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METHODOLOGY

European RMBS Insight Methodology

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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 Global Structured Finance Related Methodologies document on www.dbrs.com. 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.

DBRS is a full-service credit rating agency established in 1976. Spanning North America, Europe and Asia, DBRS is respected for its independent, third-party evaluations of corporate and government issues. DBRS's extensive coverage of securitizations and structured finance transactions solidifies our standing as a leading provider of comprehensive, in-depth credit analysis.

All DBRS ratings and research are available in hard-copy format and electronically on Bloomberg and at DBRS.com, our lead delivery tool for organized, web-based, up-to-the-minute information. We remain committed to continuously refining our expertise in the analysis of credit quality and are dedicated to maintaining objective and credible opinions within the global financial marketplace.

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Key Updates

For key updates to this methodology please refer to the press release titled *DBRS Publishes Updated European RMBS Insight Methodology* dated 12 April 2018.

Introduction

This methodology is DBRS's approach to analysing the credit risk of European residential mortgage-backed securities (RMBS). It describes DBRS's proprietary default model (European RMBS Insight Model or the Model) to forecast the expected defaults and losses of portfolios of European residential mortgages. The Model combines a loan scoring approach (LSA) and dynamic delinquency migration matrices (DMM) to calculate loan-level defaults and losses. Loan-scoring functions and dynamic delinquency migration matrices are developed using jurisdiction-specific data on loans, borrowers and collateral types. In addition, the European RMBS Insight Model uses a simulation of home price changes to generate stressed Market Value Declines (MVD).

Jurisdiction-specific addenda were and will be published for each country where the Methodology is applied for rating European RMBS. Each addendum outlines the country-specific aspects of the Methodology to estimate defaults and losses, including an overview of each mortgage scoring function (with jurisdiction-specific parameters to assess credit risk), summary of delinquency migration matrices and MVDs.

Scope and Limitations

DBRS evaluates both qualitative and quantitative factors when assigning ratings to European RMBS transactions. This methodology represents the updated DBRS approach for rating European RMBS transactions with residential mortgage loans originated in the European jurisdictions where the relevant addendum is published. It describes DBRS's approach to its loan-level data analysis to calculate the expected credit losses on a residential mortgage portfolio and cash flow analysis. This report also outlines the asset class and discusses the model and methods DBRS typically employs when assessing a transaction and assigning a rating(s). It is important to note that the methods described herein may not be applicable in all cases. Further, this methodology is meant to provide guidance regarding the DBRS methods used in the sector and should not be interpreted with formulaic inflexibility, but understood in the context of the dynamic environment in which it is intended to be applied.

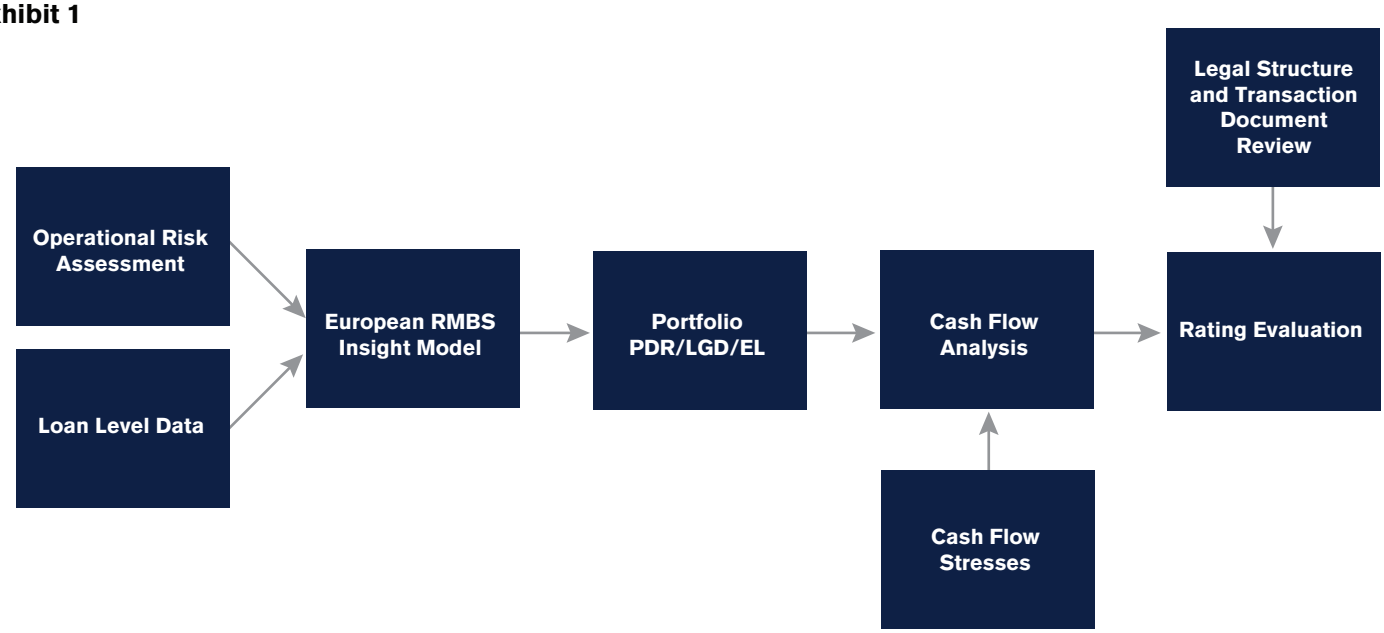
Executive Summary

This report describes the DBRS rating methodology for European residential mortgage portfolios and forms part of the DBRS Ratings Limited (DBRS) criteria for rating European RMBS and other transactions linked to residential mortgage assets including covered bonds where applicable. Please refer to the published jurisdictional addendum on dbrs.com for additional detail regarding DBRS's asset analysis for each country where the European RMBS Insight Methodology is applicable.

The legal framework and counterparty criteria used to analyse European RMBS can be found in the *Legal Criteria for European Structured Finance Transactions* methodology. The treatment of derivatives and assessment of derivative counterparty risk is described in DBRS's *Derivative Criteria for European Structured Finance Transactions* methodology. Operational risk is assessed in accordance with the *Operational Risk Assessment for European Structured Finance Servicers and Operational Risk Assessment for European Structured Finance Originators* methodologies. Ongoing monitoring of European RMBS is described in the *Master European Structured Finance Surveillance* Methodology.

DBRS Rating Process for European RMBS Transactions

Exhibit 1



The diagram above summarises the process for analysing a European RMBS transaction which is described below:

1. DBRS assesses operational risk by evaluating the quality of the mortgage originator and servicer.
2. DBRS conducts a loan-level analysis[1] using its proprietary model (European RMBS Insight Model).[2] The model output includes the "life of pool" portfolio default rate (PD), loss given default (LGD) and expected losses (EL) for a pool of residential mortgages. The results are then reviewed along with the results of the operational risk review and assessment of historical performance data, which are subject to adjustments, as warranted.
3. DBRS performs a cash flow analysis by incorporating stress assumptions applied to defaults, losses, timing of defaults and losses, prepayments and interest rates to ensure payments of interest and principal are received by the holders of the rated bonds consistent with the terms and conditions for the assigned rating.
4. DBRS reviews the legal structure of the transaction and the associated legal opinions for consistency with DBRS's Legal Criteria for European Structured Finance Transactions methodology.
5. DBRS evaluates the ratings to be assigned to a class of notes based on the above analytical considerations and form and sufficiency of available credit enhancement.

Jurisdictional Differences

Each European jurisdiction exhibits different legal frameworks, market practices and product characteristics. The DBRS *European RMBS Insight Methodology* applies to the European jurisdictions where a relevant addendum is published. The European RMBS Insight Model estimates defaults and losses of mortgage portfolios using jurisdictional specific data on loan, borrower and collateral types where available. This includes an analysis of the risk drivers to adverse outcomes of loan-level data and analysis of housing market data to form assumptions on expected and stressed house price declines. With regard to DBRS analysis of the legal structure of securitisations transactions, the reader is referred to DBRS's *Legal Criteria for European Structured Finance Transactions* methodology, which refers to commentaries addressing specific issues relevant to the principal European jurisdictions of each transaction rated by DBRS.

The different jurisdictions in Europe also exhibit varying degrees of sovereign-related risk. Here, the reader is referred to the *Rating Sovereign Governments* methodology.

1. For revolving transactions, DBRS typically incorporates its expectations of the potential change in credit quality of the asset pool. These assumptions are typically derived from the replenishment criteria and variation conditions set forth in the legal documents.
2. The European RMBS Insight Model is a substantial component of the DBRS rating process. A material deviation from the rating implied by the model would be a three-notch or greater rating difference.

Data Provision for a Collateral Pool

As part of the rating process, DBRS is typically provided with the following data for each transaction:

- Loan-level data for the securitised portfolio provided in the European DataWarehouse (EDW) format.
- Historical arrears, defaults, recovery and prepayment data from the originator.
- Repossession data from the servicer.

To gain comfort on the accuracy of loan-level data relative to the underlying documents and data specific to each loan, DBRS may seek to access Agreed Upon Procedures (AuP), or audit reports, which are performed by an issuer and/or seller for regulatory purposes. In situations where DBRS requests sight of AuP reports, DBRS reviews the procedures performed for the following:

- The quantity of the loans reviewed.
- The confidence level.
- The nature of the tests performed.
- The results of the tests and the nature and quantity of the exceptions.

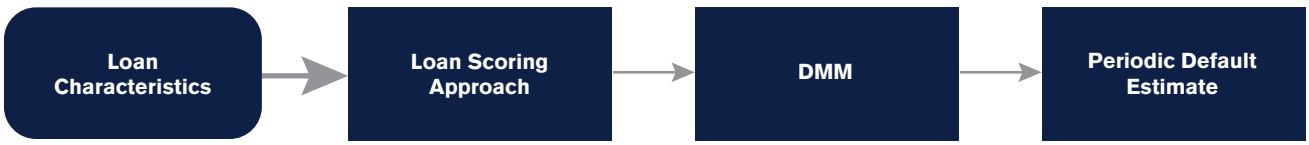
DBRS may reflect these results directly in its analysis through additional loan-level or portfolio-level default stresses or, in certain situations, may decline to rate a transaction.

Portfolio Default Rates

Base Case Default Rates

Loan-level defaults are forecasted using the European RMBS Insight Model, a loan scoring approach in combination with delinquency migration matrices. Loan-level expected defaults are calculated in a three-step process as shown in Exhibit 2. Firstly, each loan is scored following a process that is jurisdiction-specific. Secondly, each loan is assigned to a Delinquency Migration Matrix (DMM) based on such score. Finally, periodic loan-level defaults are forecasted over time by multiplying the periodic default probability (estimated based on the borrower's loan status and DMM) by each loan's outstanding balance at the time of default.[3]

Exhibit 2



The default forecasting process is dynamic in that a mortgage is scored on a periodic basis (annually) to account for risk factors that migrate over time (such as loan-to-value (LTV) or seasoning). Additionally, the forecast takes into account DBRS's expectations for Conditional Prepayment Rates (CPR). Through this process, the risk of a loan to default is periodically updated and subsequently its risk segment and DMM can change over time.

An individual mortgage scoring function is constructed for each European jurisdiction. The models are developed using loan-level data from either the European Data Warehouse (EDW) or other sources where loan-level data is available (typically on servicer and/or trustee websites or received by DBRS on request from the originator/data provider).

Logistic regression is used to build the loan scoring functions. The logistic regression assesses a loan's risk characteristics over a period of 12 months and has a binary response: the loan defaults ('bad') or does not default ('good'). A loan is considered 'bad' if it experiences an adverse credit event. For the purpose of the scoring function, this is generally when a loan has entered into 90+ days in arrears or foreclosure states. Additionally, the 'bad' status is required to have persisted for at least three (3) observations during the 12-month time window. Additional or alternative criteria for a loan to be considered 'bad' are assessed on a jurisdictional basis and defined in each jurisdictional addendum.

The logistic regression function is fitted for objective variables (loan and borrower characteristics) and judgmental variables (for example, underwriting score). Although some variables are common to the loan scoring functions in multiple jurisdictions (for example, loan-to-value (LTV)), the inclusion of each variable and estimated impact on the scoring are jurisdiction-specific.

3. The default modelling approach is a variant of Dynamic Delinquency Movement Matrices as described in Grimshaw, Scott D. and Alexander, William P. (2011). "Markov Chain Models for Delinquency: Transition Matrix Estimation and Forecasts." Applied Stochastic Models in Business and Industry, 27, 267-279.

The loan scoring is dynamic in that a score is recalculated on an annual basis within the default forecast. Most risk characteristics tend to be static. However, there are characteristics which evolve over time including loan seasoning, remaining term and current LTV.

Risk segments have been determined for each jurisdiction by scoring all eligible loans in the universe and defining the segments in percentiles of the score distribution. DMMs are then estimated for each risk segment based on the observed roll rates within each respective dataset. Loans are assigned to a risk segment based on the loan score. Because of the dynamic feature of the model, loan scores may change over time and, as a result, the risk segment which the loan is assigned may migrate as well. The roll rates within a DMM are the probability of a loan changing its status from one period[4] to the next. Exhibit 3 is an example of a hypothetical DMM where the starting position of a loan for period 0 is on the y-axis and the status of the loan at period 1 is on the x-axis.

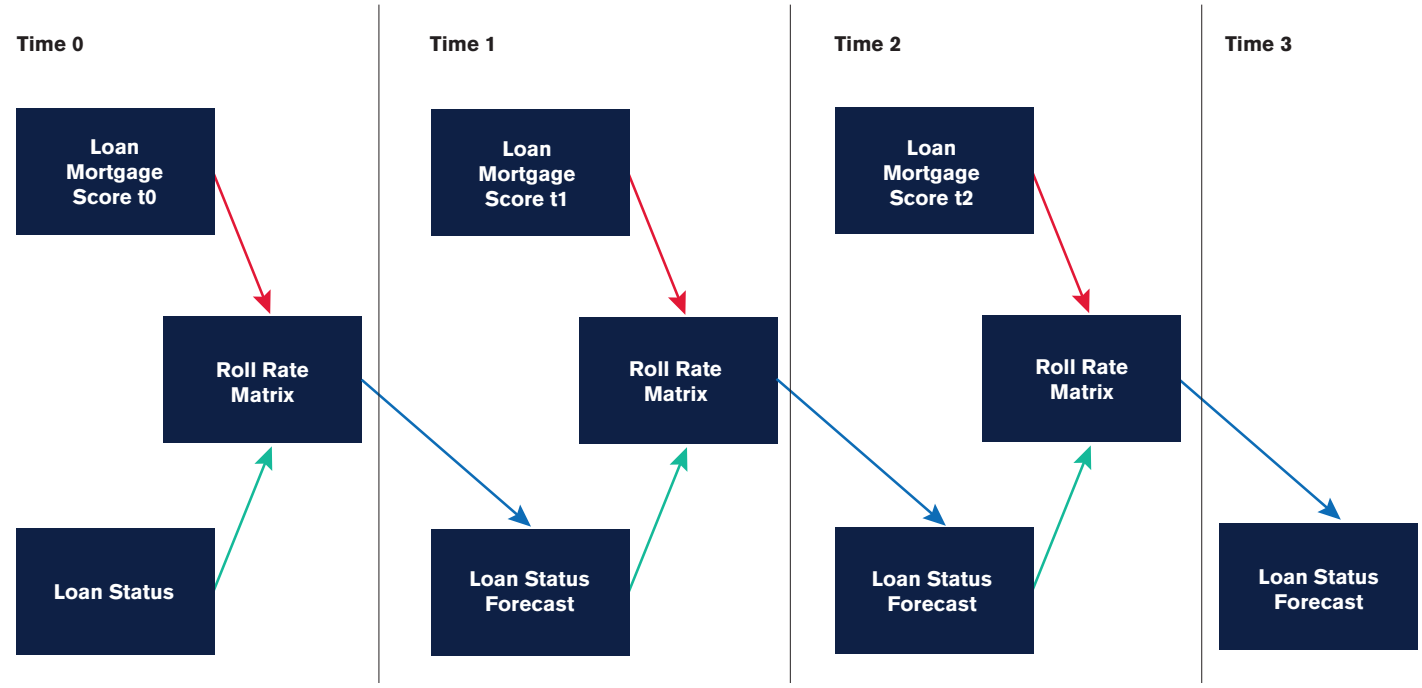
Exhibit 3 – DMM Example

	DQ0	DQ1	DQ2	DQ3	Default	Redeemed
DQ0	98.45%	1.00%	0.00%	0.00%	0.05%	0.50%
DQ1	14.25%	35.00%	50.00%	0.00%	0.50%	0.25%
DQ2	5.00%	10.00%	33.50%	50.00%	1.50%	0.00%
DQ3	2.00%	5.00%	15.00%	40.00%	38.00%	0.00%

Where DQ0 = current; DQ1 = 1 month in arrears; DQ2 = 2 months in arrears; DQ3 = 3+months days in arrears; Default = defaulted per defined criteria; Redeemed[5] = prepaid in full.

'Default' and 'Redeemed' are considered absorbing states as the loans do not return from these states. DMMs are static in that the values within a DMM do not change overtime. However, as described earlier, loans are rescored annually to account for changing risk characteristics. Periodic arrears and default rates are calculated by applying a DMM to each loan on a periodic basis. Exhibit 4 shows the approach to the default analysis over time to forecast the periodic status of each loan over a period of time.

Exhibit 4



Loan scores at each time period define the appropriate roll rate matrix (red arrow). The loan status distribution at each time period is applied to the appropriate row in the roll rate matrix (green arrow) which produces the forecast for the next period. The loan status forecast for each period produces a periodic default rate for each loan.

4. DMM frequencies are dependent on the availability of data within each jurisdiction and are described in the relevant jurisdictional addenda.
5. Redeemed is estimated for each DMM; however, a CPR assumption is applied in the default forecast.

To forecast the periodic loan-level defaults, the periodic default rate is multiplied by the exposure at default (EAD). EAD is the outstanding principal loan balance 'k' number of months prior to a loan defaulting. 'k' is jurisdiction-specific and is typically determined by market standards for when a servicer identifies a loan as defaulted. The outstanding principal loan balance is determined by the expected amortisation schedule, which is a function of the loan-level repayment characteristics and a prepayment assumption. Prepayment assumptions are generally determined by DBRS's CPR outlook for each sector. However, these may be adjusted on a transactional basis subject to CPR data provided.

Periodic loan-level defaults are summed to arrive at the loan-level expected defaults. Loan-level expected defaults are then summed to estimate the portfolio defaults. The expected PD is calculated as the expected portfolio defaults divided by the outstanding portfolio balance at the pool cut-off date.

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: expected default rate and asset correlation. The expected PD is estimated from the DBRS European RMBS Insight Model as described above. The asset correlation assumption is jurisdiction-specific and defined in the relevant jurisdictional addenda.

Once a distribution of potential default rates is estimated for a portfolio of 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's Idealised Default Table (IDT)[6]. The tenor for the IDT is the weighted-average life (WAL) of the portfolio. The portfolio WAL is a function of (1) the expected amortisation schedule of the loans and (2) a CPR assumption. The expected amortisation schedule of each loan is calculated based on the loan-level characteristics adjusted for the expected portfolio CPR. Expected CPRs are based on the DBRS assessment of the current prepayment environment for each jurisdiction. However, CPRs may be adjusted for a transaction based on specific portfolio characteristics or historical originator data.

Loss Given Default

The base case LGD is estimated by firstly calculating the periodic loan-level losses for each loan; secondly, summing up the periodic losses to arrive at the total loss amount for the portfolio; and finally dividing the total loss amount by the base case default amount. Periodic loan-level losses are calculated as the Loss defined in Exhibit 5 multiplied by the periodic default rate.

Exhibit 5

Loss = max (0, EAD – Sales Price – Foreclosure Costs)
Where
EAD = Exposure at default
Sales Price = EPV * (1 – MVD) * (1-DSD)
Foreclosure Costs = Total of fixed and variable costs associated with sale of a property

Periodic sale prices for each property are estimated by first indexing the property value, applying an MVD and finally applying a Distressed Sale Discount (DSD). Expected property values (EPV) are indexed[7] using a published home price index within the relevant jurisdiction. DBRS may make further adjustments to property valuations for other characteristics, including property types or property size for situations where changes to the property values over time may be more volatile relative to changes in the index.

Rating level LGDs are estimated by applying the rating-specific MVD to the EPV in the Loss calculation from Exhibit 5. Rating scenario defaults are not estimated on a periodic basis. To adjust the rating-level loss calculation, the base case periodic defaults are scaled up by the multiple of the rating-specific default level divided by the base case default level.

MVD assumptions for each rating scenario are determined from historical house prices.[8] A single DSD assumption applies to all rating scenarios. DSDs are estimated for each jurisdiction. DSDs are applied to the expected property value after applying the MVD and are meant to address a property sale in a liquidation scenario.

6. See Appendix 2.
7. Indexed property values are updated to a recent data point used in the house price model for each jurisdiction. DBRS reviews the periodic publication of each house price index used in the European RMBS Insight Methodology. Updates to the MVDs and home price index are reviewed at least as frequently as the review of the methodology.
8. See Appendix 3 for details.

Foreclosure costs are the costs associated with the sale of a property through a foreclosure process. These may include legal fees, property maintenance fees, auction fees and transfer fees. The cost structure associated with a residential sale typically includes both a fixed and variable component. Variable costs may be based on either the property value or outstanding loan balance. Variable costs for the property value are based on the sale price after adjusting the indexed property valuation for MVD and DSD. Foreclosure costs are estimated for each jurisdiction and defined in the relevant jurisdictional addenda. Additionally, foreclosure cost assumptions are constant across all rating scenario stresses.

Cash Flow Analysis

DBRS undertakes a series of cash flow stresses to test the ability of the transaction to pay interest and principal consistent with the terms and conditions of the notes for the assigned ratings given the rating scenario defaults and losses. The cash flow stresses DBRS uses are a combination of prepayments, default timing and recoveries and interest rate stresses. Multiple scenarios based on a combination of these assumptions are typically applied to test the resilience of the rated bonds. Exhibit 6 summarises the stresses that DBRS typically applies in its cash flow analysis. A security is expected to pass all scenarios at the relevant rating level. However, in certain circumstances, a specific scenario(s) may not pass.

Exhibit 6

Scenario	Prepayments	Default Timing	Interest Rate
1	Slow	Front-Loaded	Upward
2	Mid	Front-Loaded	Upward
3	Fast	Front-Loaded	Upward
4	Slow	Back-Loaded	Downward
5	Mid	Back-Loaded	Downward
6	Fast	Back-Loaded	Downward
7	Slow	Front-Loaded	Upward
8	Mid	Front-Loaded	Upward
9	Fast	Front-Loaded	Upward
10	Slow	Back-Loaded	Downward
11	Mid	Back-Loaded	Downward
12	Fast	Back-Loaded	Downward

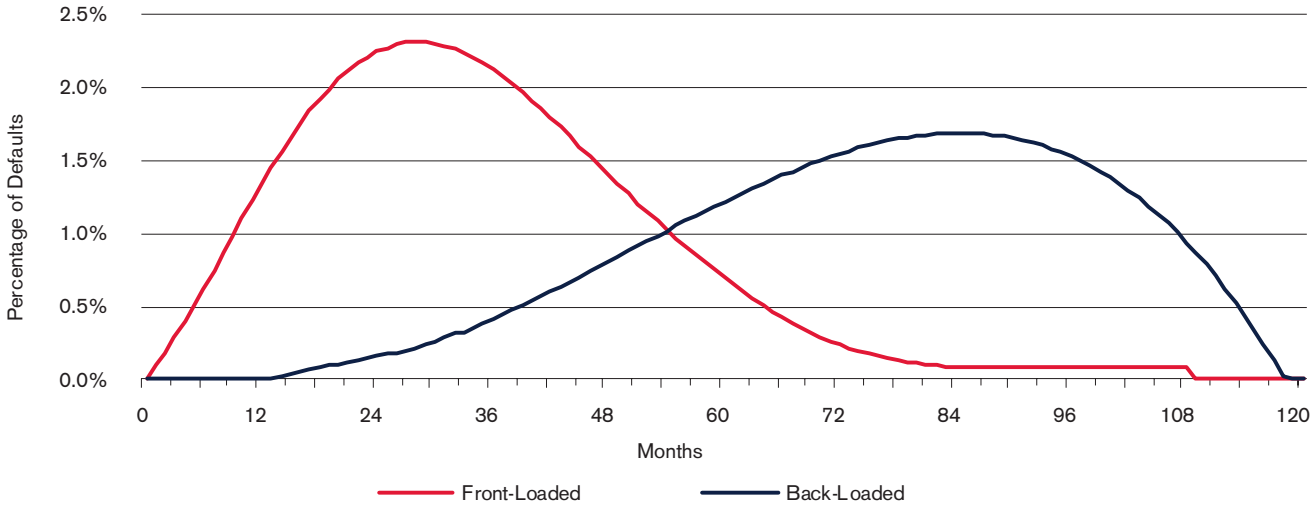
Prepayments

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'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 where a portfolio has unique collateral characteristics relative to the market.

Timing of Defaults and Recoveries

Two default timing curves are analysed in the DBRS cash flow stresses: front- and back-loaded, as shown in Exhibit 6. The curves illustrate stresses for the distribution of defaults over the life of a transaction. The distribution is over a ten-year period. However, the distribution may be consolidated or expanded depending on the WAL of the collateral.

Figure 7 – Ten-Year Default Timing Distribution



Recoveries on loans are assumed to flow to the issuer in a certain amount of time after a loan has defaulted. The recovery lag varies across jurisdictions due to various factors. Recovery lags are jurisdiction-specific and defined in the relevant addendum.

Interest Rates

Interest rates for assets and liabilities are stressed upward and downward as per the *Interest Rate Stresses for European Structured Finance Transactions* methodology. Additional stresses may be applied for basis risk or non-standard interest rate indices.

Appendix 1 – Operational Risk Assessment

Operational Risk Assessment

Overview

DBRS's operational risk review is designed to evaluate the quality of the parties that originate and service the loans being securitised. In instances where DBRS believes that the originator's or servicer's quality of operations is weak, issuers may incorporate certain structural enhancements such as additional credit support, dynamic triggers or the presence of a strong backup servicer in order for DBRS to rate the transaction. In the event that DBRS determines that an originator or servicer is unable to effectively manage the assets within a specific transaction and/or there are limited mitigating factors surrounding the identified operational risks, DBRS may decline to rate the transaction.

Originator Review

The originator review process evaluates the quality of the parties that originate the loans (leases or receivables) that are about to be securitised in a transaction rated by DBRS. While DBRS does not assign formal ratings to these processes, it typically conducts operational risk reviews to assess if an originator is acceptable and incorporates the results of the review into the rating process.

DBRS typically begins the initial originator review process by sending a questionnaire to the company that outlines the topics to be covered during the discussion with management. In the event that DBRS determines that an originator's lending policy and procedures are particularly weak and the operational risks associated with poor origination practices are not sufficiently mitigated, DBRS may refuse to rate the deal.

The originator review process typically involves a review and analysis of the following:

1. Company and management.
2. Financial condition.
3. Controls and compliance.
4. Origination and sourcing.
5. Underwriting guidelines.
6. Technology.

For details on the originator review process, please refer to DBRS's Operational Risk Assessment for European Structured Finance Originators methodology.

Servicer Review

The servicer review process evaluates the quality of the parties that service or may conduct backup servicing on the loans (leases or receivables) that are about to be securitised in a transaction rated by DBRS. While DBRS does not assign formal ratings to these processes, it typically conducts operational risk reviews to assess if a servicer is acceptable and incorporates the results of the review into the rating process.

DBRS typically begins the initial servicer review process by sending a questionnaire to the company that outlines the topics to be covered during the review. In instances where DBRS determines that the servicer is below average, and potentially unable to meet its servicing obligations, issuers may incorporate certain structural enhancements into a proposed transaction such as additional credit support, dynamic triggers or the presence of a warm or hot backup servicer in order for DBRS to be able to rate the transaction.

The servicer review process typically involves an analysis of the following:

1. Company and management.
2. Financial condition.
3. Controls and compliance.
4. Loan/lease administration.
5. Customer service.
6. Account maintenance.
7. Default management.
    - Collections
    - Loss mitigation
    - Bankruptcy
    - Fraud
8. Investor reporting.
9. Technology.

For details on the servicing review process, please refer to DBRS's *Operational Risk Assessment for European Structured Finance Servicers* methodology.

Appendix 2 – DBRS Idealised Default Table

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

Appendix 3 – House Prices

The DBRS *European RMBS Insight Methodology* uses a stochastic process to generate base house prices and MVDs for each rating scenario. These are jurisdiction-specific and typically use published home price data. The analysis is based on a binary lattice stochastics process that estimates house prices, as well as their distributions, which can then be used to generate MVD assumptions.

Approach

The approach focuses on real house prices. The real house prices are calculated as the ratio of the house price index to the consumer price index (CPI). The series are 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: volatile or stable based on their behaviour. Further, a series is denoted as overheated if the real price index exceeds 150. It resets once the real price index returns to 85 or below.

Analysis

The direction of the movement is analysed using logistic regression. The factors in the analysis are (1) the real house price index, (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.

Realisations of length five years of each series are simulated. The base house price level is the mean of the realisations. For each realisation, the largest drop in prices is calculated. 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, the average CPI increase since 2007 is used. For the "A" case, the minimum of this value and 2% is used for AA and the ceiling is 1%; and for AAA the ceiling is 0% (i.e., no CPI increases).