Methodology
Common RMBS Rating Methodology

DBRS Morningstar
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Contents

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Related Research

For a list of the Structured Finance related methodologies for our principal Structured Finance asset class methodologies that may be used during the rating process, please see the *DBRS Morningstar Global Structured Finance Related Methodologies* document. Please note that not every related methodology listed under a principal Structured Finance asset class methodology may be used to rate or monitor an individual structured finance or debt obligation.

Key Updates

For key updates in this methodology, please refer to the press release titled, "DBRS Morningstar Publishes Updated Common RMBS Rating Methodology" dated 8 February 2023.

Scope and Limitations

A methodology sets forth the key analytical considerations and applicable analytics used when DBRS Morningstar assigns or monitors credit ratings or other opinions. DBRS Morningstar applies approved methodologies in the evaluation of a structured finance transaction or debt obligation. Quantitative and qualitative factors set forth in a methodology or in a combination of methodologies are evaluated by a DBRS Morningstar rating committee or discussion group that exercises analytical judgment and considers the regulatory environment, market standards, and customary practices in addition to other factors deemed relevant to the analysis.

As part of the evaluation process, DBRS Morningstar may consider whether a sponsor's proposed capital structure supports the assignment of a given rating(s), the loss level(s) the capital structure is able to withstand, or the rating level(s) supported by a sponsor's proposed capital structure. Once completed, this process facilitates the assignment of a DBRS Morningstar rating, at a given rating level.

In cases when an applicable methodology does not address one or more elements of a structured finance transaction or obligation, or such element(s) differs from the expectations contemplated when an applicable methodology was approved, DBRS Morningstar may apply analytical judgment in the determination of any related analytical factor, assumption, rating or other opinion. For a methodology that incorporates the use of a predictive model, DBRS Morningstar may also depart from the rating stress(es) implied by the predictive model. DBRS Morningstar typically expects there to be a substantial likelihood that a reasonable investor or other user of the credit rating(s) would consider a three-notch or more deviation from the rating stress(es) implied by the predictive model to be a significant factor in evaluating the rating(s). When a rating committee determines a material deviation, DBRS Morningstar discloses the material deviation and its analytical judgment for the material deviation.

Introduction

This methodology outlines DBRS Morningstar's common approach to analysing the credit risk of residential mortgage portfolios (including those securing covered bonds or pass-through instruments backed by residential mortgage portfolios) in markets that are not covered by a specific DBRS Morningstar rating methodology. The approach determines an expected level of lifetime defaults (Expected Portfolio PD) and losses in such mortgage portfolios, and an analytical tool is used to determine Expected Portfolio PD and losses for all rating categories. Calculation of market value declines (MVDs) is based on a simulation of home price changes, as detailed in Appendix 2.

This methodology should be followed in the context of the dynamic environment in which it is intended to be applied, and the approach described herein may not be equally applicable to all cases as different jurisdictions could exhibit differences in mortgage features, market practices, regulation, and/or legal frameworks

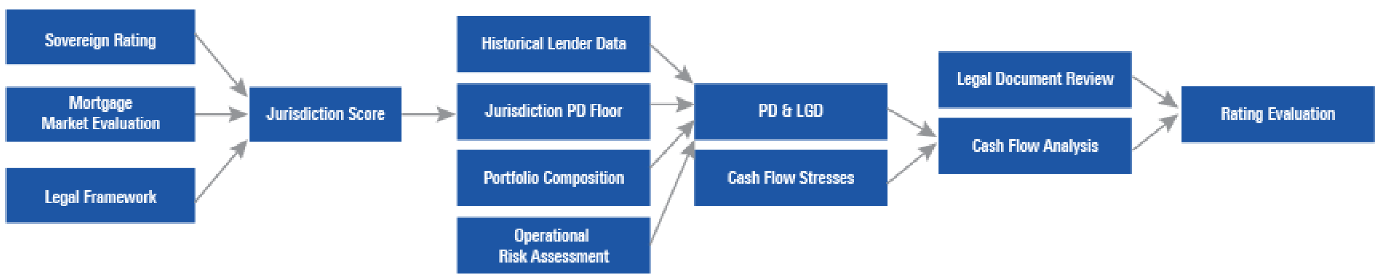
Executive Summary

This methodology summarises DBRS Morningstar's rating approach for assessing the credit risk of bonds backed by residential mortgage portfolios originated in jurisdictions that are not covered by other rating methodologies. This methodology applies to the asset analysis of residential mortgage-backed securities (RMBS), covered bonds, and pass-through instruments backed by residential mortgage portfolios.

This methodology is applicable to pools composed of performing, local currency-denominated residential mortgage portfolios that, in DBRS Morningstar's opinion, have standard features in the context of the jurisdiction in which they have been originated. While nonperforming loans are outside of the scope of the methodology, a limited amount of loans in arrears would not preclude DBRS Morningstar from rating a proposed issuance.

The estimation of the Expected Portfolio PD assumption follows a two-step approach:

Exhibit 1 Rating Process



Source: DBRS Morningstar.

1. The first step focuses on jurisdiction-specific factors, namely the sovereign rating, the mortgage market, and the legal framework, to determine a Jurisdiction Score, which is then associated with a minimum Expected Portfolio PD to be applied to portfolios in that jurisdiction (Jurisdiction PD Floor).
2. The second step sets the lifetime level of default expected for the analysed portfolio (i.e. the Expected Portfolio PD). This will typically be equal to or higher than the Jurisdiction PD Floor and reflects the lender's historical performance data, the collateral pool composition, and the quality of origination and servicing.

Data Availability for Jurisdiction PD Floor Analysis

In order to carry out the Jurisdiction PD Floor estimation, DBRS Morningstar determines a Jurisdiction Score, considering the sovereign assessment from its Sovereigns team and macroeconomic and mortgage market data obtained from national statistics authorities and/or other reputable national or supranational institutions. This data may be supplemented by market- or lender-specific data provided by issuers. DBRS Morningstar conducts an analysis of the legal and regulatory framework, considering publicly available information and additional analysis from the issuer's legal counsel and/or independent external legal counsel.

All jurisdiction data collected to develop the Jurisdiction Score is expected to be comparable with regional peers for benchmarking purposes. If the data collected to assign a Jurisdiction Score is not deemed to be appropriately robust in terms of comparability, timeliness, and/or specificity, DBRS Morningstar may decline to rate residential mortgage loan-backed debt in such jurisdiction.

Data Provision for Collateral Pool Analysis

Following the determination of the Jurisdiction Score and Jurisdiction PD Floor level for a given jurisdiction, the second step involves the estimation of Portfolio Expected PD. DBRS Morningstar reviews originator-specific data, such as

- Loan-level data for the securitised portfolio;
- Historical origination volumes, arrears, defaults, recovery, and prepayment data from the originator and/or the market for similar portfolios; and
- Repossession data from the servicer.

DBRS Morningstar may seek to access Agreed-Upon Procedures or audit reports, which are performed by an issuer and/or seller for regulatory purposes, to the extent of their availability.

Determination of Jurisdiction Score and Jurisdiction PD Floor

For each jurisdiction for which DBRS Morningstar is approached to rate an instrument backed by a residential mortgage portfolio under this methodology, a Jurisdiction Score is assigned, which determines the Jurisdiction PD Floor for such jurisdiction.

A Jurisdiction Score is determined for each jurisdiction based on a combination of the following factors:

1. Sovereign Rating
2. Mortgage Market Evaluation
3. Legal Framework Evaluation

The Jurisdiction Score is the simple average of A, B, and C above, leading to the classification of each jurisdiction under consideration into five different categories, for which different Jurisdiction PD Floors apply.

Exhibit 2 Jurisdiction Scores & PD Floors

Jurisdiction Score	Jurisdiction PD Floor (%)
1 (Lowest Risk)	1.5
2	3.0
3	7.0
4	15.0
5 (Highest Risk)	30.0

A. Sovereign Rating

The Sovereign Rating Factor is based on the sovereign entity's current Long-Term Local-Currency Issuer Default Rating in the relevant jurisdiction. If DBRS Morningstar does not maintain a sovereign rating, it is not able to rate a residential mortgage-backed issuance in that jurisdiction.

Exhibit 3 Sovereign Rating Factors

Sovereign Rating	Sovereign Rating Factor
AAA	1.0
AA (high)	1.5
AA	2.0
AA (low)	2.3
A (high)	2.7
A	3.0
A (low)	3.3
BBB (high)	3.7
BBB	4.0
BBB (low)	4.3
BB (high)	4.7
BB or below	5.0

B. Mortgage Market Evaluation

The evaluation of the mortgage market comprises three aspects that are separately scored:
B.1 Maturity level of the mortgage market
B.2 European Banking Authority’s (EBA) key risk indicator (KRI)
B.3 Regulatory and economic framework related to the housing and mortgage market

B.1 Maturity Level of the Mortgage Market (MLMM) Score

The MLMM Score is based on the following subscores, with each subscore having a different weight to determine the final score. The weights used to compute Score B.1 are shown in brackets in Exhibit 4.

Exhibit 4 MLMM Subscore and Weights

Subscore	Subscore Name	Weight (%)
B.1.1	Size & Development of the Mortgage Market	60
B.1.2	Credit Information Sharing Between Lenders	15
B.1.3	Underwriting Criteria Standardisation Within the Market	25

DBRS Morningstar assigns scores and subscores based on a comparative analysis between jurisdictions through a benchmarking exercise.

Subscore B.1.1 is mainly based on quantitative indicators measuring the size and stability of the residential market and the relevance of the residential property market for the overall economy.

- Outstanding Residential Mortgages over Total Adults (end-of-current-year value)
- Outstanding Residential Mortgages over Total Adults (standard deviation of past 10 years)
- Mortgage Debt-to-GDP Ratio (end-of-current year value)
- Total Outstanding RMBS & Covered Bonds Assets over Total Adults (end-of-current-year value)

Since a purely quantitative score does not directly assess the development of a mortgage market, DBRS Morningstar also considers qualitative factors such as the lending market infrastructure, the range of mortgage products offered in the market, and the type of lenders active in the market.

Subscore B.1.2 is a qualitative assessment of the quantity, quality, and availability of borrowers' credit information within the jurisdiction. Jurisdictions with an established and competitive credit information industry receive a higher subscore. If credit information providers in the market record both positive and negative credit information, the jurisdiction receives a higher subscore.

Subscore B.1.3 is based on the average loan-to-value (LTV)/debt-to-income (DTI) granted to borrowers, the harmonisation of underwriting standards amongst lenders and types of lenders, and the assessment of the underwriting practices that are widely used in the analysed jurisdiction. Regulatory limits or macroprudential rules (MAPPs) are not relevant for this subscore, as DBRS Morningstar reviews the levels of actual average leverage in the residential market. Underwriting practices relevant for this subscore include the lenders' affordability stresses applied to grant residential mortgage loans and the prevalent property valuation type that is allowed by lenders.

Jurisdictions are assigned a subscore from 1 to 5, with the final B.1 score being the weighted average of the three subscores.

B.2 EBA's KRI Score

Quarterly, the EBA publishes a summary of KRIs for banks that use the advanced internal ratings-based approach (A-IRB) for managing their risk and capital. Under A-IRB, banks use their own quantitative models to estimate PD, exposure at default, loss given default (LGD), and other parameters required for calculating the risk-weighted assets.

Banks can use this approach only subject to approval from their local regulators. This approval is a rigorous process that requires banks to demonstrate to their regulator that they satisfy all the requirements to be able to use their internal models instead of standardised risk weights. The definition of default under A-IRB is 90 days past due or earlier if certain other conditions are satisfied, which is stricter than the default definition employed in most rating analysis.

EBA's KRIs include the jurisdiction-adjusted PD (i.e., the weighted-average one-year PD for nondefaulted loans for banks in that country). As such, it provides a useful estimate of the residential mortgage default risk in each jurisdiction.

Exhibit 5 EBA's KRI Scores

Score	EBA KRI Weighted-Average Adj. PD for Residential Loans
1	Below 1%
2	Between 1% and 2%
3	Between 2% and 3%
4	Between 3% and 5%
5	Above 5%

Source: DBRS Morningstar.

The EBA provides KRIs for all EU countries and a few other jurisdictions such as the UK, Australia, Canada, Singapore, and others. If DBRS Morningstar is approached for a rating in a jurisdiction not included in the EBA KRI survey, it would benchmark that jurisdiction to other comparable jurisdictions included in the EBA KRI survey. The peer group for such a benchmarking exercise would be based on shared market features, including similar historical mortgage performance.

B.3 Regulatory and Economic Framework Related to Housing and Mortgage Market (HMM) Score

The HMM Score is based on the following subscores, with each subscore having a different weight to determine the final score. The weights used to compute Score B.3 are shown in brackets in Exhibit 6.

Exhibit 6 HMM Subscores & Weights

Subscore	Subscore Name	Weight (%)
B.3.1	Financial Education	20
B.3.2	Regulatory Oversight of Lenders	20
B.3.3	Macroprudential Lending Rules	20
B.3.4	Supply/Demand Dynamics	40

Subscore B.3.1 is driven by quantitative indicators related to the financial literacy of the population as assessed by international surveys and financial inclusion metrics, such as the percentage of residents that have acquired a financial product in the past year. This subscore also reflects the qualitative assessment of consumer education as pertaining to residential mortgages and government promotion of overall financial education amongst residents.

Subscore B.3.2 is a qualitative assessment of the jurisdiction's regulatory framework in terms of banking (and lender) supervision, financial consumer protection, and the governance and powers of the government entity (or entities) in charge of regulating and supervising financial markets, with a more marked focus on residential mortgages.

Jurisdictions with supervisory entities that are more transparent, independent, and that have clear mandates in well-defined areas of focus receive a higher subscore than jurisdictions with supervisors that are not entirely independent from the government, are underfunded, and either do not have clear mandates or have conflicting mandates.

Jurisdictions with strong and effective financial consumer protection laws that are routinely implemented and enforced receive a higher subscore than jurisdictions that have more lax consumer protection and/or that lack actual enforcement for noncompliant lenders.

Subscore B.3.3 is a comparative evaluation of the MAPPs in use in the jurisdiction to control systemic risks posed by residential lending. The more common MAPPs are LTV limits, DTI limits, and amortisation limits for interest-only loans. The subscore is set on the basis of a benchmarking exercise between peer jurisdictions and is not entirely driven by the absolute levels and presence of mandatory limits. Rather, the need for and the effectiveness of residential MAPPs is at the core of this assessment.

Subscore B.3.4 is an assessment of the current status of the housing and mortgage market in the jurisdiction, which is based on several indicators, both quantitative and qualitative. DBRS Morningstar sets this subscore following an analysis of demographic trends (e.g., population growth, average age of children leaving their parents' household), mortgage affordability ratios and housing cost overburden (current and trends), the comparative affordability of mortgage alternatives (e.g., social housing, private rents), housing supply factors (e.g., planning-system efficacy, building costs), and long-term trends in the housing and mortgage markets (e.g., percentage of home ownership).

Jurisdictions are assigned a subscore from 1 to 5, with the final B.3 score being the weighted average of the four subscores.

Mortgage Market Evaluation Factor

The final Mortgage Market Evaluation (Factor B) of the jurisdictions is the weighted average of

- B.1: MLMM Score (40%)
- B.2: EBA KRI Score (20%)
- B.3: Regulatory and Economic Framework Related to HMM Score (40%)

C. Legal Framework Evaluation

While the overall strength of the legal system is already taken into account by the Sovereign Rating factor (Factor A), this score (Factor C) is based on legal aspects directly linked to the mortgage market. In order to evaluate the residential mortgage legal framework, DBRS Morningstar may request additional analysis from the issuer's counsel and/or avail itself of the advice of an independent law firm with expertise in the local market.

The evaluation of the legal framework for residential mortgages is split into three scores set forth in Exhibit 7:

Exhibit 7 Legal Framework Scores & Weights

Score	Score Name	Weight (%)
C.1	Ease of Enforcing Creditor Rights	33.3
C.2	Costs of Enforcing Creditor Rights	33.3
C.3	Ease of Registering Property Rights	33.3

C.1 Ease of Enforcing Creditor Rights

This score is qualitatively set on the basis of the possession options available to mortgage lenders, the standardisation of the recovery process amongst the lenders, and the role played by courts in the recovery process. A key quantitative indicator that is considered for this score is the average time from loan default to recovery after foreclosure, where a shorter time is considered a beneficial feature for the mortgage market.

C.2 Costs of Enforcing Creditor Rights

In addition to statistics on the direct enforcement costs within the jurisdiction, this score is based on the assessment of indirect costs such as pre-enforcement costs, property depreciation as a result of the recovery process (e.g., maintenance costs during enforcement phase, sale discount after repeated auctions), and opportunity costs when regular nonperforming loan portfolio sales are common in the jurisdiction.

C.3 Ease of Registering Property Rights

This score is based on the quality of the property registration rights system in place in the jurisdiction, the cost and timing of the registration, and an evaluation of the legal risks caused by a mortgage's lack of timely registration.

Jurisdictions are assigned a score from 1 to 5, with the final Legal Framework Evaluation (Factor C) being the simple average of the three scores.

Final Jurisdiction Score

The three different Factors (Sovereign Rating, Mortgage Market Evaluation, and Legal Framework Evaluation) are equally weighted (as rounded to the first decimal) to form the Jurisdiction Score. Additional factors may be taken into consideration in the final Jurisdiction Score to account for factors unique to the given jurisdiction. Typically, the final Jurisdiction Score is the closest integer to the weighted-average score.

The final Jurisdiction Score determines the Jurisdiction PD Floor as per Exhibit 2 above.

Expected Portfolio PD

Different portfolios within a jurisdiction may have different levels of credit risk depending on various factors such as the quality of origination and servicing, type of borrowers and products targeted by the lender, origination vintage, and selection criteria in the pool. To account for these divergences in credit quality, the Expected Portfolio PD for the analysed residential mortgage portfolio is determined based on the following factors:

1. Lender’s Historical Performance

The review of a lender’s historical performance data typically includes static default and loss data and dynamic delinquency data. Such historical data is expected to refer to mortgages with the same features as those in the analysed portfolio.

The Expected Portfolio PD may be further adjusted based on marketwide data and default experience in that jurisdiction. DBRS Morningstar expects that the historical data used to calculate the Expected Portfolio PD will cover various points within a credit cycle.

Further adjustments to Expected Portfolio PD may be made for the economic environment reflected in the historical performance data vis-à-vis the expectation of future economic performance. If the data covers a benign economic period and the expectation is for economic performance to deteriorate, a more conservative Expected Portfolio PD relative to historical performance may be assumed, and vice versa.

Notable changes in lending standards may also be taken into account. For example, in most European jurisdictions, loans originated after the 2008 global financial crisis have stricter underwriting standards and hence are expected to perform differently than pre-crisis originations.

2. Portfolio Composition
DBRS Morningstar looks at how the analysed portfolio's composition differs from the lender’s outstanding residential mortgage book, on which the historical performance data is based. Credit-relevant differences may be in LTV levels, origination vintage distribution, DTI distribution, geographical concentration, loan purpose, and other features.

DBRS Morningstar compares the portfolio characteristics with what is deemed to be average for the market but also with the lenders' loan book. For example, a portfolio with a higher LTV from the same lender is deemed to be riskier than portfolios with lower LTVs from that same lender. The selection criteria used to determine the securitised pool out of the originators' full book can also positively or negatively influence the portfolio's credit profile and would be considered when determining the Expected Portfolio PD.

3. Lender and Servicer Evaluation
DBRS Morningstar evaluates a lender's origination process and servicing with a focus on the following:

- Lender's market position,
- Product offering/segment in which the lender operates,
- Management quality and depth, and
- Previous capital market or securitisation experience.

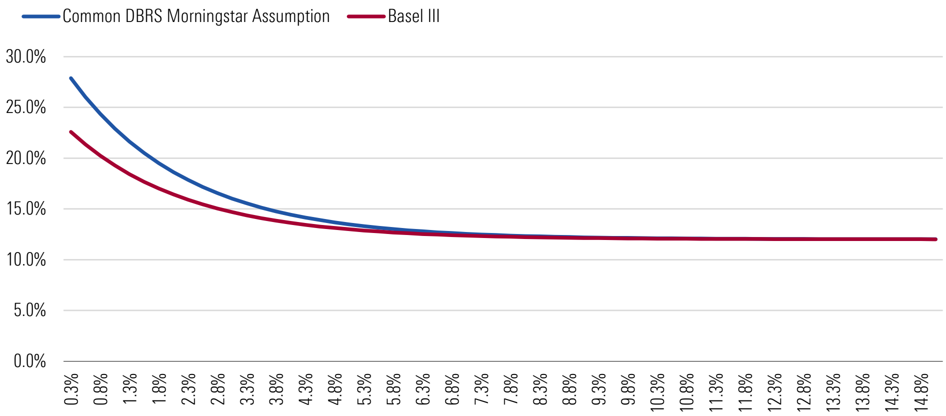
The same Expected Portfolio PD is applied to all performing loans in the pool, whereas nonperforming loans are assumed to be in default. The nonperforming loan definition depends on both transaction-specific factors, such as the definition of default and the provisioning mechanism, as well as jurisdiction-specific factors such as regulators' guidelines for default classification.

Rating Scenario Default Rates

Rating scenario default rates are estimated assuming the distribution of potential portfolio defaults, which is a Vasicek distribution. The distribution is estimated based on two variables: the Expected Portfolio PD and the asset correlation assumption.

The asset correlation applied to the analysed portfolio for estimating stressed rating scenario default rates is a function of the Expected Portfolio PD. Correlations assigned to the analysed portfolio range from 12% to 30%, with higher-default-rate portfolios assigned lower correlations and lower-default-rate portfolios assigned higher correlations. The scale of correlations for each Expected Portfolio PD is based on a modification of the Basel III framework.

Exhibit 8 Correlation Graph



Source: DBRS Morningstar.

Once a distribution of potential default rates is estimated for a portfolio of residential mortgages, percentiles of that distribution are used to estimate the specific rating scenario default rates. The percentiles are derived by the tenor of the underlying asset portfolio and DBRS Morningstar’s Idealised Default Table (IDT) (see Appendix 1).

The tenor for the IDT is the weighted-average life (WAL) of the analysed portfolio. The portfolio's WAL is a function of (1) the expected amortisation schedule of the loans and (2) a conditional prepayment rate (CPR) assumption.

The expected amortisation schedule of each loan is calculated based on the loan-level characteristics adjusted for the expected portfolio CPR. Expected portfolio CPRs are based on DBRS Morningstar's assessment of the current prepayment environment for the relevant jurisdiction. The historical prepayments shown by lender-specific data or by available peers within the same market are also considered when setting the expected portfolio CPR. If DBRS Morningstar is not able to establish a CPR assumption based on robust historical prepayment data at the jurisdiction level and/or originator level, a CPR assumption of 5% is considered in the analysis.

LGD Analysis

House Prices and Market Value Declines

The property valuation carried out at the time of mortgage origination is updated by using the change in available house price indices (HPIs), which reflects the price development in the region where the property is located. Depending on the correlation between regional housing markets within the jurisdiction, the geographical size of the country, and the availability of regional HPIs, the relevant jurisdiction's properties may be indexed with either a single national HPI or multiple regional HPIs.

DBRS Morningstar uses a stochastic process to generate base house prices and MVD rates for each rating scenario. These are jurisdiction-specific and typically based on published residential property price data. The analysis is based on a binary lattice stochastic process that estimates house prices as well as their distributions, which can then be used to generate MVD assumptions. For more details on DBRS Morningstar's approach to generating MVD assumptions, please refer to Appendix 2.

Distressed Sale Discount

Distressed Sale Discounts (DSDs) are applied to expected property values after applying the MVD and are meant to address a property sale in a liquidation scenario.

Where robust, lender-specific loan-level repossession data is available such that it allows DBRS Morningstar to calculate average DSDs, such data would typically form the basis of the transaction's DSD assumption.

Where repossession data is not available, the DSD is set between 30% and 50% based on benchmarking with other comparable markets and/or other data sources. DBRS Morningstar expects jurisdictions with less-liquid residential property markets to have a DSD assumption towards the lower end of the range.

DBRS Morningstar acknowledges that there may be limited instances where a DSD lower than the 30% floor can be applied, but this would typically be either for non-repossession cases with sufficient data to back up a DSD lower than 30% or for cases where the available property valuations have been recently refreshed to reflect the likely realisation value of a foreclosed property.

Foreclosure Costs

DBRS Morningstar analyses lender-specific data on a transaction basis and generates assumptions on costs of foreclosure based on the data received. Foreclosure costs may also be set with the help of jurisdiction-wide data provided by reputable publications or as advised by expert law firms in the relevant jurisdiction. Proxy data from peer jurisdictions can also be considered when setting the foreclosure cost assumption.

LGD Floors

DBRS Morningstar acknowledges that, in periods of high economic stress, it may be difficult or even impossible to find a market-clearing price for residential real estate, resulting in potential losses, which may be greater than those implied by stressed liquidation values. As a result, the LGD assumptions are typically floored for the investment-grade rating scenarios at 25% for AAA (sf), 20% for AA (sf), 15% for A (sf), and 10% for BBB (sf) and below.

Cash Flow Analysis

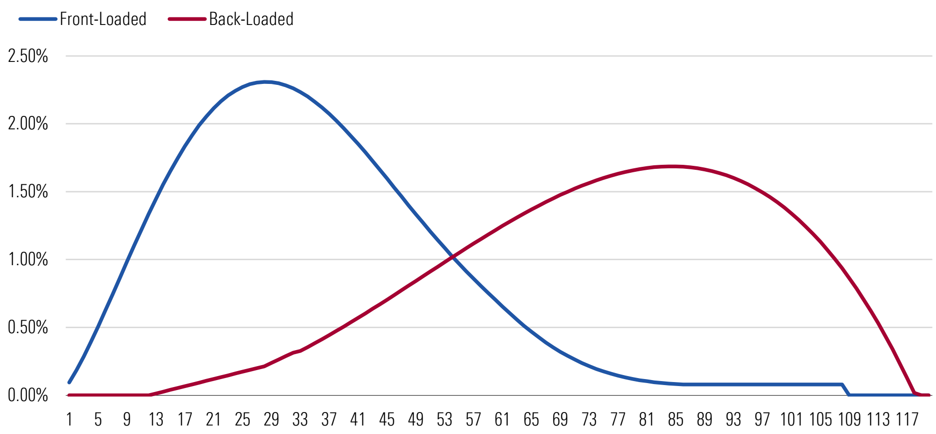
Prepayments

Three prepayment stresses are generally run in the cash flow analysis: slow, mid, and fast. Each prepayment stress corresponds to a different CPR over the life of the transaction. The mid stress may not necessarily reflect DBRS Morningstar's CPR outlook for a portfolio jurisdiction. Prepayment assumptions are meant to test a structure's robustness to the impact of stressed losses in various prepayment scenarios. Given that slow prepayment stresses are effectively bound by 0%, a slow stress for a low prepayment outlook may not result in a stress. Additional or different stresses may be run in situations such as a review of an originator's performance history or a portfolio that has unique collateral characteristics relative to the market.

Default Timing

Two default timing curves are analysed in the DBRS Morningstar cash flow stress scenarios: front-loaded and back-loaded. The curves in Exhibit 9 illustrate stresses for the distribution of defaults over the life of a transaction. The distribution is over a 10-year period. However, the distribution may be consolidated or expanded depending on the WAL of the collateral.

Exhibit 9 DBRS Morningstar Standard Default Timing Pattern



Source: DBRS Morningstar.

Recovery Timing

DBRS Morningstar requests lender-specific data on a transaction basis and generates assumptions on the recovery timing on the data received. The recovery timing may also be set with the help of jurisdiction-wide data provided by reputable publications or as advised by expert law firms in the relevant jurisdictions.

For jurisdictions with a better-than-average Legal Framework Factor, DBRS Morningstar expects the recovery lag to be shorter, and at times significantly shorter, than for jurisdictions with a Legal Framework Factor higher than 3.

Surveillance

Each rating assigned using this methodology is reviewed in accordance with DBRS Morningstar's Structured Finance Ratings Surveillance Global Policy (the Policy) on www.dbrsmorningstar.com. DBRS Morningstar's review may consist of analysing performance trends, comparing actual performance with initial expectations, and forecasting collateral behaviour and its impact on the rated securities. The evaluation also entails the review of transaction rating thresholds or triggers that, according to each transaction's specific documentation, may change cash flow allocations or cause the replacement of key entities within the transaction structure. For key transaction parties and sovereign entities, DBRS Morningstar reviews each entity's public rating(s), DBRS Morningstar private ratings or internal assessment(s) and other qualitative considerations.

In accordance with the Policy, Annual reviews for ratings assigned under this methodology will typically reflect the following analytical considerations:

- Review of Jurisdiction Scores.
- Sovereign ratings and ratings/assessments of counterparties in accordance with DBRS Morningstar methodologies and policies.
- Key performance metrics such as arrears, defaults, cumulative losses, and prepayments compared with expectations used when initial ratings(s) were assigned.

Where the performance data indicates that the actual level of defaults are materially above or below the level of defaults expectation when assigning the current rating, DBRS Morningstar may increase or decrease Expected Portfolio PD. This may in some cases lead to an Expected Portfolio PD which may be lower than the Jurisdiction PD Floor.

Before changing a rating, DBRS Morningstar typically considers whether the transaction performance trend is sustainable.

Appendix 1: DBRS Morningstar Idealised Default Table

Rating	1	2	3	4	5	6	7	8	9	10
AAA (sf)	0.01%	0.03%	0.05%	0.07%	0.10%	0.13%	0.17%	0.22%	0.28%	0.34%
AA (high) (sf)	0.02%	0.04%	0.07%	0.11%	0.15%	0.21%	0.28%	0.36%	0.45%	0.56%
AA (sf)	0.02%	0.05%	0.09%	0.14%	0.21%	0.29%	0.38%	0.49%	0.62%	0.77%
AA (low) (sf)	0.03%	0.07%	0.13%	0.21%	0.30%	0.41%	0.54%	0.70%	0.87%	1.06%
A (high) (sf)	0.04%	0.11%	0.20%	0.33%	0.48%	0.66%	0.87%	1.10%	1.35%	1.63%
A (sf)	0.05%	0.13%	0.24%	0.39%	0.57%	0.78%	1.03%	1.30%	1.60%	1.92%
A (low) (sf)	0.09%	0.24%	0.44%	0.68%	0.96%	1.28%	1.63%	2.00%	2.40%	2.81%
BBB (high) (sf)	0.19%	0.47%	0.83%	1.27%	1.75%	2.28%	2.84%	3.41%	4.00%	4.60%
BBB (sf)	0.23%	0.58%	1.03%	1.56%	2.15%	2.78%	3.44%	4.12%	4.80%	5.49%
BBB (low) (sf)	0.37%	0.89%	1.51%	2.21%	2.95%	3.72%	4.51%	5.29%	6.06%	6.83%
BB (high) (sf)	1.08%	2.44%	3.93%	5.47%	6.99%	8.45%	9.84%	11.15%	12.37%	13.51%
BB (sf)	1.36%	3.06%	4.90%	6.77%	8.60%	10.34%	11.97%	13.49%	14.89%	16.18%
BB (low) (sf)	2.23%	4.73%	7.25%	9.68%	11.96%	14.05%	15.96%	17.69%	19.26%	20.69%
B (high) (sf)	3.6%	7.4%	11.0%	14.3%	17.3%	20.0%	22.3%	24.4%	26.3%	27.9%
B (sf)	4.9%	9.7%	14.3%	18.4%	22.0%	25.2%	27.9%	30.3%	32.4%	34.2%
B (low) (sf)	10.1%	17.7%	23.5%	28.1%	31.9%	34.9%	37.5%	39.7%	41.5%	43.1%
CCC (high) (sf)	18.8%	30.9%	38.8%	44.3%	48.3%	51.2%	53.4%	55.2%	56.7%	58.0%
CCC (sf)	22.3%	36.1%	45.0%	50.8%	54.8%	57.7%	59.8%	61.5%	62.8%	63.9%
CCC (low) (sf)	61.1%	68.1%	72.5%	75.4%	77.4%	78.8%	79.9%	80.7%	81.4%	81.9%
C (sf)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Appendix 2: House Prices

Approach

The approach focuses on real house prices. The real house prices are calculated as the ratio of the HPI to the consumer price index (CPI). The series are typically quarterly. The base year for the real house price series is determined for each jurisdiction by analysing the historical relationship between nominal house prices, CPI, and income growth to identify a relatively stable market environment. The model separates real house price movements into two components: the direction of the movement and its magnitude. At the outset, the series are assigned to one of two groups based on their behaviour: volatile or stable. Furthermore, a series is denoted as overheated if the real price index exceeds 150, and it resets once the real price index returns to 85 or below.

Analysis

The movement's direction is analysed using logistic regression. The factors in the analysis are (1) the real HPI, (2) an indicator that the series is volatile, and (3) whether the series is currently in an overheated state. The magnitude of the quarterly movement is analysed as a Weibull distribution with a mean that matches the mean of the series. The quarterly increments are correlated. Five-year realisations of each series are simulated, and the base house price level is the mean of the realisations. For each realisation, the largest drop in prices is calculated, and the MVDs are based on the empirical distribution of these drops. The values need to be converted to nominal values from real values for these calculations. For the expected case and MVDs through BBB (sf), the average CPI increase since 1990 is used. For the A (sf) case, the minimum of this value and 2% is used; for AA (sf), the ceiling is 1%; and for AAA (sf), the ceiling is 0% (i.e., no CPI increases).

Appendix 3: Jurisdiction-Specific Market Value Decline Assumptions

3.1 Greece

The Greek MVDs assumptions are estimated for three regions: Athens, Thessaloniki, Other Urban Areas as well as the national average, as reported by the Bank of Greece.

Region	AAA (sf)	AA (sf)	A (sf)	BBB (sf)	BB (sf)	B (sf)
Athens	47.9%	36.0%	27.7%	21.9%	14.9%	10.5%
Urban areas	41.4%	31.7%	24.2%	18.9%	12.6%	8.8%
Thessaloniki	48.1%	38.3%	30.3%	24.1%	16.6%	11.8%
National	45.1%	33.7%	25.6%	20.1%	13.5%	9.5%

3.2 Belgium

The Belgian MVDs assumptions are estimated at national level only.

Region	AAA (sf)	AA (sf)	A (sf)	BBB (sf)	BB (sf)	B (sf)
National	24.5%	18.8%	12.7%	8.5%	4.5%	2.4%

3.3 Germany

The German MVDs assumptions are estimated for 10 big urban areas and at the country level.

Region	AAA (sf)	AA (sf)	A (sf)	BBB (sf)	BB (sf)	B (sf)
Country	25.4%	19.6%	14.0%	10.0%	5.6%	3.2%
Berlin	39.1%	31.9%	24.7%	18.7%	11.6%	7.5%
Dortmund	40.9%	34.3%	27.1%	20.6%	12.9%	8.3%
Dresden	53.7%	46.6%	38.7%	31.2%	21.3%	14.7%
Düsseldorf	38.0%	31.5%	24.4%	18.3%	11.2%	7.1%
Frankfurt	34.0%	27.7%	21.0%	15.5%	9.3%	5.7%
Hamburg	33.0%	26.6%	20.2%	14.9%	8.9%	5.5%
Hanover	35.8%	29.3%	22.5%	16.7%	10.1%	6.3%
Cologne	39.8%	33.4%	26.1%	19.7%	12.3%	7.9%
Munich	54.9%	47.7%	39.6%	31.7%	21.7%	15.0%
Stuttgart	42.8%	36.0%	28.6%	21.8%	13.6%	8.8%

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