

MOODY'S

INVESTORS SERVICE

RATING METHODOLOGY

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Large Loan and Single Asset/Single Borrower Commercial Mortgage-Backed Securitizations Methodology

This rating methodology replaces *Large Loan and Single Asset/Single Borrower Commercial Mortgage-Backed Securitizations Methodology* published in May 2022. In the update, we added a new appendix that describes our analysis of exchangeable securities, and we made limited editorial updates to improve readability. The updates do not change our methodological approach.

Scope

This rating methodology applies to securities backed by commercial mortgage loans originated in the US, Canada, Asia-Pacific and Latin America and issued by large loan and single asset/single borrower transactions.

In this methodology, we explain our approach to assessing credit risks for large loan (LL) and single asset/single borrower (SASB) (LL and SASB collectively, LL/SASB) commercial mortgage-backed securities (CMBS) in the United States and Canada, including quantitative and qualitative factors that are likely to affect rating outcomes in this sector. Details on how we apply the approach in Asia-Pacific (APAC) ex-Japan and Latin America can be found in Appendix 5, and Appendix 6 provides details on how we apply the approach in Japan.

We discuss the asset and liability analysis, including associated modeling, as well as other considerations. We also describe our monitoring approach.

Rating Approach

In this section, we describe the key characteristics of LL/SASB commercial mortgage loans and summarize our approach to assessing credit risks for LL/SASB CMBS, including quantitative and qualitative factors that are likely to affect rating outcomes in this sector.

LL/SASB transactions are typically backed by either a single loan or multiple loans made to unrelated borrowers. We typically use this methodology to rate securities backed by multi-borrower loan pools with a Herfindahl (Herf) score of less than 10.¹ The Herf score measures the effective pool size by reducing a pool of loans of uneven size to an equivalent pool of equal-size loans. When the number of loans as measured by the Herf score is 20 or more, we typically apply our conduit/fusion CMBS rating methodology.² For pools with a Herf score of 10 to 19, we consider elements of both the LL and conduit/fusion approaches.

LL/SASB transactions are securitizations of first-priority mortgage loans collateralized by commercial real estate (CRE). Loan size typically exceeds \$100 million. The number of properties backing the loan may be as few as one or more than 100. A transaction secured by one property is a "single asset" transaction, while a transaction backed by a single loan secured by more than one property is a "single borrower" transaction. We may also classify transactions that contain multiple, affiliated borrowers with individual cross-collateralized and cross-defaulted ("crossed") loans on one or more properties as "single borrower" transactions as this structure effectively creates one large exposure.

Our LL/SASB rating approach analyzes the payments expected from the loan or loans under various scenarios consistent with our rating levels. Upper investment-grade ratings should weather more-stressed scenarios reflecting the potential for substantial loss of collateral value, while we use scenarios closer to the expected case for low speculative-grade ratings.

The "Monitoring" section addresses how we apply our LL/SASB approach to transactions as they season and credit quality changes from the time of issuance. This section also discusses how we address the diminishing likelihood of prevailing market capitalization (cap) rates changing by a transaction's maturity date.

Our methodology for rating LL/SASB securities combines fundamental CRE analysis with structured finance analysis. Our analysis reflects our judgment about the extent to which the mortgage loan or mortgage pool's cash flow is sufficient to make promised payments to the investors. As part of our analysis, we consider, among other things, the sustainable future performance and value of the collateral securing the mortgage loan or pool and additional attributes. We then assess the transaction structure and other considerations, including legal, counterparty, and qualitative risks.

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 the quantitative assessments, our rating committees also consider other qualitative and quantitative factors in our analysis. If actual performance or performance trends are not in line with the assumptions described in this methodology, we may consider or reflect that in our analysis. Rating committees assign and monitor ratings, considering the characteristics of each transaction.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the issuer/deal page on ratings.moodys.com for the most updated credit rating action information and rating history.

¹ For more information, see Appendix 7.

² For more information, a link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Asset-level Analysis and Related Modeling

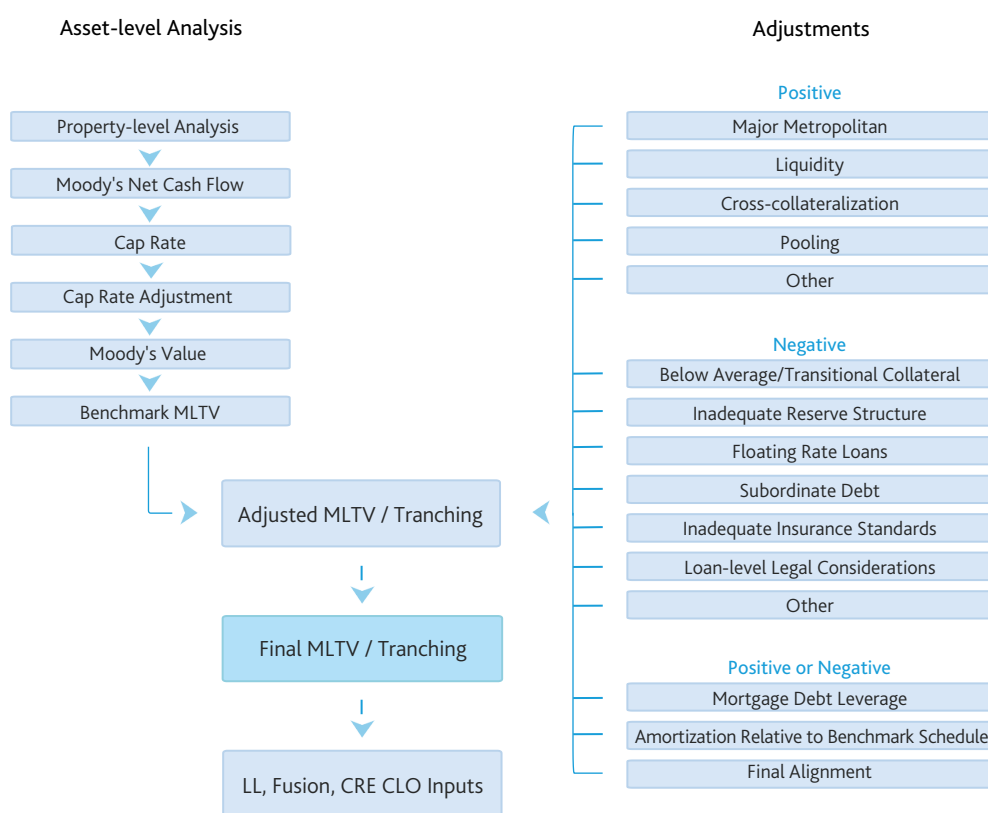
In this section, we explain how we analyze the underlying assets that back LL/SASB securitizations and how we estimate potential losses on those assets.

Exhibit 1 illustrates our LL/SASB transaction rating approach step by step. We start by performing an analysis of the collateral to determine our assessment of its value. We then use our benchmark Moody's loan-to-value ratio (MLTV) levels as an initial assessment of the alignment of loan proceeds with each rating level. We then make positive or negative adjustments to the benchmark level to reflect the unique characteristics of the collateral and structure. We conclude the collateral assessment by considering an alignment step that takes into account additional information such as debt yield, value per unit, and collateral performance during a historical period of severe economic stress.

The collateral assessment process results in the ratings of SASB transactions, given that they comprise a single loan. The process results in inputs that we use to assess LL transactions, with portfolio diversification and other factors taken into account.

EXHIBIT 1

LL/SASB Assessment Process



Source: Moody's Investors Service

We assign ratings to LL/SASB CMBS by reviewing the structure and other considerations of the transaction proposed by the issuer and aligning it with our MLTV-based collateral assessments for SASB transactions and with the results of our portfolio analysis for LL transactions.

The following sections provide a detailed discussion of our approach to rating LL/SASB transactions.

Property-level Analysis

To assess the credit risk of a loan backing an LL or SASB transaction, we first analyze the property or properties securing the loan to derive the long-term sustainable net cash flow (Moody's NCF) and corresponding sustainable value (Moody's value). The following sections summarize how we determine Moody's NCF and Moody's value. For more details, see our cross-sector methodology that describes our approach to deriving sustainable net cash flow and value for major property types in the Americas and APAC.³

Moody's Net Cash Flow

Moody's NCF is our estimate of sustainable net cash flow for a commercial property collateralizing a loan. It represents our base case expectation through the economic cycle. The goal is to identify a level of NCF that a property can reliably produce, which may be higher or lower than actual NCF in any given year.

For most property types, a basic property-level financial analysis requires estimates of income, vacancy and collection loss, operating expenses, and capital expenses. We take this analysis a step further by incorporating the concept of sustainability when we derive Moody's NCF. As a result, we look to long-term trends to see how current income and expense levels compare to market figures and make positive or negative adjustments as needed.

Typically, our adjustments entail reducing income, increasing vacancy and collection losses, and normalizing operating and capital expenses compared to underwritten NCF. Adjustments to these factors in the opposite direction would be exceptions because we consider the sustainability of NCF from a debt rather than equity perspective.

We base our loan credit metrics on NCF, which provides a more complete and accurate picture of a property's sustainable economics than the net operating income (NOI) formulation widely used by property market participants. This is because NCF incorporates capital expenses whereas NOI does not.

Capitalizing Net Cash Flow to Determine the "V" in Moody's LTV

After determining the net cash flow, we assign a grade to each property securing the loan. As each CRE property type has its own unique set of credit quality considerations, we pair property grades and property use categories to determine the corresponding cap rate. We describe the relationship between property grades, property use categories, and cap rates in our cross-sector methodology mentioned above.

We then apply the cap rate to Moody's NCF to derive our assessment of the property value that we use to determine MLTV. Our cap rates are typically higher than existing market cap rates as they consider more than 50 years of historical cap rate data.

We typically adjust cap rates during periods of sustained low interest rates, i.e., when the 5-year average of the 10-year US Treasury rate falls to 3.5% or below. The interest rate adjustment calculation starts with our estimate of an appropriately stressed market cap rate given the interest rate environment. This "stressed market cap rate" is a function of the 10-year US Treasury rate and was estimated using a regression analysis of historical market cap rates and US Treasury rates.⁴ The estimate is based on a weighted average across property types and is stressed at the 75th percentile.

We determine the interest rate adjustment amount by comparing the stressed market cap rate to the historical average unadjusted cap rate (Moody's cap rate) used in our ratings. To the extent that the historical average Moody's cap rate is greater than the stressed cap rate, we adjust cap rates downward for

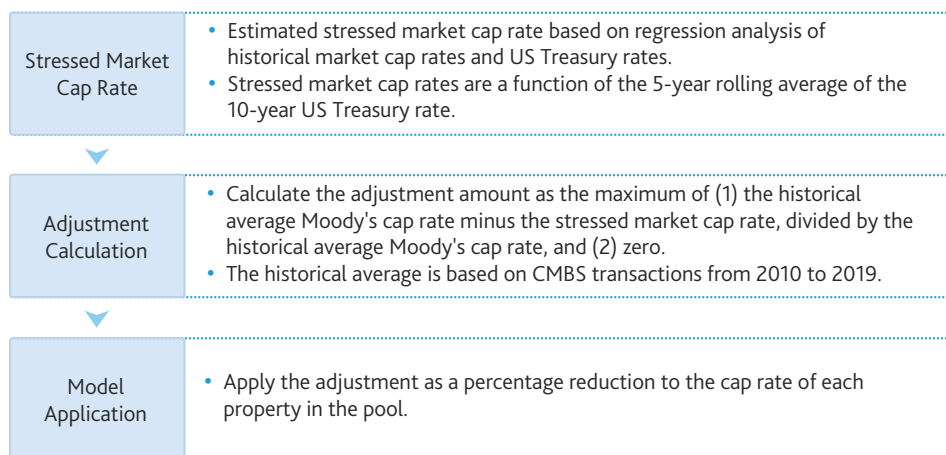
³ A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

⁴ For more information, see the "Moody's Related Publication" section.

properties in the pool. We apply the adjustment as a percentage reduction. The percentage amount equals the greater of (1) the historical average Moody's cap rate minus the stressed market cap rate, divided by the historical average Moody's cap rate, and (2) zero.

We describe the adjustment further in the exhibit below.

EXHIBIT 2

Cap Rate Adjustment for US and Canadian CMBS Transactions

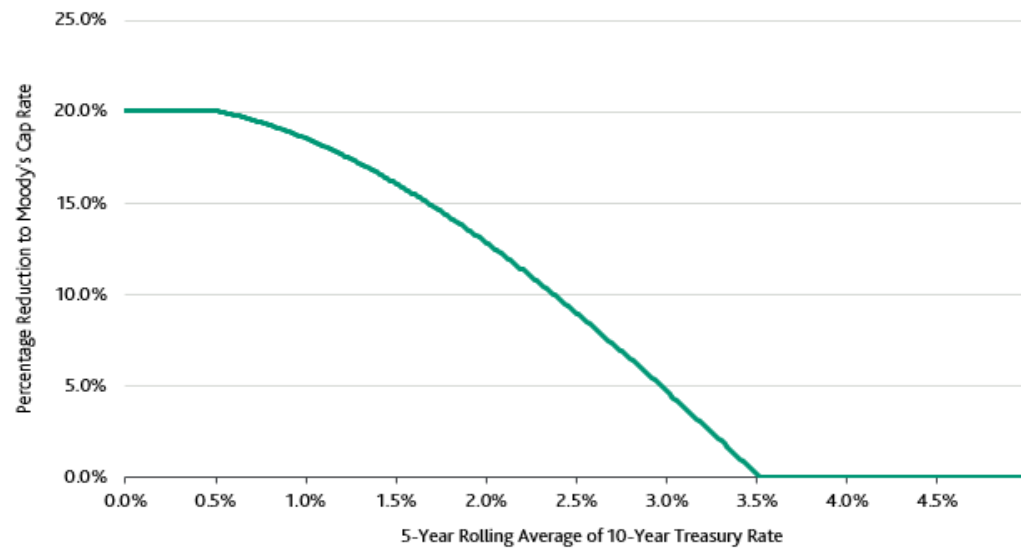
Source: Moody's Investors Service

The magnitude of the adjustment increases as the 5-year rolling average US Treasury rate declines, as shown in the exhibit below. The magnitude of the adjustment reaches a maximum of 20.1% when the 5-year rolling average of the 10-year US Treasury rate equals 0.5% or less.⁵

We divide Moody's NCF by the adjusted cap rate to calculate an adjusted value (called adjusted Moody's value). We divide the loan balance by the adjusted Moody's value to calculate the adjusted MLTV.

⁵ See Appendix 3 for a list of adjustment values as a function of 5-year rolling average US Treasury rates.

EXHIBIT 3

Cap Rate Adjustment for Sustained Low Interest Rates

Source: Moody's Investors Service

We may reduce or eliminate this Treasury-based adjustment to cap rates when a property's cash flow volatility has increased for a sustained period beyond what is observed in a typical real estate cycle. For example, we may not apply this adjustment to a hotel property that is either closed or experiencing depressed occupancy due to imposed travel restrictions and/or lack of travel during periods of war, terrorism, pandemic, or any other extreme scenarios. Nor would we often apply this adjustment to a regional mall showing very poor tenant rent collections and/or experiencing strong re-tenanting headwinds due to corporate bankruptcies and store closures. The decision to reduce or not apply the adjustment is based on our view of whether the distressed property's cash flow will normalize in the foreseeable future. We base our assessment on evidence of a durable normalization of property and market performance.

For loans with a short remaining term to maturity, we may apply cap rates closer to existing market levels to reflect the greater likelihood that market conditions will be unchanged during a refinancing period.

Loan-level Analysis and Benchmark MLTVs

Benchmark MLTVs are key analytical thresholds used to assess the credit risk of LL/SASB collateral. The benchmark MLTV for each rating level for US and Canadian transactions is shown in Exhibit 4. The benchmark MLTV for other jurisdictions can be found in Appendices 5 and 6.

These benchmarks reflect a buffer from property value decline that is commensurate with the associated rating. For example, for a Aaa (sf) rating level, the collateral value could experience a 52% decline below adjusted Moody's value before the equity cushion is eroded. In the US and Canada, adjusted Moody's values are typically below market values, providing an additional cushion from market value decline.

EXHIBIT 4

US and Canadian Benchmark MLTVs

Rating	Benchmark MLTV
Aaa (sf)	48%
Aa1 (sf)	52%
Aa2 (sf)	56%
Aa3 (sf)	59%
A1 (sf)	62%
A2 (sf)	65%
A3 (sf)	69%
Baa1 (sf)	73%
Baa2 (sf)	77%
Baa3 (sf)	81%
Ba1 (sf)	86%
Ba2 (sf)	90%
Ba3 (sf)	95%
B1 (sf)	100%
B2 (sf)	105%
B3 (sf)	113%
Caa1 (sf)	122%
Caa2 (sf)	130%
Caa3 (sf)	140%

Source: Moody's Investors Service

Other Loan-level Credit Adjustments

We may make positive and negative credit adjustments to the benchmark MLTVs to reflect collateral and structural attributes in each LL/SASB transaction. We apply adjustments at the Aaa (sf) rating level expressed in percentage points of adjusted MLTV. Some adjustments are scaled from Aaa (sf) down through the lowest level of rated loan proceeds, while others are applied in a like amount at each rating level. The adjustments are then added to or subtracted from the benchmark MLTV levels to arrive at our adjusted benchmark MLTV levels. The adjusted benchmark MLTV levels are subject to a final alignment process, described below, taking into account debt yield and collateral income and value during historical downturns.

Positive Adjustments

We adjust benchmark MLTV levels upwards for credit positive collateral or structural attributes. Our positive adjustments and their typical ranges are as follows:

MAJOR METROPOLITAN AREAS

Major metropolitan areas typically benefit from diverse labor pools and sources of tenant demand, as well as higher and more stable land values. Additionally, in some cases, major metro areas also have barriers to new construction due to restrictive zoning or lack of available land. This reduces the likelihood of sharp income declines resulting from oversupply. These property characteristics for assets located in major metro areas may offer the cash flow and value stability to support our confidence in recovery value. For these reasons, we increase MLTV benchmarks by up to six percentage points for collateral located in major metropolitan areas.

The property type is key when considering the amount of adjustment for a location in a major metro area. A location like Honolulu may be one of the strongest for a hotel, but it does not have the same demand

strength for an office property. Adjustments of four to six percentage points would be appropriate for a property located in one of the strongest markets for its respective property type. Examples may include an office property in Midtown Manhattan and the hotel mentioned above in Honolulu. Properties located in very strong markets, a tier below the best, that demonstrate value and tenant demand stability typically receive adjustments ranging from two to four percentage points. Upper-tier industrial markets, such as Sacramento, which are not classified as global gateway markets, may receive adjustments within this range. Properties located in strong markets, including assets in large major metro areas that may not be the strongest for their respective property type, may receive zero to two percentage points of benefit. Properties in secondary or tertiary markets typically receive no major metro adjustment.

The relative ranking of different markets for each property type is not static and may change over time as other markets grow or diminish in importance.

EXHIBIT 5

Major Metropolitan Area Adjustments

Location	Range
One of the top markets	4.0% to 6.0%
Very strong market	2.0% to 4.0%
Strong market	0.0% to 2.0%
Secondary/tertiary market	0.0%

Source: Moody's Investors Service

LIQUIDITY

Demand from tenants and buyers for top-quality properties typically limits income swings and generates liquidity from equity investors and lenders during challenging economic periods. We may increase the MLTV benchmark by up to nine percentage points to reflect the credit benefits of this demand-supported liquidity.

Adjustments of seven to nine percentage points are appropriate for properties of class-leading quality for their property type and benefit from global tenant/buyer demand and recognition. Examples of the property type that may receive such an adjustment include globally recognized trophy office properties in Midtown Manhattan or class-leading life-science properties in Cambridge, Mass. Very high-quality properties with limited international tenant/buyer demand and recognition may receive four to seven percentage points, such as a portfolio of high-quality industrial properties in strong industrial markets. High-quality properties with national tenant/buyer demand and recognition – for example, one of the best assets situated in a market outside of the top tier for the property type – may receive two to four points of adjustment. Properties of above-average quality and tenant/buyer demand may receive adjustments of zero to two percentage points.

EXHIBIT 6

Liquidity Adjustments

Characteristics	Range
Class leading asset quality / global demand	7.0% to 9.0%
Very high asset quality / limited international demand	4.0% to 7.0%
High asset quality / national demand	2.0% to 4.0%
Above average asset quality / regional demand	0.0% to 2.0%

Source: Moody's Investors Service

CROSS-COLLATERALIZATION

Loans that are cross-collateralized and cross-defaulted (crossed) may receive up to 20 percentage points of MLTV adjustment. When a loan has a cross-collateralization and cross-default feature, the loan amount is allocated among a group of properties owned by a single borrower. A default on one loan constitutes a default on all loans in the crossed-loan pool. We consider crossing to be a valuable mechanism for risk

reduction because the risk of default may be reduced to the extent that the performance of the properties is not perfectly correlated.

In determining the adjustment size for cross-collateralization, we consider several factors, including the Herf score for the properties based on the allocated loan amount, the geographic distribution, and property type, demand driver, and tenant concentrations. The upper end of the adjustment range generally applies to extremely diverse pools with collateral in many markets and low tenant concentration. Exposure to more locations typically increases the diversity of the employment base that supports collateral occupancy and income. At the same time, decreased tenant concentration helps reduce exposure to event risk and cash flow volatility that could result from a single tenant vacating or defaulting on its lease.

An example of a portfolio that may support an adjustment of 15 to 20 percentage points would be a large industrial portfolio with a property Herf score well above 100, with assets located across more than 20 different markets and a granular rent roll of tenants across multiple industries. A diverse industrial portfolio's lower exposure to a single industry would result in a larger adjustment versus, for example, a similar sized hotel portfolio whose performance is more closely correlated with the overall travel and hospitality industry.

A portfolio with a property Herf score above 50 may receive a 10 to 15 percentage-point adjustment, and a Herf score above 20 may result in 5 to 10 points. However, the relationship is not linear, and as the overall portfolio size decreases, the other factors of geographic and tenant concentrations become increasingly important in determining the benefit. For instance, a multifamily portfolio with a Herf score above 20 in which all the properties are closely located within the same market may receive less than five percentage points of adjustment.

EXHIBIT 7

Cross-collateralization Adjustments

Characteristics	Property Herf Score*	Range
Very high portfolio diversity	100.0+	15.0% to 20.0%
High portfolio diversity	50.0 to 100.0	10.0% to 15.0%
Moderate portfolio diversity	20.0 to 50.0	5.0% to 10.0%
Limited portfolio diversity	0.0 to 20.0	0.0% to 5.0%

* These Herf score ranges are purely given as an illustrative guide as the relationship is not linear or direct, and a portfolio with a property Herf score equivalent to those shown above may not receive an adjustment within the shown range after the other factors, including the geographic distribution, and property type, demand driver, and tenant concentration are considered.

Source: Moody's Investors Service

Collateral Release

The benefits of crossing can be substantially offset if the loan documents freely allow collateral to be released by paying the allocated loan amount. In such a case, the sponsor could "cherry-pick" the loan pool in a manner in which the better-performing properties are released while the weaker-performing properties remain.

We analyze the relationship between the allocated loan amounts and our value assessment, as well as the prices at which properties can be released by running stress scenarios to test the potential impact of adverse selection on the loan. Typically, if release prices are less than 115% of the allocated loan amount, the benefits of crossing significantly diminish.

Additional loan features that are standard and maximize the benefits of crossing include tests for metrics such as debt service coverage ratio (DSCR) and/or debt yield and may also include other metrics such as LTV. To pass these tests, the release must not make such metrics worse than they were at both loan closing and immediately prior to the release. There may also be provisions that help maintain diversity, including a

minimum property count floor, limits on concentration by loan size, and prohibitions from releasing more than a specific percentage value of the loan pool or certain key properties.

We may reduce the overall crossing MLTV benefit, typically by 10% to 50% of what would otherwise be applied, to reflect weak release provisions. For example, suppose the loan allows all properties to be released at a low allocated loan amount premium of 105% and has a debt yield test that is to loan closing only (which limits the possibility of portfolio improvements above this level). In this case, we may reduce the crossing benefit by 50%. However, suppose the loan allows only a portion of the properties (for example, up to 20%) to be released at a low allocated loan premium of 105%, with the remainder to be released at 115%. In that case, the reduction of crossing benefit may be less at approximately 30%. A loan agreement with a release premium of 115% for all properties, but still limits the debt yield test to loan close only, may see a 10% reduction in crossing benefit.

It is important to note that the level of portfolio diversity and crossing benefit can impact the level of crossing benefit reduction for weak release provisions. For instance, if a loan agreement allows for 20% of the portfolio to be released at a 105% premium, this will have a larger effect on a portfolio with a property Herf score of 10 than a portfolio with a property Herf score of 150, which would still be highly diverse even after the release of 20% of the portfolio.

Property Substitutions

A borrower's right to substitute collateral in a crossed loan is typically conditional upon meeting several tests designed to limit the possibility that asset substitution will erode the overall creditworthiness of the collateral. Some of these tests include:

- » Limits on amount substituted. The total amount substituted is typically limited to 20% to 30% of the original collateral.
- » No erosion in DSCR/debt yield and LTV. Similar to property release, the DSCR, debt yield, and LTV for the replacement collateral should not produce a worse credit profile than either the current or origination values.
- » Satisfaction of documentation, third-party reports, and other requirements, such as title insurance, survey, zoning, environmental, engineering, provision of satisfactory reserves and escrows, lease reviews, estoppel letters, insurance certificates, organizational documents of the borrowing entity, and certified rent roll and operating statements.
- » Borrower provides substantially similar representations and warranties for the substitute collateral as it provided for the original collateral.

POOLING

Large loan transactions are typically backed by a pool of unrelated, and thus uncrossed, loans with a Herf score of 10 or less. We may adjust the MLTV target by up to 25 percentage points for LL pools to reflect the reduced likelihood that multiple independent loans would each default and experience realized losses up to a given tranche level. The upper end of the range applies to pools in which the effective number of loans approaches 20 as measured by the Herf score. We would consider analyzing a pool with 20 or more loans using our conduit/fusion CMBS rating methodology.

As with our adjustment for loan-level cross-collateralization, we consider several factors, including the loan Herf score, distribution of loan structured credit assessment (SCA) levels,⁶ geographic distribution of the loans, and property type, demand drivers, and tenant concentrations.

⁶ For more information, see the discussion of structured credit assessments in *Rating Symbols and Definitions*. A link can be found in the "Moody's Related Publications" section.

A pool of loans with a loan Herf score of 20, which has good geographic diversity and loans secured by multiple property types, may receive a pooling benefit of 25 percentage points. Conversely, a pool with a loan Herf score of five secured by loans with limited geographic diversity all of the same property type may receive a pooling benefit of less than five percentage points.

EXHIBIT 8

Pooling Adjustments

Characteristics	Property Herf Score*	Range
Very high pool diversity	15.0 to 20.0	18.0% to 25.0%
High pool diversity	10.0 to 15.0	11.0% to 18.0%
Moderate pool diversity	5.0 to 10.0	5.0% to 11.0%
Limited pool diversity	0.0 to 5.0	0.0% to 5.0%

* These Herf score ranges are purely given as an illustrative guide as the relationship is not linear or direct, and a pool with a loan Herf score equivalent to those shown above may not receive an adjustment within the shown range after the other factors, including the distribution of loan SCA levels, geographic distribution, and property type, demand driver, and tenant concentration are considered.

Source: Moody's Investors Service

Negative Adjustments

We may lower our MLTV targets to address collateral, structural or legal attributes of a transaction that harm credit quality. We do not limit downward adjustments, including to the extent in which a transaction may not be ratable, or we may cap the ratings on a class below Aaa (sf). Our negative adjustments and their typical ranges are as follows:

BELOW-AVERAGE QUALITY OR TRANSITIONAL COLLATERAL

While our positive collateral adjustments reflect that above-average quality collateral is less susceptible to income or value swings, our negative adjustments reflect the opposite for below-average quality collateral or risky non-standard property types.

Although our downward adjustments for poor-quality collateral typically range up to 20 MLTV percentage points, there is technically no limit. Properties with highly uncertain long-term cash flow and value retention prospects, such as malls with low sales volumes, may not be eligible for investment-grade credit assessments regardless of initial loan proceeds.

Properties of very low asset quality with significant concerns over cash flow sustainability may receive a downward adjustment of 13 to 20 percentage points. An aging asset with limited capital investment, significant near-term lease expirations, and located in a market where similar stressed assets trade at a low recovery value could see an adjustment within this range. Properties of low asset quality may receive a negative adjustment of 7 to 13 points and those of below-average quality between zero and seven points of downward adjustment.

For transitional properties with an achievable plan and funding appropriate to execute the plan, we make smaller downward adjustments than in cases in which the plans appear risky or underfunded. For example, a multifamily property with a plan to make limited renovations to the units on turnover and the full necessary capital has been reserved upfront may see a downward adjustment of less than five percentage points. Conversely, a poorly performing hotel with a very high-risk plan with limited details regarding new franchise and management arrangements and limited funding available for capital improvement may receive a negative adjustment of 15 to 20 points.

EXHIBIT 9

Below-average Quality or Transitional Collateral Adjustments

Characteristics	Range
Very low asset quality	-13.0% to -20.0%
Low asset quality	-7.0% to -13.0%
Below-average asset quality	0.0% to -7.0%
Transitional asset very high risk	-15.0% to -20.0%
Transitional asset high risk	-10.0% to -15.0%
Transitional asset moderate risk	-5.0% to -10.0%
Transitional asset low risk	0.0% to -5.0%

Source: Moody's Investors Service

INADEQUATE RESERVE STRUCTURE

Our benchmarks assume an appropriate level of both upfront reserves and ongoing trapping for replacement reserves, taxes, insurance, tenant improvements, and leasing commissions.

In some cases, typically when the loan has high leverage or near-term operational disruption, capital replacement needs and lease rollovers, the lender may require upfront cash reserves (possibly from loan proceeds) to cover expenses, capital replacement, tenant improvement, or leasing costs for a certain period. These upfront reserves maintain or improve the loan's credit quality because they reduce the likelihood that the asset's cash flow will be insufficient to pay for debt service due to disruptions, major capital expenditures and lease rollovers. The upfront reserves reduce the dependence on the borrower's ability to finance such expenditures with capital from sources other than the building. Conversely, the absence of upfront reserves or reserves built up over time is a credit negative for which we may make a negative adjustment.

FLOATING RATE LOANS

Our benchmark MLTVs assume the underlying loans bear a fixed interest rate. We view floating rate loans as riskier because of the potential mismatch between typically stable property cash flows and movements in interest rates. As interest rates rise, net cash flows may be reduced by the higher interest costs during the loan term, increasing the likelihood of default. On the other hand, the refinancing risk faced by loans is unaffected by whether the original loan has a fixed or floating interest rate. The incremental risk posed by floating rate loans, all else being equal, is higher for longer-term loans since there is more time for interest rates to rise.

Most lenders require that a borrower with a floating rate loan purchase an interest rate cap to mitigate the risk of interest rate volatility. However, a cap typically would not eliminate the incremental risk as the cap maturity is typically related to the scheduled loan maturity. Given that the final legal maturity date of the securities typically extends well beyond the loan term, there is a risk that, post loan maturity, an interest rate spike could lead to a mismatch between the interest payments the collateral is capable of paying and the interest on the loan agreement.

Negative adjustments for floating rate loans typically range up to eight percentage points of MLTV. Factors affecting the size of the adjustment include the loan term, the presence of an interest rate cap agreement for the entire loan term, the prevailing interest rate versus the agreed rate cap, and the loan's leverage as measured by MLTV, which can indicate default risk. We may calculate the loan's debt service coverage at the rate cap to compare to the coverage at the prevailing rate, which can indicate the potential increase in default probability from a move in interest rates before the rate cap protection would apply.

A completely unhedged loan may receive a five to eight percentage-point negative adjustment, depending on the loan term and MLTV level. A loan with a rate cap agreement in place typically receives a negative

adjustment of two to four percentage points. A loan with a small difference between the prevailing interest rate and the rate cap would be at the lower end of this range, while a loan with a larger difference would be at the upper end. We typically expect the rate cap provider to be rated investment grade.

SUBORDINATE DEBT

A subordinate debt behind a securitized loan increases the likelihood of default on the senior loan and, in some cases, increases the loss severity on the senior loan when a default occurs. The borrower has less equity in the property and less incentive to maintain or create value. In stress scenarios, they may choose to divert resources to other properties with lower leverage.

Our benchmark MLTVs assume there is no subordinate debt behind the senior loan. In case of subordinate debt, we reduce the benchmark MLTVs based on these factors:

- » **The amount and type of the subordinate debt:** Common types of subordinate debt in CMBS are debt-like preferred equity, mezzanine loans, B notes, and second mortgages. The adjustment we apply to the benchmark MLTV is typically (1) for debt-like preferred equity or mezzanine loans: one-third of what the adjustment would be if the subordinate debt were part of the senior loan; and (2) for B notes or a second mortgage: the same adjustment as if the subordinate debt was part of the senior loan (see the "Mortgage Debt Leverage Adjustment" section for more information). This reflects that debt-like preferred equity or mezzanine loans are, in general, weaker interests with fewer rights on default or in bankruptcy than B notes or second mortgages. The aggregate adjustment applied for subordinate debt is generally no more than -6% for loans with a total debt-to-Moody's-value ratio below 140%, with up to -7% for loans with a total debt-to-Moody's-value ratio above 140%. For second mortgages, we apply an additional adjustment as described in Appendix 4.
- » **Total leverage:** Loans with higher leverage might receive a smaller adjustment for the presence of subordinate debt as they move closer to the point where we assume a default. The incremental adjustment relates primarily to the potential for additional loss severity. Similarly, we apply a smaller adjustment to loans with very low leverage as they typically have a very low probability of default, including any subordinate debt.

We distinguish "debt-like" preferred equity from "true" preferred equity by these characteristics: (i) a hard coupon and/or (ii) a hard maturity date, with (iii) consequences for failure to meet (i) or (ii), such as a change in control or triggering of buy-sell mechanisms. We do not apply any leverage penalty for "true" preferred equity.

INADEQUATE INSURANCE STANDARDS

Property and casualty insurance protect the lender's security from possible impairment in case of damage to the property.

We do not apply any negative adjustments when the loan agreements require the borrower to carry property insurance for the asset's full replacement value under "special causes of loss" forms, in addition to general liability, umbrella and rent interruption insurance in adequate amounts, and other customary coverages (e.g., boiler and machinery). We also assess whether adequate insurance coverage is provided against climate risks, including windstorm, earthquake, and flood perils for properties in special hazard zones, and terrorism insurance for assets comprising a large portion of the pool or for single asset loan transactions. In some cases, we may deem credit neutral insurance coverage for certain risks, such as windstorm or earthquake perils, that are less than replacement cost amounts after review of satisfactory probable maximum loss or other specialized studies or data. We examine blanket insurance for concentrations of properties in special hazard zones to determine the adequacy of coverage and policy limits. For a loan to be credit neutral, the borrower also covenants to carry such other insurance as prudent lenders reasonably require.

For LL/SASB transactions with property or loan Herf scores of five or less, we may apply negative adjustments if insurance carriers are not rated investment grade. In the absence of a rating, we may utilize a credit estimate⁷ or consider other evidence or indications of financial strength. For complex, multiple-layer arrays of insurance carriers, we assess the number and diversity of insurers, the relative amounts that each insurer has committed to, the placement in the insurance “stack” of each insurance commitment, and the rating, credit estimate, or other evidence or indications of financial strength of a varying percentage of the insurers (which percentage depends on the prior considerations).

If we determine that loan documents include inadequate insurance standards, we may adjust the benchmark MLTV of the Aaa and the Aa certificates.

Master servicers are typically required to carry “force-placed” insurance on properties whose owners failed to obtain property and casualty insurance. Our assessment of forced-placed insurers follows the same process as outlined above.

LOAN-LEVEL LEGAL CONSIDERATIONS

Our analysis of US and Canadian LL/SASB transactions focuses on loan-level legal issues that – considering the likelihood and impact in the event of occurrence – present a material risk to investors in such transactions.

In Appendix 4 (section “Commonly Observed Loan-Level Legal Risks”), we describe the typical loan-level legal risks that we assess in US and Canadian CMBS LL/SASB transactions. For each risk, we assess two factors, the likelihood of occurrence and possible impact. We combined these two factors to determine our legal risk assessment, as shown in the matrix in Exhibit 10. If we identify a material legal risk not mentioned in Appendix 4 when reviewing a CMBS loan, we will also assess it per Exhibit 10.

EXHIBIT 10

Legal Risk Assessment Matrix

	Possible Impact				
	Minimal	Minor	Moderate	Major	Severe
Highly Likely	Medium	Medium	Medium High	Medium High	High
Likely	Medium Low	Medium	Medium	Medium High	Medium High
Possible	Medium Low	Medium Low	Medium	Medium	Medium High
Unlikely	Low	Medium Low	Medium Low	Medium	Medium
Highly Unlikely	Low	Low	Medium Low	Medium Low	Medium

Source: Moody's Investors Service

Our legal risk assessment translates into a loan-level adjustment. Loan-level adjustments range from 0% to 2% of credit enhancement (CE) per legal risk, as shown in Exhibit 11.

⁷ For more information, see our cross-sector methodology on using credit estimates in our rating analysis. A link to a list of our sector and cross-sector methodologies can be found in the “Moody's Related Publications” section.

EXHIBIT 11

Legal Risk Assessment

Legal Risk Assessment	Individual CE Adjustment
High	2.0%
Medium High	1.5%
Medium	1.0%
Medium Low	0.5%
Low	0.0%

Source: Moody's Investors Service

For each loan, we assess whether any legal risks are present, particularly those listed in Exhibits 15 to 20. For each identified risk, we apply the corresponding individual CE adjustment as shown in Exhibit 11. If any legal risk, particularly one listed in Exhibit 16, applies only to one property backing a multiple property loan, the CE adjustment will be weighted by the share of such property in the total collateral backing this loan. We then sum individual CE adjustments and compare the aggregate adjustment to the ranges indicated in Exhibit 12 to derive the final CE adjustment.

EXHIBIT 12

Credit Enhancement Adjustment

Aggregate CE Adjustment Ranges	Final CE Adjustment
Aggregate CE Adjustment \geq 6%	7%
$4.0\% \leq$ Aggregate CE Adjustment $<$ 6%	5%
$2.0\% \leq$ Aggregate CE Adjustment $<$ 4%	3%
$0\% <$ Aggregate CE Adjustment $<$ 2%	1%

Source: Moody's Investors Service

Lastly, we multiply the final CE adjustment by the loan's adjusted MLTV to calculate the loan-level legal adjustment. We base the adjusted MLTV for this calculation on the underlying first mortgage debt and the adjusted Moody's value of the property.

Certain legal issues may lead us to assign zero credit to a loan in an LL transaction. Additionally, we may be unable to assign or maintain ratings on the securities in a SASB transaction due to the legal issue's very high potential impact, including the possibility of the trust losing all, or nearly all, of the loan amount if the risk materializes. Such risks are not considered within the above matrix because the adjustments described in this section would be insufficient to account for such risks. See Appendix 4 ("Material Legal Deficiencies" section) for more information.

OTHER NEGATIVE ADJUSTMENTS

We assess other transaction attributes and assign penalties to those that may negatively impact the ability of the collateral to service debt or that may contribute to a higher loss given default. Such attributes include, but are not limited to, environmental or engineering conditions or the amount and quality of information submitted for review.

We assess these other negative credit attributes and determine related penalties on a case-by-case basis. In cases where we determine that the negative attribute has a material impact, we may cap ratings or not assign ratings.

Adjustments That May Be Positive or Negative**MORTGAGE DEBT LEVERAGE ADJUSTMENT**

Total mortgage loan leverage is the primary credit attribute resulting in MLTV benchmark adjustments in either direction. Our benchmark MLTV levels for ratings at and above Baa3 (sf) assume that overall mortgage loan leverage is at or above the Baa3 (sf) level.

The loan sponsor has a significant equity cushion with total mortgage loan proceeds commensurate with Baa3 (sf). There is a lower likelihood the sponsor will diminish collateral value through poor maintenance or default. Positive adjustments for low leverage range up to six percentage points of MLTV in cases where the most junior debt merits a high investment-grade credit assessment.

The sponsor has a thinner equity cushion when overall mortgage loan proceeds are commensurate with a Ba1 (sf) or lower rating. Further, higher overall leverage may also involve additional lenders or structural complexity, leading to higher resolution costs and a higher loss given default. The negative adjustments when total leverage is at the below-investment-grade level range up to seven MLTV percentage points.

AMORTIZATION RELATIVE TO BENCHMARK SCHEDULE

Amortization is a powerful tool to mitigate refinancing risk and help offset the potential loss in asset value due to physical depreciation and changes in market prices. We may adjust the benchmark MLTV to account for amortization faster than our benchmark schedules. Hotels have amortization on a 25-year schedule, and loans backed by other core asset classes have amortization on a 30-year schedule.

The benchmark MLTV adjustment approximates the difference between the loan amortization using the benchmark amortization schedule and the loan's actual amortization schedule, at the point in time that approximates our "expected life" for the loan. A loan with poor credit quality has a shorter expected life than a higher-quality loan. We use a stressed interest rate when calculating the amortization adjustment. Loans with lower rates may receive a reduced penalty. Loans with amortization schedules at or above benchmark levels may receive a benefit.

FINAL ALIGNMENT ADJUSTMENTS

Our MLTV adjusted benchmarks are subject to final alignment before we assign a rating. This step helps ensure that all relevant information is considered and reconciled with the target adjusted MLTV as adjusted. This step is akin to that followed by appraisers. Sales of comparable properties and the collateral replacement cost are reconciled with the results of the capitalized income approach before a value is concluded. The adjustment can be positive or negative, with positive adjustments typically not exceeding two notches of the adjusted MLTV benchmarks.

Our final alignment process typically includes assessing debt yield, the relationship between collateral cash flow and the debt level. Debt yield is essentially the yield a lender realizes if it takes control of the collateral.

We compare debt yield with the cap rates at which comparable assets trade during various points in the cycle, particularly in downturns. For example, suppose a top-quality asset did not trade higher than an 8% cap rate during a period of severe economic stress. In that case, we may conclude that an 8% debt yield is appropriate for the lowest investment-grade classes and that a debt yield in the order of 15% may be appropriate for the highest investment-grade classes. Should the debt yield assessment result in a rated proceeds level above that produced by the MLTV benchmarks as adjusted, we may make a positive adjustment. Should the debt yield assessment result in rated proceeds lower than those suggested by the adjusted MLTV benchmarks, we may make a negative adjustment.

In our final alignment, we may also consider sales transactions involving the collateral or comparable properties, particularly when the transaction occurred during a period of severe economic stress. Crisis sales transactions for similar assets help establish "floor" values below which the collateral value is unlikely to fall and upon which recovery estimates can be based. For example, suppose the MLTV targets as adjusted result in low investment-grade-rated loan proceeds of US\$800 per square foot for a top-quality property, but transactions during or immediately following the economic stress indicate a value of US\$1,000 per square foot. In that case, we may make a positive adjustment. On the other hand, if comparable properties trade at

US\$600 per square foot during or immediately following the economic stress, we may make a negative adjustment.

Additionally, we may also consider the income generated by the collateral or similar property during the economic stress to the extent available. For example, suppose collateral income during the economic stress was sufficient to generate debt service coverage of more than 1.00x at the rated loan proceeds level we assessed for below-investment-grade tranches. In that case, we may make a positive adjustment. If the debt service coverage based on income during the economic stress is below 1.00x, we may make a negative adjustment.

Multi-Borrower Pool Analysis

For multi-borrower large loan pools, we aggregate the proceeds from each loan in the pool at each rating level. We then adjust the aggregate proceeds to reflect the diversity of the loan pool.

Pool Diversity

Pool diversity has a positive impact on the credit quality of senior classes in the capital structure. While a single loan in an LL transaction may suffer a high loss severity, the probability is much lower that every loan in a pool will suffer the same degree of loss.

We consider the potential effects of diversification by assessing bond proceeds in relation to the effective number of loans in the pool, as determined by the pool's Herf score. We show the Herf score calculation in Appendix 7.

Our ratings are affected by the average (or expected) pool loss and the distribution of pool losses. Pool diversity, as measured largely by the loan pool's Herf score, affects the probability distribution of pool loss. The distribution of losses, in turn, affects our assessment of senior and junior tranches.

As part of our pooling analysis, we may examine the extent to which each tranche is protected under various "blowup" scenarios in which specific loans are assumed to default with specific recoveries. To achieve a particular rating, a tranche must pass a scenario we deem consistent with that rating. The specific scenarios vary on a case-by-case basis in relation to the pool's Herf score, the credit quality of the loans, and the underlying property types, as well as geographic and other factors relating to diversity.

As an example, we may, given a pool of six loans each assessed at the Ba2 (sf) level and with a low level of correlation, test the Aa2 (sf) pool level tranche with a default scenario such as the following: two loans experience loss up to the Aa2 (sf) level, two experience loss to the A2 (sf) level, and one each experience loss to the Baa2 (sf) and Ba2 (sf) levels, respectively. The Aa2 (sf) enhancement under this scenario equals the sum of the losses that occurred. We would then compare the results with our quantitative analysis and assess an appropriate enhancement level.

In addition to the credit assessment of the underlying loans and the loan pool's Herf score, we consider other factors that may increase or decrease correlation among the loans. Factors affecting loan correlation include:

- » **Tenant concentration:** For example, a pool backed by multiple loans collateralized by malls can see multiple loans affected if they each have in common anchor tenants that experience financial difficulty or vacate. The same could be true among office loans with an in-common tenant such as a bank, law or accounting firm. An example of low tenant concentration is a large pool of industrial properties in which no single tenant accounts for more than 5% of rental income.

- » **Location:** When the collateral backing multiple loans is located in the same market or sub-market, pool diversity decreases because the collateral can be affected by the same local supply and demand dynamics. Further, the collateral can be affected by common zoning, property tax, and other issues that affect value correlation.
- » **Industry concentration:** Even collateral with dispersed locations can be affected by shifts in a single industry. For example, in the US, a technology or energy sector downturn can affect multiple metro areas. We examine the local economies and tenants of the collateral to ascertain if they have common economic segment exposures.
- » **Management:** In some cases, many or all loans in a pool are managed by the same entity. This is often the case with hotel pools in which most or all of the collateral has one manager or "flag." The manager's effectiveness can impact many, if not all, properties to the same degree.
- » **Sponsorship:** If more than one loan has the same sponsor/borrower, they can be affected by the borrower's ability to fund leasing or maintenance costs to maintain the collateral's value. When a sponsor is financially stretched, one or more collateral loans may suffer value loss.

We adjust the aggregate proceeds at each tranche to reflect diversity so that each security class aligns with its expected loss target.

To help assess portfolio diversity, we may employ simulation analysis in which the correlation and recovery assumptions are consistent with the pool and tranche being analyzed. We develop customized default and loss scenarios for the most highly concentrated LL pools to help better align proceeds and ratings.

Structural Analysis and Liability Modeling

In this section, we explain how we analyze the structural features of an LL/SASB securitization, including how we model and allocate cash flows to different classes of securities, taking into account asset cash flows and available credit support.

Once we complete our asset analysis, we analyze the liability structure of the securities. Principal and interest payments are allocated sequentially in most LL/SASB transactions, with the most senior outstanding tranche receiving all principal payments until it is paid in full. Realized principal losses and interest shortfalls are allocated in reverse sequential order.

We further analyze loan or pool cash flows to assess whether they generate sufficient interest to pay interest on the rated securities, given default scenarios commensurate with the rating of each class. For pools, we assume loans with the highest interest rates default first, leaving the lower-paying loans in the pool to pay interest on the securities.

We use our LL/SASB MLTVs as a tranching tool to help inform the credit risk assessments of the various classes we may rate in a securitization. When rating a sequential pay structure, we apply the MLTVs assuming the various subordinate classes are 6%-9% thick. To the extent that a transaction has either a non-sequential pay waterfall or thinly sized classes, we adjust our assumptions which may translate into higher credit enhancement associated with a given rating level.

Subordination Adjustment for Non-Sequential Payment Structures

Although most LL/SASB transactions have sequential payment structures, some have been structured with various forms of non-sequential principal waterfalls. Subject to various tests and conditions, these transactions allocate a portion of principal receipts to the subordinate classes before the full liquidation of the most senior class.

The determination of the subordination adjustment for non-sequential payment structures is not a static analysis. We consider different prepayment and default scenarios to evaluate potential future pool composition and to determine whether the credit support will be sufficient to support our initial ratings.

To determine the adjustment, we follow an iterative process. We first determine the expected change in pool composition due to negative credit migration. We typically derive assumptions related to modeled credit migration by thresholds defined in the loan and securitization documents (e.g., debt yield, LTV, DSCR). Next, we assume certain loans – for instance, lower leverage or those backed by superior assets – pay down, and the principal is applied as stipulated in the proposed structure. We then determine the estimated credit support required for such a pool (considering the changes in credit quality and diversity). We repeat this process through a set of scenarios to identify adverse combinations of reduced diversity and deteriorating credit quality. Each scenario is assigned a probability factor, and the credit support for the base case sequential payment structure is increased by the incremental credit support indicated.

Rating A-Note Pools and Non-Pooled or "Rake" Classes

Issuers often structure CMBS transactions with loans with A/B notes where the A note proceeds are pooled, while the B note proceeds are not, although they are included in the securitization as a separate class or classes. This is commonly known as a "rake" structure. We determine the rating of a rake class by assessing the loan proceeds of the individual loan associated with the rake bond on a standalone (non-pooled) basis

Other Considerations

Along with our asset, structural, and liability analysis, we consider other quantitative and qualitative factors in our credit analysis such as transaction counterparties, other legal risks, reliability, and completeness of historical and portfolio data, and environmental, social and governance (ESG) considerations.

Counterparty Risks

We consider and integrate various counterparty-related risks at different stages throughout our credit analysis. More specifically, we consider operational risks, hedge counterparties, commingling risk, and account banks.⁸ Based on our review, we may adjust our assumptions, inputs, or model results. If information is limited, we may also adjust the rating level.

Operational Risk

Operational risks can arise from various potential sources, including disruption to cash flows caused by the financial distress of a service provider to the LL/SASB transaction. As part of our analysis, we consider the financial disruption risk and the roles of the master servicer, special servicer, certificate administrator, and trustee.

In some transactions, the trust assets include pari passu loans that are serviced by CMBS transactions that are not rated by us. Alternatively, the trust assets may include pari passu loans that will ultimately be serviced by a CMBS transaction not rated by us and by a master servicer or special servicer that is, as of the closing date of the transaction, undetermined. We review these circumstances on a case-by-case basis, and in each case, we consider as a key factor the percentage of the pool represented by loan balance of such pari passu loan.

⁸ For more information, see our methodology for assessing counterparty risks in structured finance transactions. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

SERVICING

Our analysis accounts for the impact of servicing arrangements on the performance of the transaction. CMBS transactions typically have both a master servicer for loan administration and a special servicer for underperforming or non-performing loans. We review the qualifications and experience of the master and special servicers. If a servicer's qualifications and experience are inadequate, we may be unable to assign ratings to or maintain ratings on the transaction.

We typically consider servicing arrangements and the servicing fee structure and adjust our assumptions when appropriate. We will apply adjustments in our analysis on a case-by-case basis if the servicing agreement permits potential conflicts of interest between the special servicer and borrower.

Servicing Agreement Provisions

- » **Servicing Standard:** We review the servicing agreement to determine the scope of the servicer's obligations and the servicing standard which governs a servicer's decisions. To the extent the servicing standard is not sufficiently exacting, we may increase credit enhancement levels.
- » **Servicer Termination Events and Replacement Mechanisms:** We qualitatively consider servicer termination events and related enforcement mechanisms in our analysis. CMBS servicing agreements typically provide that a servicer or special servicer can be terminated upon any unremedied failure of such servicer to perform its obligations.

We expect servicer termination events to be more effective if a transaction party or group of investors can act upon them. We view it as credit neutral for servicing agreements to provide that if any servicer termination event occurs, the trustee is required to replace the servicer at the written direction of the investors entitled to 25% (or less) of the voting rights.

- » **Standard for liability and indemnification:** Servicing agreements in CMBS typically exempt servicers and other transaction parties from liability to the trust, other than liability arising from any breach of warranties or representations or any liability due to willful misconduct, bad faith or negligence or by reason of negligent disregard of such party's obligations and duties. Servicing agreements typically apply a similar limitation to the transaction parties' entitlement to indemnification from the trust and require the transaction parties to indemnify the trust for such liabilities. We view this arrangement as credit neutral and consider deviations from this standard on a case-by-case basis.

Hedge Counterparties

We analyze the rating impact of exposures to hedge counterparties, assessing the probability of a transaction becoming unhedged and deriving additional potential losses.⁹ We may conclude that we adjust the ratings to reflect the linkage and additional loss as part of our analysis.

Commingling Risk

In LL/SASB transactions, the risk of commingling with the funds of another transaction party before the funds' transfer to the issuer's account is typically addressed by using accounts for collection and distribution that are always separate, identifiable, and deal-specific. However, should commingling risk exist in a transaction, we will determine the credit quality of the party and the exposure and incorporate the additional loss.

Account Banks and Investments

Generally, our analysis of account banks and temporary investments consists of three steps: (1) we assess the "rating uplift" to the account bank's rating to obtain an "adjusted" rating; (2) if the adjusted rating is below a certain threshold, we assess the exposure of the transaction and categorize the risk into either

⁹ For more information, see our cross-sector methodology for assessing counterparty risks in structured finance, including swap linkage. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

"standard" exposure or "strong" exposure; and (3) we determine maximum achievable ratings to the transaction subject to other quantitative and qualitative factors.¹⁰

Liquidity Analysis

CMBS transactions commonly incorporate a liquidity mechanism (often in the form of servicer or trustee advances) to ensure timely payment of interest on the rated securities and pay amounts necessary to protect the collateral. This includes payments for real estate taxes, insurance, and ground rent. In transactions with advancing, the master servicer typically has primary advancing responsibility, typically backed up by the trustee or other entity. In the absence of advancing, we evaluate other structural features such as liquidity facilities or reserve funds.

Without a satisfactory liquidity mechanism, we are unlikely to assign investment-grade ratings. We take account of the credit quality of the servicer (in case of servicer advancing) or any other liquidity provider.

In a transaction with servicer advances, shortfalls can arise when servicers recover amounts previously advanced plus interest on a priority basis at the top of the waterfall. To protect the highly rated classes (of transactions that include multiple mortgage loans) from sudden interest shortfalls due to immediate reimbursement of advances, servicing agreements typically provide that upon the determination that an advance is nonrecoverable, to the extent that the reimbursement thereof would exceed the amount of the principal portion of general collections deposited in the collection account, the advancing party may elect to refrain from reimbursing itself for up to 12 months. We view this arrangement as credit neutral and consider the rating impact of alternative arrangements on a case-by-case basis.

In addition, servicing agreements that permit reimbursement of recoverable advances that are workout-delayed reimbursement amounts typically limit such reimbursements to principal collections. We view this arrangement as credit neutral.

Non-Reimbursable Trust Expenses

We will assess whether there are mechanisms to protect the senior securities from losses due to non-reimbursable trust expenses. Such expenses may arise during the life of a loan, for example, from disputes between the servicer and the borrower.

We typically will not assign ratings higher than A1 (sf) to the senior securities, unless at least one of the following mitigants is present: (x) a reserve equal to approximately 1% of the loan amount, or (y) a support class whose regular interest entitlement over 12 months will equal around 1% of the loan amount (with the servicer agreeing to reimburse itself, typically over up to 12 months, so that the senior certificates will not incur interest shortfalls).

Transaction-level Legal Risks

We assess legal risks that may affect the expected losses posed to investors. At closing, we review legal opinions to inform our views on the key legal risks identified in a transaction. For transaction-level legal issues, we apply adjustments to credit enhancement or other components of our analysis on a case-by-case basis, considering the likelihood and potential impact of the legal issue. In certain cases, such issues may raise ratability concerns.

¹⁰ For more information, see our cross-sector methodology for assessing counterparty risks in structured finance. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Bankruptcy Remoteness of the Issuer and True Sale Considerations

We analyze whether the issuer is bankruptcy remote such that the likelihood of (1) a bankruptcy filing by or against it; or (2) substantive consolidation – that is, the pooling of the issuer's assets and liabilities with those of a bankrupt affiliate – is so low that it has no rating impact.¹¹ If we determine that the issuer is not bankruptcy remote, we assess the potential rating impact on a case-by-case basis according to the likelihood of bankruptcy and the possible negative consequences for investors.

As part of our analysis, we will also review true sale opinions to confirm that in a bankruptcy proceeding of the loan seller or the depositor, the loans would not be considered property of the seller's or depositor's, as applicable, bankruptcy estate, nor that the automatic stay would attach to loan payments. Similar considerations and analysis may apply to pre-securitization transfers by affiliated entities that owned the mortgage loans before the mortgage loan seller.

We expect securitizations also to have a backup security interest in the collateral that discourages creditors from challenging the transaction's structure. Even if a challenge is successful and the securitized loans are considered part of the seller's or depositor's bankruptcy estate, the creditors would accomplish little because they would be in an unsecured position.

Tail Period

CMBS transactions commonly include a tail period¹² beyond the maturity date of the longest-dated loan. Special servicers are also typically allowed to extend the term of troubled loans. We assess whether a special servicer has sufficient time, in the relevant legal system, to gain control of a property and dispose of it as sufficient time is necessary to maximize recoveries.

We generally consider as credit neutral a tail period of at least 12 years, comprised of seven years after the maturity date, followed by a further period of five years during which no extensions by the servicer are permitted. We assess the impact of shorter periods on a case-by-case basis.

For a detailed discussion of additional stresses applied to CMBS transactions during the tail period, please refer to Appendix 9.

Some loans are structured with an anticipated repayment date of, for instance, 10 years from origination, but with a legal maturity date of, for instance, 30 years, fully amortizing (with stepped-up interest) by year 30. We generally use a relatively abbreviated tail period of three years for such loans. Thus, for example, for a pool with a 10-year anticipated repayment date loan and a 30-year legal maturity, the credit neutral rated final distribution date generally would be 33 years from the origination of such a mortgage loan.

Representations, Warranties, and Covenants

Our analysis of a transaction's representations and warranties (R&W) framework includes an evaluation of the scope of the R&Ws, their enforcement mechanisms, and the financial strength of the entity that provides them. We also review the document delivery provisions in the mortgage loan purchase agreement and the servicing agreement to confirm that the mortgage loan documents are delivered to the trust within an appropriate period after the closing date.

We will consider the R&W framework and the document delivery provisions to be credit neutral if:

¹¹ For more information, see our cross-sector methodology for assessing bankruptcy remoteness in structured finance. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

¹² For more information, refer to Appendices 5 and 9.

- » The R&Ws are generally in line with market standards as of the date hereof, for example, as published in our 17g-7 reports for US markets, subject to internal considerations.
- » Adequate and timely mechanisms are in place in case of a material breach of R&Ws or a material document defect, such as an obligation to cure such breach or defect, repurchase the loans from the trust at par plus accrued interest and expenses, or an obligation to indemnify the trust with agreement of the special servicer, in case of any loss to the transaction. We generally view a R&W breach or document defect as "material" if it materially and adversely affects the value of the mortgaged property,¹³ the value of the mortgage loan, or the interests of the certificate holders therein.
- » The R&Ws and the repurchase obligation are provided by a reputable and financially strong entity or its subsidiary.

We may adjust credit enhancement levels to account for weak R&W frameworks or weak document delivery provisions, and we consider the presence of structural mitigants in making this determination.

Appraisal Reduction

For troubled loans, the servicer typically orders a new appraisal. It applies an appraisal reduction if estimated recoveries (subject to customary adjustments) are less than the outstanding loan balance plus accrued interest and other amounts. Appraisal reduction mitigates the risk of over-advancing to junior investors. Because the servicer or liquidity provider has a super-priority claim on the loan collateral for the reimbursement of advances, advancing more than amounts that are ultimately recovered can result in the most-subordinate securities receiving distributions that otherwise would be paid to senior-ranking securities. To the extent the mortgage loan has become corrected and the appraisal reduction amount has been reduced to zero, servicing agreements also provide for the calculation of a collateral deficiency amount for any mortgage loan that has been subject to a modification that includes the creation of a hope note.

We will consider a transaction's appraisal reduction framework to be credit neutral if:

- » Appraisal reductions and collateral deficiency amounts notionally reduce the balances of the control-eligible classes of certificates. Applying appraisal reductions and collateral deficiency amounts to control-eligible classes prevents controlling classes that are "out of the money" from controlling servicing decisions and replacements.
- » Liquidation or other recovery proceeds are allocated to unpaid interest, excluding any interest not advanced because of appraisal reductions, which portion is then paid to fully reduce unpaid principal before going to repay such appraisal reduced interest. The servicing agreement accords similar treatment for accrued and unpaid interest on any hope note.

We may apply adjustments in our analysis to account for weak appraisal reduction frameworks case-by-case.

Controlling Class Rights

In a typical CMBS securitization, one or more subordinate classes of certificates are designated as "control eligible certificates" that entitle the majority of the holders of each such class to designate a representative (sometimes referred to as the controlling class representative or CCR) that often has the right to terminate the special servicer without cause and to approve and/or direct certain servicing actions to be taken by the master servicer or special servicer. We assess if the transaction documents include provisions to mitigate potential risks stemming from the exercise by the CCR of these rights. We consider that the following provisions in the servicing agreement sufficiently mitigate these risks:

¹³ This may apply only to LL/multi-borrower transactions, but not SASB because SASB transactions generally do not have seller representations relating to the property.

- » The servicer may disregard the CRR's refusal to provide consent, direction or advice if the servicer determines that the CRR decision would otherwise cause the servicer to violate the loan documents, applicable law, or the servicing agreement.
- » A CCR is deemed to have approved a request for consent following a specified period. To address emergency situations that arise during that specified period, the servicer is authorized to take immediate action that the servicer determines is required to protect the interests of the certificate holders.
- » The CCR's consent, direction, and replacement rights terminate when the certificate balance of the most senior class of control eligible certificates (taking into account the application of appraisal reduction amounts and collateral deficiency amounts for such class) is less than 25% of the initial certificate balance of such class.¹⁴

We will apply adjustments in our analysis on a case-by-case basis if the servicing agreement permits potential conflicts of interest between the controlling class certificate holders and the borrower.

We apply similar considerations when evaluating B note or participation control rights outlined in an A/B co-leader or participation agreement.

Tax Issues

We review transactions to consider the risk of entity-level taxation. For US LL/SASB transactions, the risk is typically remote when the transaction is structured as a REMIC or a grantor trust. We review legal opinions on REMIC or grantor trust tax eligibility and other tax matters.

Data Quality Evaluation

We assign ratings to securities issued by an LL/SASB transaction when we determine the information provided by reliable sources is sufficient. Data quality is also important throughout the life of an LL/SASB transaction, as described in the "Monitoring" section.¹⁵

Environmental, Social and Governance Considerations

Environmental, social and governance (ESG) considerations may affect the ratings of securities backed by a portfolio of commercial mortgage loans. We evaluate the risk following our cross-sector methodology that describes our general principles for assessing these ESG issues¹⁶ and may incorporate it in our analysis.

Monitoring

In this section, we describe our approach when monitoring transactions.

We generally apply the key components of the approach described in this report when monitoring transactions, except for those elements of the methodology that could be less relevant over time.

¹⁴ For more information, see the "Appraisal Reduction" section.

¹⁵ For more information, see our approach to evaluating data quality in structured finance transactions. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

¹⁶ A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Transaction Performance

We review the periodic transaction-specific information we receive as well as review and update our expectations for market trends and conditions. Both sets of metrics could prompt a more detailed analysis resulting in a rating change following a rating committee process.

Exhibit 13 lists the loan-level data we typically review during the surveillance process.

EXHIBIT 13

Loan/Property Data

Standardized financial statements prepared by the servicer – commercial operating statement analysis report (OSARs)

Borrower submissions, including financial statement, budget, rent-roll, sales reports, and occupancy cost reports

Smith Travel Research reports for hotel properties

Servicer's commentary on loans on watch* and specially serviced loans**

* These include loans that meet certain portfolio review guidelines established in the CREFC monthly reporting package. Some of the watch-listed loans may have material issues that could impact future performance.

** A specially serviced loan is generally in default (i.e., payment or maturity default), or the master servicer has determined that it is at risk of imminent default. The loan is transferred to the special servicer responsible for developing a workout strategy for the loan, such as a loan modification, forbearance, or liquidation.

Source: Moody's Investors Service

Our performance analysis may consider, among additional factors, (1) loan amortization, paydowns and payoffs, (2) defaulted loan recoveries and losses, (3) changes in share of defeased loans, (4) updated loan-level financial reporting, (5) interest shortfalls, (6) appraisal reductions and (7) changes in credit enhancement relative to estimated losses if any. We could also consider other factors evidencing actual or potential credit drift.

Our surveillance analysis process entails 1) reassessing property- and loan-level net cash flows and values, 2) deriving a SCA for each loan based on Moody's LTV when applicable, and 3) incorporating the impact of portfolio-level changes, such as loan payoffs, defeasance, paydowns due to release of assets in a portfolio or prepayments on a pool's diversity. Finally, we compare the outcome of our reassessment with the current capital structure of the transaction.

Surveillance generally uses the same approach as at new issuance to analyze property cash flows and to derive Moody's NCF, DSCR, and LTV. We base our NCF analysis on a review of reported property data supplemented with market information as needed. Cash flow adjustments are based on historical property performance, a review of comparable properties as needed, expected leasing rollover, and our judgment. Updated loan and property-level information such as appraisal reports, rent rolls, and leasing strategies could be less detailed or available than at transaction closing. In our surveillance analysis, we may apply (a) more conservative assumptions compared to the current property performance or market conditions if we lack information supporting sustained improvement in property or market performance, or (b) less conservative assumptions if we expect an in-place decline in performance levels is temporary and performance will return to sustainable levels in the foreseeable future.

We then apply a cap rate to each property's NCF to derive a Moody's value. Generally, these cap rates align with the cap rates we used when we assigned our initial rating at issuance with an adjustment to account for changes in the interest rate environment since closing. Also, we may adjust cap rates up or down based on changes in property performance, real estate market conditions, or capital market requirements. In our monitoring, we consider the rating impact of changes in the 5-year rolling average of 10-year US Treasury rates in conjunction with aggregate commercial property price movements, updated property net cash flows, final alignment adjustments, the term to maturity and associated refinance risk, and other surveillance considerations described in this section.

For any loss and recovery analysis, we base our recovery value on discussions with the master or special servicer, comparable sales and other relevant property and market data. We may also apply our estimate of a market cap rate in our determination of recovery value, as we expect this to provide the most accurate estimate at that time. We may also apply market cap rates to loans approaching their maturity dates to assess the refinancing likelihood of seasoned loans.

Portfolio-level Analysis

We evaluate LL transactions using the same loan and transaction models we use for newly issued ratings.¹⁷ However, as transactions season, loan diversity and credit distribution may change as loans pay off and pool size shrinks. We may change model inputs and qualitative parameters based on market or property-specific conditions.

Rake Classes

Our surveillance of rake classes or non-pooled classes (securities whose credit quality is linked exclusively to a single loan) is similar to the evaluation of pooled classes, except that diversity is not a factor. We compare the actual MLTV of the rake class to the current benchmark MLTV after making the adjustments discussed above. If the actual MLTV differs materially from the required MLTV for a given rating level, a rating committee may decide to change the rating of a rake class.

Defaulted or Poorly Performing Loans

We determine the expected loss for loans that have defaulted and have been transferred to special servicing or that have a high probability of default given poor performance. We derive our loss estimates on market data, comparable sales, and qualitative considerations. If we determine a material expected loss, we assume those loans will liquidate. In our analysis, we apply net liquidation proceeds to the senior-ranking securities and losses to the lower-ranking securities in the capital structure according to the transaction's cash flow waterfall.

Interest Shortfalls

Liquidity concerns affecting rated securities are an important component of our surveillance analysis. Interest shortfalls can be caused by temporary or permanent interruptions of interest payments to specific classes of securities. The interruptions may be caused by special servicing fees, trust expenses associated with specially serviced loans, appraisal subordinated entitlement reductions, and non-recoverability determinations.

¹⁷ 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.

Appendix 1: General Information Typically Provided for LL/SASB Transactions

Framework

- » Selection criteria for presented loan or pool of loans
- » Description of applicable underwriting criteria and origination process

Property Level

- » Underwriter's property description
- » Underwriter's valuation approach and credit decision
- » Third-party appraisal (discussion of market rents, concessions, vacancy, sales and rent comparables, expenses, taxes, tenant improvements and leasing commissions, reserves, capital expenditures, net cap rates, land value, income/expense ratios)
- » Third-party engineering/property condition reports
- » Insurance coverage/earthquake risk (probable maximum loss)
- » Third-party environmental assessment
- » Tax assessment
- » Current rent roll and historical financials
- » Financial underwriting analysis
- » Description of due diligence process
- » Loan characteristics
- » Recourse information
- » Loan seasoning and performance/modifications
- » Borrower information
- » Nature of leases (terms, summaries)/ground lease summaries
- » Subordinate financing/preferred equity
- » Release prices/provisions/allocated loan amounts for crossed and blanket mortgages
- » Purchase price/construction cost/previous debt financing
- » Sales history and disclosure regarding co-tenancy, kick-out, and go-dark provisions for major retail properties

Structure and Legal

- » Overview and term sheet
- » Structure: bankruptcy remoteness, SPE, true sale opinions
- » Servicing: identification of master and special servicers
- » Overview of advancing for liquidity and property protection
- » Tail period
- » Overview of interest and currency risks
- » Proposed transaction timing

Market Studies and Valuations

The following market and property characteristics are relevant to our rating analysis of CRE transactions. Please note that additional information might be helpful for our review of a specific property.

Market

- » General market overview
- » Detailed submarket description
- » Submarket vacancy rates - discussion of supply and demand conditions (history and expectations)

Property vs. Market

- » Competitive positioning of subject property - discussion of relevant property characteristics
- » Discussion of typical lease terms and covenants
- » Detailed discussion of market rents and relevant trends (subject and comparable properties)
- » Discussion of concessions and credit loss rates
- » Anticipated downtime to release vacant space in submarket and subject property
- » Review of ongoing property expenses (actual vs. market ratios)
- » Discussion of appropriate third-party management fees
- » Review of property taxes (actual vs. readjustment after sale)
- » Property ownership
- » Discussion of appropriate tenant improvements
- » Discussion of standard leasing commissions (new and renewal)
- » Capital expenditure requirements (deferred maintenance and ongoing)
- » Discussion of appropriate cap rates (based on NOI) for subject property in relevant submarket (recent sales of comparable properties)
- » If appropriate, discussion of redevelopment opportunities, alternative use, land value (after conversion costs)

Value

- » Current value based on net income approach and sales approach - supported by cost approach
- » Open market value at loan maturity
- » Additional value based on vacant procession/go-dark approach for properties leased to one or a small number of tenants on a long-term and net basis. Such valuation should discuss anticipated downtime after tenant default, current market rents, concessions, leasing commissions, tenant improvements, and conversion costs.

Supporting Information

- » Detailed listing of applicable sales and rent comparables used to determine the value and market rents in the relevant submarket
- » Detailed tenancy schedule
- » If available, photographs and location plans
- » Basis of valuations and assumptions

Appendix 2: Canadian LL/SASB Transactions

Overview

Our approach to rating Canadian LL/SASB transactions generally follows the US approach detailed above, but with some adjustments to reflect unique attributes of Canada's lending practices and legal system. Major credit positives of the Canadian CMBS market include a creditor-friendly legal environment which may result in a shorter tail period than those applied in the US. Given the less competitive market, underwriting standards are typically better than in the US. These positives are partially offset, however, by the concentration of loans in comparatively few markets.

To analyze the sustainability of cash flows, we look to Canada-specific property market data and analysis as Canada can have cycles that differ from the US in terms of duration and magnitude. Similar to the US, we look to the balance of new supply and expected demand for near-term impact on property cash flow. However, loan terms are long, and supply and demand can become unbalanced, particularly in smaller metropolitan areas with limited demand drivers.

To determine value, we use a set of cap rates that is generally consistent with those we apply to US collateral. However, in our property grades, we typically consider the strong track record of Canadian CMBS transactions. Given the close historical correlation between US and Canadian interest rates, we adjust cap rates based on the US Treasury rate as described above. The major Canadian markets have the same range of property quality, including assets we consider trophy quality with extremely high ability to retain tenants and attract capital. While Canada's CRE capital markets may not be as deep as those in the US, there is ample portfolio lender participation to help ensure an exit for a CMBS loan.

Recourse Lending

Recourse loans are debt agreements secured by real property. The lender has the right to seek payment from a borrower in default and typically a guarantor beyond the property pledged as collateral.

Our approach to analyzing a pool of recourse loans is the same as we use to rate non-recourse loans, except for the additional step of assessing the incremental benefit derived from recourse. To quantify the value of the recourse commitment, we analyze the amount of recourse, recourse exposure coverage, and the recourse provider credit profile.

The recourse benefit stems from a potential reduction in both the frequency and severity of default. Recourse loans have a lower probability of default because borrowers will make great efforts to avoid putting their non-pledged assets at risk. Severity may be lower as defaulting recourse borrowers are less inclined to engage in litigation with the lender, reducing the length and cost of the foreclosure process. In addition, the cash recovered from the borrower beyond the real estate collateral diminishes severity. Further, recourse borrowers are less inclined to defer capital expenses and allow the property to deteriorate because they can be held accountable for any reduction in property value below the loan balance.

Appendix 3: Cap Rate Adjustment Values

The table below shows the corresponding percentage reduction to Moody's cap rate as a function of 5-year rolling average of the 10-year Treasury rate.

EXHIBIT 14

Adjustment to Moody's Cap Rate for Sustained Low Interest Rates

5-Year Rolling Average of 10-Year Treasury Rate	% Reduction to Moody's Cap Rate	5-Year Rolling Average of 10-Year Treasury Rate	% Reduction to Moody's Cap Rate
0.00%	20.1%	2.50%	9.1%
0.25%	20.1%	2.75%	7.0%
0.50%	20.1%	3.00%	4.8%
0.75%	19.5%	3.25%	2.5%
1.00%	18.6%	3.50%	0.2%
1.25%	17.5%	3.75%	0.0%
1.50%	16.1%	4.00%	0.0%
1.75%	14.6%	4.25%	0.0%
2.00%	12.9%	4.50%	0.0%
2.25%	11.0%		

Source: Moody's Investors Service

Appendix 4: US and Canada - Loan-level Legal Risks

This appendix is specific to US transactions, but we use a substantially similar analysis for Canadian transactions.

Material Legal Deficiencies

Certain material legal deficiencies may lead us to assign zero credit to an LL in our analysis, or in the case of a SASB transaction, not assign ratings.

In particular, we may assign zero credit or not assign ratings for any of the following ground lease issues: (i) the ground lease has not been recorded, (ii) the ground lease does not permit the leasehold financing, (iii) the ground lease is not in full force and effect or is in default, (iv) the ground landlord has not provided an estoppel for the ground lease, (v) casualty/condemnation proceeds to be applied for restoration are not held by the lender or by an appropriately rated depository, (vi) the ground lease has inadequate lender notice and cure rights, (vii) the ground lease is or can be subordinate to a senior lien, and there is no acceptable Subordination, Non-Disturbance, and Attornment (SNDA) from the lienholder that is a fee mortgagee, (viii) amendments to the ground lease or ground lease surrender, termination or cancellation are allowed without the leasehold lender's consent, or (ix) the leasehold mortgage is secured by a sub-lease.

Furthermore, if any of the following issues mentioned in Exhibits 16 and 19 are present for a loan that represents 20% or more of the pool (at securitization), for LL, we may assign zero credit to the relevant loan and, for SASB, we may be unable to assign ratings (or we may assess a penalty following the relevant exhibit below): *Weak Lender Protections in Ground Lease – New Lease*, *Weak Lender Protections in Ground Lease – Subordination*, *Weak Lender Protections in Ground Lease – Merger*, *Sharia Law* and *Financial Statements*.

Commonly Observed Loan-level Legal Risks

Exhibits 15 to 20 list commonly observed loan-level legal risks relating to borrower entity, collateral, non-recourse carve-out guaranty/guarantor, cash management, borrower representations and covenants, and additional debt issues. The exhibits also provide the legal risk score we assign to each issue. For a typical US LL/SASB transaction, we review if any of the legal risks in this list exist.

If there is a legal issue for a loan which requires an adjustment and which is not listed in Exhibits 15 to 20, we assess the legal issue on a case-by-case basis. We assign a likelihood, impact, and legal risk assessment based on reviewing the specific credit negative clauses and availability of potential mitigants.¹⁸

¹⁸ For example, for loans with pari passu interests or subordinate debt, we may apply an adjustment in addition to the leverage penalty if the intercreditor agreement, participation agreement or other documentation has credit negative clauses that are not considered in Exhibit 20. This includes subordinate debt that is granted unusual rights to payment priorities or control, advancing or otherwise.

EXHIBIT 15

Borrower Entity

Category	Legal Issue	Legal Risk Assessment
Limited Purpose	The borrower's permitted activities are not limited to owning and operating the property. The borrower is not restricted from incurring additional debt (subject to customary exceptions), liquidating its assets, dividing into multiple entities, dissolving, merging into another entity, or amending its organizational documents.	Medium
Separateness Covenants	The borrower does not have appropriate separateness covenants.	Medium High
Bankruptcy Remote Structure	The borrower (and any permitted transferees) does not meet one or more of the following criteria: (i) has an independent manager sourced from a nationally recognized corporate services provider whose vote is necessary for bankruptcy filings and similar actions and who cannot be terminated without cause and prior notice to the lender, (ii) has waived any fiduciary duty of the independent manager to the borrower's equity ownership and its corporate family, and (iii) is structured as a Delaware LLC or as an entity controlled by a Delaware LLC.*	Medium High
No Non-Consolidation Opinion	No non-consolidation opinion.*	Medium High
Weak Non-Consolidation Opinion	Weak non-consolidation opinion.*	Medium
Recycled Borrower	Borrower entity was formed before the subject loan was originated, and loan documents do not include proper "look-back" representations and warranties.	Medium

* We do not apply this legal adjustment if the first mortgage debt at securitization is less than \$25 million.

Source: Moody's Investors Service

EXHIBIT 16

Collateral Issues

Category	Legal Issue	Legal Risk Assessment
Weak Lender Protections in Ground Lease – New Lease	For loans that are less than 20% of the pool (at securitization), the fee owner is not required to grant the lender a new lease if the ground lease terminates for any reason.*	Medium High
Weak Lender Protections in Ground Lease – Subordination	For loans that are less than 20% of the pool (at securitization), the ground lease is or can be, subordinate to a senior lien, but there is an acceptable SNDA from the lienholder that is a fee mortgagee.*	Medium
Weak Lender Protections in Ground Lease – Merger	For loans that are less than 20% of the pool (at securitization), the ground lease does not protect against merger of the fee and leasehold interests.*	Medium
Weak Lender Protections in Ground Lease – Highly Limited Assignability	Borrower is not permitted to assign the leasehold interest without the fee owner's consent, to be exercised in its sole discretion.*	Medium High
Weak Lender Protections in Ground Lease – Limited Assignability	Borrower is not permitted to assign the leasehold interest without the fee owner's consent, which may not be unreasonably withheld.*	Medium Low
Sharia Law	For loans that are less than 20% of the pool (at securitization), the mortgage loan is structured to comply with Sharia law, and the lender does not have collateral assignment of the master tenant's mortgage to master landlord/borrower securing the tenant's lease obligations.**	Medium

EXHIBIT 16

Collateral Issues

Category	Legal Issue	Legal Risk Assessment
ROFRs	A tenant (or other third party) has a right of first refusal (ROFR) to match any offer to purchase the property.**	Medium
Separate Tax Parcels - No Foreclosure Impeded	The related tax parcel includes additional non-collateral real property, and the collateral is not located in a jurisdiction where foreclosure would be impeded.	Medium Low
Separate Tax Parcels - Foreclosure Impeded	The related tax parcel includes additional non-collateral real property, and the collateral is located in a jurisdiction where foreclosure would be impeded (e.g., New York City).	Medium High

* See the Weak Lender Protections in Ground Lease section below for more details.

** Securitized mortgage loans may be structured to comply with Islamic law (Sharia). Master lessees under Sharia compliant mortgage loans typically execute a leasehold mortgage in favor of the borrower or lessor as security for its obligations under the lease, which mortgage is then collaterally assigned to the lender. In the absence of such accommodation mortgage, there is a risk that if the master lease were recharacterized as a financing lease in a bankruptcy case, the lender could lose its mortgage on the property.

*** ROFRs are credit negative because when a tenant, franchisor, or other third party has a right of first refusal on the related property, marketing of the property will be more difficult as potential buyers will be disinclined to invest the time and resources in due diligence only to see the ROFR holder purchase the property at the negotiated price.

Source: Moody's Investors Service

EXHIBIT 17

Non-Recourse Carve-out Guaranty/Guarantor Issues

Category	Legal Issue	Legal Risk Assessment
Missing or Very Weak Non-Recourse Carve-out Guaranty	There is no third-party guaranty which provides for full recourse for bankruptcy (or other insolvency events), or there is a guaranty, but liability under the guaranty is limited to less than 10% of the loan balance (via either a cap on guaranty liability or a minimum net worth (NW) covenant of the guarantor). Exception: No penalty for liability limited to below 10% due to a missing or low NW covenant if the guarantor is a top-level entity of an institutional-quality sponsor (e.g., the operating partnership of an investment grade or major REIT) or an institutional quality real estate fund.	High
Weak Non-Recourse Carve-out Guaranty	There is a third-party guaranty, but liability is limited to between 10% and 30% of the loan balance (via either a cap on guaranty liability or a minimum NW covenant of the guarantor). Exception 1: No penalty if the guaranteed amount is \$100 million or more. Exception 2: No penalty for liability limited to between 10% and 30% due to a low NW covenant if the guarantor entity is a reputable institutional-quality sponsor (e.g., the operating partnership of an investment-grade or major REIT) or an institutional-quality real estate fund.	Medium
No Environmental Sponsor Indemnity nor Adequate Environmental Insurance Policy	No recourse for losses from environmental issues and no environmental insurance policy with adequate duration, amount and creditworthiness.	Medium

Source: Moody's Investors Service

EXHIBIT 18

Cash Management

Category	Legal Issue	Legal Risk Assessment
No Cash Management	No functioning "hard" lockbox account in place at closing or no cash management arrangement.*	Medium High
Weak Cash Management Structure	Functioning hard lockbox account in place at closing with a cash management arrangement, but weak cash management structure (e.g., trigger below 1.25x DSCR or a debt yield equivalent).	Medium

* We view a "hard" lockbox in place at loan closing, accompanied by springing cash management, as credit neutral. In this arrangement, tenants and others are instructed to make payments into a designated deposit account controlled by the lender. All cash flows go into the in-place lockbox account but revert to the borrower unless the lockbox bank receives contrary instructions from the lender after certain defined DSCR or debt yield triggers events occur. Those instructions trigger the cash management regime, under which the cash in the lockbox account is then swept daily into a cash management account, where it is applied to pay taxes, insurance, debt service, reserves, and other sums under a waterfall. The remaining cash is trapped, to serve as additional collateral benefitting the lender if the borrower defaults.

Source: Moody's Investors Service

EXHIBIT 19

Borrower Representations and Covenants

Category	Legal Issue	Legal Risk Assessment
Transfers	Borrower can transfer, without lender consent, (i) the property, or (ii) 100% of the equity interests, or (iii) operational control to a transferee with thresholds that are inadequate in light of the financial position and experience of the current sponsor.	Medium Low
Financial Statements	For loans that are less than 20% of the pool (at securitization), there are limitations on the borrower's obligation to deliver annual audited financial statements.*.**	Medium High

* We do not apply this legal adjustment if the first mortgage debt at securitization is less than \$25 million.

** In case of combined audited financial statements of the borrower and corporate parent, we will consider that this risk is adequately mitigated if (a) assets included in the audited statements and not included as collateral in the transaction are appropriately limited over the life of the loan, or (b) the primary entity covered by the audited financial statements is subject to enhanced responsibilities of disclosure and transparency.

Source: Moody's Investors Service

EXHIBIT 20

Additional Debt

Category	Legal Issue	Legal Risk Assessment
Mezzanine Loan Intercreditor Agreement Issues – Subordination	Intercreditor agreement (ICA) provides that a modified mortgage loan remains senior to the mezzanine loan only so long as the modification is permitted under the ICA.*	Medium
Mezzanine Loan Intercreditor Agreement Issues – New Guaranty	Mezzanine lender is only required to supply new guaranty if the original guarantor is released.*	High
Mezzanine Loan Intercreditor Agreement Issues – Cure Rights	Mezzanine lender cure rights are not appropriately limited.*	Medium
B Notes	Waterfall provides for pro rata allocation of casualty/condemnation proceeds pre-event of default.	Medium Low
Second Mortgage	The property is encumbered by a second mortgage.**	Medium High

* See the Mezzanine Loan Intercreditor Agreement Issues section for more information.

** A second mortgagee's right to foreclose on the mortgaged property and separate voice in the context of a borrower bankruptcy poses additional risks. Even with an ICA that purports to limit, or standstill, the second mortgagee's rights and remedies, substantial risks to the first mortgagee are still present.

Source: Moody's Investors Service

Descriptions of Selected Commonly Observed Loan-level Legal Risks

This section provides additional information on selected legal issues described in the exhibits above. Specifically, it covers weak lender protections in ground leases (see Exhibit 16) and mezzanine loan intercreditor agreement issues (see Exhibit 20).

Weak Lender Protections in Ground Lease

When the loan is secured by a borrower's interest in a ground lease as a tenant/lessee (a leasehold interest), we assess whether the loan documentation protects the leasehold mortgagee from collateral termination risk. We also assess whether the documentation ensures the rights and remedies available to the mortgagee are comparable to those found in fee-simple mortgages and the borrower has a bundle of property rights similar to those of a fee property owner.

The descriptions below provide additional details on the ground lease issues described in Exhibit 16.

NEW LEASE

When the ground lease ends or goes away for any reason, the leasehold lender then no longer has any collateral. A credit-neutral provision requires the ground landlord to offer the leasehold lender a new ground lease if the ground lease terminates for any reason, even if the lender has not cured within its cure period.

SUBORDINATION

The ground lessor can finance its fee interest, and typically the fee mortgagee's interest is subordinate in all cases to the ground lease. However, if the fee mortgagee's interest is superior to the ground lease, the foreclosure by the fee mortgagee would wipe out the leasehold interest entirely. We, therefore, do not attribute any value (or assign ratings in the case of a SASB transaction) to a ground lease that is completely subordinate to a fee mortgage.

In some instances, the subordinate ground lease has the benefit of an SNDA agreement. In an SNDA, certain provisions may only partially mitigate the impact of subordination: the fee lender typically agrees not to disturb the tenant's leasehold interest, and the tenant also agrees to "attorn" to the lender, that is, agrees to accept the fee lender or its assignee as its new landlord if the fee lender forecloses. Even with an acceptable SNDA, ground leases that are, or can be, subordinated are credit negative because SNDAs pose potential uncertainty, including whether the SNDA can be rejected as an executory contract in the context of the bankruptcy of the fee lender.

MERGER

It is credit neutral for ground leases that secure securitized loans to provide that if a tenant acquires the title to the fee estate, there will not be a merger of the fee and the leasehold estates. Some states' laws or case laws may mitigate this risk.

LIMITED AND HIGHLY LIMITED ASSIGNABILITY

Typical ground leases that secure securitized mortgage loans permit the leasehold lender to assign the leasehold interest freely, with no restrictions. However, some ground leases prohibit the assignment of the leasehold interest without the fee owner or ground landlord's consent, which may be exercised at its sole discretion. Other ground leases condition the assignment on the fee owner or ground landlord's consent specifying that such consent may not be unreasonably withheld. To varying degrees, these clauses are credit negative because they add time and expense to any transfer or foreclosure process and may limit asset marketability, hence materially affecting market value.

Mezzanine Loan Intercreditor Agreement Issues

SUBORDINATION

We do not apply any legal risk penalty if the inter-creditor agreement (ICA) provides that the modified mortgage loan remains senior to the mezzanine loan. However, we apply a legal risk adjustment if the ICA provides that the modified mortgage loan remains senior to the mezzanine loan only so long as the modification is permitted under the ICA. With this subordination provision, a court may determine that a mortgage loan modification made without the mezzanine lender's consent violated the ICA, and that the qualified subordination provision should be entirely waived or that the mezzanine loan is, in fact, wholly senior to the mortgage loan.

NEW GUARANTY

Credit neutral ICAs provide that the mezzanine lender that realizes upon the ownership interests of the borrower is required to post a replacement guarantee regardless of whether or not the realization event results in the release of the original guarantor. This ensures that the mezzanine lender, the new controlling sponsor, is disincentivized from causing the borrower to file for bankruptcy. We apply a legal risk adjustment for ICAs in which the mezzanine lender is only required to post a replacement guarantee if the foreclosure results in the removal of the guarantor.

CURE RIGHTS

Cure rights not subject to a reasonable time limit (e.g., six months or less for monetary defaults) give the mezzanine lender broad optionality that permits a troubled loan to spiral downward, while the senior lender is prohibited from exercising its own remedies.

Appendix 5: APAC (ex-Japan) and Latin America Transactions

Overview

We apply this approach to LL/SASB CMBS transactions in APAC (ex-Japan), including Hong Kong, Singapore, Australia, Taiwan, China, and Latin America.

Our approach to rating LL/SASB transactions in these jurisdictions generally follows the one used for US and Canadian transactions. Still, it differs in some respects, including MLTVs and the length of the tail period. We also adjust the benchmark MLTVs to reflect collateral and structural attributes unique to each LL/SASB CMBS transaction. However, these adjustments may be more limited than those we make in the US and Canada, as described in the main body of the report.

Benchmark MLTVs

We use the benchmark MLTVs listed in Exhibit 21.

EXHIBIT 21

APAC (ex-Japan) and Latin America Benchmark MLTVs

Rating	Benchmark MLTV
Aaa (sf)	40%
Aa1 (sf)	44%
Aa2 (sf)	48%
Aa3 (sf)	51%
A1 (sf)	53%
A2 (sf)	56%
A3 (sf)	59%
Baa1 (sf)	61%
Baa2 (sf)	64%
Baa3 (sf)	67%
Ba1 (sf)	71%
Ba2 (sf)	75%
Ba3 (sf)	78%
B1 (sf)	81%
B2 (sf)	85%
B3 (sf)	88%
Caa1 (sf)	92%
Caa2 (sf)	95%
Caa3 (sf)	98%

Source: Moody's Investors Service

The benchmark MLTVs shown in Exhibit 21 diverge from those of the US, most noticeably at lower rating levels. In APAC (ex-Japan) and Latin America, LL/SASB CMBS transactions typically have shorter tail periods with control from senior investors. In a down market, this can result in the properties being sold to make senior investors whole, with a loss for subordinated debt more likely. This is at odds with structures in the US, which typically have the subordinated class in control of special servicing and much longer tail periods.

To analyze the sustainability of cash flows, we look at specific property market data and analysis since a jurisdiction's cycles may differ from the US in terms of duration and magnitude.

We use cap rates established on a case-by-case basis to determine the value using available market information and comparison with similar markets.

Tail Periods

A transaction enters its tail period because some underlying loans have not been repaid by their maturity dates. If tail periods are too short, the risk exists that the workout of the loans will not be completed in time to make principal payments to the securities by their final maturity date.

We generally consider as credit neutral a rated final distribution date that is four years longer than the maturity date of the SASB transaction or the longest-dated loan in an LL pool in Singapore and five years later in Australia. Both are creditor-friendly jurisdictions. We recognize that in Singapore, in most LL CMBS transactions, senior investors have control over the tail period, and where this is not the case, the credit neutral tail period will be five years.

We deal with deviations from our expectations on a case-by-case basis when certain factors mitigate the risk of a lower tail period. These may include low leverage of CMBS funding structures, a strong transaction sponsor, the high quality of the property being financed (trophy properties), the target rating level, and/or senior investors' control. Senior investors' control can be one of the factors that lower the tail period in Australian CMBS transactions because the proposed five-year credit tail period does not consider this feature.

For Chinese CMBS, we determine the length of the tail period on a case-by-case basis according to the specifics of a transaction, as there is not sufficient information on commercial property sales in a distressed market in China to form a market-wide view. We follow the same approach in Latin American transactions.

As a transaction moves closer to the maturity date, the risk increases that the workout of the loan will not finish in time to make principal recovery payments to the notes before their final maturity date. We address this risk by applying additional stresses for transactions in the tail period as the maturity date approaches. For a detailed discussion of additional stresses applied to CMBS transactions during the tail period, please refer to Appendix 9.

Liquidity Arrangements for Singapore CMBS

Typical Singapore CMBS Structure and Characteristics

In Singapore, CMBS are issued by an SPE, which is typically a bankruptcy-remote entity set up for the sole purpose of facilitating a CMBS transaction. The SPE lends the proceeds of the CMBS to a borrower in the form of a mortgage secured by a portfolio of CRE properties. The underlying borrower is normally a Singapore real estate investment trust (S-REIT).

An S-REIT borrower is essentially a unit trust scheme constituted by a trust deed executed by a trust manager and a trustee. It is regulated by the Monetary Authority of Singapore and governed primarily by the Securities and Futures Acts, the Code of Collective Investment Schemes (in particular, the Property Funds Guidelines), and SGX listing requirements.

Unlike a traditional bankruptcy-remote SPE in securitization transactions, an S-REIT is an operating entity. It may acquire, develop, hold, manage and divest properties and have creditors other than the CMBS issuer.

Considerations for Liquidity Arrangements

Since an S-REIT is an operating entity and has other creditors, cash flow may be disrupted by these creditors or the certificate holders of the S-REIT should it default on other obligations.

We generally consider that some liquidity protection at the CMBS issuer level covering a minimum of six months of interest and senior fees (or one note's payment period if longer) adequately mitigates the risk of disruption to cash flow and achieves delinkage from the S-REIT's credit quality. The minimum liquidity protection is premised on certain assumptions in the transactions and can serve only as a guideline. We review each transaction individually and may consider additional liquidity protection in specific cases.

Rating Linkage for Transactions with Inadequate Liquidity Protection

For transactions without sufficient liquidity protection, the assigned ratings of the CMBS will be linked to the ratings of the S-REIT borrower. The potential rating uplift benefit from this could be up to five notches; in other words, the CMBS ratings could be at a maximum of five notches higher than the rating of the S-REIT borrower. We generally base the degree of rating linkage in individual transactions on whether a transaction has some other form of liquidity arrangement, the strength of the S-REIT borrower, and the remaining term to maturity of the CMBS transactions.

Appendix 6: Japanese Transactions

Overview

This appendix describes the analytical considerations specific to Japanese LL/SASB transactions. Our approach to rating LL/SASB transactions in Japan generally follows our approach for US and Canadian transactions as detailed in the main section. Still, it differs in some respects, including benchmark MLTVs and the length of the tail period. We adjust the benchmark MLTVs to reflect collateral and structural attributes unique to Japanese LL/SASB transactions. These adjustments may be more limited than those we make in the US and Canada.

Benchmark MLTVs

We use the benchmark MLTVs shown in Exhibit 21, the same as those used for other countries in the APAC region. To analyze the sustainability of cash flows, we review specific property market data because property market cycles in Japan may differ from the US or Canada in terms of duration and magnitude.

Cap Rates

We typically apply an income approach in assessing a property value, which we calculate as sustainable net cash flow divided by a sustainable cap rate. The discounted cash flow method and other approaches can also apply to valuation, depending on the characteristics of the underlying properties and the transactions.

Exhibit 22 shows our typical cap rates across the property quality spectrum for office buildings, the main asset type in Japan, located in Tokyo and adjacent areas and backing LL/SASB transactions. For other asset types or other areas, we use cap rates established on a case-by-case basis using available market information and comparison with similar markets. We may adjust these capitalization rates as needed on a case-by-case basis to reflect prevailing market conditions.

EXHIBIT 22

Typical Cap Rate Used for Japanese LL/SASB CMBS

Property Quality Grade	Japan*
1	5.6%
2	6.1%
3	6.6%
4	7.6%
5	8.1%

*Average cap rate for offices located in Tokyo and adjacent areas

Source: Moody's Investors Service

Tail Periods

We generally consider as credit neutral a final maturity date that is four years longer than the maturity date of the LL/SASB transaction or the longest-dated loan in a pool. Japan is a creditor-friendly jurisdiction, and we assume senior investors have control during most of the tail period. Where this is not the case, the credit-neutral tail period will be five years.

We analyze deviations from our credit-neutral tail period on a case-by-case basis and may consider several factors when assessing the risk of a shorter tail period. These include low leverage of a transaction's capital structure, a strong transaction sponsor, the high quality of the property being financed (trophy properties), a single-property asset, and/or the rating level.

We apply additional stresses for transactions in the tail period as the maturity date approaches. For a detailed discussion of these additional stresses, please refer to Appendix 9.

Legal and Structural Considerations on Property Ownership in Japanese LL/SASB Transactions

In determining our rating, we combine our collateral assessment with our assessment of the transaction's legal and structural risks. One of the key legal and structural features we analyze for LL/SASB transactions is property ownership. Underlying properties of Japanese transactions are fee-simple, but sometimes Japanese transactions include properties with condominium ownership, co-ownership, and ground leases (*futsu shakuchi*), some of which may be term ground leases (*teiki shakuchi*). Our property-level analysis of transactions that contain these property types considers the legal aspects of individual properties' ownership structures.

Condominium Ownership Properties

In the case of underlying properties with condominium ownership, management of common-use areas is bound by law¹⁹ and by their condominiums' own rules laid down through an agreement among condominium owners. In these cases, fee-simple properties may demonstrate greater flexibility in maintaining and repairing the property; for condominium-owned properties, decisions on the management of common-use areas are made at meetings of condominium owners. Thus, our analysis of the ownership structures includes a review of the voting procedures at the individual condominiums backing the transaction because some procedures are determined by law and others by the condominium's own rules.

We examine both the condominium owners' rules and the degree of authority that the loan borrower has over the maintenance and repair of the property. Individual condominium owners' influence over the property maintenance and repair differs depending on the number of their voting rights (determined by the proportion of floor space owned) and the total number of condominium owners. This analysis helps us determine what effect the quality of property management might have on property values. We also review the characteristics and creditworthiness of other condominium owners, as they affect the adequacy of management, maintenance, and repairs.

Our analysis of office buildings with condominium ownership considers any rules for the owners, including clauses on priority sale to other owners in the same buildings, agreements on the conditions for leasing to tenants, and management cost burdens. The ownership of some properties involves a complicated mixture of rights and obligations, such as ground with shared ownership.

Co-owned Properties

With co-owned properties, most co-owners decide on property management as set out under Japan's Civil Code. If the co-owners agree on specific rules, these rules determine which matters should be subject to a vote. There is a risk that the intentions of some owners will not be reflected in decisions on the management of the entire property, tenant selection, or contract terms, depending on the size of ownership interest. The co-owners' rules usually stipulate cost sharing, ownership transfer, and transfer restrictions. We review co-owner rules as they may affect property values. We also review the characteristics and creditworthiness of other co-owners because they could affect management, maintenance, and repairs.

In some cases, ownership transfer requires the consent of other co-owners, and other owners have first refusal rights on ownership transfer. We examine whether disposition can be completed without fail during the tail period by verifying, for instance, whether a definite deadline has been set for gaining the consent of other owners and concluding preferential negotiations.

¹⁹ Article 11 of the Condominium Owners Law (Law No. 69, 1962, including amendments).

If a co-owned property is rented out, the lessor's right to the property rents becomes an indivisible claim, and the liability to refund security deposits becomes an indivisible obligation. Therefore, when another co-owner becomes bankrupt, the creditors against that co-owner may seize all the rights to rents, including those exceeding the ownership interest of the bankrupt co-owner. The borrower may be forced to bear the whole of the obligation to refund security deposits to the lessee if the bankrupt co-owner does not fulfill its obligations under their specific rules or lease agreements. The borrower needs to take precautionary measures such as setting aside cash reserves for interest payments on loans at the time of asset seizure and accumulating enough reserves for other co-owners' deposit refund obligations.

Moreover, because every co-owner can file a request for division of ownership interest under the Civil Code, co-owners should conclude a contract precluding division and file for registration to protect against possible successors.

Ground Lease Properties

A ground lease consists of leasehold rights (*shakuchi-ken*) and surface rights (*chijo-ken*) and is commonly created by leasehold rights. Transfer of surface rights, which are real rights, does not require the landowner's agreement. Still, the landowner's agreement is a prerequisite for transferring leasehold rights, which are claimable assets.

If the transfer of leasehold rights requires the payment of fees for approving the transfer, we typically deduct an amount equivalent to such fees from property values. If the landowner refuses to agree to the transfer of leasehold rights, even though the transfer would not lead to any disadvantage, court permission can be obtained to substitute for the landowner's agreement. However, it is desirable to gain the landowner's consent in advance to ensure disposition within the tail period.

If a ground lease must be renewed by paying fees during the loan period, we check whether an amount equivalent to the renewal fees must be accumulated in advance to prevent the ground lease contract from being canceled.

Additionally, we examine the risk of future ground rent hikes mainly by looking at ground rent yields and tax multiplying factors. When determining property values, we also consider the prospect of ground rent payments pushing the expense rate above that of fee-simple properties and boosting cash flow volatility.

Term Ground Lease Properties

A term ground lease cannot be renewed upon expiration of the contract. The Land and House Rental law stipulates three types of term ground lease: a) a general ground lease with a contract period of 50 years or longer, b) a ground lease for business use with a contract period of 10 to 50 years, and c) a ground lease with a contract period of at least 30 years, requiring transfer of the building on the land to the landowner at an appropriate price level at the time of contract expiration.

If underlying properties were built on land contracted under term ground lease, the properties would cease to exist upon expiration of the contract. Therefore, the loans must be repaid in installments by the expiration of the lease contract; otherwise, it is necessary to ensure that a sufficient period remains until the expiration of the lease contract when balloon repayment remains at loan maturity. Also, for the valuation of properties involving term ground lease, we adopt the discounted cash flow (DCF) method, which assumes the remaining period of the lease contracts after the loan maturity.

Land Boundary Considerations

In principle, all land boundaries need to be defined. Still, it is not unusual in Japan for land boundaries not to be defined. Therefore, in some cases, it is difficult to establish demarcations before the closing of transactions, depending on the property owners' relationships with owners or leaseholders of adjoining land.

If the boundaries of the underlying properties have not been decided, we examine the reason for the problem, the historical background, the current situation, and the outlook. We also examine the expected economic loss if the land area is reduced, the burden of liability for damage, and the possibility of the problem developing into a dispute. All these steps are intended to help evaluate the impact on the marketability of individual properties and their asset values.

In principle, other parties' buildings or any other objects on a property owners' premises, as well as the property owners' buildings or any other objects on the adjoining premises, must be removed before the closing of transactions. If this removal is difficult, we weigh the possibility that these objects may restrict the property and consequently affect the rents adversely. We also consider the impact that the additional costs of removing the objects may have on property values.

Monitoring

Our approach to monitoring the credit quality of an LL/SASB transaction generally follows the US approach detailed above, with additional consideration of whether performance triggers (e.g., a DSCR trigger) are breached.

Appendix 7: Herfindahl Score

Summary

LL/SASB CMBS transactions are rarely highly diverse, and in some cases, their lack of diversity is addressed with additional subordination.

When differentiating LL/SASB CMBS transactions by diversity, we use the Herfindahl or Herf score.²⁰ The Herf score measures pool concentration as a function of loan size. Other dimensions of diversity (such as geographic, borrower, and property type concentration) are also reviewed in the course of our analysis and reflected in our credit enhancement levels.

Transactions with a high Herf score indicate less loan concentration than those with a low Herf score. Loan concentration has an important bearing on potential rating volatility, including the risk of multiple-notch downgrades under adverse circumstances unless addressed by extra credit enhancement.

Delinquency rates have the potential to increase much more quickly in low Herf transactions. The performance of low Herf transactions can meaningfully depart from that of the overall market. While frequently cited industry-wide delinquency statistics are based on a universe of tens of thousands of securitized loans, most CMBS transactions have fewer than 50 loans as measured by the Herf score.

Although aggregate CRE performance is largely driven by broad market forces such as liquidity and the supply of and demand for space, on the level of individual properties, there are material idiosyncratic risks, including tenant credit, borrower performance, and trends within a property's submarket. Even when pools have more of the same property type in the same market, such as Dallas office, reduced exposure to property-level idiosyncratic risk can be highly beneficial. This is especially so for investment-grade investors, who seek protection from scenarios far greater than the expected case. A more diverse pool has greater protection from extreme scenarios.

Our ratings reflect protections provided through structure. Subordination levels help shield senior certificate holders from delinquency and rating volatility. Higher subordination levels are often structured for low Herf transactions due to their increased exposure to extreme scenarios. Other common transaction features, such as servicer advancing, also reduce delinquency events.

Herf Defined

We derive the Herf score from a calculation that measures diversity by determining the effective number of loans in a CMBS transaction as if all loans were equally sized. It proves helpful given that CMBS are among the more concentrated securitizations, with the loan count typically running from the dozens to the low hundreds. There can be significant variation within a pool by loan size, with the balances of loans in a CMBS transaction running from under \$2 million to over \$200 million, and from a fraction of a percent of overall pool balance to 10% or more. Tools like the Herf score help us differentiate the diversity profile of transactions, an important step toward ensuring that they are properly enhanced.

²⁰ The Herfindahl score is the inverse of the Herfindahl-Hirschman Index or HHI.

The formula for the Herf score is as follows:

EXHIBIT 23

$$H = 1 / \sum_{i=1}^n (S_i^2)$$

Where:

» S_i is the share of loan i in the transaction, and n is the number of loans.

Source: Moody's Investors Service

The Herf score for CMBS can range from as little as one (for a single asset transaction) to 250 or more (most frequently seen in small balance loan pools).

Appendix 8: Country Risk Analysis for CMBS or Collateral in Countries with Local Currency Country Ceilings Below Aaa

LL/SASB transactions may include collateral from other countries with our local currency country ceilings below Aaa. To analyze collateral in non-Aaa ceiling countries, we apply our approach but adjust it for country risk using the procedures outlined below, consistent with the procedures we use to rate transactions backed by CRE collateral in Europe.

Local Currency Country Ceilings and Sensitivity Analyses Account for Country Risk

To account for the impact of severe stress scenarios in a given country, we consider as additional factors in our analysis: (1) our local currency country ceiling of the countries in which the underlying properties are located and (2) sensitivity analyses assuming reduced recoveries for loans in multi-country pools.

Country Ceiling Indicates the Highest Achievable Rating for Single-Country Pools

For more information, see our country ceilings cross-sector methodology.²¹ In addition, transactions with non-prime characteristics in terms of loan and asset concentrations, property quality, and MLTV may be further constrained at a reduced number of notches above the government bond rating, reflecting a higher dependency on the local economy and banking sector.

For Multi-Country Pools, We Assess the Impact on Tranches Rated Higher Than the Country Ceiling of Included Countries

In the case of multi-country exposures within a CMBS pool, we consider stressed scenario analyses for the tranches that we rate higher than the country ceiling of the countries in which the underlying properties are located. In our stressed scenarios where we consider a severe country event, we generally assume materially reduced recovery proceeds for the loans secured by properties in countries with a country ceiling below the highest targeted ratings in the respective transaction. We weigh these stressed scenarios with the probability indicated by the country ceiling of these countries. In a final step, we test whether the resulting blended rating of our base case (no country event occurs) and stressed case scenarios is lower than the targeted rating.

²¹ A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Appendix 9: Additional Stresses During the Tail Period

This appendix sets forth our analysis of concentrated LL/SASB transactions in the period between the maturity date of the last maturing loan and the final maturity date of the securities (tail period).

A transaction enters its tail period because either the loan (in the case of a SASB transaction) or not all the loans (in the case of a concentrated pool of large loans) have been repaid by their maturity dates. As the transaction moves closer to the legal final maturity date, the risk increases that the workout of the loan or the remaining loans will not finish in time to make principal payments to the securities before their final maturity date. Therefore, we apply additional stresses during the tail period that increase as the rated final distribution date approaches, reflecting this increasing risk of non- or partial payments.

Primary and Secondary Drivers of Additional Stresses

Our approach reflects the increasing timing risk and resulting downward credit quality migration for an LL/SASB CMBS transaction in the tail period.

Primary Drivers

The level of additional stress will depend on several factors that affect the likelihood that a servicer will complete the process in time. The most important drivers are:

- » **Remaining time to rated final distribution date.** The less time remaining, the more likely it is that the servicer will not complete a loan workout before the final rated distribution date of the CMBS.
- » **Visibility of the progress on the workout of the loan security.** The closer the servicer is to realizing cash from a workout, the more likely it is that the notes will receive payment by the final rated final distribution date.
- » **Complexity of the workout process.** The more complex the workout, the more likely it is that the servicer will not complete it in time. The workout process will be more lengthy and costly, and less successful if it involves:
 - misaligned control mechanism features, such as when effective control over the workout process rests with the junior investors
 - complex legal aspects for the underlying loan or loans
 - complicated structural transaction features
 - diverging investor interests, depending on ranking in the capital structure or the purchase price of the certificates
 - multiple interested parties, where coordination efforts increase the complexity of the loan workout.

Secondary Drivers

Other factors that will affect credit quality in the tail period include:

- » **Jurisdiction.** The speed of the enforcement process depends on the legal system to which the borrower must adhere and the location of the real estate. We take these factors into account when assessing the likelihood of completing the workout process in time.
- » **Granularity of loan pool backing CMBS.** If several loans secure a very senior certificates, it is possible that the servicer would only need to work out a small portion of the loans to repay the certificates.

- » **Granularity of property portfolio securing the loans.** Suppose several properties secure a loan underlying a CMBS. In that case, it is possible that the servicer would only need to dispose of a small portion of the properties to fully repay the certificates.
- » **Principal waterfall.** Sequential payment of workout proceeds to investors in the tail period benefits the most senior investors.
- » **Quality of sponsorship.** Strong sponsors might still support defaulted loans, especially if the availability of financing rather than asset operating performance is the main reason for the default.

Effect of Additional Stresses on Ratings

The additional stress we apply during a tail period may result in ratings up to the ranges detailed in Exhibit 24.

EXHIBIT 24

Upper Range of Expected Ratings

Length of Time to the Rated Final Distribution Date	Upper Range of Expected Ratings
24-36 months	Aa1 (sf) - A2 (sf)
12-24 months	Aa3 (sf) - Baa1 (sf)
6-12 months	A3 (sf) - Ba1 (sf)
0-6 months	Baa3 (sf) - B1 (sf)

Source: Moody's Investors Service

We typically obtain information on the drivers, especially information on a special servicer's workout plan, and consider the date at which such information becomes available to us when determining a tail period.

Appendix 10: Structured Credit Assessments for Mezzanine Loans

Overview

Some CRE transactions, such as collateralized loan obligations (CLOs), contain collateral in the form of mezzanine loans. Mezzanine loans are typically used as part of overall financing of a real estate asset, in the form of a loan to a borrowing entity (or entities) that directly or indirectly owns a real estate property-owning entity. The debt is secured by a perfected first security interest in the mezzanine borrower's pledged ownership interests in the property owner. Enforcement of the lender's remedies is not through mortgage foreclosure (as no real property lien is granted to the mezzanine lender), but through a Uniform Commercial Code (UCC) foreclosure of the lender's interest either in the mezzanine borrower's ownership interests in the property owner (a general intangible), or, if the mezzanine collateral was "certificated," in the "securities" the mezzanine lender controls or physically holds.

In evaluating mezzanine loans, we apply our LL/SASB approach to determine a SCA. We adjust the SCA to account for the position of the mezzanine loans in the capital structure (in structures with more than one mezzanine loan tranche and/or B-note tranche), the relatively weak standing of mezzanine debt compared with first-lien senior mortgage debt, and the extent to which the mezzanine loan differs from our benchmark, "credit-neutral" structure. The failure to mitigate such risk may result in additional expected losses attributable to such loans.

SCA Using LL/SASB Approach

When deriving SCAs, we determine an adjusted Moody's value to calculate the adjusted MLTV. The loan size in the MLTV incorporates the sizes of the mezzanine loans for which we are deriving SCAs and of all other related debt that is at least as senior as the mezzanine loan we assess. We would exclude, for example, other mezzanine loans that are more subordinated than the mezzanine loan we assess. We compare the calculated MLTV to our benchmark "target" MLTVs for each credit category to derive the SCA for the mezzanine loan.

Adjustments to Obtain the Mezzanine Final SCA

To obtain a final SCA of the mezzanine loan, we consider the following adjustments.

Weaker Standing of Mezzanine Loans

In our LL/SASB approach, we assume an underlying loan is a mortgage loan, which typically has priority over most other claims. A mezzanine loan is weaker from a lender's perspective since it is subordinate to most other claims, does not touch the real estate, and does not protect against changes affecting the property made in the period between the loan origination date and foreclosure date.

To account for the weaker standing of a mezzanine loan, we cap SCAs and tranching proceeds on standalone mezzanine loans at a rating factor of 70, equivalent to an assessment of **a1** (sf), and may reduce the other credit assessments that result from our LL/SASB methodology. Although we may apply an effective **a1** (sf) cap to an individual mezzanine loan, a pool of mezzanine loans may support **Aaa** (sf)-rated CRE CLO tranches if there is sufficient diversification, credit enhancement, and portfolio credit quality and recovery rates.

Mezzanine Size Compared to the Property Value

Small declines in property value can significantly impact the percentage loss incurred by relatively small mezzanine loans. Similarly, the fixed costs incurred in a default scenario (i.e., legal, servicing, and other costs) would have a large percentage impact on small mezzanine loans.

Variations from Our Base Case Characteristics

Most mezzanine loans have a set of characteristics that form the basis of our SCA analysis. To the extent that the loans have characteristics that create additional risks from the base case, it may result in additional expected losses attributable to such loans. The base case characteristics include the following:

- » A loan agreement that is comparable to a CRE mortgage loan agreement in terms, conditions precedent, affirmative and negative covenants, events of default, and representations and warranties
- » Underwriting information, due diligence materials and third-party deliverables (such as appraisals, financial statements, asset summary reports, environmental and engineering reports, underlying title policies, insurance policies, legal opinions and certificates) that are comparable to the material we receive when reviewing mortgage loans
- » Generally, borrowing entities that are special purpose, bankruptcy-remote entities
- » Legal opinions regarding non-consolidation and one or two independent directors when total loan proceeds of both mortgage and mezzanine loans exceed the same thresholds that apply to REMIC debt, between appropriately "paired" parties: mezzanine borrowers (and general partners or managing members, as applicable) with the ultimate upper tier sponsors, with the property owner and related property managers
- » 100% of the beneficial ownership interests in the property-owning entity is pledged as collateral
- » Non-recourse carve-out ("bad-boy") guarantees, similar to those in mortgage financing, with some additional bespoke provisions, such as prohibitions against impermissible changes to organizational or senior loan documents
- » A cash management system, such as a lockbox and a separate cash management account for the mezzanine lender, designed to insulate the transaction against commingling risk, depending on the strength of the property and the borrower
- » A maturity date of the mezzanine loan that coincides with maturity date of the senior loan
- » Limited-liability-company, limited-partnership, and general-partnership ownership interests that are "certificated" under Article 8 of the UCC. The mezzanine lender then could obtain priority and perfection of its security interest merely by taking control or physical delivery of the LLC or partnership certificates and can take advantage of so-called "protected purchaser" status
- » The benefit of an ALTA 16 "mezzanine financing endorsement" to a title insurance policy, or its equivalent, representing access to an owner's policy in an amount at least equal to the combined value of the senior and mezzanine loans, as well as the benefit of a "UCC insurance policy"
- » An intercreditor agreement that is generally consistent with market standards as of the date hereof
- » A floating interest rate on the mezzanine loans that is limited by an interest rate cap agreement that mitigates the potential increases in debt service and is pledged to the mezzanine lender
- » A property management agreement that is terminable upon default under the mezzanine loan, subject to senior lender consent, with an assignment and subordination agreement benefiting the mezzanine lender
- » Property owner's property and casualty insurance policies and ACORD certificates that include the mezzanine lender as an "additional insured"
- » Organizational documents of the mortgage borrower with provisions prohibiting both the issuance of additional interests and opting out of UCC Article 8 without the lender's written consent
- » A pledge agreement that includes an acknowledgement of the limited right of "qualified transferee" bidders at a UCC foreclosure sale
- » A certified organizational or structural chart of the borrower supplied as an exhibit to the loan agreement

Other Adjustments

In our LL/SASB approach, we may make positive and negative credit adjustments to mezzanine loans to reflect collateral and structural attributes that vary from our defined benchmark characteristics commensurate with our benchmark target MLTVs. Adjustments include the loan's interest rate type, expected amortization, cross-collateralization, property quality serving as collateral, and conditions in local property markets.

Similar to our LL/SASB approach, we may make "final alignment adjustments" to reconcile our final target MLTVs. These final alignment adjustments account for collateral-specific metrics such as Moody's debt yield, Moody's DSCR, and analysis of comparable distressed sales transactions that potentially establish "floor" values. Transitional properties commonly serve as collateral in CRE CLOs, and we may make positive final alignment adjustments for what we deem achievable transition plans and funding appropriate to execute the plans, as opposed to cases in which the plans appear not fully achievable or sufficiently funded.

Appendix 11: Exchangeable Securities

Analysis

In some CMBS transactions, specified liability classes (called reference classes) may be exchanged for an exchangeable class, and the exchangeable class subsequently may be exchanged for its respective reference classes. The exchangeable class is entitled to receive the sum of interest and principal distributable on its reference classes that are exchanged for the exchangeable class. The holder of the reference classes would receive the same cash flow as a holder of the related exchangeable class. The initial certificate balance of the exchangeable class is equal to the aggregate of the initial certificate balances of its reference classes.

Because exchangeable classes are a combination of the component reference classes, we rate exchangeable notes using the Weighted Average Expected Loss (Wael) of the reference classes. We use the results of the Wael calculation in conjunction with the loss benchmarks as described below. In cases where the rating that we determine on the basis of the Wael of the reference classes is more than three notches higher than the rating on the lowest-rated reference class, we would rate the exchangeable class three notches higher than the lowest-rated reference class.

Loss Benchmarks

In rating exchangeable securities in which a model is used to derive an expected loss, we select loss benchmarks referencing the Idealized Expected Loss table²² using the Symmetric Range, in which the lower bound of loss consistent with a rating category is the midpoint (strictly, the geometric mean) between the Idealized Expected Loss of the rating category and the Idealized Expected Loss of the next higher rating category. The upper-bound of loss is analogously determined as the geometric mean between the Idealized Expected Loss of the rating category and the Idealized Expected Loss of the next lower rating category. Mathematically, the benchmark boundary is computed as an equal 50/50 weighting on a logarithmic scale. That is, the benchmark boundaries of loss appropriate for evaluating rating category R are given by:

EXHIBIT 25

$$\begin{aligned}
 [1] \text{Rating Lower Bound}_R &= \exp\{0.5 \cdot \log(\text{Idealized Expected Loss}_{R-1}) + 0.5 \cdot \log(\text{Idealized Expected Loss}_R)\} \\
 [2] \text{Rating Upper Bound}_R &= \exp\{0.5 \cdot \log(\text{Idealized Expected Loss}_R) + 0.5 \cdot \log(\text{Idealized Expected Loss}_{R+1})\}
 \end{aligned}$$

Where:

- » Rating Lower Bound_R means the lowest Idealized Expected Loss associated with rating R and the expected loss range of rating R is inclusive of the Rating Lower Bound_R;
- » Rating Upper Bound_R means the highest Idealized Expected Loss associated with rating R and the expected loss range of rating R is exclusive of the Rating Upper Bound_R;
- » R-1 means the rating just above R;
- » R+1 means the rating just below R.
- » The Rating Lower Bound for Aaa is 0% and the Rating Upper Bound for C is 100%. These are not derived using the formula.

Source: Moody's Investors Service

²² For more information, see the discussion of Idealized Probabilities of Default and Expected Losses in *Rating Symbols and Definitions*. A link can be found in the Moody's Related Publications" section.

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](#).

A comprehensive description of our approach to forecasting capitalization rates can be found in the following technical supplement: [*US Commercial Mortgage-Backed Securities: Capitalization Rate Forecast Model*](#).

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 is available [here](#).

» contacts continued from page 1

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