

# Carlyle U.S. CLO 2016-4 Rating Report

Tranche Name	EJR Final Rating Non-NRSRO Rating
A1R	AAA (sf)
A2R	AAA (sf)
BR	AAA (sf)
CR	A (sf)
DR	BB (sf)



## Rating Summary

Tranche Name	EJR Implied Rating	EJR Final Rating NonNRSRO Rating	Other NRSROs EJREquivalent Rating	Current Interest OC (%)	Current Principal OC (%)	Current Subordination <sup>1</sup> (%) Assets at		Interest Rate
						MV	Par	
A1R	AAA (sf)	AAA (sf)	AAA	119.9	139.4	41.7	44.1	L_3MO + 1.08
A2R	AAA (sf)	AAA (sf)	AAA	119.9	139.4	23.2	26.4	L_3MO + 1.45
BR	AAA (sf)	AAA (sf)	A+	119.9	139.4	13.5	17.1	L_3MO + 2.10
CR	A (sf)	A (sf)	BBB-	111.0	126.8	6.6	10.5	L_3MO + 2.80
DR	BB (sf)	BB (sf)	B+	105.3	116.3	1.5	5.6	L_3MO + 5.40

Note: The data used in the analysis of this report was updated on

1. Current Subordination = (Collateral Value- (Pari-Passu Balance + Senior Balance)) / Collateral Value

MV = Market prices reported by the trustee on the latest report (when available)

Par = Par Value

## Transaction Summary

We are providing the rating of Carlyle U.S. CLO 2016-4 as a Non-NRSRO rating. The transaction closed on December 01, 2016. It had a reinvestment period, which ended on July 20, 2021. It has a maturity date of October 20, 2027. The Dealer and Trustee are Citigroup and State Street Bank and Trust Company, respectively. The issued notes are collateralized by 100.0 senior secured loans, cash, and eligible investments with the balance of the portfolio consisting of -99.0 second lien loans and senior unsecured loans. Carlyle CLO Management serves as the collateral manager.

## Quantitative Analysis

### Key Credit Metrics

Metrics	Number
SENIOR TRANCHE SUBORDINATION (%)	41.7
DIVERSITY SCORE	50
EJR WEIGHTED AVERAGE RATING SCORE	3500.8
WEIGHTED AVERAGE LIFE (Years)	3.1
CCC+ OR LESS (%)	4.8

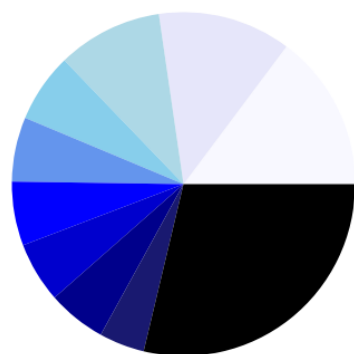
As of April 01, 2023, the total balance of the underlying assets was approximately \$354.7M. The diversity score of the portfolio was 50. Egan-Jones's weighted average rating score and weighted average life (years) of the collateral were 3500.8 and 3.1, respectively. Approximately 4.8% of the portfolio's assets were rated CCC+ or less by other agencies. Senior tranche subordination was 41.66%.

## Portfolio Characteristics

### Industry Concentration

Top 5 asset industries	Current Balance (M)	Percentage (%)	Gross Coupon (%)	Gross Margin	Market Price (\$)
Healthcare & Pharmaceuticals	51.9	14.8	8.2	3.5	90.9
Banking, Finance, Insurance & Real Estate	44.0	12.5	7.8	3.1	98.3
High Tech Industries	34.8	9.9	8.5	3.8	90.7
Capital Equipment	22.8	6.5	8.9	4.1	95.9
Media: Broadcasting & Subscription	21.3	6.1	7.3	2.7	89.2

### Top 10 Industry Contribution

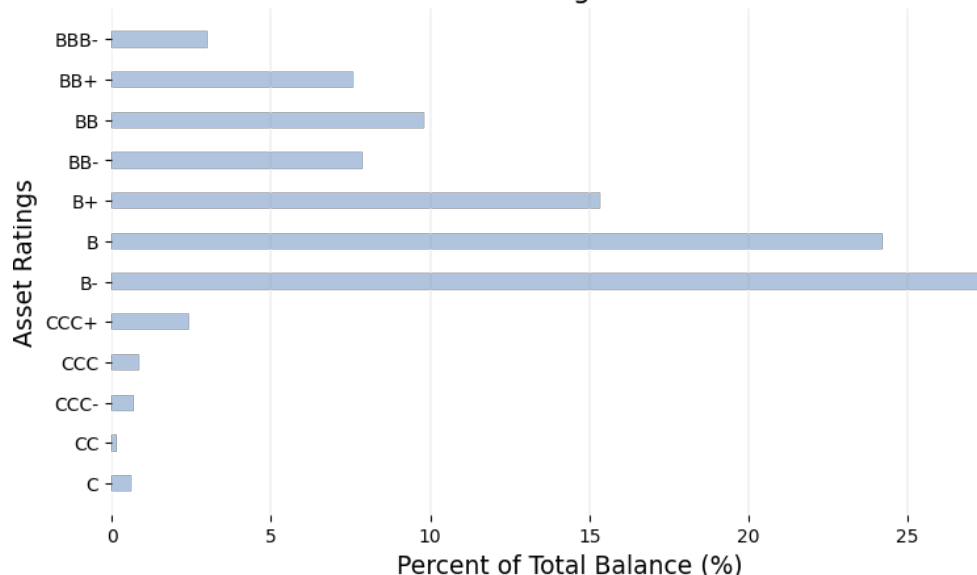


The top 5 industries constituted 49.8% of the underlying portfolio with a total current balance of \$174.8M. The top 5 industries are Healthcare & Pharmaceuticals, Banking, Finance, Insurance & Real Estate, High Tech Industries, Capital Equipment, Media: Broadcasting & Subscription. The top 10 industries constituted 74.5% of underlying portfolio with a total current balance of \$261.6M.

### Rating of Underlying Assets

Bottom 5 asset ratings	Current Balance (M)	Percentage (%)	Gross Coupon (%)	Gross Margin	Market Price (\$)
CCC+	8.6	2.4	8.3	3.6	77.8
CCC	3.0	0.9	9.9	5.1	72.0
CCC-	2.4	0.7	8.8	4.9	56.7
CC	0.6	0.2	12.6	7.8	77.8
C	2.1	0.6	8.6	4.0	27.4

### Portfolio Rating Distribution

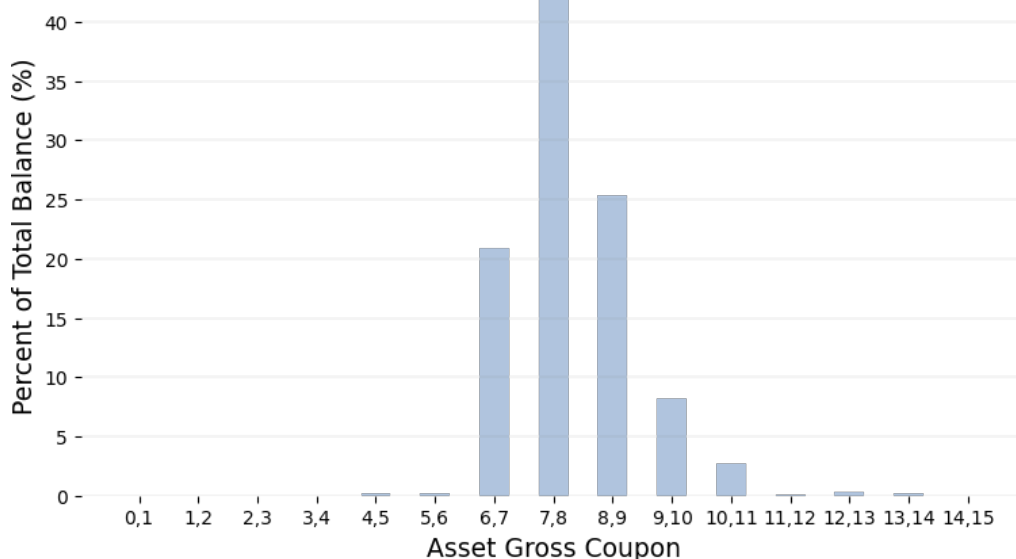


The current ratings of the underlying assets range from BBB- to C. An amount equal to 4.8% of the underlying assets have ratings equal to or below CCC+, with a total balance of \$16.7M. (Note: The current current ratings are other agencies ratings as of March 01, 2023.)

## Gross Coupon of Underlying Assets

Top 5 Gross Coupon Range	Current Balance (M)	Percentage (%)	Gross Coupon (%)	Gross Margin	Market Price (\$)
≥7% but <8%	147.2	41.9	7.6	2.9	96.7
≥8% but <9%	89.0	25.3	8.5	3.8	93.5
≥6% but <7%	73.5	20.9	6.6	1.9	97.6
≥9% but <10%	28.9	8.2	9.4	4.6	88.0
≥10% but <11%	9.4	2.7	10.5	5.8	88.8

Portfolio Gross Coupon Distribution

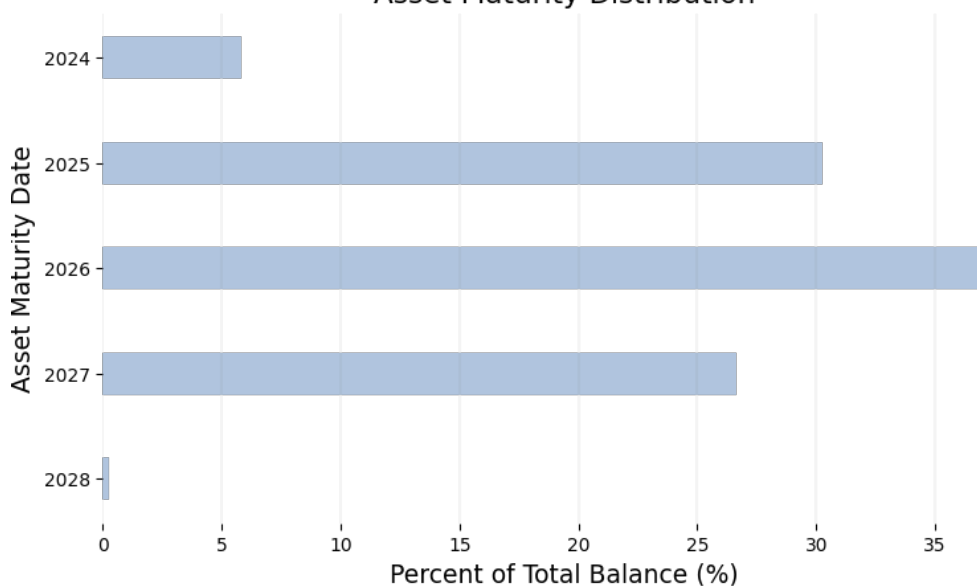


Gross coupon of the underlying assets ranges from 0.0% to 13.1%. The weighted average gross coupon of the portfolio is approximately 7.8.

## Maturity of Underlying Assets by Current Balance

Top 5 Asset Maturity Range	Current Balance (M)	Percentage (%)	Gross Coupon (%)	Gross Margin	Market Price (\$)
2026	129.9	37.0	8.1	3.4	95.8
2025	106.4	30.3	8.0	3.4	92.0
2027	93.6	26.7	8.1	3.4	90.8
2024	20.4	5.8	8.2	3.9	85.8
2028	0.9	0.3	8.7	3.9	90.8

Asset Maturity Distribution



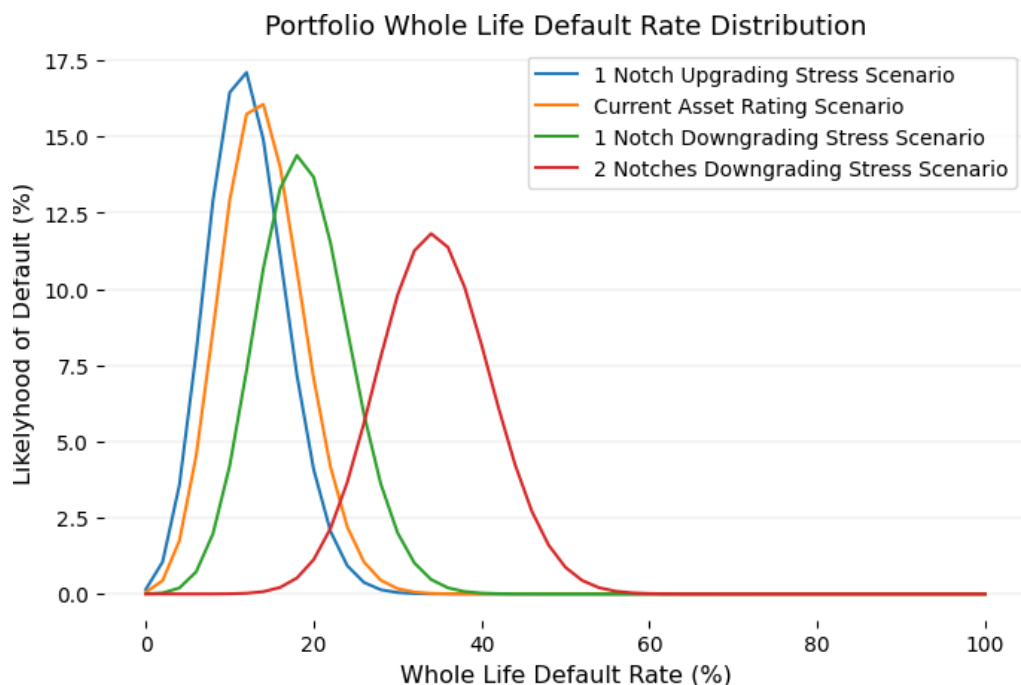
The underlying assets have maturity dates from February 01, 2024 to October 15, 2028. 42.5% of the underlying assets will mature within 3 years, while another 0.1% of the underlying assets have maturities beyond 5 years.

## Seniority of Underlying Assets

	Current Balance (M)	Percentage (%)	Gross Coupon (%)	Gross Margin	Market Price (\$)
Senior Secured	351.3	100.0	8.1	3.4	93.8

There are 244 non-default assets (with seniority information available) in the underlying collateral pool, 100.0% are senior secured loans, and 0% with lower seniority.

## Sensitivity Analysis



In EJR's view, ratings on loans may be upgraded or downgraded with little notice. In EJR's optimistic case, we assumed an one notch upgrade to the underlying assets. In EJR's stress casees, we assumed one or two notch cut to the underlying assets to reflect possible market pressure. According to EJR's Default Probability Table, the optimistic case, base case, one notch cut and two notches cut casees weighted average whole life default rate of probability are 12.2%, 14.0%, 18.8% and 34.4%, respectively.

## Estimated Loss Information

Estimated loss is one of the key considerations in EJR's structured finance ratings. In times of stress when economic conditions are deteriorating, default rates and loss severity are more likely to increase relative to a portfolio's initial or base case default and loss severity levels. EJR believes a tranche with higher rating should be able to withstand greater stress and sustain lower losses than a tranche with a lower rating. For example, a tranche with AAA rating should be able to survive the great depression scenario (the highest default and loss severity levels experienced if they were to occur in the future). A 'AA' rated tranche would be more susceptible to an adverse economic impact than the 'AAA' rated tranche, but nonetheless should be able to withstand such effects better than a tranche with a lower rating. EJR creates different stress levels based on different target tranche ratings (from AAA to B+). The detailed estimated loss (%) information of each tranche under each stress level is detailed in the below table:

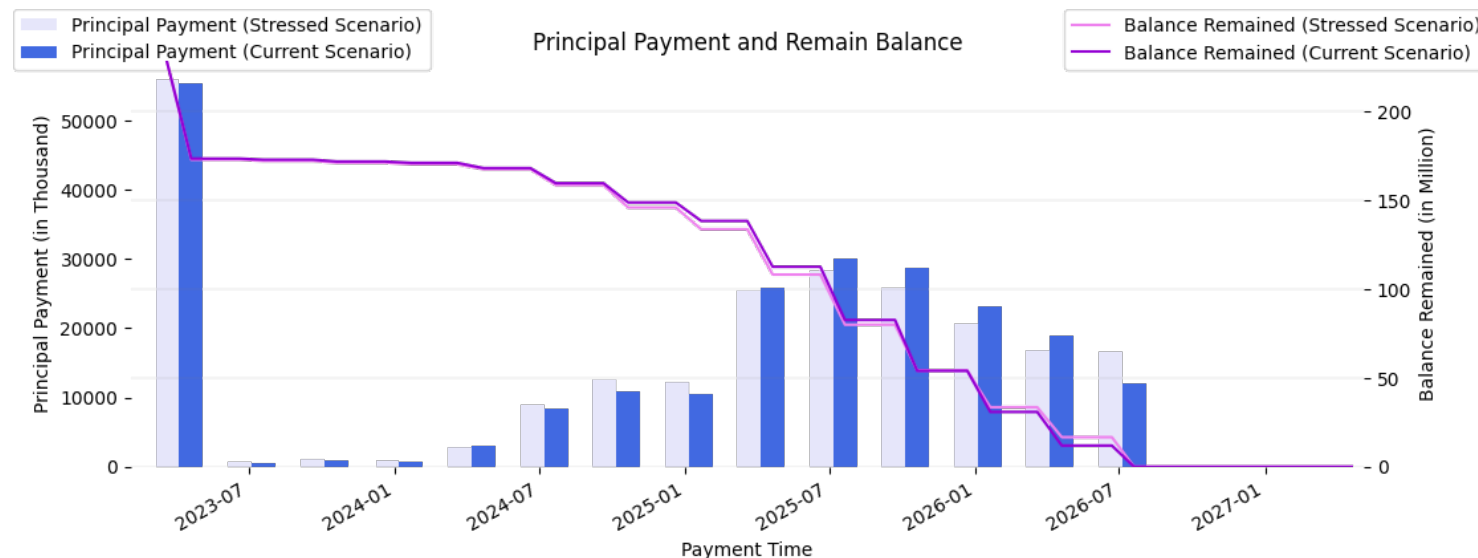
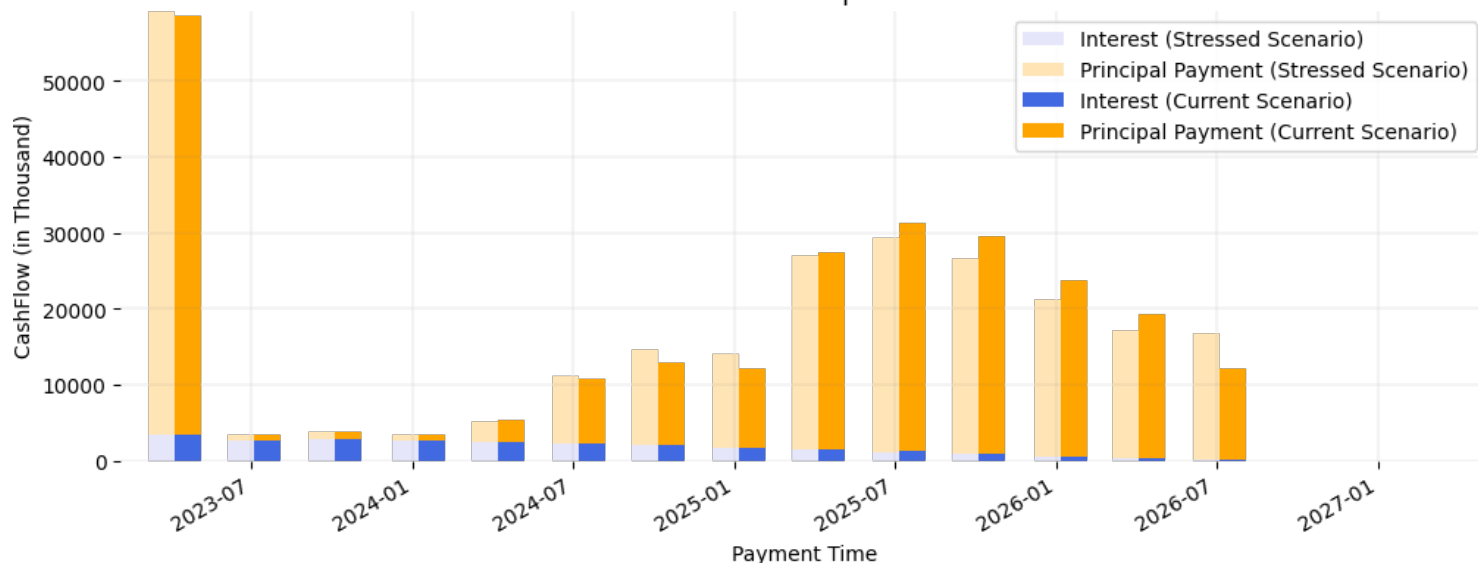
Stress Level	A1R	A2R	BR	CR	DR
AAA (sf) Stress	0	0	0	16.9	78.2
AA+ (sf) Stress	0	0	0	6.9	70.2
AA (sf) Stress	0	0	0	5.7	69.0
AA- (sf) Stress	0	0	0	4.5	67.6
A+ (sf) Stress	0	0	0	0.5	57.1
A (sf) Stress	0	0	0	0	55.4
A- (sf) Stress	0	0	0	0	53.7
BBB+ (sf) Stress	0	0	0	0	38.5
BBB (sf) Stress	0	0	0	0	36.7
BBB- (sf) Stress	0	0	0	0	35.0
BB+ (sf) Stress	0	0	0	0	4.0
BB (sf) Stress	0	0	0	0	0
BB- (sf) Stress	0	0	0	0	0
B+ (sf) Stress	0	0	0	0	0
B (sf) Stress	0	0	0	0	0
B- (sf) Stress	0	0	0	0	0
CCC+ (sf) Stress	0	0	0	0	0
CCC (sf) Stress	0	0	0	0	0
CCC- (sf) Stress	0	0	0	0	0
CC (sf) Stress	0	0	0	0	0
C (sf) Stress	0	0	0	0	0
D (sf) Stress	0	0	0	0	0

# Tranche Summary

## Tranche A1R

Title	Value	Title	Value
ORIGINAL BALANCE (\$ Million)	302.5	IC TEST TRIGGER	115.0
CURRENT BALANCE (\$ Million)	229.0	CURRENT IC	139.4
TRANCHE SPECIFIC STRESSED PD		OC TEST TRIGGER	113.1
EJR MODEL IMPLIED RATING	AAA (sf)	CURRENT OC	119.9
UNCOVERED BALANCE (assets at MV) (\$ Million)	0.0	UNCOVERED RATIO (assets at MV) (%)	0.0
UNCOVERED BALANCE (assets at Par) (\$ Million)		UNCOVERED RATIO (assets at Par) (%)	0.0

Cashflow Composition

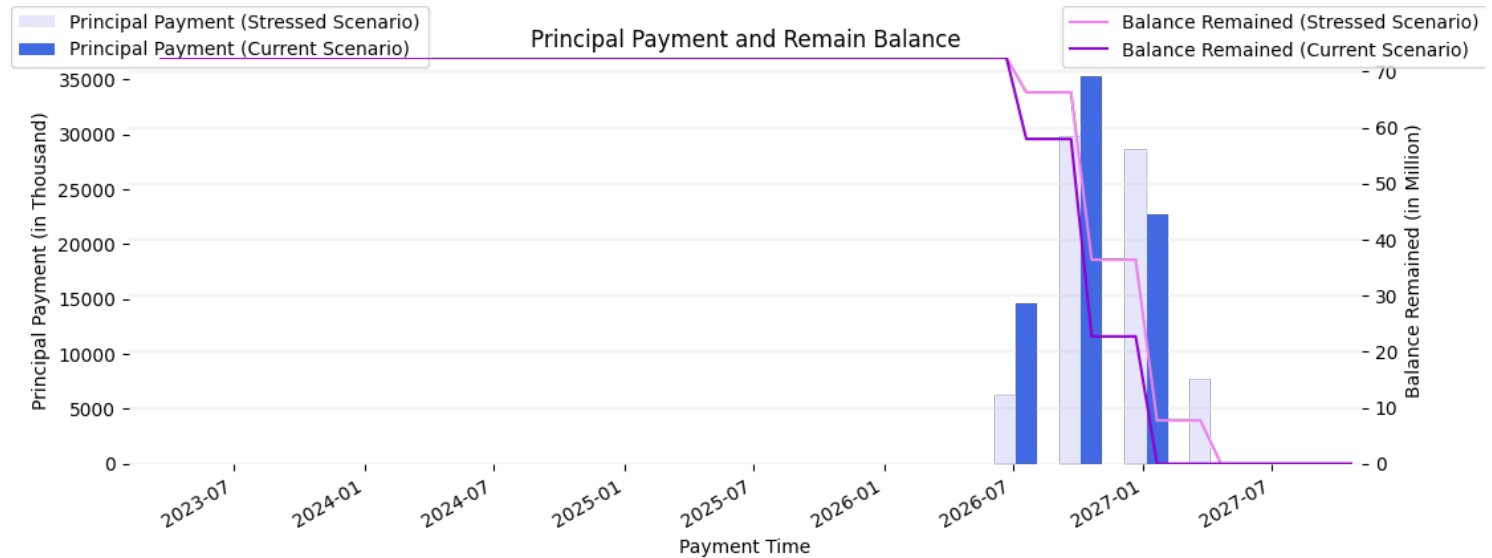
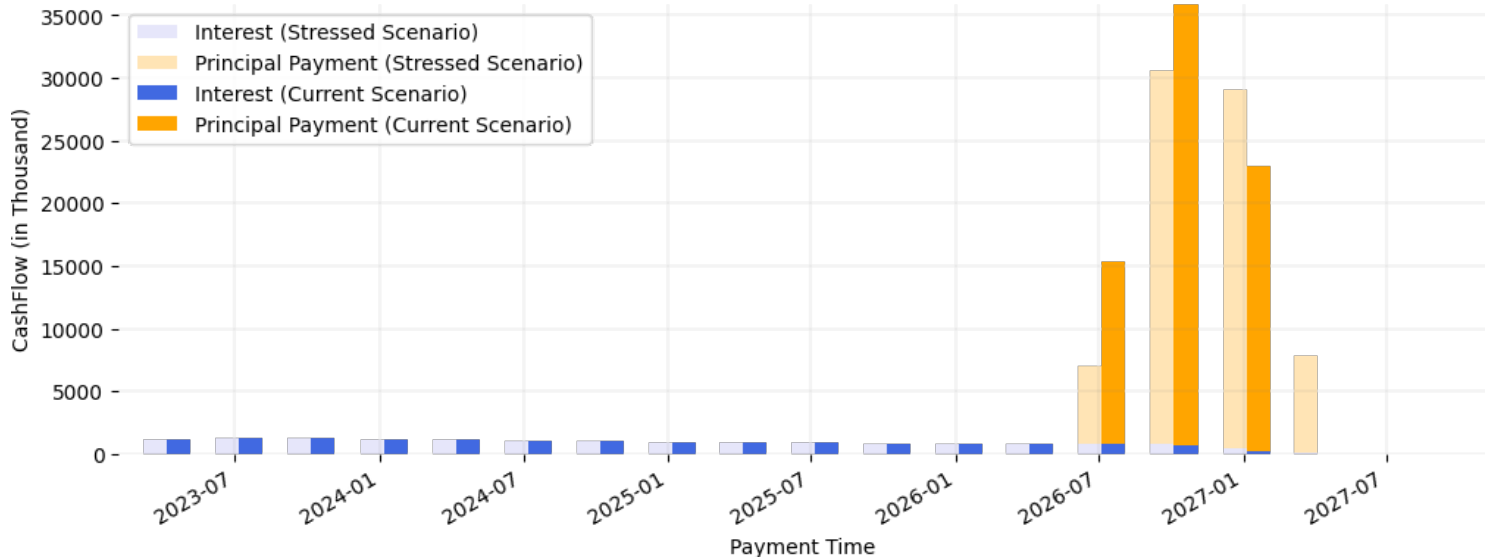


The charts reflect the remaining balance and cashflow forecasting under a) current default and recovery scenario and b) AAA (sf) stress level default and recovery scenario, assuming 50% loss will happen evenly in the first 2 years. The current principal balance of the tranche is \$229.0M. Under current default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Jul 20, 2026. By the end of the payment period (Jul 20, 2026), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M. Under AAA (sf) default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Apr 20, 2027. By the end of the payment period (Apr 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M.

## Tranche A2R

Title	Value	Title	Value
ORIGINAL BALANCE (\$ Million)	72.5	IC TEST TRIGGER	115.0
CURRENT BALANCE (\$ Million)	72.5	CURRENT IC	139.4
TRANCHE SPECIFIC STRESSED PD		OC TEST TRIGGER	113.1
EJR MODEL IMPLIED RATING	AAA (sf)	CURRENT OC	119.9
UNCOVERED BALANCE (assets at MV) (\$ Million)	0.0	UNCOVERED RATIO (assets at MV) (%)	0.0
UNCOVERED BALANCE (assets at Par) (\$ Million)		UNCOVERED RATIO (assets at Par) (%)	0.0

Cashflow Composition

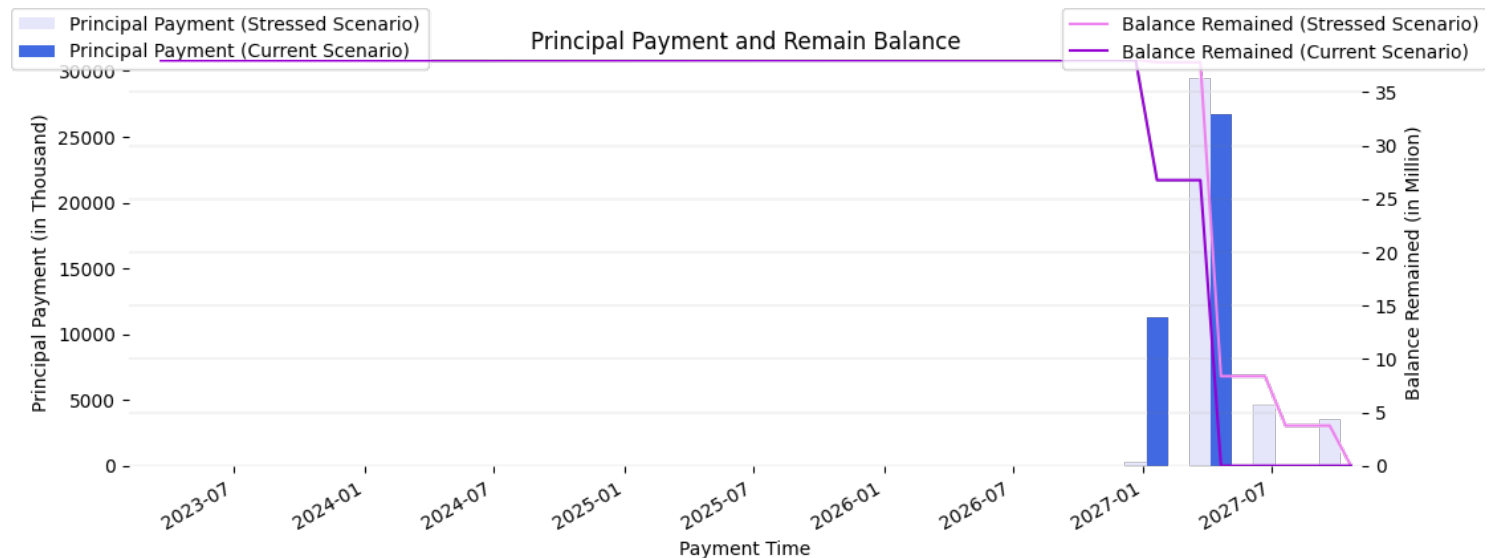
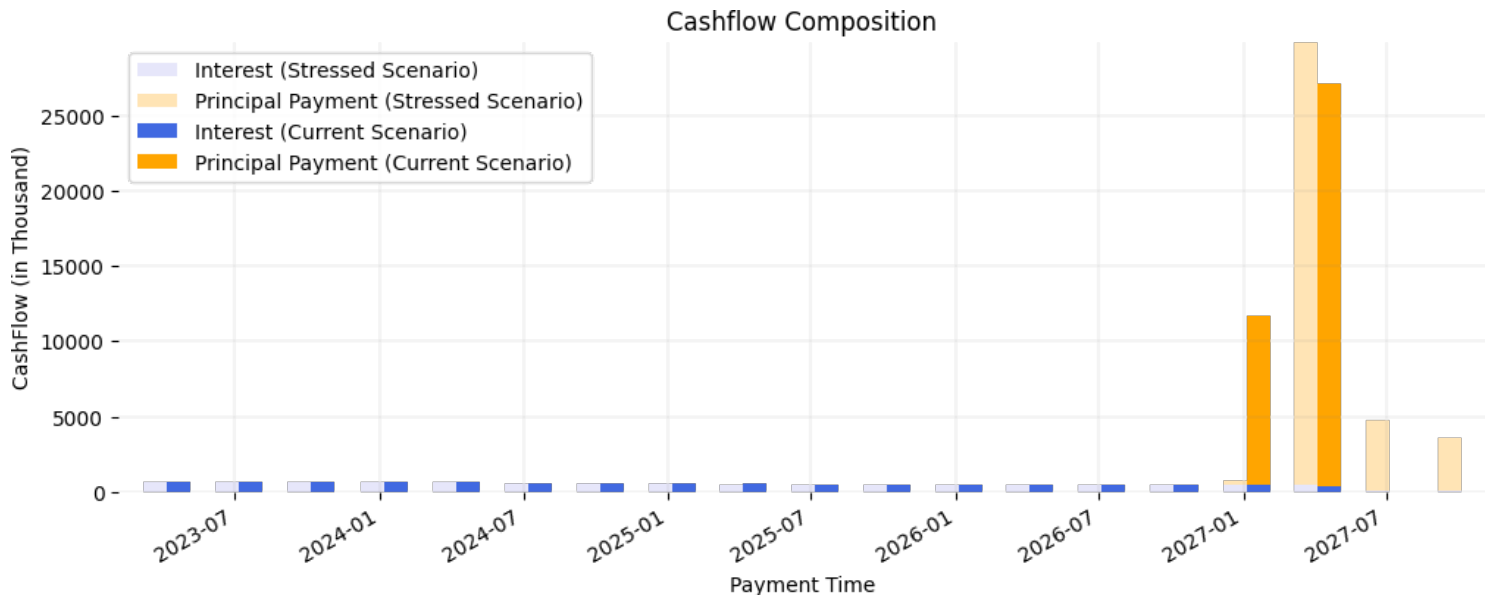


The charts reflect the remaining balance and cashflow forecasting under a) current default and recovery scenario and b) AAA (sf) stress level default and recovery scenario, assuming 50% loss will happen evenly in the first 2 years. The current principal balance of the tranche is \$72.5M. Under current default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Oct 20, 2027. By the end of the payment period (Oct 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M. Under AAA (sf) default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Oct 20, 2027. By the end of the payment period (Oct 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M.



## Tranche BR

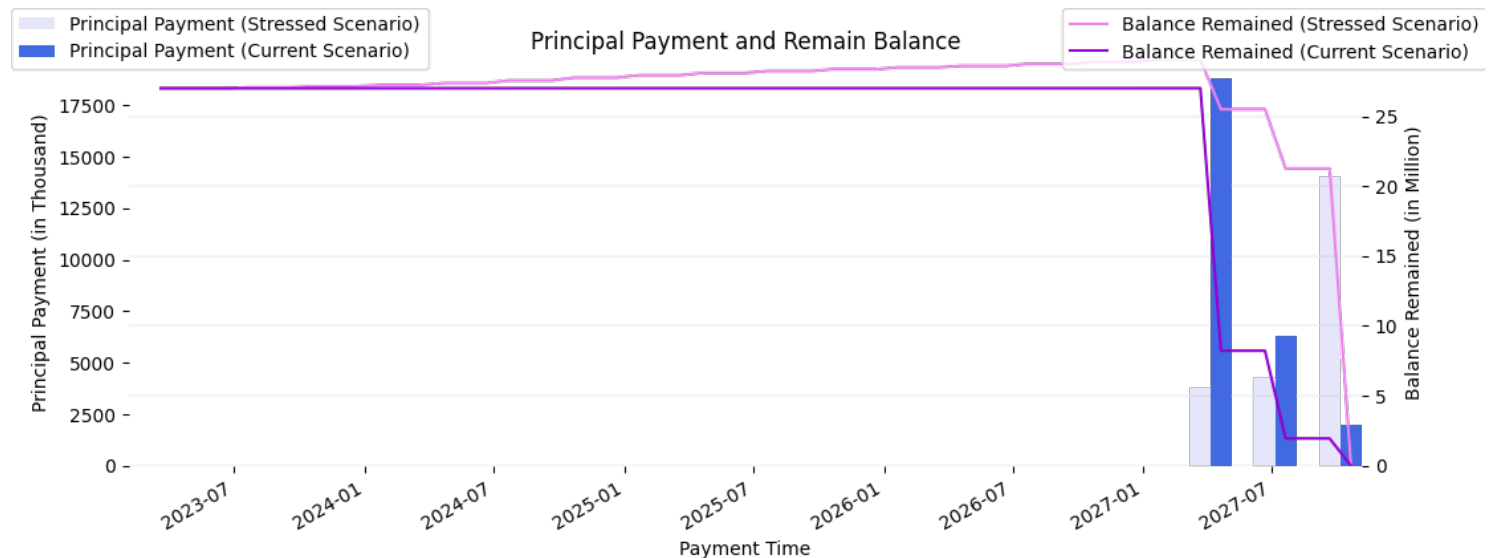
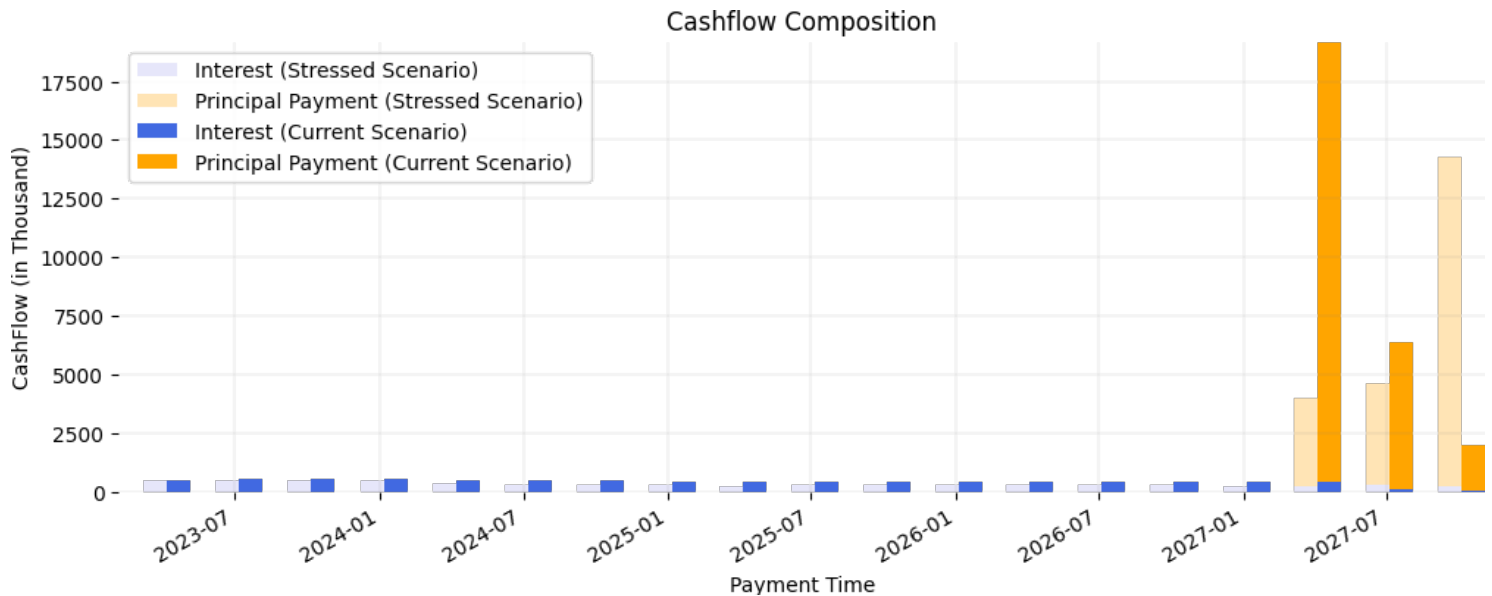
Title	Value	Title	Value
ORIGINAL BALANCE (\$ Million)	38.0	IC TEST TRIGGER	115.0
CURRENT BALANCE (\$ Million)	38.0	CURRENT IC	139.4
TRANCHE SPECIFIC STRESSED PD		OC TEST TRIGGER	113.1
EJR MODEL IMPLIED RATING	AAA (sf)	CURRENT OC	119.9
UNCOVERED BALANCE (assets at MV) (\$ Million)	0.0	UNCOVERED RATIO (assets at MV) (%)	0.0
UNCOVERED BALANCE (assets at Par) (\$ Million)		UNCOVERED RATIO (assets at Par) (%)	0.0



The charts reflect the remaining balance and cashflow forecasting under a) current default and recovery scenario and b) AAA (sf) stress level default and recovery scenario, assuming 50% loss will happen evenly in the first 2 years. The current principal balance of the tranche is \$38.0M. Under current default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Oct 20, 2027. By the end of the payment period (Oct 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M. Under AAA (sf) default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Oct 20, 2027. By the end of the payment period (Oct 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M.

## Tranche CR

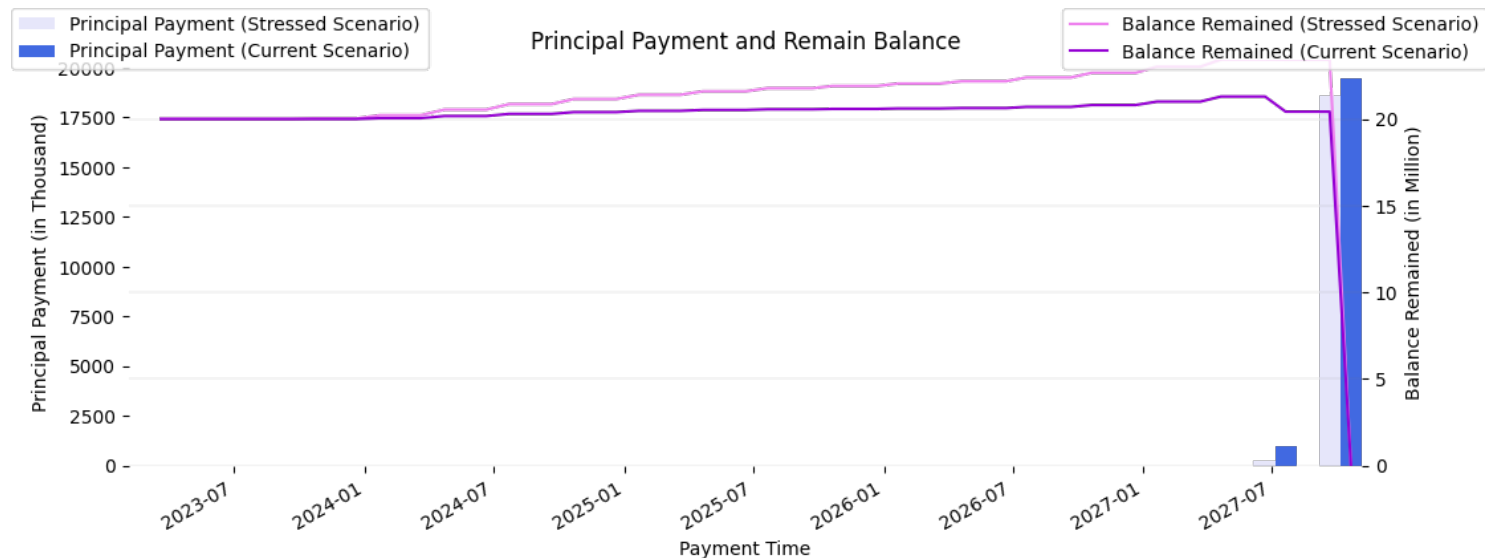
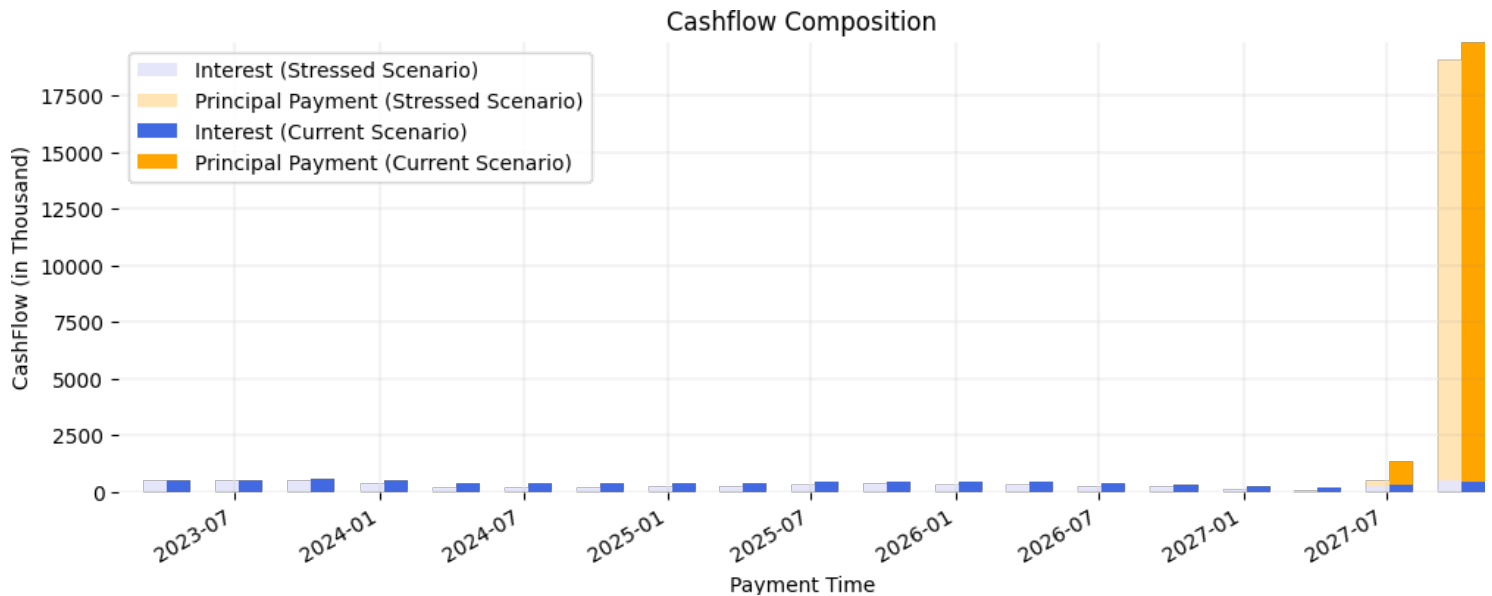
Title	Value	Title	Value
ORIGINAL BALANCE (\$ Million)	27.0	IC TEST TRIGGER	110.0
CURRENT BALANCE (\$ Million)	27.0	CURRENT IC	126.8
TRANCHE SPECIFIC STRESSED PD		OC TEST TRIGGER	107.6
EJR MODEL IMPLIED RATING	A (sf)	CURRENT OC	111.0
UNCOVERED BALANCE (assets at MV) (\$ Million)	0.0	UNCOVERED RATIO (assets at MV) (%)	0.0
UNCOVERED BALANCE (assets at Par) (\$ Million)		UNCOVERED RATIO (assets at Par) (%)	0.0



The charts reflect the remaining balance and cashflow forecasting under a) current default and recovery scenario and b) A (sf) stress level default and recovery scenario, assuming 50% loss will happen evenly in the first 2 years. The current principal balance of the tranche is \$27.0M. Under current default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Oct 20, 2027. By the end of the payment period (Oct 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M. Under A (sf) default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Oct 20, 2027. By the end of the payment period (Oct 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M.

## Tranche DR

Title	Value	Title	Value
ORIGINAL BALANCE (\$ Million)	20.0	IC TEST TRIGGER	105.0
CURRENT BALANCE (\$ Million)	20.0	CURRENT IC	116.3
TRANCHE SPECIFIC STRESSED PD		OC TEST TRIGGER	104.7
EJR MODEL IMPLIED RATING	BB (sf)	CURRENT OC	105.3
UNCOVERED BALANCE (assets at MV) (\$ Million)	0.0	UNCOVERED RATIO (assets at MV) (%)	0.0
UNCOVERED BALANCE (assets at Par) (\$ Million)		UNCOVERED RATIO (assets at Par) (%)	0.0



The charts reflect the remaining balance and cashflow forecasting under a) current default and recovery scenario and b) BB (sf) stress level default and recovery scenario, assuming 50% loss will happen evenly in the first 2 years. The current principal balance of the tranche is \$20.0M. Under current default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Oct 20, 2027. By the end of the payment period (Oct 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M. Under BB (sf) default and recovery scenario, the payment window for this tranche ranges from Apr 20, 2023 to Oct 20, 2027. By the end of the payment period (Oct 20, 2027), the principal balance should be paid in full. Total interest payments of the tranche will approximately \$0.0M.

## **EJR's Key Rating Features & Differences Compare With Other NRSROs**

Below is a summary of EJ's approach (see our Methodology for a more complete description):

1. Our rating is derived from estimated losses.
2. The probabilities of default utilized are generally more conservative than industry standards.
3. Generally, our ratings are more heavily model driven and take into account fewer subjective / qualitative assumptions.
4. Generally, EJ updates the cashflow and ratings monthly based on the availability of the trustee reports.
5. EJ's analysis is conducted using information and cash flow engines supplied by a recognized industry service provider.

## **Difference Between Implied Rating and Assigned Rating**

There is no difference between model implied rating and final assigned rating.

## SEC Rule 17g-7(a) Disclosure

Below are the disclosures as required by Paragraph (a) of Rule 17g-7.

### **1. The symbol in the rating scale used to denote the credit rating categories and notches within categories and the identity of the obligor, security, or money market instrument as required by Paragraph (a)(1)(ii)(A) of Rule 17g-7:**

There are three notches in each of EJR's rating category (e.g., A-(sf), A(sf) and A+(sf) for category A(sf)) except for AAA(sf), CC(sf), C(sf) and D(sf).

### **2. The version of the procedure or methodology used to determine the credit rating as required by Paragraph (a)(1)(ii) (B) of Rule 17g-7:**

We are using the EJR CLO Methodology (Non-NRSRO) version 1a published by December 1, 2022, the General Methodology for Rating Asset Backed and Structured Finance Obligations version 2a published by December 1, 2022.

### **3. The main assumptions and principles used in constructing the procedures and methodologies used to determine the credit rating as required by Paragraph (a)(1)(ii)(C) of Rule 17g-7:**

The credit rating assigned reflects EJR's judgement regarding the future credit quality of the issue. The major assumptions used to construct the methodologies include: 1) Past data reflects the performance and credit worthiness of the pooled assets and is useful for analysis. 2) Financial and credit information that EJR gets from the issuer or the third party is reliable and accurate. 3) The economy and regulation policies will remain stable in the foreseeable future. Specific quantitative assumptions used in this credit analysis applied to the collateral assets, which include Default Rate and Recovery Rate. According to the methodology, EJR converts the collateral assets into numbers of identical independent assets with the same default rate and recovery rate. The number of these converted assets is the Diversity Score.

### **4. The potential limitations of the credit rating as required by Paragraph (a)(1)(ii)(D) of Rule 17g-7:**

EJR's rating pertains solely to EJR's view of current and prospective credit quality. EJR's rating does not address pricing, liquidity or other risks associated with holding investments in the issuer. EJR ratings 1) Are not intended to address the value, price, price stability, liquidity, suitability, or merit of an investment. 2) Do not address investment merit, whether a particular rated security is suitable for a particular investor or suitable for an investor's risk tolerance. 3) Do not address whether the expected return of a particular investment is adequate for the inherent risk. 4) Do not address whether the market value of the security will remain stable over time. 5) Are not exact measures of the probability of default but are instead expressions of the relative credit risk of issuers and debt instruments. 6) Are not recommendations to buy, sell or hold any security.

### **5. Information on the uncertainty of the credit rating as required by Paragraph (a)(1)(ii)(E) of Rule 17g-7:**

EJR's rating is dependent on numerous factors including the reliability, accuracy, and quality of the data used in determining the credit rating. The data is sourced from issuers' publicly disclosed reports, or from third-party data vendors. For solicited rating reports, EJR may also use the information provided by the client. In some cases, the information is limited because of issues such as the lack of reported data. Such shortcomings are not always readily apparent. EJR aims to identify such shortcomings and make adjustments using its best judgement.

### **6. Whether and to what extent third-party due diligence services have been used in taking the rating action as required by Paragraph (a)(1)(ii)(F) of Rule 17g-7:**

EJR does not utilize third-party due diligence services.

### **7. How servicer or remittance reports were used, and with what frequency, to conduct surveillance of the credit rating as required by Paragraph (a)(1)(ii)(G) of Rule 17g-7:**

EJR did not conduct surveillance of this rating.

**8. A description of the data that were relied upon for the purpose of determining the credit rating as required by Paragraph (a)(1)(ii)(H) of Rule 17g-7:**

EJR uses a third-party data vendor obtain essential data for ratings on this ABS product.

**9. A statement containing an overall assessment of the quality of information available and considered in the credit rating as required by Paragraph (a)(1)(ii)(I) of Rule 17g-7:**

The information used in this analysis is generally of high quality.

**10. Information relating to conflicts of interest as required by Paragraph (a)(1)(ii)(J) of Rule 17g-7:**

This rating is unsolicited.

**11. An explanation or measure of the potential volatility of the credit rating as required by Paragraph (a)(1)(ii)(K) of Rule 17g-7:**

EJR's rating aims to assess the possible loss of investing in the obligations. Factors which affect such projection, and in turn EJRs rating, include changes in the credit worthiness of the collateral assets, changes in the correlation between them, and overall economic changes.

**12. Information on the content of the credit rating as required by Paragraph (a)(1)(ii)(L) of Rule 17g-7:**

1) Historical performance can be found on <https://portal.egan-jones.com/client/fast/clo.aspx> 2) As discussed in EJRs CLO Methodology, EJRs attempts to calculate the weighted average default probability of the portfolio by using EJRs Weighted Average Rating Score (WARS) approach. EJRs ratings of CLO tranches are based on the estimated losses (EL) generated by applying default scenarios based on likelihood of occurrence. However, EJRs credit ratings are not based on absolute measures of probability of default and expected loss. EJRs credit ratings are opinions about the relative creditworthiness of an entity or an instrument.

**13. Information on the sensitivity of the credit rating to assumptions as required by Paragraph (a)(1)(ii)(M) of Rule 17g-7:**

See the section in this report entitled "Stress Analysis".

**14. If the credit rating is assigned to an asset-backed security, a description of: (i) the representations, warranties, and enforcement mechanisms available to investors; and (ii) how they differ from the representations, warranties, and enforcement mechanisms in issuances of similar securities, as required by Paragraph (a)(1)(ii)(N) of Rule 17g-7: :**

Such information in this analysis is non-public. Hence EJRs has determined that this disclosure doesn't apply to this report.

## Disclaimer

**THIS RATING IS ISSUED IN RESPECT OF AN "ASSET-BACKED SECURITY". EGAN-JONES RATINGS COMPANY IS NOT REGISTERED AS A NATIONALLY RECOGNIZED STATISTICAL RATING ORGANIZATION IN RESPECT OF "ASSET-BACKED SECURITIES" AND THE RATING IS NOT BEING ISSUED OR MAINTAINED BY EGAN-JONES IN ITS CAPACITY AS AN NRSRO. EGAN-JONES MAKES NO REPRESENTATION OR WARRANTY THAT ANY SUCH NON-NRSRO RATING MEETS ANY CONDITIONS OR REQUIREMENTS FOR USE OF A RATING.**

## ATTESTATION FORM

In compliance with the US Securities and Exchange Commission (SEC) Rule 17g-7(a), the Egan-Jones analyst who published the report is responsible for the rating action and to the best knowledge of the person:

- 1) No part of the credit rating was influenced by any other business activities,
- 2) The credit rating was based solely upon the merits of the obligor, security, or money market instrument being rated, and
- 3) The credit rating was an independent evaluation of the credit risk of the obligor, security, or money market instrument.

### **Analyst Signature:**

THE QUANT TEAM

Date Prepared

04/01/23

### **Reviewer Signature:**

THE QUANT TEAM

Date Prepared

04/01/23