

CLO Commentary

Dynamic Matrix Provides Increased Transparency to CLO Market Participants

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Morningstar Perspective

Morningstar Credit Ratings, LLC's proposed methodology to rate collateralized loan obligations provides managers, arrangers, and investors the means to obtain ongoing insight into the credit strength of any deal, through the creation of a dynamic matrix. This dynamic maximum weighted average rating factor matrix can be created at any time during the life of a deal and helps estimate the amount of WARF cushion the collateral has before it exceeds the limit for any of the rated notes. The dynamic nature of the matrix provides the ability for a real-time transaction analysis and is in contrast with the customary covenanted static maximum WARF matrix that transaction documents may require the CLO manager to follow.

A key consideration in Morningstar's evaluation of CLO notes is the break-even conditional default rate, which is the maximum CDR that an asset pool can withstand without causing the notes to take any losses. The maximum portfolio WARF, at a given time, that would pass the target rating stress, can be calculated based on the break-even CDR of the rated note, which we explain later in the article. Because the break-even CDR for any of the notes changes over the life of the deal, the dynamic maximum WARF matrix will also change. In general, for a given rating stress, if the actual pool performance is as expected at closing or better, then the WARF values within the dynamic matrix may be expected to increase over time. Factors that may lead to such a change include: seasoning of the deal leading to a shorter time to maturity and lower outstanding liabilities, underlying assets' rating migration, lesser or higher defaults or recoveries than forecast at closing, a change in the interest-rate environment, and a change in the portfolio characteristics because of trading.

The dynamic matrix is an offshoot of, but not a formal provision within, Morningstar's proposed rating methodology, which does not mandate the creation of a WARF matrix or a comparison of it with the transaction's covenanted maximum WARF matrix. This is because we determine our ratings based on the break-even CDR using the portfolio characteristics at a point in time rather than hypothetical combinations of weighted average spread, diversity score, and portfolio WARF in the future. However, upon request of the arranger, manager, or investors, Morningstar may provide a maximum WARF matrix, thus helping them gauge the sufficiency of the WARF cushion for the rated notes.

Crafting a Dynamic WARF Matrix

In a typical CLO, the covenanted WARF matrix outlines the maximum allowed WARF, given the portfolio's weighted average spread and diversity score, before triggering a "maintain-or-improve" condition that restricts the manager's ability to trade until portfolio characteristics such as diversity, weighted average rating factor, and weighted average spread are brought back into compliance. The covenanted matrix is a tool commonly used by managers to help with investment decisions by allowing them to optimize the equity returns while keeping the deal in compliance with covenants and concentration limits. While the covenanted static matrix is helpful, it does not provide clarity on an ongoing basis regarding the extent of the ratings impact if the WARF limit were to be breached or, conversely, if the WARF were to be significantly lower than the limit. The ability to craft a dynamic matrix seeks to address this issue.

The basis of Morningstar's Proposed U.S. CLO Methodology¹ is the ability of a note to sustain a rating-specific target CDR, called the Adjusted Target Break-Even CDR. Morningstar starts with the Base-Case Target CDR, specific to a given rating level and transaction, and multiplies it with adjustments corresponding to actual pool characteristics such as WARF, diversity, and the manager's performance and operational capabilities, to get the Adjusted Target Break-Even CDR for the required rating². The adjustments account for higher or lower risk compared with the base-case assumptions.

CLO transaction participants may create the dynamic maximum WARF matrix using the same approach. For each point in the matrix that corresponds to a given weighted average spread and diversity score, the maximum WARF is the number that will make the Adjusted Target Break-Even CDR equal to the actual break-even CDR of the notes. We assume that the Manager Adjustment is the same for all the points in the matrix.

¹ [Proposed U.S. CLO Ratings Methodology](#) published Aug. 29, 2017.

² We may apply other transaction-specific adjustments. Please see the Proposed U.S. CLO Ratings Methodology for details.

Example

In evaluating CLOs, Morningstar's base case, as explained in our proposed methodology, assumes a portfolio WARF of 2720 corresponding to a B rating; a diversity score, an indicator of a deal's granularity among obligors and industries, of 80; and an expectation of a manager with proven through-the-cycle experience backed by robust operational infrastructure and capabilities. We apply quantitative and qualitative adjustments to our base-case expectations. For instance, in this example, we rate a CLO tranche with a target rating of BBB-, portfolio WARF of 2800, diversity score of 60, weighted average spread of 3.75%, and a new manager with limited experience.

Base-Case Target CDR

Morningstar's Base-Case Target CDR ranges take into account the historical leveraged loan performance for the manager and the overall market, across various sectors and industries. Upon analyzing the hypothetical portfolio and the manager's default experience, Morningstar assigned rating-specific Base-Case Target CDRs, details of which can be found in our proposed methodology, for the transaction as shown in Table 1.

Table 1: Base-Case Target CDR for the Hypothetical Transaction With BBB- Target Rating

Target Rating Scenario	Break-Even CDR (%)
BBB	6.0
BB	4.0

By linearly interpolating the CDRs for BB and BBB, we get the BBB- **Base-Case Target CDR** of 5.33%.

Adjusted Target Break-Even CDR

If the notes' break-even CDR is higher than or equal to the Adjusted Target Break-Even CDR, the notes pass that rating stress³. To calculate the Adjusted Target Break-Even CDR, Morningstar applies adjustments to the Base-Case Target CDR to reflect actual portfolio characteristics and the manager's performance and capabilities versus the base-case portfolio assumptions.

WARF Adjustment = (Portfolio WARF)/2720 = 2800/2720 = 102.94%

Diversity Adjustment = (80/Portfolio Diversity Score)^(1/4) = (80/60)^(1/4) = 107.46%

Manager Adjustment = 110%, based on Morningstar's review

³ Morningstar will also consider other qualitative, legal, and regulatory analysis, as described in the Proposed U.S. CLO Ratings Methodology.

The first adjustment penalizes for a WARF higher than the base case, as in our hypothetical portfolio with a WARF of 2800. This signals a weaker weighted average credit strength compared with a B rated portfolio. The second adjustment penalizes portfolios with diversity scores lower than our base case of 80, as in our example. Finally, our Manager Adjustment is based on Morningstar's assessment of a manager's performance and ability. As the manager in our example is relatively inexperienced, the transaction earns an adjustment above 100%.

$$\begin{aligned}\text{Adjusted Target Break-Even CDR} &= \text{Base-Case Target CDR} * \text{WARF Adjustment} * \text{Diversity Adjustment} * \text{Manager Adjustment} \\ &= 5.33\% * 102.94\% * 107.46\% * 110\% \\ &= 6.49\%\end{aligned}$$

Actual Break-Even CDR

We may use Intex CDI and CDU files to run our analysis for a transaction and the calculation of the actual break-even CDR for the rated note. The initial weighted average spread of the pool is generally increased or decreased over time to reach the weighted average spread corresponding to a given point in the maximum WARF matrix. We may also use our rating-specific stressed interest-rate curves to account for any volatility in the interest-rate movement. Morningstar assumes different recovery rates for defaulted assets under each rating stress, the basis for which is explained in the following section.

Expected Recovery

Morningstar recovery is independent of the current rating of the loan; our assumption is that a jump-to-default of a loan would lead to a recovery dependent on the notes' target rating stress scenario, rather than the current rating of the loan itself. Table 2 shows the starting point for stressed recovery rates at each rating level for this hypothetical transaction after considering the manager's historical recoveries and other collateral characteristics, covenants, and eligibility criteria.

Table 2: Base-Case Recovery Assumptions for the Hypothetical Transaction

Target Rating Scenario	First-Lien Recovery (%)	Second-Lien Recovery (%)
BBB	62	52
BB	66	56

The hypothetical transaction is covenanted to have at least 90% first-lien loans and up to 10% of second-lien loans. Interpolating BB and BBB recovery numbers for BBB- target rating, we calculate the pool's weighted average recovery as follows:

$$\text{Recovery} = 90\% * 63.33\% + 10\% * 53.33\% = 62.33\%$$

Maximum WARF Matrix

The calculations shown in the foregoing sections can be used to calculate the dynamic maximum WARF matrix. The calculation for the maximum WARF can be done by replacing the Adjusted Target Break-Even CDR in the equation with the actual break-even CDR of the notes for a given point in the maximum WARF matrix, or as follows:

$$\text{Maximum WARF} = (2720 * \text{Actual Break-Even CDR}) / (\text{Base-Case Target CDR} * \text{Diversity Adjustment} * \text{Manager Adjustment})$$

Table 3 shows the maximum WARF matrix for this hypothetical transaction. Also shown are the break-even CDRs on the right, for reference.

Table 3: Sample Maximum WARF Matrix for BBB- Rating

	Minimum Diversity									
	50	55	60	65	70	75	80	85	90	
Minimum WAS (%)										Actual Break-Even CDR (%)
2.95	2091	2142	2189	2233	2275	2315	2352	2388	2423	5.07
3.05	2152	2203	2252	2297	2340	2381	2420	2457	2492	5.22
3.15	2222	2275	2325	2372	2417	2459	2499	2537	2573	5.39
3.25	2308	2364	2416	2465	2511	2555	2596	2636	2674	5.60
3.35	2385	2442	2496	2546	2594	2639	2682	2723	2762	5.78
3.45	2465	2525	2580	2632	2682	2728	2773	2815	2855	5.98
3.55	2558	2620	2677	2731	2782	2831	2877	2921	2963	6.20
3.6	2601	2664	2723	2778	2830	2879	2926	2970	3013	6.31
3.65	2646	2710	2769	2825	2878	2928	2976	3021	3065	6.41
3.75	2734	2800	2861	2919	2974	3025	3075	3122	3167	6.63
3.85	2820	2888	2952	3011	3068	3121	3172	3220	3266	6.84
3.95	2904	2974	3039	3101	3159	3213	3266	3316	3363	7.04

For the hypothetical portfolio, with diversity score of 60 and weighted average spread, or WAS, of 3.75%, the actual break-even CDR of 6.63% is higher than the Adjusted Target Break-Even CDR of 6.49%. Because this hypothetical note passes Morningstar's

quantitative BBB- rating stress, it is a candidate for the BBB- rating, pending Morningstar's analysis of other qualitative, legal, or regulatory issues as described in the Proposed U.S. CLO Ratings Methodology. Because the hypothetical note passes the rating stress based on the break-even CDR, we observe that the actual portfolio WARF of 2800 is also lower than the maximum WARF limit of 2861, as expected.

While a maximum WARF matrix is not a requirement of Morningstar's proposed CLO methodology, the calculations in the methodology provide market participants with the ability to estimate, in real time, the credit-quality cushion for any of the rated notes. Beyond the usefulness of a covenanted static WARF matrix, the dynamic matrix is a tool that gives managers insight on the impact of changing portfolio WARF.

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