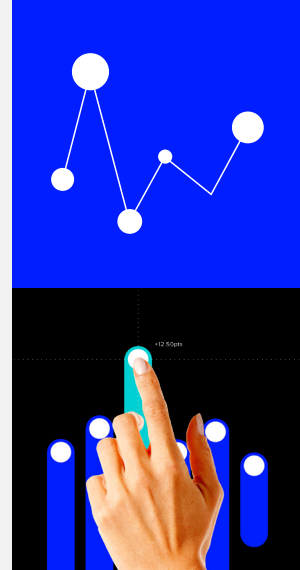


LSEG Yield Book Non Qualified Mortgage Model



Overview

LSEG Yield Book has a well-established reputation in the US Non-Agency (NAGY) RMBS space and is recognized and trusted by the industry. We currently cover a range of segments within NAGY RMBS including Non-QM, which is a critical subset. With a deal coverage of over 90%, we provide enhanced cashflow projections and analytics for these securities including Price/Yield, OAS, risk metrics, scenario analysis, collateral analysis and actual vs projected CPRs and CDRs. These are available through all of our offerings – Yield Book Classic, Yield Book Add-in and the Analytics API.

We are pleased to announce the addition of Non-QM to our suite of credit and prepayment models. The Non-QM offering is comprised of a set of 3 models fit over extensive borrower loan and property level data – these include the Voluntary Prepayment model, Credit Roll Rate for Delinquencies and Defaults and the Loss Severity model.

Our offering

Comprehensive coverage

We provide extensive cashflow and analytics coverage in the Non-QM space. Please see below for a snapshot of our Non-QM deal coverage by vintage.

Vintage	Deal Count	RPB (MM \$'s)	Loan Count (K)	WAC	FICO	CLTV	DTI	% Full Doc	% Investor Property	% ARM
2019	36	\$3,248	12.8	6.35	729	68	35	30%	32%	44%
2020	56	\$5,465	15.1	5.86	729	69	33	39%	36%	39%
2021	94	\$17,071	42.2	5.48	737	70	34	13%	38%	24%
2022	113	\$34,081	75.9	5.29	740	71	33	11%	46%	11%
2023	95	\$28,332	87.9	7.59	737	71	34	14%	39%	17%
2024	71	\$24,996	116	8.39	742	70	35	22%	35%	11%
Overall	473	\$113,821	352	6.37	737	70	34	19%	39%	21%



New non-QM model

The Non-QM model is designed with three key components – the Voluntary Prepayment model, the Credit Roll Rate for Delinquencies and Defaults and the Loss Severity model. Each model is fit over a dataset of ~425k Non-QM loans originated after 2016. The models also consider key market indicators as well as regulatory practices within the space.

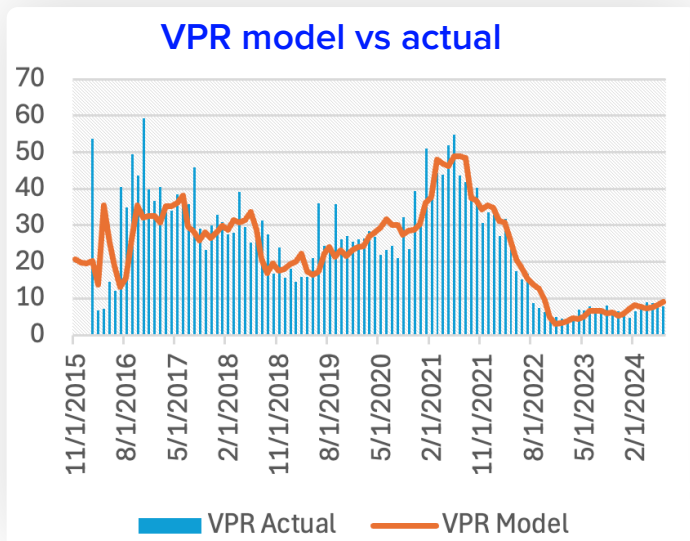
Voluntary prepayment model:

To determine VPRs, the model uses borrower and loan data from trustees, security pricing and loan level data vendors. It incorporates collateral indicative data such as loan purpose, occupancy, PMI coverage fraction, SATO, Credit Score, LTV, DTI, loan size and geography and economic drivers such as primary and secondary mortgage rates, HPA, unemployment etc. A simulated environment is used to compute complex analytics such as OAS.

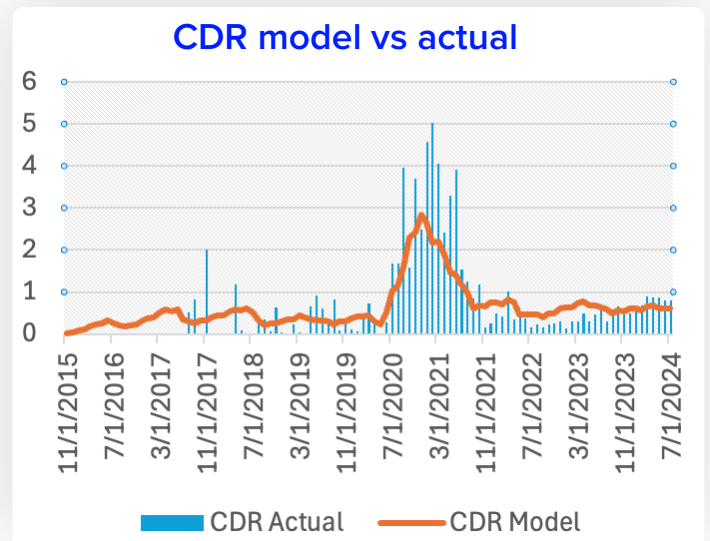
Credit-roll rate model:

To predict delinquencies and CDRs, a roll-rate model methodology has been utilized. This method has been highly popular since the mid-2000s for projecting legacy sub-prime, Alt-A and jumbo mortgage delinquencies and defaults and we have built upon the framework for Non-QM deals. The framework allows for a trade-off between flexibility of formulation and computational complexity while the transition-of-state approach allows for a blend of prior payment trends of exact collateral with key loan indicatives such as loan age, current LTV, DTI, FICO, SATO and Non-QM specific features such as DSCR, time since last bank statement as well as economic drivers such as seasonality unemployment and HPA.

Please see a comparison on VPR and CDR results:



Source: LSEG Yield Book.



Source: LSEG Yield Book.

Loss severity model:

To predict loss given default, we utilize a blended approach where we combine three possible liquidation statuses: Short-sale, Foreclosure sale and REO after predicting the likelihood of each as function of indicatives and economic drivers.

Model integration with existing analytics

The outputs of the models are monthly VPR (annualized monthly voluntary prepayment rate), CDR (annualized monthly involuntary prepayment rate) and a final loss projection which are consumed by the Yield Book cash flow engine to generate security cash flows as well as analytical results for Non-QM bonds. We have closely mimicked the existing workflow for other Non-Agency RMBS models such as the Alt-A and Sub-Prime/Prime/Jumbo Prime for seamless model integration.

In Yield Book Classic, the user can select the Non-QM model by going to screen below and selecting 'Pre-Experimental Model (V97)' from the drop-down as well as checking the boxes highlighted below:

The screenshot displays the LSEG Yield Book software interface. At the top, there is a navigation bar with buttons for 'Close Book', 'Table of Contents', 'Turn to: 2.6', '+', 'Curve Analysis', 'PY Calc', 'LSEG Yield Book', 'Kwrd Setup', 'Pricing Setup', 'Scenario Setup', 'Cash Flow Setup', 'Report Display', and 'Copy Display'. The main window contains a text area with a disclaimer: 'THIS MODEL IS NOT INTENDED FOR PRODUCTION USE. IT IS FOR ALPHA TESTING PURPOSES ONLY, AND WAS NOT REVIEWED OR TESTED BY ANY MODEL USERS PRIOR TO RELEASE. IT MAY CONTAIN MATERIAL ERRORS AND MAY NOT BE STABLE. IT IS SUBJECT TO CHANGE WITHOUT NOTICE AND IS LIKELY TO CHANGE SIGNIFICANTLY DURING ITS TESTING PERIOD. COMMENTS ARE WELCOME AND SHOULD BE SENT IN WRITING TO YIELD BOOK'S HELP DESK AT HOWTO@YIELDBOOK.COM. NOT ALL COMMENTS WILL RECEIVE A RESPONSE.' Below this, there are three sections of major changes:

- 20240801 Major Changes vs. Prior Production Model (v23.1) -- Legacy Non-Agency Model:**
 - * Credit refl curve adjusted lower, particularly for the borrowers with high significant disincentive
 - * The re-setting WAC for legacy ARM loans adjusted based on % modification for each repline
 - * Recalibration of roll rate model to be consistent with actual delinquency post COVID
 - * Liquidation rates that had dropped significantly due to foreclosure moratorium and forbearance programs during COVID were adjusted to increase and be peaked
 - * The loss severity model adjusted higher for subprime
- 20240801 Major Changes vs. Prior Production Model (v23.1) -- New-Issue Non-Agency Prepayment Model:**
 - * Adjusted the non-agency jumbo spread to 25bps
- 20240731 Major Changes vs. Most Recent (07/22/2024) Pre-Experimental Model Release (v97) -- Agency Prepayment Model:**
 - * FHFA purchase only HPA base case projection 5% for Q2-Q4 2024; 3% 2025; 0% 2026; and 3% thereafter
 - * Prior v97 projection was 4% for Q2-Q4 2024; 1.5% 2025; 0% 2026; and 3% thereafter
 - * Projection was updated in light of FNMA's latest Economic and Housing Outlook, published on July 15
 - * Seasoned GNMA turnover moderated further to better align with actuals; also slows future turnover on newer cohorts

Below the text area is a configuration section with various options:

- Supply Model Selection:** A dropdown menu is set to 'Pre-Experimental Model (V97) - 08/01/24'.
- MOATS:**
 - MOATS
 - Sprd(Swap)
 - Sprd(Tsys)
 - MOATS(Tsys)
 - Sprd(Mean)
 - EXP month
 - LIN mean
- Other Options:**
 - 1000 Paths For CMOs
 - 5 Point Convexity For CMOs
 - Term/Life VPR/CDR/LS
 - Z-Spread/Curve Durations
 - SBA Incl Prepay Penalty
 - Excl Trusts in IOPO Brkeven
 - Adjust HECM Status
 - CoreLogic Coll For NAGY
 - Model Coll Haircut Vectors
 - Model Subseq Recrvy Vectors
 - Model Loan Mods
 - Model Forbearance Recrvy
 - CoreLogic Group-Level Model
 - Stochastic HPA (Non-Ag/CRT)
 - Agency MF Prepay Penalty
 - Deliverable Pool Logic
 - TBA Back Settle Logic
 - No Opt LTCPR for GNPL
 - Non Default CC Rates
 - V97 NAGY Use Non-QM

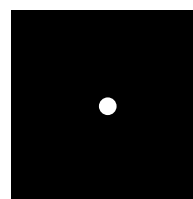
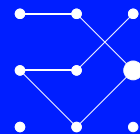
At the bottom, there is a navigation bar with buttons for 'Mail', 'Tsy/Corp', 'Mtg Generic', 'CMO', 'ABS', 'CMBS', 'YbPort', 'PortAnalysis', 'RetAtt', 'HistData', 'Futures', 'Mtg Pool', 'IntRateSwap', 'StrNote', 'Cap/Floor', 'Sector Files', 'RptPkg', and 'Batch'. Below this, there are several panels: 'Manifolds' (Pre Exp (V97)), 'Yield Curve Monitor' (Prepay Dials, Official Model, User Model 1), 'CMBS Dials' (USD Vols, Mtas LMM SOFR (New), Derivs 1-factor, Bonds 1-factor, Mtuic 1-factor), 'Messages' (0), 'Print Graph', 'Print Screen', 'Email', 'Copy', 'Print', 'B/W', and 'Color'.

Source: LSEG Yield Book. For illustrative purposes only.

In Yield Book Add-in, the user can achieve the same by selecting the 'PreExpModel' from the drop-down as well as checking/selecting the boxes highlighted below:

Bond Inputs	Pricing Inputs	Output
Bond/Portfolio Id(s) \$C\$3	Curve Type \$C25	Keyword OAS
Level \$C\$4	Curve Date AI24	CDSAdjustedOAS
Settlement Date AI26	Volatility Type AI27	ForwardPathTargetOASVlet
Prepay Type PreExpModel		ForwardPathZeroOASVlet
Prepay Rate(s) AJ28		OAS
		OASLiquidityRatio
<input type="checkbox"/> User Data*		<input type="checkbox"/> Place keyword label above formula
<input checked="" type="checkbox"/> Calculation Options*		
<input type="checkbox"/> Partial Index Sprd Durs (4 point) <input type="checkbox"/> Partial Index Sprd Durs (/ pt)		
Floater Options: <input checked="" type="checkbox"/> Forward Index 0 +shift <input type="checkbox"/> Calc Fix-to-Fit to Maturity/Call Date		
MBS Options:		
Model Options: <input type="checkbox"/> Non-Ag/CRT: Use Stochastic HPA <input type="checkbox"/> Non Default CC Rates <input type="checkbox"/> TBA Back Settle <input type="checkbox"/> CC Sprd To Swap <input checked="" type="checkbox"/> Use Deliverable Pool Logic		
<input checked="" type="checkbox"/> V97 NAGY Use Non-QM		
Other Options:		
<input type="checkbox"/> CMO 1000 Paths	<input checked="" type="checkbox"/> Model Projections	<input type="checkbox"/> CMO OAS to Call
<input type="checkbox"/> CMO 5pt Convexity	<input type="checkbox"/> OAS Path Data	<input type="checkbox"/> Do Not Calc CMO OAS
<input type="checkbox"/> New Partial Durations	<input type="checkbox"/> Index Duration	<input checked="" type="checkbox"/> CMO OAS Only
<input type="checkbox"/> Draw Rates	<input type="checkbox"/> Calc LOGN Vega with NORM Vol	<input type="checkbox"/> Roll Rate Model Projections
	<input type="checkbox"/> Curve Lookback	<input type="checkbox"/> Volatility Lookback
		<input type="checkbox"/> CCOAS Lookback
		<input type="checkbox"/> Basis Lookback
		<input type="checkbox"/> Call Underlying Remics
		<input type="checkbox"/> Stepdown Fail
		<input type="checkbox"/> FFND Spread Dur
		<input type="checkbox"/> Forward Path OAS
		<input type="checkbox"/> Ignore CMBS PP Penalty
		<input type="checkbox"/> YC Margin Only
		<input type="checkbox"/> SBA Ignore PP Penalty
		<input checked="" type="checkbox"/> CoreLogic Group-Level Model
		CoreLogic Coll for non-AG Models
		Use

Source: LSEG Yield Book. For illustrative purposes only.



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