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METHODOLOGY

# Interest Rate Stresses for European Structured Finance Transactions

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## Related Research

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## Key Updates

This methodology replaces the Unified Interest Rate Model for European Securitisations dated 2 November 2016. For key updates in this methodology, please refer to the press release titled “DBRS Publishes Interest Rate Stresses for European Structured Finance Transactions Methodology” dated 18 December 2017

## Scope & Limitations

DBRS evaluates both qualitative and quantitative factors when assigning ratings to (or maintaining ratings on) a European structured finance instrument. This methodology represents the current DBRS approach to assessing the sensitivity of European structured finance transactions and covered bonds to interest rate movements. It describes the stresses DBRS applies in its analysis of structured finance transactions where interest rate movements are not the primary source of risk. This methodology is meant to provide guidance regarding the DBRS methods used in European structured finance 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.

## Summary

This methodology outlines the framework for generating interest rate stresses that DBRS uses in its analysis of European structured finance transactions and covered bonds. The methodology is primarily applicable to interest rates for currencies in which European structured finance transactions are commonly denominated (i.e., EUR, GBP, CHF, NOK, DKK and SEK) and may be applied to interest rates of other currencies that have exhibited a similar extended period of limited inflation and interest rate volatility (e.g., USD, CAD and JPY). Interest rate stresses in other currencies are determined on a case-by-case basis, considering past interest rate and inflation development.

The framework produces two sets of curves: one for upward stress and one for downward stress. Each set contains one curve for each broad rating category (AAA, AA, 'A', BBB, BB, B and CCC). The shape of the curves is simple and has a clear relation to their intended use. For upward interest rate curves, beginning from the spot rate, interest rates are assumed to increase linearly to a short-term stress plateau where they remain for a fixed period of time. After remaining elevated at the plateau for a period of time, interest rates are assumed to decrease linearly to a longer-term level. This longer-term level is below the short-term plateau but remains elevated from the spot rate in order to provide sufficient stress given the rating assigned. The same approach, though inverted, is applied to generate downward interest rate stress scenarios, in other words, a decrease of interest rates to a short-term stress trough and a subsequent increase from the trough to a longer term level between the initial level and the trough.

Each upward interest rate scenario is described by six variables:

- Initial spot rate;
- Length of the period of increase;
- Extent of the increase;
- Length of the period of plateau;
- Length of the period of subsequent decrease;
- Extent of the subsequent decrease.

Each downward curve is summarised by the same six variables, substituting increase for decrease and vice versa.

The framework is used to provide a consistent approach to generate interest rate stress scenarios suitable for the analysis of European structured finance transactions or covered bonds where interest rate movements are not the primary source of risk. The resulting curves are not intended for use as interest rate or term structure forecasts, projections or expectations.

## Objective of the Interest Rate Stress Framework

The objective of the framework is to provide a consistent approach to generate a set of curves representing paths that interest rates may take corresponding to varying degrees of stress. This task differs from explicitly seeking to model future interest rate movements and levels in that the resulting curves generated by the framework do not represent projections or expectations. Instead the curves constitute sufficiently stressful and historically relevant interest rate scenarios to be used to stress the cash flows of European structured finance transactions and covered bonds.

The methodology is primarily applicable to interest rates for currencies in which European structured finance transactions are commonly denominated (i.e., EUR, GBP, CHF, NOK, DKK and SEK<sup>1</sup>) and may be applied to interest rates of other currencies which have exhibited a similar extended period of limited inflation and interest rate volatility (e.g., USD, CAD & JPY<sup>2</sup>). DBRS applies the same basic framework to interest rates for each of these currencies. DBRS has found support for this approach in the convergence and correlation of the movements in interest rates across major developed markets dating back to the 1980s. Furthermore, there appears no reason why the movements observed in one interest rate jurisdiction could not be observed in the interest rate of another jurisdiction that presents a similar level of economic development and financial activity.

## Description of the Framework

The framework generates two sets of interest rate curves: one for upward stress scenarios and one for downward stress scenarios. Each set of curves contains one curve for each of the following rating categories: AAA, AA, 'A', BBB, BB, B and CCC. DBRS generally uses CCC levels of stress when assigning ratings in the CC or C category.

Each upward curve starts from the spot rate<sup>3</sup> (or close to that spot rate), then increases the interest rate linearly for a set period of time until it reaches a plateau where it remains for a set period of time. Then, it subsequently decreases the rate for a set period of time until it reaches a long-term level, which is higher than the spot rate, where it remains for the remainder of the stress scenario. Each downward curve is constructed similarly, decreasing initially from the spot rate to a trough before reverting to a level between the spot rate and the trough level. Within the set of upward stress curves, each is summarised by the length of the initial increase period, the extent of the initial increase, the length of the plateau period, the length of the decrease period and the extent of the decrease. Each downward curve is similarly summarised.

### *Length of the initial increase/decrease period*

The length of the initial period of increase (for upward curves) or decrease (for downward curves) is five years. However, the length may be varied to test the sensitivity of transactions of very long- or short-tenors or where the transaction exhibits pronounced sensitivity to interest rates at a specific point in time.

### *Extent of the initial increase/decrease*

The extent of the initial increase or decrease is different for each rating category, with larger increases and decreases for higher rating levels and lower ones for lower stress levels. The level of the increase for each rating category is the same as the level of the decrease for the same broad rating category. In order not to allow interest rates to reach unreasonably high or low levels, DBRS limits the increase such that the level the interest rate reaches is no higher or lower than certain pre-defined maximum and minimum levels. These maximum and minimum levels are also set by rating category. The levels of the increases and decreases as well as the maximum and minimum levels are shown in Table 1.

**Table 1**

Rating category	AAA	AA	A	BBB	BB	B	CCC <sup>1</sup>
Increase/decrease	10.0%	8.0%	6.0%	4.5%	3.0%	2.0%	1.0%
Minimum	-1.25%	-1.00%	-0.75%	-0.56%	-0.38%	-0.25%	-0.13%
Maximum	21.00%	18.75%	16.50%	14.81%	13.13%	12.00%	10.88%

<sup>1</sup> DBRS generally uses CCC levels of stress when assigning ratings in the CC or C category.

1. "EUR" means the euro, "GBP" means the British pound sterling, "CHF" means the Swiss franc, "NOK" means the Norwegian krone, "DKK" means the Danish krone and "SEK" means the Swedish krona.

2. "USD" means the United States dollar, "CAD" means the Canadian dollar and "JPY" means the Japanese yen.

3. In practice, DBRS is likely to update spot rates less frequently than daily in times of limited interest rate movement.

**Length of the plateau period**

The length of the plateau or trough period is two years. As with the period of initial increase or decrease, it may be adjusted in order to test the sensitivity of a transaction with a specific or pronounced exposure to interest rates.

**Length of the subsequent decrease/increase period**

The length of the subsequent decrease or increase period is two years. As with the length of the other periods, it may be adjusted in order to test the sensitivity of a transaction with a specific or pronounced exposure to interest rates.

**Extent of the subsequent decrease/increase**

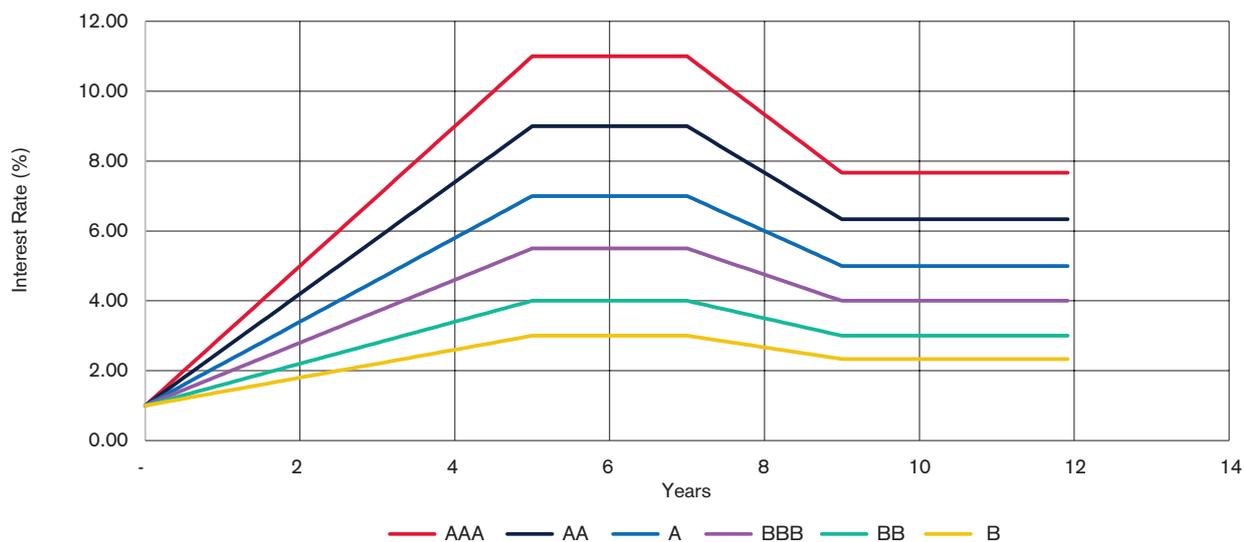
The extent of the subsequent decrease or increase is one third of the initial increase or decrease.

**Numerical example and graphic illustration**

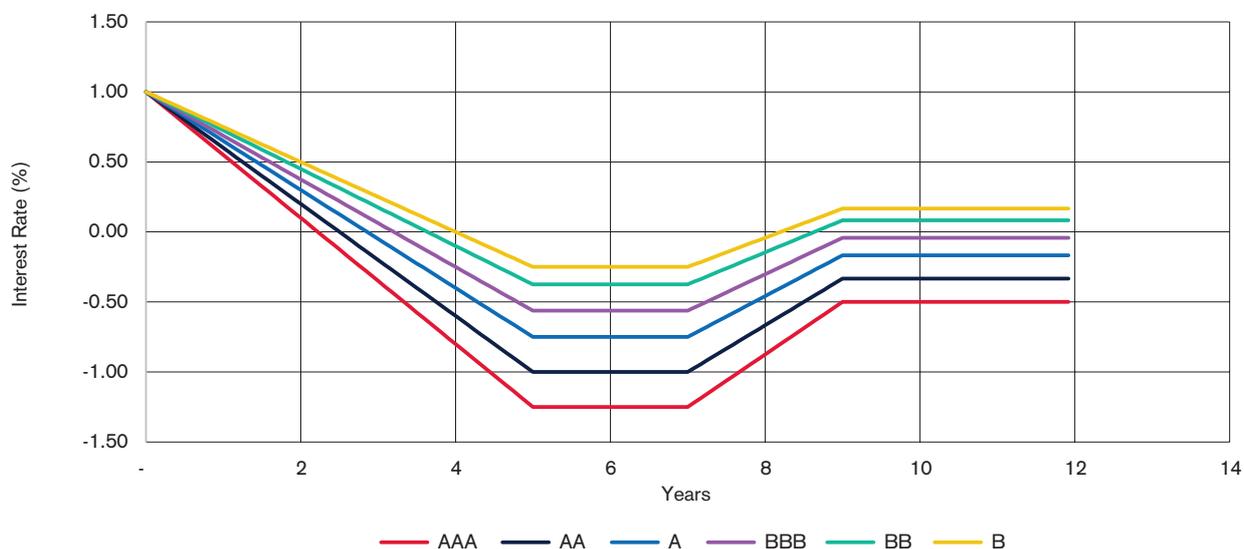
The downward stress for the ‘A’ level starting at a spot rate of 1.0% decreases linearly for five years until reaching the minimum level of -0.75%. This represents a decrease of 1.75% or 0.35% per year. After remaining at -0.75% for two years, the rate then increases for two years by 0.58%, a third of the 1.75% initial decrease, reaching -0.17% and remains at that level.

Exhibits 1 and 2 illustrate the curves for the case of a spot rate at 1.0%.

**Exhibit 1: Upward Stresses**



**Exhibit 2: Downward Stresses**



The numerical values for the increases and decreases were chosen based on the historical movements of interest rates with a focus on constant maturity US Treasury yields for which a long time series is available. The levels set are for short-term rates, which are the rates relevant in the analysis of most European structured finance transactions and covered bonds. For stresses of rates with a tenor longer than one year, DBRS uses lower numbers, reflecting their lower historical volatility. The increases and decreases for five-year rates are reduced by 15%; for ten-year rates, they are reduced by 25%.

The length of the different periods of increase, decrease and plateau were chosen in order to address common European structured finance transactions and covered bonds. As described in the earlier sections of the methodology, setting out the length of these periods, when DBRS analyses a very short- or long-tenor transaction, or where the transaction exhibits unusually high sensitivity at certain points in time, the length of these periods may be adjusted to obtain stress curves more relevant to the transaction under consideration.

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