Prepayment and credit models provide a consistent and efficient analytical tool for modeling Non-Agency RMBS.

Experienced portfolio managers add their views and market insight to the process.
Loan Level Inputs to Performance Projections

Current status is the most important performance indicator

HPA and borrower/collateral credit characteristics continue to provide strong prediction power

Different product types, status, and seasoning have different parameters

Prepayment + Delinquency / Default + Severity

- TU Current Combined LTV
- TU Vantage score
- Incentive
- Credit Inquiries
- Loan Size
- TU revolving acct utilization
- TU Debt to Income estimator
- Penalty Term
- Housing Momentum
- ‘Waiting’ Value
- Spread at Origination
- BHS
- Age
- Purpose
- Seasonality
- IO/non-IO
- Reset Structure
- Delinquency rate
- TU revolving acct utilization
- TU Debt to Income estimator
- TU length of credit history
- TU co-borrower information
- Unemployment
- Age
- Documentation
- Purpose
- Payment Shock
- Spread at Origination
- Property Type
- Loan Size
- Occupancy
- Prepayment Speed
- TU Current Combined LTV
- TU Vantage score
- Month in delinquency
- Servicer’s liquidation timeline
- Credit burnout
- Judicial State
- Current First Lien LTV
- Loan Size
- Outstanding advance
- Advance Rate
- Month in delinquency
- Existing Home Sales
- Age
- Coupon
- Mortgage Insurance
- Judicial State
- Occupancy
- Loan Purpose

Deal Structure
Cash Flow Engine

Stop Advance
- Loan size
- Current LTV
- Month in delinquency
- Judicial state
- Servicers

Loan Modification
- Interest reduction
- Principal reduction
- Recap

TU = TransUnion®
**Dynamic Clustering**

Individual loans are bucketed into clusters

- A “smart bucketing” algorithm is developed to balance the cluster size vs cluster homogeneity

Clusters are based on dynamic variables such as seasoning, current status, and HPA, as well as static variables such as State, FICO, LTV, IO, etc.

Different clusters run through different models

### Dynamic Loan Clustering

**Today**

<table>
<thead>
<tr>
<th>Loans</th>
<th>Clusters</th>
<th>Model</th>
<th>Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan 1, Loan 2, Loan 3, Loan 4</td>
<td>CL01 (CC), CL02 (D3)</td>
<td>CC models, D3 models</td>
<td>Prepay, Default, Delinquency, Loss severity</td>
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**3 months later**

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Clusters with different seasoning/delinquency status map to different prepay and credit models.

All share the same severity model which projects the probability of short-sales vs REO liquidations.
Based on the empirical stop-advance rate by collateral types, the key drivers of the stop-advance model are:

- Current LTV
- Months in delinquency
- Loan size
- Servicers

Assumption is that stop-advance rates for IO loans are the same as amortizing loans, as the stop-advance rate for IO loans cannot be easily measured

Source: BlackRock Solutions and Loan Performance
Liquidation type (short sale, FCL, or REO) has a large impact on loss severity.

The empirical liquidation distribution and estimated months in delinquency are used to project the loan’s probability of each liquidation type.

- The top chart shows the likelihood of liquidation from short sale, foreclosure or REO by months in delinquency for Alt-A loans.
- The bottom chart shows the difference in servicer behaviour:
  - Some servicers perform short sales more aggressively than the average among servicers.
- Models use months in delinquency to project the liquidation type probabilities going forward and take servicer differences into consideration.

Source: BlackRock Solutions and Loan Performance
Loss severity model combines accounting and statistical components

\[
\text{Loss Severity} = \left( \frac{UPB - Sale\ Proceeds}{UPB} \right) + (P&I\ Advance) + Liquidation\ Cost - PMI + \text{Statistical Factors}
\]

Statistical factors are used to capture variation due to factors outside the accounting model:
- Liquidation type, collateral type
- Occupancy, bankruptcy, loan purpose
- Geographic factors, property type
- Current delinquency status

Updates have been made to both accounting and statistical factors:
- Upward adjustment on loss severity for REO loans
- Increased liquidation costs as a function of projected months in delinquency
- Advancing history for the loan is used to estimate outstanding advancing
The modified loan model suite contains:

- Model to project delinquency and default on previously modified loans
- Model to project future modifications
- Adjustments to the prepayment model

The model for existing modifications is fully integrated into the seasoned loan framework

- Separate delinquency projections for current clean, current dirty, 30-day delinquent, 60-day delinquent, 90+ day delinquent
- The standard prepayment model is dialed to account for slower prepayments among modified loans

Future modifications are projected based on collateral type and delinquency status

- Calibrated to recent modification trends
- Modification rates vary across deals given their delinquency distribution

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Source: BlackRock Solutions and CoreLogic
Important Notes

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