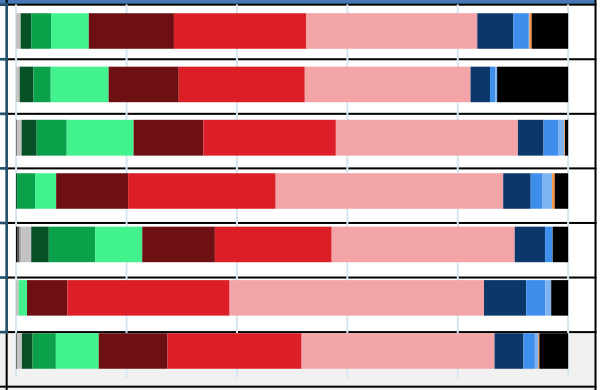
Scope of Sample CLO Deals

As of 9/30/24	Balance ($mn)	Loans (#)	Unique Issuers (#)	Issuer* Rating Distribution
867331201	496.9	474	381	
867578342	598.6	499	435	
867567170	436.8	307	268	
830960738	684.3	365	329	
830871594	424.7	348	295	
867931338	389.6	171	153	
Sample Deals	3,030.9	1,660	933	
Total Moody's CLO Universe	**744,181.3**	**27,802**	**2,021**	

*Issuer rating shown. When comparing issuer and loan rating, S&P ratings are the same for 98% of the balance. Moody's ratings are the same for 57% and within 1 notch for 94% of the loan balance.

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Loan Collateral Model (RStudio)

Targeted Modifications—Loan Collateral Model Parameters

Model Parameter	ACLI & Moody's C-1 Bond Model	Loan Collateral Model
Simulations	10,000	Kept the same
Projection Years	10 years	Kept the same
Time Step	Annual	Monthly
Target Risk Metric	VaR(96), selected based on the greatest PV of losses in excess of accumulated risk premium	VaR(x) where x =90, 91, ... 98, 98.5, 99, 99.25, 99.5, 99.75, 99.9, 99.95, 99.99, selected based on the PV of losses*
Discounting	Discount Rate = 3.47% (pre-tax) 2.74% (post-tax)	Kept the same pre-tax*
Output	C1 bond factors = PV of losses in excess of risk premium / Amount exposed	Undiscounted defaults and recoveries by deal and by credit rating

*Discounting only used to identify the scenario at the Target Risk Metric.

Targeted Modifications—Loan Collateral Model Assumptions

Model Assumption	ACLI & Moody's C1 Bond Model	Loan Collateral Model
Default Rates	Empirical distribution by issuer rating based on Moody's data	Kept the same
Recovery Rates	Empirical distribution by economic state based on Moody's data for senior unsecured bonds	Empirical distribution by payment priority (sr. unsecured, sr. secured, 2nd lien) based on S&P data
Economic State Transition Matrix	Based on original Academy's work	Not used
% Variance Explained by Systematic Error	10%	Kept the same, results in implicit diversification benefit
Tax Adjustment	Tax Rate = 21% Recovery Rate = 80%	Not used*
Reinvestment	Surplus used to purchase identical bond after default	Modeled to align with reinvestments in CLO cash flow Model (CDOnet)

*Tax Adjustment used in a downstream step of the overall CLO model process

Reinvestments in Loan Collateral Model

Reinvestment modeling
is a key methodological choice that impacts credit losses

- Credit losses may occur from existing loans or from future reinvestments.
- The tail scenarios are selected in the loan collateral model (RStudio), before modeling the CLO cash flows.
- To maximize alignment between collateral modeling and CLO cash flow modeling, loan collateral losses are modeled consistent with CDOnet assumptions:
    a) Only maturities and recoveries from default are reinvested (i.e., no prepayments)
    b) Reinvestment distributions are
        30% B1 | 30% B2 | 40% B3
        92.5% Sr. Secured | 7.5% Sr. Unsecured

Reinvestment Methodologies Considered

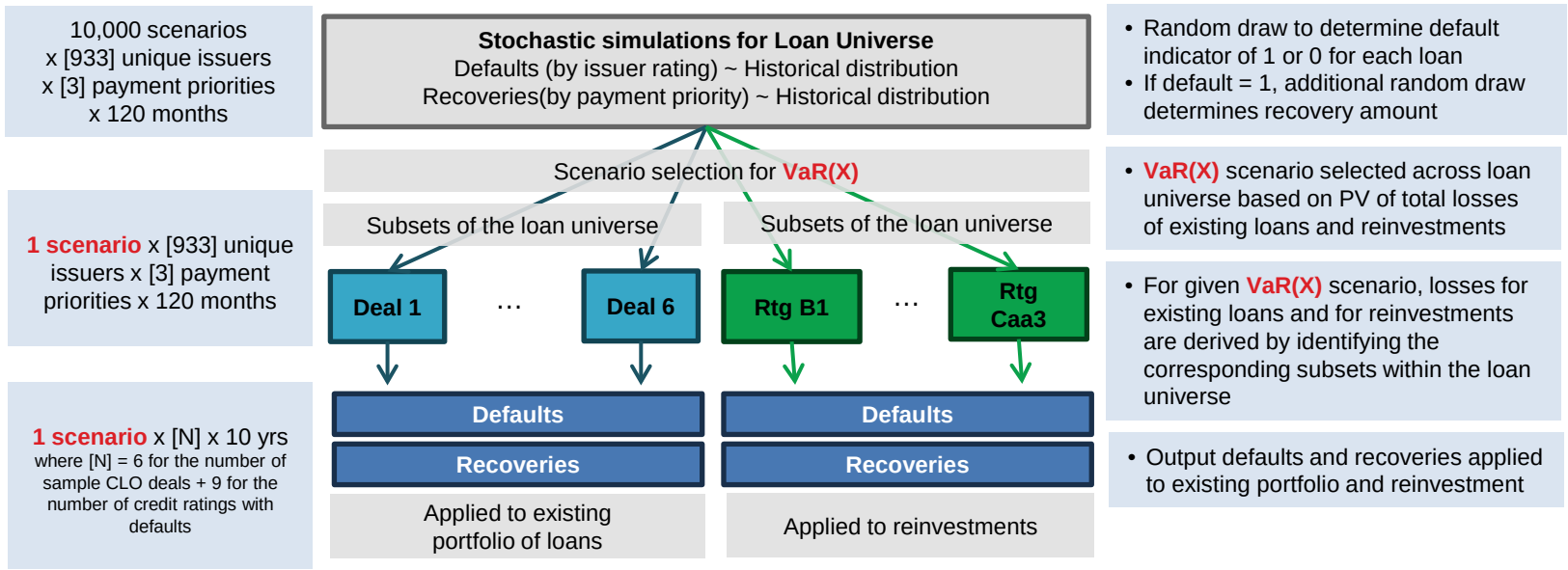
Approach used

	Reinvestment Amount at t	Loss from Reinvestment	Modeled Loan Universe	Pros	Cons
1	Deterministic	Deterministic empirical distribution	[933 x 3] existing loans at t=0	• Simple	• Understates tail risk, loss curve is an average scenario, not Xth percentile • The systematic error is not captured in the reinvestments
2	Based on stochastic scenario	Deterministic average of stochastic simulations, staggered to start at time t	[933 x 3] existing loans at t=0	• Simple	• Overestimates tail risk by compounding of Xth percentile on top of Xth percentile • Misalignment of systematic error, which should follow time from projection t • Exacerbates misalignment in VaR(X) for deal A vs. VaR(X) for deal B
3	Based on stochastic scenario	Stochastic simulation	[933 x 3] existing loans at t=0 + [933 x 3 x 120] hypothetical loans for t=0 through 120	• Most mathematically accurate	• Most computationally expensive • Creates an open-ended universe of loans and issuers, which may introduce unwarranted diversification benefits

Reinvestment Methodologies Considered

	Reinvestment Amount at t	Loss from Reinvestment	Modeled Loan Universe	Pros	Cons
4	Based on stochastic scenario	Deterministic, average of stochastic simulations, aligned by projection year, based on original credit rating at t=0	[933 x 3] existing loans at t=0	• Computationally feasible • Alignment of systematic error • Closed-ended universe of loans and issuers	• Does not account for credit migration that happens between t=0 and reinvestment time t • Reinvestments limited to existing pool of loans and issuers that have not defaulted at time t
5	Based on stochastic scenario	Deterministic, average of stochastic simulations, aligned by projection year, based on simulated credit rating at t=t	[933 x 3] existing loans at t=0, each with a simulated credit rating at each time step t	• Same as approach 4 • Addresses credit migration limitation in approach 4	• Introduces model risk by modeling credit migration from complexity and reliance of credit migration data • Same as above, reinvestments limited to existing pool of loans and issuers that have not defaulted at time t

Step-by-Step Description of Loan Collateral Model



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CLO Cashflow Model Assumptions & Parameters

Model Assumption/Parameter	SSG Approach in CLO Ad Hoc Group	Academy Approach
Collateral Prepayment	No prepay, consistent with rating agencies	Kept the same
Collateral Reinvestment Price	At par, consistent with rating agencies	Kept the same
Reinvestment Timing & Quality	Reinvestments are made into existing collateral pool specific to each deal	Reinvestments made into newly issued loans, quality not deal-specific
Recovery Lag	6 months	Immediate recovery, consistent with S&P recovery data
Default Vectors	10 default & recovery scenarios, weighted to minimize difference between CLO C-1 and collateral C-1 across deals	17 tail scenarios drawn from loan collateral model (10,000 total scenarios) to inform an estimation of CTE-90; CLO/collateral C-1 equivalence not enforced
All Other CDOnet Parameters	Various less impactful modeling choices that need to be made	Kept the same

C-1 CLO Factor Model (Excel)

Converting CLO Cash Flows Into C-1 Factors

Objectives	Approach	
	Consistency with C-1 Bond Factors	Prioritizing Estimation of Portfolio Tail Events
• Consistency with C-1 bond factors approach except for risk measure (CTE-90 vs. VaR-96) • Prioritize estimating risk consistent with a portfolio tail event instead of estimating each security's specific tail risk	• 10-year projection • Risk premium by CLO tranche rating equal to C-1 bond factor risk premium • Statutory losses (simplified SSAP 43 impairment modeling used for CLOs) • Greatest present value of accumulated deficiency (GPVAD) • Difference: tax loss occurs at the earlier of a full impairment or a tranche defaulting at maturity (in bond model, tax loss always occurs at time of default)	• Rank order of scenarios determined based on PV of losses on the combined collateral pool instead of being reordered for each CLO or each CLO tranche • Leads to greater dispersion of modeled C-1 factors across CLOs, but averages across deals will represent risk of a diversified CLO portfolio • Updates to Portfolio Adjustment factor for CLOs will be considered in next steps

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Simplified SSAP 43 Impairment Modeling—Details

- Per previously identified principles, capital is downstream from accounting
- C-1 corporate bond model assumes statutory losses occur only upon default
- For most CLOs, default only occurs at maturity when the final payment cannot be made
- However, in many cases it is clear years before that a default will occur—in this case, a statutory loss may result from an impairment prior to default
- This model's simplistic approach is to check for an impairment any time an interest payment is missed (in other words, any time the CLO PIKs)
- At that time, the model assumes the insurer has full knowledge of future cash flows and performs a perfectly accurate impairment analysis (in the tail scenarios that drive C-1 results, this effectively pulls statutory losses forward in time in the model)
- If a security's book yield is significantly higher than the C-1 discount rate and the C-1 risk premium is low, this approach could underestimate C-1. If book yield is low relative to risk premium, this approach could overestimate C-1
- This is all a practical expedient—the Academy has been unable to identify a more realistic way of conducting an "inner loop" impairment analysis, and we estimate the effect of this simplification to be minor

Selected Model Decisions to be Reconsidered

Model Assumption/Parameter	Potential Change	Potential Impact
% Variance Explained by Systematic Error	May reduce from 10% to reflect below-IG nature of collateral (e.g., 5%)	Reduce C-1 factors
Collateral Reinvestment Price & Prepay	Allow for prepayment and reinvestment at less than par	Reduce C-1 factors
Projection Horizon	Adjust results for tranches that pay off in less than 10 years (senior tranches)	Reduce the difference between C-1 factors for senior and junior tranches (less slope)
Statistical Safety Level	Showing results for CTE-90, but the level is for regulators to decide	Depends on direction of change, if any
Relationship between default rates and severities	Change correlation between defaults and severities from zero to positive	Increase C-1 factors
Reinvestments—General Approach	Detailed earlier in the presentation	Reduce C-1 factors (for most alternatives considered)
Reinvestments—Aligning with Reinvestment Period	Stop reinvesting recovered principal after 2-3 years when generating default vector	Increase C-1 factors (by better aligning rank order of collateral scenarios with CLO losses, per below)
Rank Order of Collateral Scenarios	Identify patterns of default timing that result in greater CLO losses	Increase C-1 factors
Risk Premium	Derive risk premia from CLO loss distribution instead of from bond factors	Increase C-1 factors (if based on VaR or standard deviation)

Questions

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Appendix A
Loan Collateral Model

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Moody's C1 Bond Model Summary

Inputs	Calculations	
	Stochastic Simulations	C1 Bond Factors
• Default rates by rating and tenor, from Moody's historical study 1983-2020 • Recovery rates by economic state, from Moody's historical study 1987-2020 • Economic states transition matrices with starting state of contraction	For simulation *i*, year *t*: • 1 of 4 discrete economic states sampled from Markov-Chains • Default indicator sampled from a distribution by issuer rating and tenor, with a Gaussian Copula function where 90% of the variance is idiosyncratic and 10% is systematic • Loss rate = 1 – recovery rate, sampled from a discrete distribution by economic state	• C1 bond factor = VaR(96) PV of simulated C1 losses • PV of simulated C1 losses = NPV of simulated C1 losses over 10 yrs discounted at a flat 2.74% post-tax rate • Simulated C1 loss for year *t* = simulated post-tax loss – risk premium where risk premium = expected loss + 0.5*std dev by issuer rating, representing losses covered in reserves Losses expressed as a % of t=0 book value

Moody's C1 Bond Model Validation

	C1 Bond Model Rerun												Original C1
	Seed 1	**Seed 2**	**Seed 3**	**Seed 4**	**Seed 5**	**Seed 6**	**Seed 7**	**Seed 8**	**Seed 9**	**Seed 10**	**Avg**	**Std Dev**	**Model Output**
Aaa	**0.158%**	0.163%	0.149%	0.148%	0.152%	0.170%	0.159%	0.158%	0.158%	0.152%	0.157%	0.007%	**0.158%**
Aa1	**0.271%**	0.274%	0.271%	0.256%	0.271%	0.280%	0.261%	0.272%	0.269%	0.266%	0.269%	0.007%	**0.271%**
Aa2	**0.419%**	0.439%	0.435%	0.431%	0.440%	0.440%	0.425%	0.434%	0.429%	0.430%	0.432%	0.007%	**0.419%**
Aa3	**0.545%**	0.539%	0.520%	0.521%	0.530%	0.537%	0.531%	0.537%	0.516%	0.540%	0.532%	0.010%	**0.523%**
A1	**0.683%**	0.670%	0.659%	0.669%	0.675%	0.643%	0.649%	0.677%	0.651%	0.649%	0.663%	0.014%	**0.657%**
A2	**0.800%**	0.824%	0.815%	0.833%	0.806%	0.815%	0.816%	0.823%	0.807%	0.818%	0.816%	0.010%	**0.816%**
A3	**1.023%**	1.007%	0.999%	0.997%	1.004%	1.005%	1.026%	1.012%	0.993%	0.997%	1.006%	0.011%	**1.016%**
Baa1	**1.226%**	1.242%	1.241%	1.237%	1.222%	1.217%	1.235%	1.220%	1.213%	1.201%	1.225%	0.014%	**1.261%**
Baa2	**1.553%**	1.527%	1.512%	1.556%	1.558%	1.529%	1.544%	1.540%	1.549%	1.580%	1.545%	0.019%	**1.523%**
Baa3	**2.186%**	2.183%	2.172%	2.174%	2.173%	2.136%	2.168%	2.112%	2.182%	2.209%	2.170%	0.027%	**2.168%**
Ba1	**3.168%**	3.181%	3.187%	3.154%	3.143%	3.136%	3.206%	3.143%	3.177%	3.179%	3.167%	0.023%	**3.151%**
Ba2	**4.619%**	4.651%	4.614%	4.630%	4.562%	4.741%	4.613%	4.571%	4.640%	4.652%	4.629%	0.050%	**4.537%**
Ba3	**5.680%**	5.874%	5.864%	5.862%	5.853%	5.871%	5.799%	5.868%	5.853%	5.882%	5.841%	0.061%	**6.017%**
B1	**7.268%**	7.352%	7.453%	7.389%	7.337%	7.400%	7.409%	7.373%	7.380%	7.275%	7.364%	0.058%	**7.386%**
B2	**9.290%**	9.497%	9.688%	9.361%	9.198%	9.543%	9.512%	9.221%	9.365%	9.274%	9.395%	0.159%	**9.535%**
B3	**12.307%**	12.509%	12.290%	12.612%	12.471%	12.423%	12.358%	12.372%	12.315%	12.606%	12.426%	0.120%	**12.428%**
Caa1	**16.360%**	16.804%	16.562%	16.771%	17.181%	16.815%	16.855%	16.785%	16.647%	16.707%	16.749%	0.212%	**16.933%**
Caa2	**23.458%**	23.451%	23.822%	23.355%	23.535%	23.333%	23.648%	23.524%	23.838%	23.404%	23.537%	0.180%	**23.798%**
Caa3	**32.762%**	32.490%	32.605%	33.417%	33.069%	33.056%	32.883%	33.030%	33.289%	32.927%	32.953%	0.286%	**32.975%**

Moody's C1 Bond Model Validation

	C1 Bond Model Rerun – Original C1 Model Output											Original C1
	Seed 1	**Seed 2**	**Seed 3**	**Seed 4**	**Seed 5**	**Seed 6**	**Seed 7**	**Seed 8**	**Seed 9**	**Seed 10**	**Avg**	**Model Output**
Aaa	**0.000%**	0.005%	-0.009%	-0.010%	-0.006%	0.012%	0.001%	0.000%	0.000%	-0.006%	-0.001%	**0.158%**
Aa1	**0.000%**	0.003%	0.000%	-0.015%	0.000%	0.009%	-0.010%	0.001%	-0.002%	-0.005%	-0.002%	**0.271%**
Aa2	**0.000%**	0.020%	0.016%	0.012%	0.021%	0.021%	0.006%	0.015%	0.010%	0.011%	0.013%	**0.419%**
Aa3	**0.022%**	0.016%	-0.003%	-0.002%	0.007%	0.014%	0.008%	0.014%	-0.007%	0.017%	0.009%	**0.523%**
A1	**0.026%**	0.013%	0.002%	0.012%	0.018%	-0.014%	-0.008%	0.020%	-0.006%	-0.008%	0.006%	**0.657%**
A2	**-0.016%**	0.008%	-0.001%	0.017%	-0.010%	-0.001%	0.000%	0.007%	-0.009%	0.002%	0.000%	**0.816%**
A3	**0.007%**	-0.009%	-0.017%	-0.019%	-0.012%	-0.011%	0.010%	-0.004%	-0.023%	-0.019%	-0.010%	**1.016%**
Baa1	**-0.035%**	-0.019%	-0.020%	-0.024%	-0.039%	-0.044%	-0.026%	-0.041%	-0.048%	-0.060%	-0.036%	**1.261%**
Baa2	**0.030%**	0.004%	-0.011%	0.033%	0.035%	0.006%	0.021%	0.017%	0.026%	0.057%	0.022%	**1.523%**
Baa3	**0.018%**	0.015%	0.004%	0.006%	0.005%	-0.032%	0.000%	-0.056%	0.014%	0.041%	0.002%	**2.168%**
Ba1	**0.017%**	0.030%	0.036%	0.003%	-0.008%	-0.015%	0.055%	-0.008%	0.026%	0.028%	0.016%	**3.151%**
Ba2	**0.082%**	0.114%	0.077%	0.093%	0.025%	0.204%	0.076%	0.034%	0.103%	0.115%	0.092%	**4.537%**
Ba3	**-0.337%**	-0.143%	-0.153%	-0.155%	-0.164%	-0.146%	-0.218%	-0.149%	-0.164%	-0.135%	-0.176%	**6.017%**
B1	**-0.118%**	-0.034%	0.067%	0.003%	-0.049%	0.014%	0.023%	-0.013%	-0.006%	-0.111%	-0.022%	**7.386%**
B2	**-0.245%**	-0.038%	0.153%	-0.174%	-0.337%	0.008%	-0.023%	-0.314%	-0.170%	-0.261%	-0.140%	**9.535%**
B3	**-0.121%**	0.081%	-0.138%	0.184%	0.043%	-0.005%	-0.070%	-0.056%	-0.113%	0.178%	-0.002%	**12.428%**
Caa1	**-0.582%**	-0.138%	-0.380%	-0.171%	0.239%	-0.127%	-0.087%	-0.157%	-0.295%	-0.235%	-0.193%	**16.933%**
Caa2	**-0.340%**	-0.347%	0.024%	-0.443%	-0.263%	-0.465%	-0.150%	-0.274%	0.040%	-0.394%	-0.261%	**23.798%**
Caa3	**-0.213%**	-0.485%	-0.370%	0.442%	0.094%	0.081%	-0.092%	0.055%	0.314%	-0.048%	-0.022%	**32.975%**

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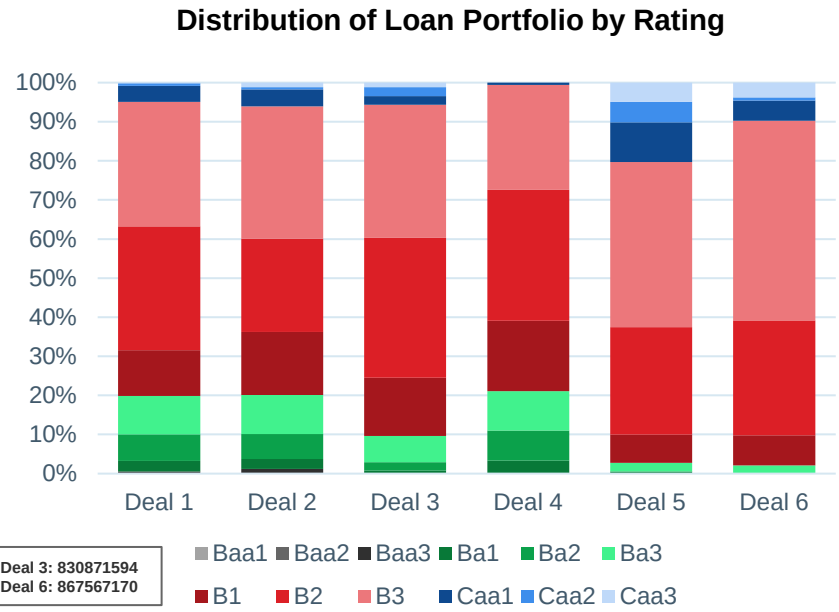
Potential Model Simplification—Average by Rating

We explored a model simplification:

simplified portfolio losses = weighted avg of losses by rating

where losses by rating are generated by pooling loans across all 6 CLO deals by rating



Potential Model Simplification—Average by Rating

Comparison Explicit Model vs. Model Simplification

Difference in First Year Aggregate Losses % of Principal

Pct	Deal 1	Deal 2	Deal 3	Deal 4	Deal 5	Deal 6
25%	-0.01%	-0.10%	-0.07%	0.04%	-0.16%	0.00%
50%	-0.04%	-0.07%	-0.04%	-0.04%	-0.15%	-0.03%
75%	-0.07%	0.02%	0.03%	-0.07%	-0.06%	0.02%
90%	-0.13%	0.11%	0.11%	-0.10%	0.01%	-0.08%
96%	-0.13%	0.27%	0.11%	0.00%	0.14%	0.03%
99%	0.03%	0.70%	0.37%	0.10%	0.43%	-0.22%

The model simplification overestimates tail losses in most cases

Deal 1: 830960738 Deal 2: 867578342 Deal 3: 830871594
Deal 4: 867331201 Deal 5: 867931338 Deal 6: 867567170

Explicit Model of Full Loan Portfolio

First Year Aggregate Losses % of Principal

Pct	Deal 1	Deal 2	Deal 3	Deal 4	Deal 5	Deal 6
25th	0.88%	1.07%	1.12%	0.65%	1.99%	1.55%
50th	1.67%	1.85%	2.01%	1.36%	3.43%	2.76%
75th	2.86%	3.00%	3.28%	2.40%	5.31%	4.32%
90th	4.38%	4.43%	4.82%	3.72%	7.50%	6.31%
96th	5.86%	5.77%	6.36%	4.95%	9.44%	7.98%
99th	7.98%	7.70%	8.49%	6.94%	12.17%	10.91%

Model Simplification Weighted Avg by Rating

First Year Aggregate Losses % of Principal

Pct	Deal 1	Deal 2	Deal 3	Deal 4	Deal 5	Deal 6
25th	0.86%	0.96%	1.06%	0.68%	1.82%	1.55%
50th	1.63%	1.79%	1.97%	1.32%	3.29%	2.73%
75th	2.79%	3.02%	3.31%	2.33%	5.24%	4.33%
90th	4.26%	4.54%	4.92%	3.62%	7.50%	6.23%
96th	5.72%	6.04%	6.48%	4.95%	9.58%	8.01%
99th	8.01%	8.40%	8.86%	7.04%	12.60%	10.69%

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Potential Model Simplification—Average by Rating

Comparison Explicit Model vs. Model Simplification

Difference in 10-Year Aggregate Losses % of Principal

Pct	Deal 1	Deal 2	Deal 3	Deal 4	Deal 5	Deal 6
25%	-0.10%	-0.39%	-0.15%	-0.09%	-0.05%	0.21%
50%	-0.04%	-0.08%	-0.03%	-0.01%	-0.04%	0.07%
75%	0.18%	0.27%	0.16%	0.07%	-0.02%	0.06%
90%	0.35%	0.76%	0.30%	0.10%	0.08%	-0.04%
96%	0.47%	1.07%	0.40%	0.14%	0.14%	-0.15%
99%	0.69%	1.41%	0.42%	-0.10%	-0.10%	-0.46%

The model simplification overestimates tail losses in most cases

Deal 1: 830960738 Deal 2: 867578342 Deal 3: 830871594
Deal 4: 867331201 Deal 5: 867931338 Deal 6: 867567170

Explicit Model of Full Loan Portfolio

10-Year Aggregate Losses % of Principal

Pct	Deal 1	Deal 2	Deal 3	Deal 4	Deal 5	Deal 6
25th	15.76%	16.13%	17.12%	14.74%	20.14%	19.11%
50th	18.41%	18.55%	19.80%	17.30%	23.32%	22.16%
75th	21.17%	21.23%	22.63%	20.10%	26.70%	25.28%
90th	23.87%	23.67%	25.31%	22.83%	29.72%	28.22%
96th	26.02%	25.71%	27.44%	25.01%	32.10%	30.55%
99th	28.56%	28.22%	30.09%	27.96%	35.16%	33.46%

Model Simplification Weighted Avg by Rating

10-Year Aggregate Losses % of Principal

Pct	Deal 1	Deal 2	Deal 3	Deal 4	Deal 5	Deal 6
25th	15.66%	15.74%	16.97%	14.65%	20.09%	19.32%
50th	18.38%	18.47%	19.77%	17.29%	23.28%	22.23%
75th	21.35%	21.50%	22.79%	20.17%	26.68%	25.34%
90th	24.22%	24.43%	25.61%	22.93%	29.80%	28.18%
96th	26.50%	26.78%	27.84%	25.15%	32.23%	30.40%
99th	29.26%	29.63%	30.51%	27.86%	35.07%	33.00%

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Appendix B
CLO Cash Flow Model

Further Details on CLO Cashflow Modeling in CDOnet

Except where otherwise noted in this presentation, CDOnet parameters and assumptions are set according to the methodology described on the SSG CLO webpage:

https://content.naic.org/industry/structured-securities/collateralized-loan-obligations

Appendix C
Detailed Results for 6 Sample CLOs

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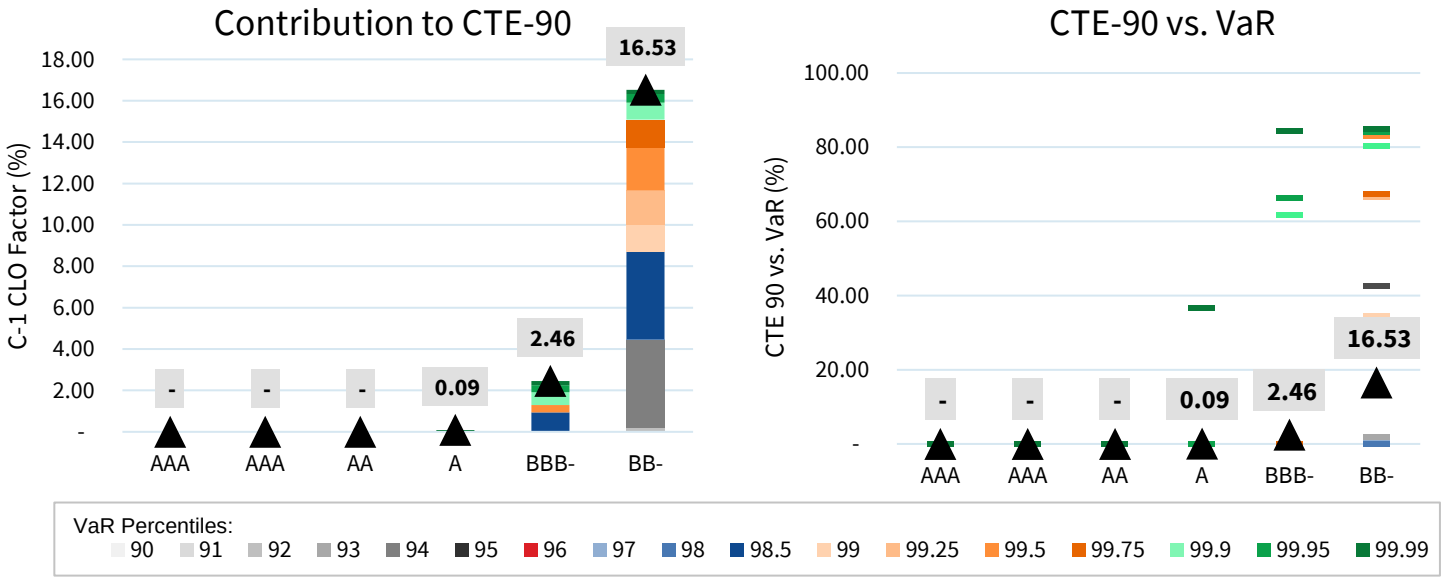
Hypothetical Results for Strata II, Deal ID#867931338



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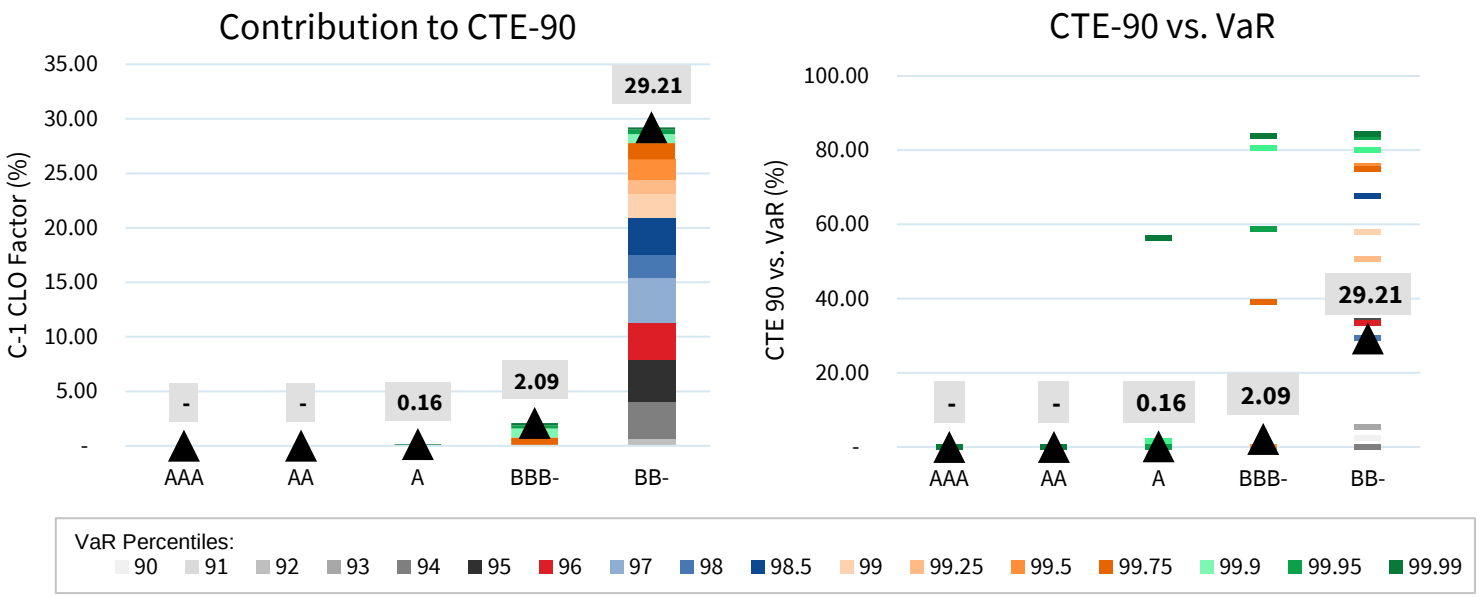
Hypothetical Results for Magnetite 27, Deal ID#867331201



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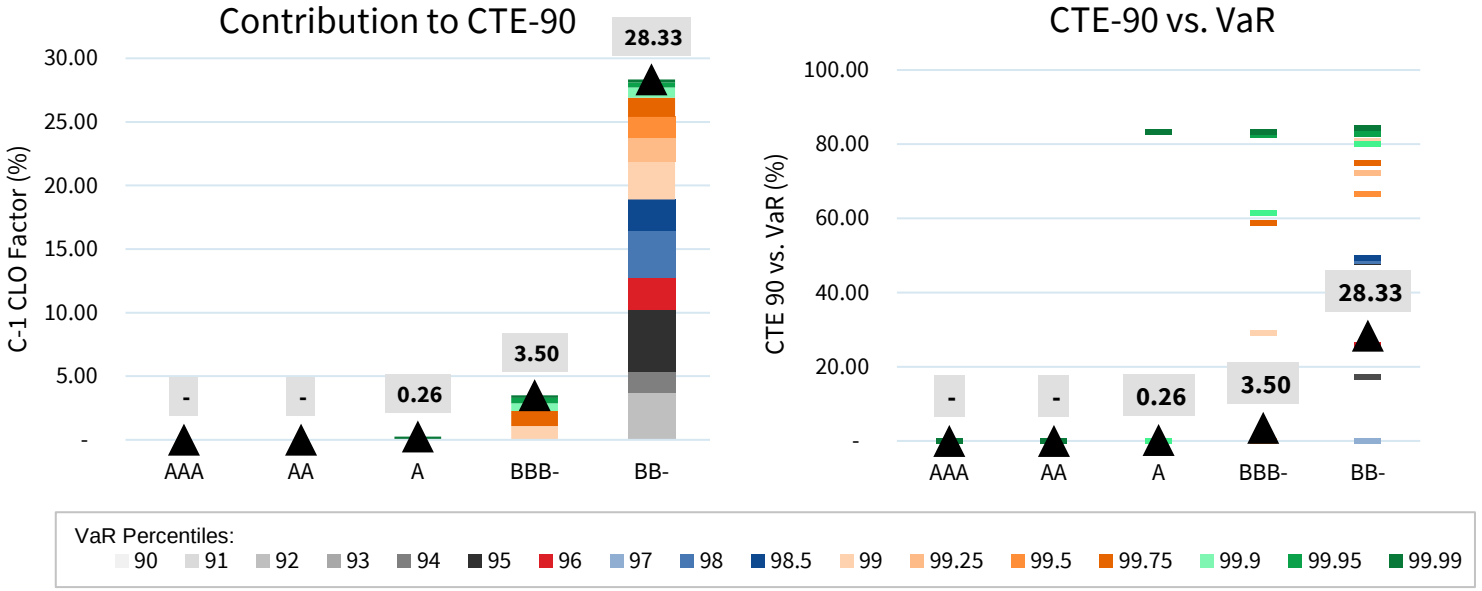
Hypothetical Results for OHA 3, Deal #830960738



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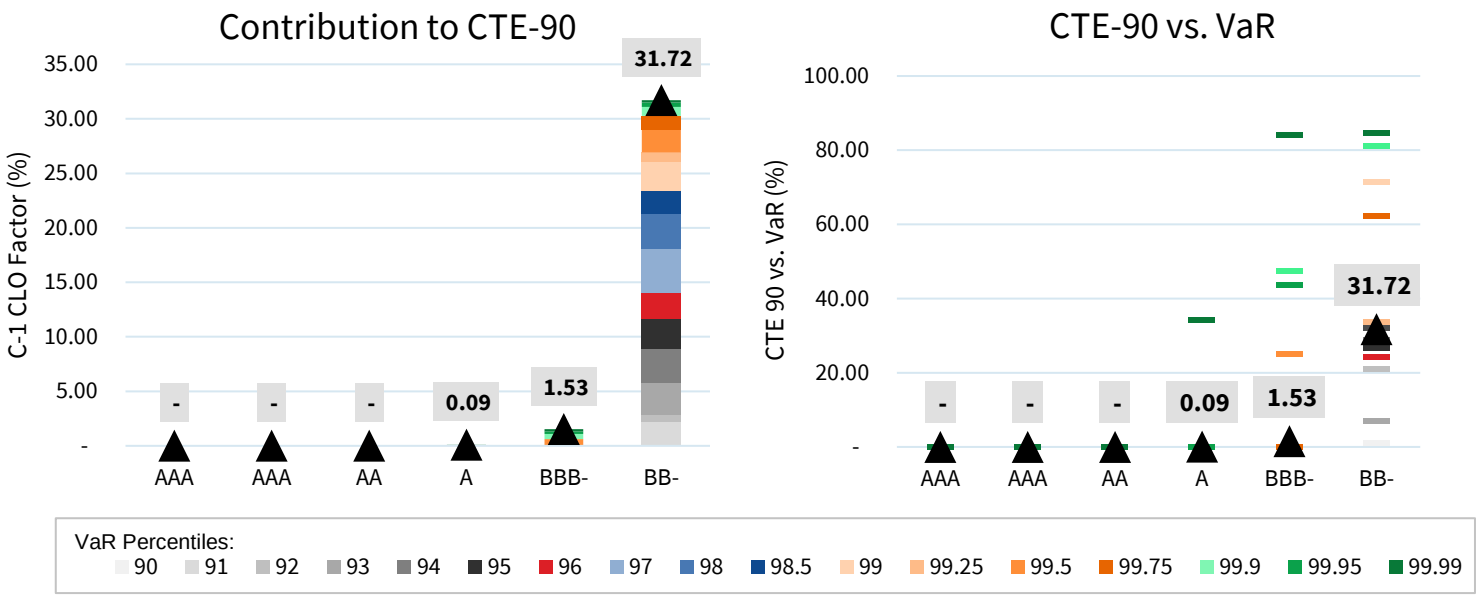
Hypothetical Results for Anchorage 17, Deal ID #867567170[38]



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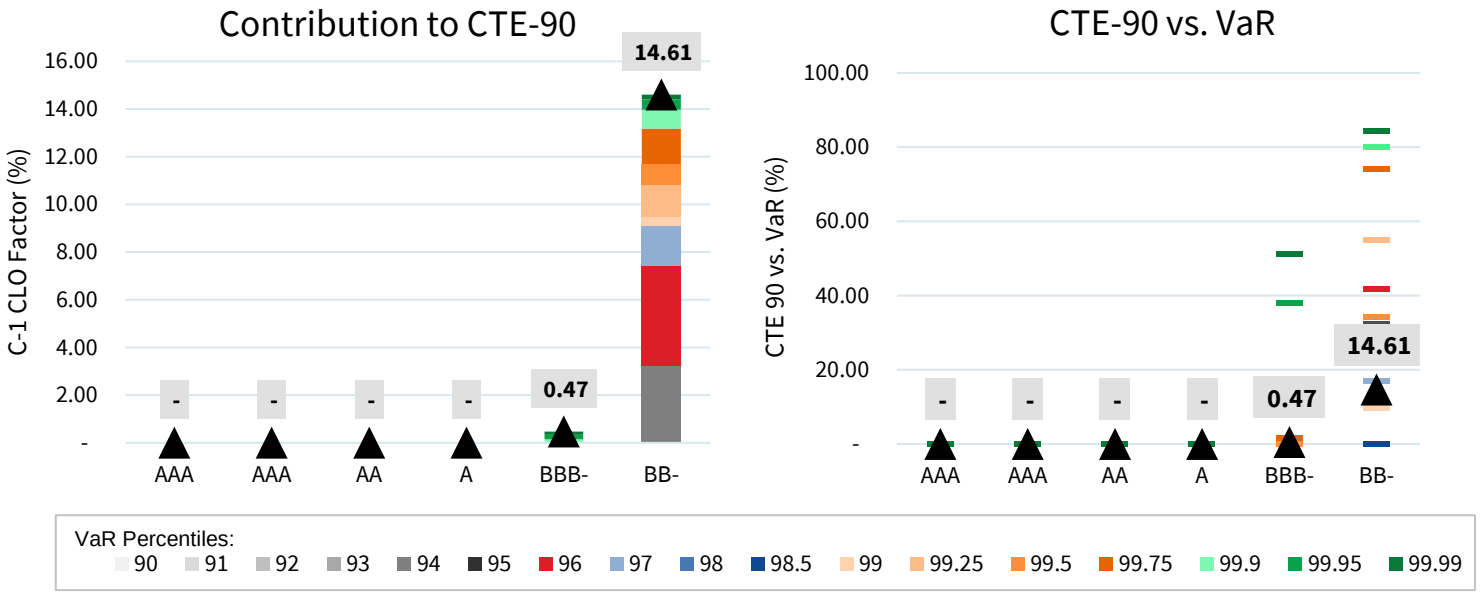
Hypothetical Results for Ares 52, Deal ID#830871594



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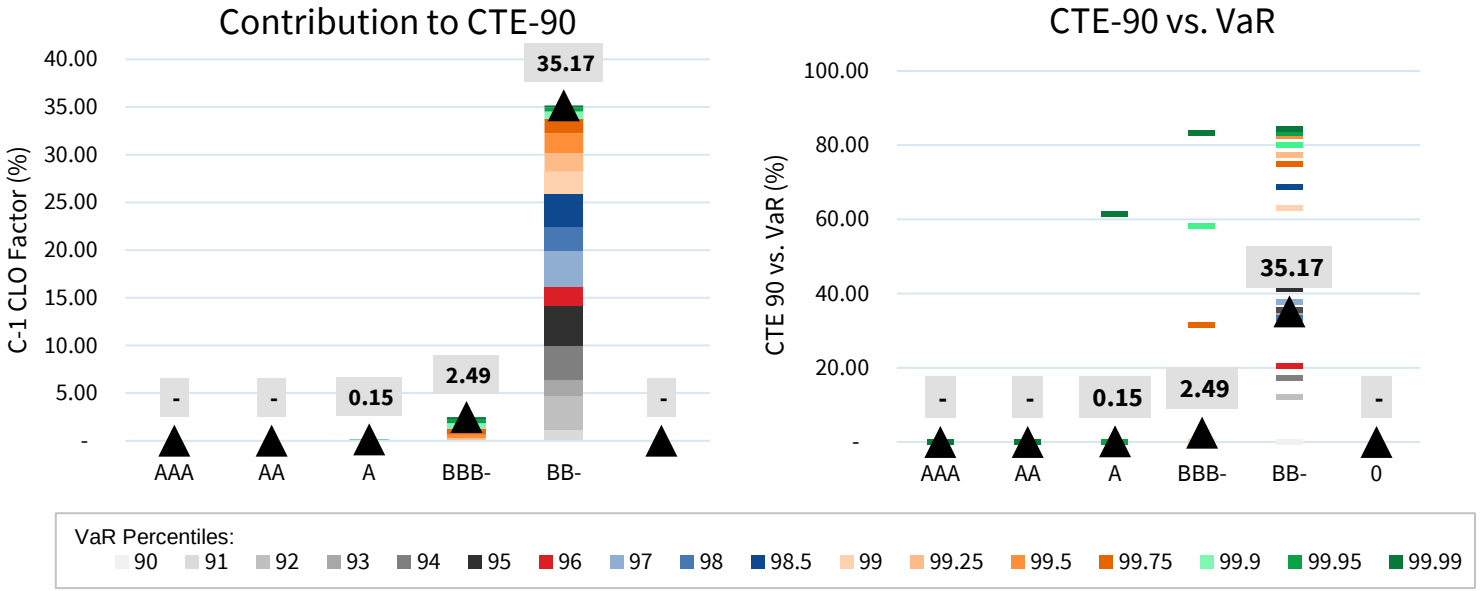
Hypothetical Results for Carlyle 2021-1, Deal ID#867578342 40



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