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## RATING METHODOLOGY

# FHA-VA US RMBS Surveillance Methodology

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This rating methodology replaces *FHA-VA US RMBS Surveillance Methodology* published in February 2019. We added a footnote for further transparency on our approach to monitoring transactions, and we made limited editorial updates. The updates do not change the substantive approach of the methodology.

## Summary

This methodology describes our approach for monitoring US residential mortgage-backed securities (RMBS) backed by Federal Housing Administration (FHA) and Department of Veterans Affairs (VA) loans typically originated before 2008.

For seasoned transactions that have significant performance information available, and which have been exposed to significant declines in home prices and increases in unemployment (such as the transactions originated prior to 2008), we can leverage the available performance information for our analysis. In these circumstances, borrowers' payment patterns are usually better predictors of default than initial loan credit characteristics that have not been updated or reviewed for reliability by an independent third party.

Our methodology in monitoring securities backed by FHA-VA mortgage loans is based on our estimate of the expected loss on the transaction's loan pool(s) and our assessment of the credit enhancement available at each rating level.

We base the expected loss on the collateral pool(s) on the observed performance and on our assumptions regarding future delinquencies, default rates, loss severities and loan modifications.

To arrive at a rating, we compare the expected losses to the total available credit enhancement (CE) for each bond, including excess spread, subordination, overcollateralization and any external support.

As with all rating methodologies, in applying this methodology, where appropriate, we consider all factors that we deem relevant to our analysis. In addition to these quantitative assessments, our rating analysis also considers various qualitative factors. If for instance, actual performance or performance trends are not in line with the assumptions described in this methodology, we may reflect that in our analysis.

## Overview of FHA and VA Loans

### FHA Loans

The Federal Housing Administration (FHA) is a federal agency within the Department of Housing and Urban Development (HUD). An FHA loan is a mortgage loan issued by an FHA-approved lender and insured by the FHA. The FHA mortgage insurance program, which protects the lenders against losses on defaults, is primarily used by first-time homebuyers. The FHA insurance covers 100% of the principal amount of the loans and most of the lost interest and foreclosure expenses on defaulted loans. Upon a foreclosure sale, when free and clear title is obtained on the property and the property has been vacated, it is then typically conveyed to HUD. In some cases, servicers can also file claims with HUD without conveyance of title.

The FHA insurance provides lenders with protection against losses and is fairly comprehensive, as detailed in Exhibit 1.

#### EXHIBIT 1

#### Typical FHA Insurance Coverage

Principal	100% of the outstanding principal amount at the time of default <sup>[1]</sup>
Interest	The FHA pays interest from the time the loan is deemed to be in default through the claim date at a rate equal to the applied debenture rate <sup>[2]</sup>
Expenses	2/3 of eligible foreclosure expenses

[1] The date of default is 30 days after the first uncorrected failure to perform any obligation under the mortgage; or the first failure to make a monthly payment which subsequent payments by the borrower are insufficient to cover when applied to the overdue monthly payment in the order in which they become due.

[2] The debenture rate is the rate set by FHA twice a year, on January 1 and July 1 and is based on the yield of US Treasury securities adjusted to a constant maturity of 10 years. This rate is generally lower than the mortgage note rate. For loans originated before 2004, the applicable debenture rate is the debenture rate in effect at the date of either the insurance commitment or the endorsement for insurance, whichever is higher. In 2004, the FHA changed the method of determining the interest paid on mortgage claims. The debenture rate for any loan endorsed for FHA insurance after 23 January 2004 is based on the debenture rate in effect at the time of mortgage default, rather than the rate in effect at the time of mortgage origination.

Source: Moody's Investors Service

Given the broad FHA guarantee, loss severities on liquidated FHA loans have generally been relatively low and primarily driven by losses due to the prevailing debenture rate, foreclosure costs, and foreclosure timelines. The FHA changed the debenture rate calculation in 2004, and the difference between the mortgage note rate and the interest rate paid by the FHA has widened for loans originated in 2004 and later. This difference, which is passed as loss to the securitization trust, increases loss severities for loans originated post 2003.

While FHA loans are broadly subject to the same foreclosure process as non-FHA-VA loans, foreclosure timelines for these loans can run long for borrowers in bankruptcy or if servicers are pursuing loss mitigation plans with the borrower. Foreclosure costs can also run high if the property is in a severely damaged condition or does not meet FHA's requirements for conveyance of property to HUD.

FHA loans experience losses from interest and expenses typically not covered by FHA. The exception rate refers to the proportion of loans that experience losses in excess of this uncovered amount either because HUD rejects the claim or because servicers pass through costs to the trust that they believe have reasonably incurred. The exception severity refers to the losses in excess of the uncovered amount, in the case of an exception. We typically incorporate an assumption on the exception rate and exception severity in estimating losses on FHA-VA transactions, which is further described in the methodology section below.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the ratings tab on the issuer/entity page on [www.moodys.com](http://www.moodys.com) for the most updated credit rating action information and rating history.

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## VA Loans

The Department of Veterans Affairs (VA) is a cabinet-level agency of the US federal government. The VA Home Loan Guarantee Program encourages mortgage lenders to offer long-term, low down-payment financing to eligible veterans by partially guaranteeing the lender against loss upon foreclosure.

VA loans allow a veteran, or in certain circumstances, a veteran's spouse, to obtain a partial mortgage loan guarantee from the VA for the purchase of a home. Under some scenarios, a borrower can qualify for a mortgage with no down payment (i.e. a borrower can obtain 100% financing).

Unlike the FHA insurance, the VA guarantee on these loans is only partial and based on the loan exposure amount. This exposure amount is commonly calculated as the lesser of either the sum of the current loan amount, accrued and unpaid interest, and eligible foreclosure expenses, or the original loan amount. Moreover, the VA guarantee coverage is lower for higher property values.

Due to the partial nature of the VA guarantee, losses on these loans are typically higher than those of FHA loans. Also, during periods of declining home prices, loss severities on VA loans rose much higher than comparable FHA loans.

The mix at origination between FHA loans and VA loans in the transactions originated prior to 2008 that we monitor has averaged approximately 80% FHA loans and 20% VA loans.

## Loss Methodology

Our loss projection approach for FHA-VA transactions is similar to the approach that we use for the rest of our RMBS portfolio. We first forecast future delinquency rates based on pool-specific performance and economic trends to come up with pool-specific lifetime default rates, and second, calculate loss severities based on the interest and expenses that are not covered by the FHA and VA insurance as well as our assumptions on the exception rate. We then apply the loss severity assumptions to the lifetime default rate to arrive at the loss projection.

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## Loss Projection Approach

We perform our delinquency projection approach in four steps:

- » *Step 1:* We first calculate the annualized rate at which current or 30 days delinquent loans became seriously delinquent during the past 12 months (the rate of new delinquencies). In this step we treat modified loans as delinquent and increase the observed rate of new delinquencies by the observed rate of modifications.
- » *Step 2:* We then project future annual delinquencies for eight years by applying sector-specific burnout<sup>1</sup> factors to the rate of new delinquencies that we calculated in Step 1. The burnout factors reflect our expected change in future economic and housing conditions.
- » *Step 3:* We then aggregate the delinquencies and convert them to losses by applying pool-specific lifetime default frequency and loss severity assumptions. Total defaults consist of delinquency pipeline-implied defaults from current delinquencies and projected future defaults (calculated in Step 2). We project pool-specific severities based on assumptions specific to FHA-VA loans and rolling averages of loan-level severities.

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<sup>1</sup> The delinquency burnout factor is the percentage of the baseline delinquency rate that will be used for a given period. A higher burnout factor means we are using a higher percentage of the baseline rate of new delinquencies for that period.

- » *Step 4:* We reduce our cumulative loss estimates to account for the positive impact of successful loan modifications.

### Step 1: Measuring the Rate of New Delinquencies

To forecast future defaults, we first calculate the rate of new delinquencies that occurred over the past 12 months. The rate of new delinquencies is the annual change in serious delinquencies over this period divided by the balance of loans that were contractually current or 30 days delinquent at the beginning of that period. We then add the observed rate of modification activity to this observed rate of new delinquencies. This adjustment attempts to capture the amount of at-risk (i.e. modified) loans that are missing from the delinquency buckets by virtue of having been modified. While loan modification increases the likelihood of a loan curing, the overwhelming determinant of loan repayment is whether the loan has ever been delinquent. We therefore calculate a true rate of at-risk loans and give modified loans some degree of performance benefit at a later stage.

### Step 2: Calculating Future Delinquencies

After calculating the rate of new delinquencies over the past year (as described in Step 1), we apply annual delinquency burnout factors<sup>2</sup> as shown below in Exhibit 2 to forecast the rate of new delinquencies in future years. Each burnout factor is an expectation about the persistence of the current new-delinquency rate. A burnout factor for the rate of new delinquency for year two of 85% is an expectation that in year two the prevailing rate of new delinquencies will be 85% of the current rate of new delinquencies calculated in Step 1. We typically forecast burnout factors for the next eight years based on long-term macroeconomic and default forecasts, incorporating projections from our macroeconomic assumptions and other relevant sources.

EXHIBIT 2

#### Typical Annual Delinquency Burnout Factors

Year

Burnout Factor

1-2	100%
2-3	85%
3-4	75%
4-8	70%

Source: Moody's Investors Service

### Step 3: Calculating Losses from Delinquencies

We estimate future pool losses by aggregating three values: (1) losses from the currently delinquent loans, (2) losses due from projected delinquencies, and (3) post-projection-horizon losses.

To obtain losses due to the delinquency pipeline we first calculate defaults by applying lifetime default frequencies ("roll rates") to the delinquency buckets. Exhibit 3 lists our typical lifetime roll-rate assumptions. These roll rates indicate the percentage of borrowers in each delinquency bucket that we expect will ultimately default. The more severe the delinquency, the lower the likelihood of curing, and the higher the roll rate. Once we obtain the defaulted balance, we apply a liquidation severity. We explain the calculation of loss severity in the next section "Calculating Loss Severity."

<sup>2</sup> The delinquency burnout factor is the percentage of the baseline delinquency rate that will be used for a given period. A higher burnout factor means we are using a higher percentage of the baseline rate of new delinquencies for that period.

Losses due to projected delinquencies are the realized losses on the future delinquent balances calculated in Step 2, above. We assume that a large percentage of these projected delinquent balances will ultimately default. We apply a liquidation severity to these defaulting balances to calculate losses.

Post-projection-horizon losses occur after the eighth year. At this point only a fraction of the pool will remain and, as the macroeconomy stabilizes, subsequent pool losses will likely be much smaller. We assume subsequent losses of 3% of the outstanding balance.<sup>3</sup>

We obtain the total projected realized losses by combining the losses that these three sources generate.

#### EXHIBIT 3

##### Typical Lifetime Roll Rates

60 – 89 Days Delinquent	65%
90+ Days Delinquent	80%
Foreclosure	90%
Real Estate Owned (REO)	100%

Source: Moody's Investors Service

#### CALCULATING LOSS SEVERITY

We generally obtain the loss severity by taking a simple average of the actual severity and loan level estimated severity. If we do not have an adequate sample of loans that defaulted in the recent preceding months to calculate the actual severity, we include a global severity assumption in the average or we use the actual loss severity from similar pools as a proxy.

1. We calculate the loan level estimated severity based on the assumptions discussed in the section "severity assumptions."
2. The actual severity is the most recent observed average severity on defaulted loans in the pool with a particular focus on most recent severity performance in the preceding 12-month period. We attempt to eliminate any data anomalies by subjecting this estimate to a floor and a cap based on the pool's vintage.
3. Our global severity assumption, which historically has been 12% based on assumptions outlined in Exhibits 4 and 5, may be adjusted upward if delinquency pipelines, servicing strategy and self-curtailments or the underwriting quality deviate from those expectations.

#### SEVERITY ASSUMPTIONS

The loss severity on a defaulted FHA loan is typically equal to the interest and expenses not covered by the FHA insurance and generally includes:

1. One-third of eligible foreclosure costs.
2. The excess, if any, of the amount of interest calculated at the mortgage rate over the amount of interest calculated at the debenture rate (over the period from the claim date to the property liquidation date).
3. Interest for 60 days: The FHA pays interest from the time the loan is deemed to be in default, which is typically 30 days after the first uncorrected failure to perform any obligation under the mortgage, so 60 days after the borrower's first missed payment. Hence we expect the securitization trust to absorb losses due to unpaid interest for an average of about 60 days.

<sup>3</sup> Note, this is a projection of losses, not of defaulting balance.

To calculate our expected, or B2 (sf)-rating level, severity on pre-2004 loans, we assume a total foreclosure expense of \$3,000. Aaa (sf) stresses assume foreclosure costs to be \$6,000 and foreclosure timelines to be 36 months. In estimating the interest expense, we use average FHA values of a 7.0% mortgage coupon, 6.0% debenture rate, and a two-year foreclosure timeline.

To account for the high volatility in loss severity for these transactions, we increase the exception rate from 5% at the B2 (sf) rating level to 35% at the Aa2 (sf) rating level and 50% at the Aaa (sf) rating level. We increase the exception severity from 60% at the B2 (sf) rating level to 85% at the Aaa (sf) rating level. Our expected severity (as shown in Exhibit 4 below) for pre-2004 FHA loans is 7.28%. But the severity is significantly higher at a Aaa (sf)-rating level (45.92%).

For loans originated during 2004 and after, the FHA calculates interest at a debenture rate at the time of the claim (as opposed to the origination date for loans originated before 2004). In calculating our expected, or B2 (sf)-rating level, severity for these loans, we apply the debenture rate of 3.875%. These loans also had a lower initial coupon rate than those originated before 2004. We also stress the debenture rate at higher rating levels to account for possible declines in interest rates in addition to the other stresses that we apply on pre-2004 loans. Incorporating these changes, our final severity estimate for FHA loans originated during 2004 and after (as shown in Exhibit 5 below) is 9.67% at the B2 (sf) rating level and 49.53% at the Aaa (sf) rating level.

In addition to the above assumptions, in assessing severities on FHA-VA loans, we further consider several other factors such as performance of the servicer, collateral characteristics, and potential for Truth in Lending Act (TIL-A) violations for the underlying loans. We also consider the sensitivity of projected losses to several credit metrics to determine the final ratings, such as higher severities for either aged delinquent loans or higher proportion of VA loans.

## EXHIBIT 4

## FHA Severity Calculation Across Different Rating Levels – Pre 2004\*

## A) Non-Exceptions

			B2 (sf)	Ba2 (sf)	Baa2 (sf)	A2 (sf)	Aa2 (sf)	Aaa (sf)	
Foreclosure Expenses	A	Total Foreclosure Expenses	\$3,000	3,500	4,000	4,500	5,000	6,000	
	B	1/3 of FC Expenses \$ Not Covered	\$1,000	1,167	1,333	1,500	1,667	2,000	$B=A*(1/3)$
	C	Average Loan Amount	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	
	D	1/3 of FC % of Loan Amount	1.33%	1.56%	1.78%	2.00%	2.22%	2.67%	$D=B/C$
Interest Expense	E	Average Coupon 1998-2003	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	
	F	Debenture rate	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	
	G	Difference between Coupon and Debenture Rate	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	$G=E-F$
	H	FC Timeline, years	2.00	2.20	2.40	2.60	2.80	3.00	
2 Months Interest	I	Interest Expense	2.00%	2.20%	2.40%	2.60%	2.80%	3.00%	$I=G*H$
	J	2 Months Interest Not Covered	1.17%	1.17%	1.17%	1.17%	1.17%	1.17%	$J=E*2/12$
	K	Non-Exceptions Severity	4.50%	4.92%	5.34%	5.77%	6.19%	6.83%	$K= D + I + J$
B) Exceptions									
	L	Exceptions %	5.0%	7.0%	9.0%	25.0%	35.0%**	50.0%***	
	M	Exceptions Severity	60.0%	65.0%	70.0%	75.0%	80.0%	85.0%	
	N	Total FHA Severity	7.28%	9.13%	11.16%	23.08%	32.02%	45.92%	$N = (100\% - L) * K + L * M$

\* Severity calculations may be adjusted upward for severely delinquent loans based on a qualitative assessment

\*\* Roughly a third of the defaulting loans are exceptions

\*\*\* Roughly half of the defaulting loans are exceptions

Source: Moody's Investors Service



## EXHIBIT 5

## FHA Severity Calculation Across Different Rating Levels – 2004 and After\*

A) Non-Exceptions		B2 (sf)	Ba2 (sf)	Baa2 (sf)	A2 (sf)	Aa2 (sf)	Aaa (sf)	
Foreclosure Expenses	A	Total Foreclosure Expenses	\$3,000	3,500	4,000	4,500	5,000	6,000
	B	1/3 of FC Expenses \$ Not Covered	\$1,000	1,167	1,333	1,500	1,667	2,000 B = A*(1/3)
	C	Average Loan Amount	\$75,000	\$75,000	\$75,000	\$75,000	\$75,000	
	D	1/3 of FC % of Loan Amount	1.33%	1.56%	1.78%	2.00%	2.22%	2.67% D = B/C
Interest Expense	E	Average Coupon 2004-2007	6.20%	6.20%	6.20%	6.20%	6.20%	
	F	Debenture rate	3.875%	3.650%	3.425%	3.200%	2.975%	2.750%
	G	Difference between Coupon and Debenture Rate	2.33%	2.55%	2.78%	3.00%	3.23%	3.45% G = E-F
	H	FC Timeline, years	2.00	2.20	2.40	2.60	2.80	3.00
2 Months Interest	I	Interest Expense	4.65%	5.61%	6.66%	7.80%	9.03%	10.35% I = G*H
	J	2 Months Interest Not Covered	1.03%	1.03%	1.03%	1.03%	1.03%	1.03% J = E*2/12
K		Non-Exceptions Severity	7.02%	8.20%	9.47%	10.83%	12.29%	14.05% K = D + I + J
B) Exceptions								
	L	Exceptions %	5.0%	7.0%	9.0%	25.0%	35.0%**	50.0%***
	M	Exceptions Severity	60.0%	65.0%	70.0%	75.0%	80.0%	85.0%
	N	Total FHA Severity	9.67%	12.17%	14.92%	26.88%	35.99%	49.53% N = (100% - L)*K + L*M

\* Severity calculations may be adjusted upward for severely delinquent loans based on a qualitative assessment

\*\* Roughly a third of the defaulting loans are exceptions

\*\*\* Roughly half of the defaulting loans are exceptions

Source: Moody's Investors Service

## VA LOANS

Since VA loans are only partially guaranteed, the average loss severity and the variability of the loss severity of VA loans are greater than those of FHA loans. The loss severity on VA-guaranteed loans is affected by the property value and the loan-to-value (LTV). Assuming that VA loans before the VA guarantee have the same severities as subprime loans, the VA loss is the difference between the severity on a comparable non-insured loan and the applicable VA guarantee coverage.

Exhibit 6 details our assumption on VA severity for the B2 (sf) through Aaa (sf) rating levels. We expect a loss severity of 25% (an initial loss severity of 65%, of which 40% will be covered by the VA (sf) guarantee) at the B2 (sf) rating level and a loss severity of 50% at Aaa (sf) rating level.

## EXHIBIT 6

## Example of a Typical VA Severity Calculation Across Different Rating Levels

VA Severity		B2 (sf)	Ba2 (sf)	Baa2 (sf)	A2 (sf)	Aa2 (sf)	Aaa (sf)	
A	Non-Insured Severity (Subprime)	65%	70%	75%	80%	85%	90%	
B	VA coverage	40%	40%	40%	40%	40%	40%	
Severity after VA coverage		25.0%	30.0%	35.0%	40.0%	45.0%	50.0%	C=A-B

Source: Moody's Investors Service



### **SURVEILLANCE CONSIDERATION OF LONGER TERM DELINQUENT FHA-VA LOANS**

A transaction's performance and bond ratings could be sensitive to the length of delinquencies, future trends of claim denials by HUD and self-curtailment of claims by servicers.

- » Longer-term delinquencies may be the result of extended foreclosure timelines, particularly in judicial US federal states, or the consequence of loans with documentation issues precluding property foreclosure and vacancy, which are prerequisites for a HUD insurance payout.
- » A high number of claim denials by HUD can increase loss severity significantly, resulting in higher losses for a transaction.
- » A servicer may choose self-curtailment of claims to avoid or limit penalties stipulated by HUD. Self-curtailment could be for example chosen when delinquent loans have not been serviced in line with regulations, namely an incomplete servicing chronology, incomplete default and foreclosure file, which could lead to foreclosure costs in excess of the FHA or VA applicable limits.

When pools contain seriously delinquent loans that remain unresolved over an extended period, i.e. beyond our typically expected foreclosure horizon set forth in Exhibit 4 and 5, we will qualitatively assess and likely increase our loss severity assumption. The qualitative assessment would take into account an expected increase in related expenses that may not be covered by the relevant insurance as well as /or an increased likelihood that a servicer would not submit the claim to HUD and instead would pass the loss to the transaction, resulting in losses that could be equal or in excess of a defaulted loan balance. In certain instances, we may complement this assessment with a sensitivity analysis.

#### **Step 4: Modification Adjustment**

To assess the impact of modifications on pool losses we:

- » Estimate the number of borrower defaults that loan modifications will prevent. Loans in REO status are not eligible to be modified and we assume that only 30%-50% of the loans in foreclosure are eligible for modification.
- » Apply the percentage of eligible defaults likely to be modified. We base these on actual observed modification rates for the different sectors.
- » Estimate the success rate of modifications by applying the re-default rate on the total modifications.

### **Structural Analysis and Ratings**

For FHA-VA transactions, we estimate average severity and default rates separately to determine collateral losses for each rating level. We compare total credit enhancement (CE) for a bond, including excess spread, subordination, and overcollateralization to that required for each rating level. A tranche's rating is the highest level for which it has adequate enhancement.<sup>4</sup>

Exhibits 4 and 5 show our severity assumptions for each rating level. For defaults, we first estimate Aaa (sf) defaults using the assumptions that we apply to subprime pools. In doing so we assume that the frequency of default is comparable between FHA-VA pools and similar-performing subprime pools. We then assume defaults are log normally distributed between our Aaa (sf) and base cases. Using the associated probabilities

<sup>4</sup> For example, in methodologies where models are used, modeling is not relevant when it is determined that (1) a transaction is still revolving and performance has not changed from expectations, or (2) all tranches are at the highest achievable ratings and performance is at or better than expected performance, or (3) key model inputs are viewed as not having materially changed to the extent it would change outputs since the previous time a model was run, or (4) no new relevant information is available such that a model cannot be run in order to inform the rating, or (5) our analysis is limited to asset coverage ratios for transactions with undercollateralized tranches, or (6) a transaction has few remaining performing assets.

from our seven-year idealized default rates,<sup>5</sup> we approximate the defaults that would occur at each rating level.

### Pool Size

We will not assign or maintain ratings on securities in a structure with the following characteristics:

1. For structures that do not have effective support mechanisms, such as credit enhancement floors or reserve fund floors: once the underlying pools has decreased to an effective number<sup>6</sup> of borrowers of 30 or below;<sup>7</sup>
2. For structures with reserve fund or credit enhancement floors that partially compensate for the increased exposure to single borrowers: once any of the underlying pools has decreased to an effective number of borrowers of 15 or below.<sup>8</sup>

However, we typically make exceptions for securities whose ratings do not rely on our assessment of individual obligor creditworthiness, such as those with a full and unconditional third-party guarantee, whether at the portfolio or note level, or securities with full cash collateralization.<sup>9</sup>

### Addressing Tail Risk in Shifting Interest Structures

Tail risk is the risk of a disproportionately large loss (based on current balance of the pool) on the underlying pool at the end of a transaction's term when few loans remain in the pool and credit enhancement, although high in percentage terms, may be very low in dollar terms. Shifting interest transactions in which the subordinate bonds receive a portion of prepayment and principal, and where there are no credit enhancement floors, expose the most senior bonds to tail risk by depleting the dollar credit enhancement available to absorb future losses. For these transactions with Aaa (sf)- through A (sf)-rated tranches, we apply additional stresses to assess the resilience of these tranches to tail-end risk. The stress is a combination of (1) increased losses based on collateral quality and (2) a haircut to available credit enhancement.

We first calculate the stress loss by applying a collateral quality based factor to our expected loss on these pools. The factor varies from 1.0 to 1.5 and is based on the pool's current collateral characteristics such as updated LTV, proportion of loans above 80% updated LTV, average balance, vintage, and number of loans. We also subject this stress loss to a floor equal to the loss from the default of the five largest loans in the pool, at the expected severity.

For the tranche analysis, we apply a haircut to the CE to account for the pay down of subordinate tranches. We then determine the rating through the resulting ratio of the bond's haircut CE to its related mortgage pool's stress losses. We will typically cap the ratings of the bonds with exposure to tail risk at:

(1) A3 (sf) for bonds currently rated Aaa (sf)- to A (sf) that have exposure to tail risk but maintain their ratings under the stress scenario and (2) Baa1 (sf) for all other bonds. However, there are some exceptions.

<sup>5</sup> For more information, see *Rating Symbols and Definitions*. A link can be found in the "Moody's Related Publications" section..

<sup>6</sup> The effective number is a measure of the pool diversity that looks beyond the nominal number of borrowers in a pool to take into account the actual size of their loans and express this number in terms of equally sized exposures.

$$\text{Effective Number of } n \text{ Borrowers} = 1 / \sum_1^n (Wi)^2$$
where  $Wi$  is the weight of borrower  $i$  in the total pool.

<sup>7</sup> If we cannot obtain the effective number, we will use a threshold of 45 borrowers instead. If we cannot obtain the effective number of borrowers, we will use the effective number of loans instead.

<sup>8</sup> If we cannot obtain the effective number, we will use a threshold of 25 borrowers instead.

<sup>9</sup> However, for structured finance securities with full support from a financial guarantor, if the financial guarantor's rating is below investment grade, we would not make an exception for a small portfolio and withdraw the rating of the security after withdrawing its underlying rating.

For example, we will not downgrade the ratings of Aaa (sf)- to A (sf)-rated tranches if (1) they maintain their ratings under the stress scenario, and (2) they are either likely to pay off within a year or likely to pay off two years before the date we project the number of loans in the underlying pool will fall below 100.

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### Interest Shortfall Risks

Our ratings also take into account interest payments to tranches. We rate tranches that have interest shortfalls resulting from insufficient funds to meet their interest obligation (as defined in transaction documents) using our approach for structured finance securities in default described earlier.

In addition, we typically cap ratings on tranches that currently have no interest shortfalls but weak reimbursement mechanisms should any shortfalls occur. Our cap on these tranches is usually A3 (sf) or lower. In these structures, the interest shortfall is typically reimbursed from excess interest only after overcollateralization builds to a pre-specified target amount. In transactions where performance is poor and the overcollateralization has depleted, the shortfall is unlikely to be reimbursed and could be permanent. Also, we usually cap ratings on tranches that have already suffered very small unrecoverable interest shortfalls at Baa3 (sf).

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## Appendix 1: Typical FHA-VA Assumptions

As with all methodologies, in applying this methodology, where appropriate, we consider all factors that we deem relevant to our analysis. If, for instance, actual performance or performance trends are not in line with the assumptions described in this methodology and summarized in Exhibit 1-A below, we may consider or reflect this in our analysis.

### EXHIBIT 1-A

#### Summary Overview of Typical FHA-VA Assumptions

##### Lifetime Roll Rates

60 – 89 Days Delinquent	65%
90+ Days Delinquent	80%
Foreclosure	90%
REO	100%

##### Annual Delinquency Burnouts

Year	
Burnout Factor	
1-2	100%
2-3	85%
3-4	75%
4-8	70%

##### Global Severity

Severity Assumption	12%
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##### Prepayment Cap and Floor Assumptions

Cap	5%
Floor	5%

##### Modification

Modification Rate	50%
Lifetime Re-default Rate	65%

Source: Moody's Investors Service

## Moody's Related Publications

Credit ratings are primarily determined through the application of sector credit rating methodologies. Certain broad methodological considerations (described in one or more cross-sector rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments. A list of sector and cross-sector credit rating methodologies can be found [here](#).

For data summarizing the historical robustness and predictive power of credit ratings, please click [here](#).

For further information, please refer to *Rating Symbols and Definitions*, which includes a discussion of Moody's Idealized Probabilities of Default and Expected Losses, and which is available [here](#).

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