Residential Mortgage-Backed Securities (RMBS) Rating Methodology (Non-NRSRO)

Version 1

Board Approval Date: December 19, 2024

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 RMBS. 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 RMBS tranches are based on the estimated losses (EL) generated by applying historical default scenarios on the collateral pool. 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.

EJR conduct the historical study on the residential mortgage loan performance. To derive the historical residential mortgage default rate, EJR conducted the logistic regression on Freddie Mac single residential mortgage loans originated between 1999 and 2012. Several hundred originated loans were randomly selected for each quarter as the regression dataset. A loan is treated as default for the regression purpose when a loan becoming 180 days delinquent or more. (Note, we mainly discuss about the RMBS Prime transactions in this methodology. In the future, EJR may use the similar approach to derive historical residential mortgage default rate for Alt-A or Subprime transactions when performance data are available.)

When determining a loan's default probability, the most predictive variable is Loan-to-Value ("LTV") metric, calculated using the current estimated market value, discounted by any estimated overvaluation. The current estimated market value is based on the most recent appraised value for refinances or the purchase price. EJR uses S&P CoreLogic Case-Shiller U.S. National Home Price Index and conducts the linear regression to determine the long-term normalized home price index. If the home price index is higher than the long-term regression level, EJR views home price as overvalued at the period and discounts the property value of the underwritten mortgage loan to the long-term regression level, therefore adjusting LTV accordingly.

Based on the regression result, EJR identifies the following significant factors, which drives the default rate: original FICO, Adjusted Loan-to-Value, Debt-to-Income (DTI), Loan Term (months), Number of borrowers, Loan Purpose (New purchase, Re-finance Cashout or others), Occupancy Status (Primary residence or others), Origination Channel (Retail or others).

Logistic Regression:

$$p(x) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x)}}$$

Detailed steps as below:

I. Determine the Default Probability of Underlying Assets

By applying the regression formula, EJR assumes the future default probability will stand similarly with the historical performance and calculates the default probability of each current residential mortgage loan based on the original loan information.

The regression-derived PD assumption reflects the probability of a loan becoming 180 days delinquent or more. Historically, a meaningful percentage of loans that have "defaulted" per this definition have resolved without a loss. To reflect this, EJR adjusts each loan's regression-derived PD by a cure rate adjustment (CRA) based on the adjusted LTV.

II. Determine Stressed Loss Severity of Underlying Assets

EJR calculated the loss severity of each loan assuming the loan is being liquidated under a stress level. Each stress level has its own liquidation time assumption. The higher the stress level is, the longer the liquidation time is assumed. For example, for AAA stress level, it assumes 36 months to liquidate the property.

When determining the loss severity of each mortgage loan, EJR determines the distressed sale price, foreclosure and liquidation cost, advanced unpaid principal and interest, etc. The loss severity is also subject to a floor based on the stress level.

III. Determine Total Collateral Pool Loss Amount

With each loan's PD and Loss Severity calculated in the prior steps with unpaid loan balance, EJR calculates the loss dollar amount of the entire pool by summing up all loans' loss dollar amount.

$$\text{Pool Loss Amount} = \sum UPB_i * PD_i * LS_i$$

Where: i = Loan Asset i

IV. Determine Timing of Loss

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We may apply a number of scenarios for assumed default timing. EJR assumes three loss timing curves, i.e. front-loaded (losses in early months), middle-loaded (losses occur during the middle) and back-loaded (losses occur later). Each default timing allocates total collateral loss amount across 120 months. If any collateral loss amount is not allocated within the period, the loss curve will be scaled up to make sure all the Pool Loss Amount is allocated. The three loss timings are equally weighted.

V. Determine Prepayment Rate

The residential mortgage loans are usually prepaid ahead of the schedule, especially in the declining interest rate conditions. This fast prepayment would shorten the transaction life and lower the estimated loss as the cashflows would be received earlier. To be conservative in the rating perspective, EJR uses the conditional prepayment rate ("CPR") of 5% in the model. This could capture the losses in the later periods.

VI. Determine Interest Rate

In typical Prime RMBS transactions, the collaterals are generally fixed-rate residential mortgages where the tranches have the weighted average coupon from the collateral. In the case where significantly floating-rate assets or liabilities in a transaction, 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.

VII. Cashflow Model

We create a proprietary cashflow model to calculate the cashflow of the RMBS products. In the model, we build in the typical senior tranche and subordinated tranche tests in the Prime RMBS transactions to simulate the future cashflows under each scenario. The scenarios are created with the loss vectors combined with the prepayment assumptions in the prior steps. We may also use the data engine from a reliable third-party provider for the similar cashflow projections.

VIII. Estimated Loss

Estimated loss of each tranche in each scenario is 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)

Estimated loss of each tranche in a RMBS transaction is the weighted average loss the specific tranche experienced in each scenario. Under the same stress level, the loss timings are equally weighted.

$$EL_i = \sum_{j=1}^{N} \frac{Lj}{N}$$

Where: N = number of loss timing,
L_j = loss allocated to tranche I in loss timing j

We calculate each tranche's duration as the tranche life based on the tranche cashflows under certain stress level. EJR determines the life of each tranche as the tranche's largest duration among all stress levels with the floor of 1-year. 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 Property Value

EJR applies stress factors to the property value as market value discount ("MVD"). MVD reflects the homeowner's equity in the property and plays a crucial role in the PD and LS estimation historically. According to the regression result, the Loan-to-Value derived from the property value has significant impacts on the PD. The lower the property market value is, the higher of probability of default the mortgage loan has. In addition, the property market value has direct impact on LS estimation. The lower the property market value is, the less value the property can be liquidated and the higher of the estimated loss.

For structured finance obligations, we believe higher rated tranches should be able to withstand higher stress scenarios. We may apply a stress to the property value based on the

target rating category 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 stress level of AA assumption. If the tranche cannot pass the AA stress level, we will test the tranche under A stress level. The test will stop at the highest stress level that the tranche can stand with, and the rating of the tranche will be the rating related to the stress level. If the tranche cannot pass the lowest stress level, the tranche will be assigned the rating derived from the Estimated Loss. 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.

Other Considerations

When assigning a rating, EJR might conduct sensitivity analysis. For Prime RMBS transactions, the collateral is mostly fixed-rate home mortgages, and the liability coupon rate is the weighted average coupon from the collateral. There would be limited impact from the floating yield curve. In the case where significant floating assets or having floating tranches in the transaction, we might 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.

In general, the RMBS collateral pool is sufficiently diversified. EJR might adjust the probability of default of the collateral pool if the number of the pool assets is considered low compared to the comparable transactions.

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 RMBS-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 RMBS liabilities. The analysis includes modeling of a transaction's cash flows; reviewing the characteristics of the RMBS'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 RMBS, like that of any other obligation, is subject to uncertainty.