Aircraft Non-payment Insurance Methodology

Project Finance

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1 Areas of application

This document describes Scope's Aircraft Non-payment Insurance Rating Methodology (NPI methodology) for the rating of aircraft financing transactions protected with non-payment insurance (NPI). This methodology only applies to credit exposures secured by aircraft that benefit from such NPI protection.

This methodology is applied in conjunction with Scope's Aviation Finance Rating Methodology as an add-on layer to the analysis explained in the aviation methodology. This document explains how we analyse different factors in an aircraft-secured NPI transaction so as to determine the expected loss to the investor in the secured instrument. NPI transactions can have different structural elements and not all of the credit factors in this methodology may apply to every NPI transaction.

This methodology takes a world-wide approach and can be applied to NPIs globally, across all regions, aircraft models and airlines. The methodology is not applicable for other transaction types or asset classes that benefit from non payment or similar protections provided by insurance companies. The analytical approach to determine the potential credit enhancement is provided in the General Structured Finance Rating methodology.

2 Methodology highlights

Expected loss. Scope's NPI methodology explains how we determine the credit protection provided by an NPI and how it can reduce the expected loss for an investor.

Credit to insurer diversification. We take into account diversification effects if the NPI protection is provided by a portfolio of insurers even if the commitments are not joint and several.

Discrimination between different levels of insurer credit quality and exposure. Our analysis captures and reflects the impact of the different credit quality of insurers across transactions as well as their differing concentration in the portfolio of insurers.

3 Aircraft non-payment insurance – analytical assumptions

3.1 Insurance coverage

NPI contracts provide lenders with credit protection against an airline's default and non-payment under an aircraft-lease or loan contract in that it provides principal and interest (accrued unpaid interest) for a specified period after the airline's default. Furthermore, the insurance covers the ultimate loss after the liquidation of the aircraft (i.e. the difference between the proceeds from the aircraft sale and the debt outstanding) or, if the aircraft cannot be sold within a pre-specified timeframe (coverage period) it covers the full outstanding principal amount at the end of such period. An example of an 18-month NPI is given in Figure 1 below. The expected aircraft value at the time of sale is derived using the approach described in our aviation finance methodology.

3.2 Obligor

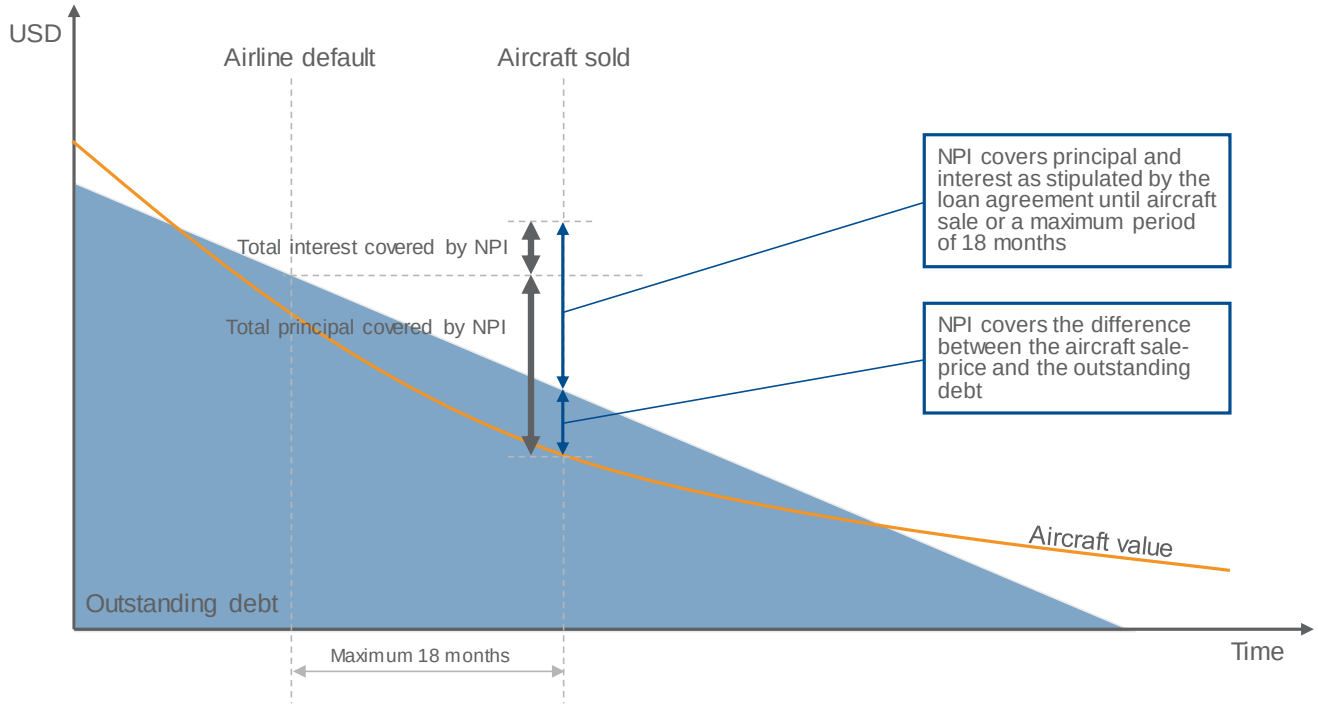
An aircraft NPI covers against the airline defaulting in a transaction secured by an aircraft. Generally, several insurers form a consortium to insure the credit risk of the transaction. NPI contracts insure collections in the case of non-payment by an aircraft-finance obligor. The obligor in the methodology is referred to as the airline; however, it can also be a lessor or other parties entering the lease and loan agreements.

3.3 Several basis

The NPI framework in this methodology is based on insurances provided on a several basis i.e. that an insurer is only responsible for the share of the exposure covered by its commitment, i.e. not for the shares of the other insurers in the consortium comprising the portfolio of insurers for the transaction. Defaulted insurers will not be replaced.

We also assume that an insurer cannot be replaced if it defaults during the life of the transaction, despite the fact that many NPI transactions provide for the replacement of a defaulted insurer. This is because the premium payable to the new insurer must typically be provided by the policyholder and replacing the insurer is not a hard requirement. Such structures leave the transaction exposed to the risk of non-replacement, which is the scenario considered in our analysis. We will adjust our framework accordingly if we can be certain that a defaulted insurer will be replaced over the life of a given NPI transaction.

Figure 1. Visual example of NPI coverage



Source: Scope

3.4 Insurers' probability of default strength

We assume that an insurer's credit rating can be used to derive the term structure of defaults expected for the insurer over the life of the transaction. We consider public ratings from regulated and supervised CRAs in our analysis, which we may adjust in case we deem necessary. Those ratings are mapped to a Scope probability of default (PD) strength. See section 4.2.

3.5 Severity of insurers' default

This methodology makes the conservative assumption that any claim on a defaulted insurer will have a zero recovery rate under all rating-conditional scenarios.

3.6 Correlation of insurers' default

We assume a pairwise correlation of insurer defaults of 25%. We may stress this correlation assumption if the insurers in the consortium are related to each other.

3.7 Contractual Provisions

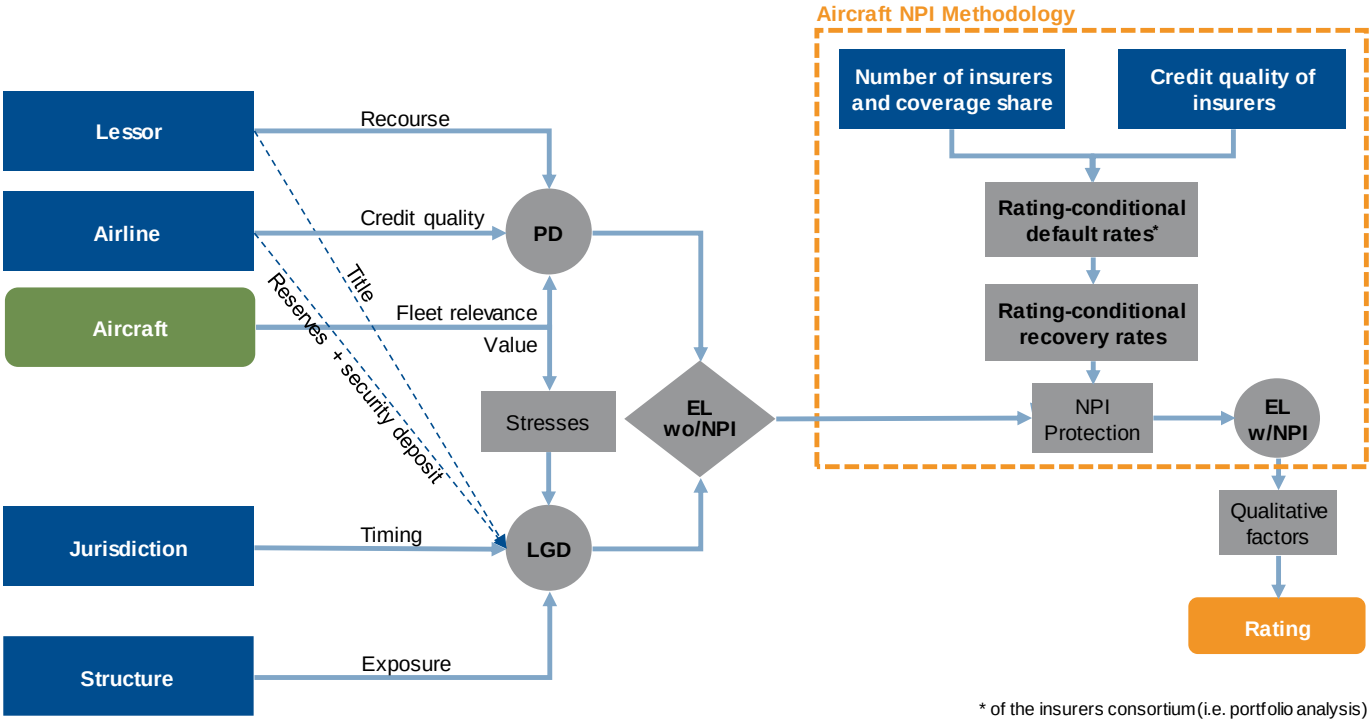
We expect the obligations to be irrevocable, as well as legal, valid, binding and enforceable. We assume that there is no conditionality of the protection with regards to timing delays of the payment from the insurance company, or scenarios where the insurance company can put a defense to not pay.

4 Analytical framework

The analysis of NPI transactions is essentially the same as the analysis of regular aviation finance transactions as covered by our Aviation Finance Rating Methodology. The major difference is that for an NPI transaction, the severity of an airline default is reduced and the probability of default is reduced by the protection provided by the consortium of insurers.

Figure 2 illustrates how the NPI methodology fits into the broader framework for the analysis of aviation finance transactions. The orange perimeter defines the elements covered in this methodology. The remaining elements are covered by our Aviation Finance Rating Methodology.

Figure 2. NPI methodology framework visualised in the context of Scope's aviation-finance methodology



Source: Scope

NPI protection reduces the severity of an airline default. This is modelled by calculating a loss given default for an insurer, obtained as the assumed default rate in the portfolio of insurers for the period under analysis. The share of the portfolio of insurers that is not performing represents the portion of the outstanding claim before NPI that will not be recovered and will eventually be lost in that period. The sum of the probability-weighted losses after NPI for each period in the life of the transaction is the total expected loss for the NPI transaction.

In this analysis, we apply rating-conditional stresses in which the insurer-portfolio default rates increase along with the rating level tested.

Consequently, the NPI protection under each rating-conditional scenario will have a recovery rate for a theoretical claim outstanding after the aircraft's sale, or at the end of the coverage period, that is a function of: i) the number of insurers; ii) the share of each insurer in the consortium; iii) the correlation of insurer defaults; and iv) the time from the date of the analysis to the point at which the insurance claim is expected.

4.1 Default rate of the portfolio of insurers

We determine the share of the consortium assumed to be defaulted at a certain point in the transaction's life by running a Monte Carlo simulation on the portfolio of insurers (applying Scope's portfolio model, please find a list of Scope's models here: https://www.scopegroup.com/ScopeGroupApi/api/methodology?id=a87251ff-6abd-4e2c-a539-7017a1f5f4d0). The simulation

produces the non-parametric probability distributions of the default rate of the insurer portfolio for every period in the transaction's life.

The default rate assumed for the portfolio of insurers equals the share of the outstanding claim after the sale of the aircraft. We assume zero recovery on the claims to defaulted insurers (i.e. 100% severity upon insurer default). NPIs are generally on a several basis, meaning that each insurer is only responsible for its share. Insurance coverage is lost for the share of defaulted insurers.

The expected transaction severity is equal to the mean of the distribution ($E\{LGD\} = \mu_{DR}$). We use the expected default rate as the base-case assumption for the B rating-conditional stress. A higher default rate assumption is used for higher rating-conditional levels (see section 4.3).

The share of the portfolio of insurers that is defaulted increases with the risk horizon, so the probability that NPI protection is not complete are higher for the final periods in the life of a transaction.

The higher the number of insurers in the consortium, the lower the severity if an insurer defaults. A larger number of insurers increases the effective credit enhancement provided by the NPI protection.

4.2 Probability of default strength of insurers in the consortium

In order to run the portfolio simulation, we assign a PD strength assumption to each of the insurers in the consortium. Our PD strengths represent assumptions about the frequency and time term-structure of defaults, linked to our idealised probability of default tables.

We assign PD strengths by mapping the public ratings available from other regulated and supervised CRAs to the different insurers' parts of the portfolio. Appendix I provides our mapping assumptions, which are based on the rating correspondences implicit in the regulatory mapping of ratings to credit quality steps.

4.2.1 Stress for single-rating, concentrated insurers

If an insurer is only rated by one credit rating agency and its share in the consortium is 50% or more, we assign a PD strength which is one notch lower than the strength that would directly result from the mapping. In the case of split ratings of three or more notches, we would consider deviating from the strict average. The credit rating agencies used for the mapping are listed in Appendix I.

Figure 3. PD strength assumption for the modelling of insurer defaults during the Monte Carlo simulation

Insurer concentration in insurer pool	Only one rating	Two or more ratings
Less than 50%	Mapped PD strength	Average of mapped PD strengths
50% or more	Mapped PD strength downgraded by 1 notch	Average of mapped PD strengths

Source: Scope

4.3 Rating-conditional stress

We assume that the scenarios that would result in the highest aircraft-value loss will also correspond to the scenarios where the insurers will have the highest probability of default. Therefore, this methodology implements a framework where the severity from defaulted insurers is rating-level conditional as per expression (1): the higher the rating level, the higher the stress applied. We consider the expected default rate for the B rating case (i.e. no stress on the mean as shown in expression (2)) and a default rate equal to the mean plus two standard deviations for the AAA rating case (expression (3)). The default rate assumption for the other rating categories from BB to AA is interpolated linearly at 20% increments.

(1) $\boldsymbol{LGD^{NPI}_{rating}(i) = DR^{NPI}_{rating}(i) = \mu_{DR(i)} + 2 \times w_{rating} \times \sigma_{DR(i)}}$

where $\boldsymbol{w_{rating}}$ takes values 0%, 20%, 40%, 60%, 80% or 100% when rating is B, BB, BBB, A, AA or AAA, respectively.

(2) $\boldsymbol{LGD^{NPI}_{B}(i) = DR^{NPI}_{B}(i) = \mu_{DR(i)}}$

(3) $\boldsymbol{LGD_{AAA}^{NPI}(i) = DR_{AAA}^{NPI}(i) = \mu_{DR(i)} + 2 \times \sigma_{DR(i)}}$

4.4 Expected loss calculation

We calculate the probability-weighted average loss for the investor after NPI protection by overlaying the severity factor from NPI to the calculations as described in our aviation methodology.

The analysis is rating-level conditional. This means that the expected loss realised by an instrument must be commensurate with the rating level being tested. If it is not, we will consider the instrument to have failed the rating test and assign a lower rating. We benchmark the expected loss and the risk horizon against our idealised expected loss table to determine whether the losses exceed the maximum tolerable loss for the rating level being tested[1]. Our aviation finance methodology explains how we calculate the expected risk horizon.

4.4.1 Expected loss calculation with NPI credit enhancement

(4) $\boldsymbol{EL_{rating} = \sum_{i=1}^{n}\left[PD(i) \times LGD_{rating}^{AF}(i)\right] \times LGD_{rating}^{NPI}(i)}$

(5) $\boldsymbol{LGD_{rating}^{NPI}(i) = DR_{rating}^{NPI}(i)}$

Where:

$i =$ Period in the life of the transaction

$PD(i) =$ Probability of default of the aircraft finance contract for period (i)

$LGD_{rating}^{AF}(i) =$ Rating conditional loss given default under the AF methodology for period (i) $= max\left(0{,}1 - \frac{ACv_{rating}(i + \Delta t)}{Debt(i)}\right)$

$ACv_{rating}(i + \Delta t) =$ Aircraft value at time of sale (i. e. period i plus reposession and remarketing times)

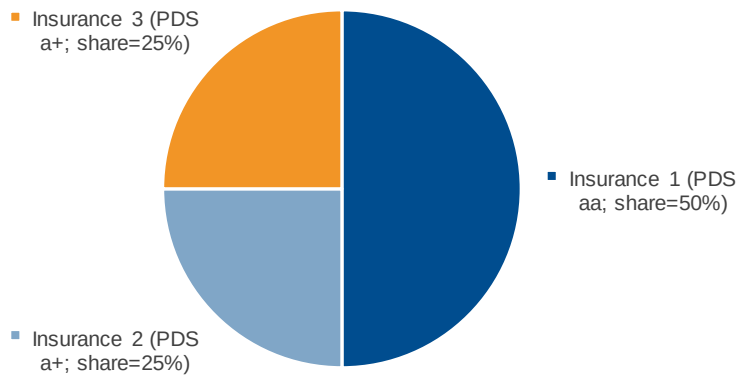
$Debt(i) =$ Outstanding debt at time of default

$LGD_{rating}^{NPI}(i) =$ Rating conditional loss given default of insurers for period (i)

$DR_{rating}^{NPI}(i) =$ Share of the portfolio of insurers assumed to be in default in period (i) under rating stress level $rating$

Figure 4 presents an example of a typical insurer portfolio, in which the consortium comprises three insurers with shares of 50%, 25% and 25%, respectively. The non-parametric default rate probability distribution is discrete and can logically only take any of the following values: 0%, 25%, 50%, 75% or 100%, depending on which insurers default. If only insurer 2 defaults in the time to period (i), the default rate of the portfolio would be 25% and 75% of the protection provided by NPI would still be available. This is equivalent to a severity of 25% and a recovery rate of 75%.

Figure 4. Example of insurer portfolio composition

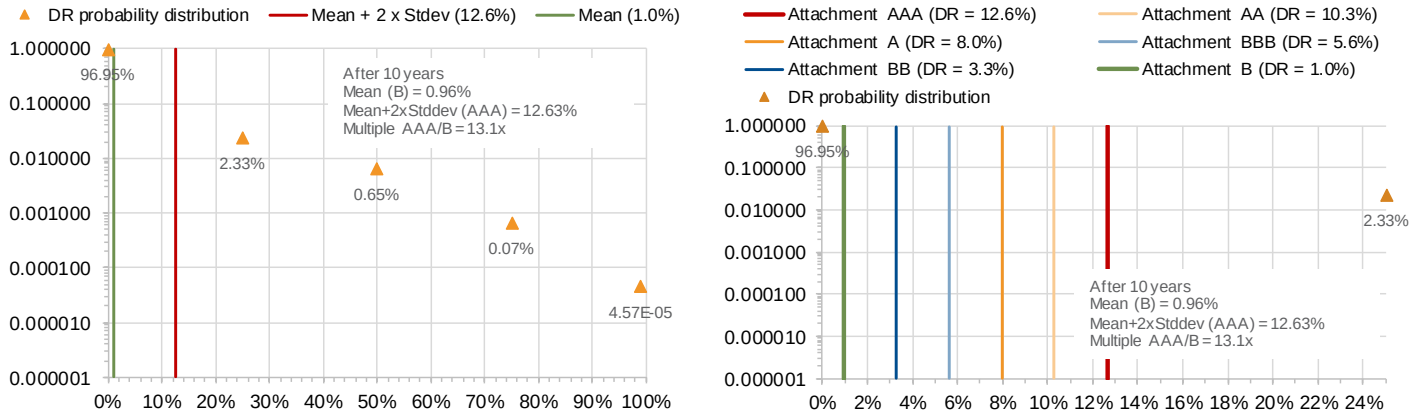


[1] The Scope Idealised Expected Loss Table can be found in the Ratings Definitions section of Scope's website www.scoperatings.com.

Source: Scope

Figure 5 shows one of the resulting non-parametric distributions obtained by running the Monte Carlo simulation for period *i*=10 years. Figure 5 (right) also shows the different rating-conditional default rate assumptions we use to determine the severity after NPI protection.

Figure 5. Example of non-parametric distribution of insurer portfolio default rates after 10 years of exposure



Note: The X axis represents the default rates of the portfolio of insurers. The Y axis represents the probability in a logarithmic scale.
Source: Scope

5 Legal and structural analysis

We perform our credit analysis by working with documentation that is standard for NPI transactions. We are flexible with respect to the format of the information used to produce a rating (i.e. we do not impose proprietary templates).

We assess the adequacy and completeness of the information used in the rating process. We will explain any limitation observed in the information and may request more detail if documentation proves insufficient to rate a transaction.

5.1 Insurance policy analysis

We analyse the insurance policy with regard to covenants and other elements that could exempt the insurers from their obligations. In case policies give rise to such exemptions we would expect to receive legal opinions to provide further clarity.

6 Information quality

We judge the plausibility of information received for the rating process, even when sources are considered reliable and accurate. We may need additional information or clarification if the information conflicts with our understanding. These 'sanity checks' do not, however, constitute an audit nor do they comprehensively verify the reliability and accuracy of the information and data used in our rating analysis.

We believe the reliability of information increases with the degree of the arranger's alignment of interests, or the independence, experience and financial strength of the parties providing the information. For example, independent legal and tax opinions generally support our legal and tax assumptions, whereas representations by an affected party would not be deemed robust.

We also use conference calls and operational review visits to gain a better understanding of the transaction's fundamentals and to obtain further insight into the information received.

7 Counterparty risk

We take comfort in the regulated framework governing insurance companies. However, if, and only if, there is any concern (e.g. intermingling ownerships between the insurers in the consortium) about a given insurer exposure, we will analyse the counterparty risk posed by the different insurers' parts of the consortium for the NPI transaction in line with Scope's Rating Methodology for Counterparty Risk in Structured Finance Transaction.

8 Rating sensitivity

In addition to the sensitivity analysis established by our aviation methodology, our rating reports for NPI transactions will also provide the ratings' stability with respect to the main analytical assumption that influences our calculation of losses for investors: the mapping of ratings to PD strengths. The sensitivity analysis illustrates how heavily the ratings depend on our analytical assumptions. Sensitivity scenarios should not be interpreted as likely or expected scenarios.

Figure 6 shows the typical sensitivity scenarios we report as part of our rating analysis. We may lower the final rating assigned to an NPI exposure in order to increase the rating's stability if we see excessive sensitivity to this main analytical assumption.

Figure 6. Typical sensitivity tests considered during our analysis

Analytical assumptions tested	Shifts considered
Insurance credit quality sensitivity	One category downgrade in the quality of all insurers

Source: Scope

9 Rating determination

We assign the final rating in a committee process. The quantitative outcome (i.e. quantitative rating indication) is evaluated in the context of qualitative elements from our legal and structural analysis, as well as the results of our sensitivity analysis.

10 Monitoring

We monitor NPI ratings using performance reports produced by the technical advisors, lessors and/or the SPV. The ratings are monitored continuously and reviewed at least once a year or earlier if warranted by events.

Appendix I Scope PD strengths Credit Quality Steps (CQS) mapping table

In order to run the portfolio simulation, we assign a probability of default (PD) strength assumption to each of the insurers in the consortium. Our PD strengths represent assumptions about the frequency and time term-structure of defaults, linked to our idealised probability of default tables.

We established the mapping relationships based on the implicit correspondences created by the mapping of ratings to credit quality steps in the context of Directive 2009/138/EC of the European Commission.

Figure 7 shows the assumptions that we use in the context of this methodology. In case a CQS mapping has changed, we would use the then current mapping. Our PD strength assumptions will be further adjusted for number of ratings, split-ratings and concentration as described in section 4.2.1.

Figure 7. Current mapping of ratings to PD strengths for the purpose of running the insurer portfolio default analysis

Scope PD strength	CQS[2]	AM Best	S&P	Moody's	Fitch
PDS aaa	0		AAA	Aaa	AAA
PDS aa+	1		AA+	Aa1	AA+
PDS aa	1	A++	AA	Aa2	AA
PDS aa-	1	A+	AA-	Aa3	AA-
PDS a+	2		A+	A1	A+
PDS a	2	A	A	A2	A
PDS a-	2	A-	A-	A3	A-
PDS bbb+	3		BBB+	Baa1	BBB+
PDS bbb	3	B++	BBB	Baa2	BBB
PDS bbb-	3	B+	BBB-	Baa3	BBB-
PDS bb+	4		BB+	Ba1	BB+
PDS bb	4	B	BB	Ba2	BB
PDS bb-	4	B-	BB-	Ba3	BB-
PDS b+	5		B+	B1	B+
PDS b	5	C++	B	B2	B
PDS b-	5	C+	B-	B3	B-

Source: Scope

[2] Source: Joint committee of the European Supervisory Authorities, Final Report on Revised Draft ITS on the Mappings of ECAIS' Credit Assessments CRR ART 136(1) and (3), 28 May 2021

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