Collateralized Loan Obligation (CLO)Rating Methodology (Non-NRSRO)

Version 1

Board Approval Date: February 26, 2020

Replace the prior EJR CLO Rating Methodology (Non-NRSRO) in EJR Procedures and Methodologies for Determining Credit Ratings version 13

SEC Requirements

A general description of the procedures and methodologies used to determine credit ratings. The description must be sufficiently detailed to provide users of credit ratings with an understanding of the processes employed in determining credit ratings, including, as applicable, descriptions of: policies for determining whether to initiate a credit rating; a description of the public and non-public sources of information used in determining credit ratings, including information and analysis provided by third-party vendors; whether and, if so, how information about verification performed on assets underlying or referenced by a security or money market instrument issued by an asset pool or as part of any asset-backed or mortgage-backed securities transaction is relied on in determining credit ratings; the quantitative and qualitative models and metrics used to determine credit ratings, including whether and, if so, how assessments of the quality of originators of assets underlying or referenced by a security or money market instrument issued by an asset pool or as part of any asset-backed or mortgage-backed securities transaction factor into the determination of credit ratings; the methodologies by which credit ratings of other credit rating agencies are treated to determine credit ratings for securities or money market instruments issued by an asset pool or as part of any asset-backed or mortgaged-backed securities transaction; the procedures for interacting with the management of a rated obligor or issuer of rated securities or money market instruments; the structure and voting process of committees that review or approve credit ratings; procedures for informing rated obligors or issuers of rated securities or money market instruments about credit rating decisions and for appeals of final or pending credit rating decisions; procedures for monitoring, reviewing, and updating credit ratings, including how frequently credit ratings are reviewed, whether different models or criteria are used for ratings surveillance than for determining initial ratings, whether changes made to models and criteria for determining initial ratings are applied retroactively to existing ratings, and whether changes made to models and criteria for performing ratings surveillance are incorporated into the models and criteria for determining initial ratings; and procedures to withdraw, or suspend the maintenance of, a credit rating. Market participants are provided the opportunity to comment on the methodologies through the EJR's website (publicly available) for EJR's consideration

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Introduction and Overview

The purpose of this report is to summarize in EJR's approach to rating CLOs. We do not apply this methodology paper rigidly in all circumstances; when appropriate, rating committees consider other factors we deem relevant to our analysis which could affect the rating outcome. Further, we expect to revise this rating methodology periodically.

EJR ratings of CLO tranches are based on the estimated losses (EL) generated by applying historical default scenarios based on likelihood of occurrence. The estimated loss is then distributed to each tranche using EJR proprietary modeling. This can relate each default scenario to the asset and liability side cashflow. Detailed steps as below:

I. Determine the Default Probability and Life of Underlying Assets

1. We attempted to calculate the weighted average default probability of the portfolio by using EJR Weighted Average Rating Score (WARS) approach. More specifically:

   - Each probability of default rating is associated with a particular rating score. EJR calculates the rating score as the 10-year default rate of the target rating times 100.

   - To measure the default probability of the portfolio, EJR calculates the WARS of the portfolio as well as the weighted average life (WAL) of the portfolio. EJR derived the WARS as current balance weighted average of the rating score of each asset in the portfolio:

$$\text{WARS} = \sum_{i=1}^{N} (\text{Rating Score}_i * \text{W}_i)$$

Where: Rating Score_i=Rating score of asset i
W_i=current balance-based weight of asset i
N=number of assets in the portfolio

2. Similarly, the weighted average life (WAL) of the portfolio is current balance weighted average of the remaining life of the individual asset.

$$\text{WAL} = \sum_{i=1}^{N} (\text{Remaining Life}_i * \text{W}_i)$$

Where: Remaining Life_i = Remaining life of asset

W_i = current balance-based weight of asset *i*

N = number of assets in the portfolio

3. Once WARS and WAL have been calculated, EJR maps out the weighted average cumulated default probability of the portfolio in the default probability table.

II. Determine Independence of Underlying Assets

The CLO's assets are classified according to the corporate industry for each obligor. We use the number of assets and the par value of each asset to calculate the portfolio's diversity (i.e., correlation) score and corresponding Independence Factor. The diversity score is intended to represent the number of independent, identical assets that we can use to mimic the default distribution of the actual portfolio. For example, if a portfolio of 100 assets had a diversity score of 50, this means that the 100 assets have the same loss distribution as 50 independent identical assets. More specifically:

a. The calculation of the diversity scores starts from an equivalent unit score which calculated for each obligor by taking the lesser of (a) one or (b) the quotient of (i) its obligor par amount and (ii) the average par amount.

b. An aggregate industry equivalent unit score is then calculated for each industry group by adding the equivalent unit scores for all obligors in the same industry.

c. Each aggregate industry equivalent unit score is mapped to its corresponding Industry Diversity Score Table.

d. The CLO's diversity score is the sum of all the industry diversity scores.

III. Determine the Likelihood of Default Probability of Underlying Assets

We assume the underlying portfolio can be replaced by N (N=diversity score of the specific portfolio) independent identical assets, and each asset equals to a Bernoulli experiment with default rate as weighted average cumulated default probability of the portfolio. Then all possible default outcomes can be transferred into N+1 scenarios (0 of N assets default, 1 of N assets default, 2 of N assets default...N of N assets default). We apply the binomial distribution to reflect the likelihood of each default scenario. Then, the cumulative default rate (CDR) of a specific default scenario *j* equals to:

$$CDR_j = \frac{j}{N}$$

Where: N = diversity score,

j = the number of defaults in the specific scenario j,

The likelihood or the weight of a specific default scenario {j assets default (0<=j<=N)} will occur is given by the binomial formula:

$$P_j = \frac{N!}{j!\,(N-J)!} p^j (1-p)^{(N-j)}$$

Where: N = diversity score,

j = the number of defaults in the specific scenario j,

p = weighted average cumulated default probability of the portfolio (the probability of default, given by the WARS and WAL covenants, multiplied by the WARF stress for the target rating of the tranche)

IV. Determine Timing of Loss

We may apply a number of scenarios for assumed default timing. We consider cases in which the defaults in a given BET scenario will occur during the first six years of the CLO, typically with 50% of scenario defaults occurring in one year and 10% in each of the other five years. The 50% default spike, which is intended to mimic the bunching of defaults in a recession, is typically

moved through each of the first six years for a total of six default-timing scenarios. Each default scenario is assigned a weight i.e., a probability of occurrence.

V. Determine Interest Rate

We may apply interest rate curves (such as the SOFR) from a third-party data provider as interest rate assumptions. Currently, we do not assume a discrete number of interest-rate scenarios to reflect the potential for shifts in short-term rates over time.

VI. Determine Recovery Rate

We map the recovery rate of each asset based on the seniority of the asset and the stress level. The basic idea is that the higher the seniority of the instrument rating, the higher the expected recovery rate should the instrument default. For structured finance obligations, a specific tranche with higher rating should be able to withstand lower recovery scenario. More specifically, EJR separates the instrument into 3 seniority categories: First Lien / Senior Secured, Second Lien / Senior Unsecured, and Subordinated. EJR will use data from a third-party provider to determine the seniority of the debt. If the priority of the assets unavailable, EJR turns to other NRSROs' recovery rates at the AAA stress level recovery rate and applies adjusted rates for lower stress levels. Detailed recovery assumptions for each seniority level and rating category can be found in IX. 2. Stress on Recovery Rate section.

We define the weighted average recovery rate (WARR) as the current balance-weighted recovery rate of each asset of the portfolio for a tranche with a "AAA" target rating.

$$\mathrm{WARR} = \sum_{i=1}^{N} (\mathrm{RR}_i * \mathrm{W}_i)$$

Where:
RR_i = recovery rate of asset i under AAA stress level
W_i = current balance-based weight of asset i
N = number of assets in the portfolio

VII. Cashflow Model

We may use data form a third-party provider to calculate the cashflow of the CLO products. We will typically create scenarios in the tools provided by the third-party data source according to the binomial distribution output, then set recovery rate and interest rate as the values we calculated above.

VIII. Estimated Loss

Estimated loss of each tranche in each scenario calculated as below:

$$L = \frac{PV_{promise} - PV_{received}}{PV_{promise}}$$

Where: $PV_{promise}$ = present value of total promised cashflow that should be received (by using the coupon rate of the tranche as discount rate, the present value should equal to the current balance of the tranche)

$PV_{received}$ = present value of total cashflow received in that scenario (we are using risk free rate as discount rate since the risk has been included in the cashflow output under certain default scenario)

Estimated loss of each tranche in a CLO product is the weighted average loss the specific tranche experienced in each scenario:

$$EL_i = \sum_{j=0}^{N+I} P_j * L_j$$

Where: N=diversity score,
j=the number of defaults in the specific scenario j,
P_j=the likelihood or the weight of default scenario j
L_j=loss allocated to tranche I in default scenario j

We determine the life of each tranche as the time range of tranche's principal payments assuming zero defaults on the underlying collateral. Based on the EL and WAL of the tranche, a rating can be mapped via Estimated Loss Table.

IX. Assign Ratings based on the Stress Analysis

Stress on Default Probability

We may apply a stress to the default probability based on the target rating of the tranche. For example, if we are going to assign AA+ to a specific tranche, the rating derived from Weighed Average Estimated Loss and life of the tranche should be AA+ or above under the WARF stress of AA+ assumption. If the tranche cannot pass the AA+ stress level, we will test the tranche under AA stress level. The test will stop at the highest stress level that tranche can stand with, and the rating of the tranche will be the rating related to the stress level.

1. Stress on Recovery Rate

For structured finance obligations, we believe higher rated tranches should be able to withstand lower recovery rate scenarios. We assume recovery stresses based on the target rating of the tranche. For example, if we are going to assign AA+ to a specific tranche, the rating derived from Weighed Average Estimated Loss and life of the tranche should be AA+ or above under the recovery rate of AA+ assumption. If the tranche cannot pass the AA+ recovery stress level, we will test the tranche under AA stress level. The test will stop at the highest stress level that tranche can stand with, and the rating of the tranche will be the rating related to the stress level. EJR also assumes instruments with higher seniority or secured by the asset from the issuer or guarantor should have higher recovery rate than subordinated facilities.

2. Stress on Current Rating

The credit quality for syndicated loans generally varies with the economic cycle. Frequently, during an economic downturn, ratings on some loans may be cut multiple notches with little notice. Accordingly, during times of economic pressure, EJR may stress the ratings of the underlying assets by a notch to reflect the credit quality of each tranche assuming their current rating has been overestimated.

Other Considerations

When assigning a rating, EJR might conduct sensitivity analysis. Prospectively, we expect to assume a discrete number of interest-rate scenarios to reflect the potential for shifts in rates over time. Specifically, we consider the prevailing forward interest rate curves (such as the SOFR or Euribor curve) as a base case.

Nota Bene

Ultimately our ratings are a matter of judgement and include factors that are not necessarily immediately evident or perhaps are never evident in the quantitative aspects.

Surveillance

EJR applies the same rating methodology and assumptions we use when assigning initial ratings to our surveillance analysis. However, when the evolution of market and economic conditions as well as CLO-specific performance indicates a need to consider refinements to certain components of the rating approach, we may adjust our analysis.

In our monitoring analysis, we assess quantitatively and qualitatively aspects in assessing ratings.

Conclusion

We have presented here – directly or through reference – the primary factors that we consider when assigning ratings to and monitoring the ratings of CLO liabilities. The analysis includes modeling of a transaction's cash flows; reviewing the characteristics of the CLO's assets and liabilities; reviewing the transaction structure; and evaluating the probability of repayment of interest and principal. It is our intention to update this report whenever we make material changes to our rating approach. Our analysis of CLOs, like that of any other obligation, is subject to uncertainty.