27 May 2024

Covered Bond Rating Methodology

Financial Institutions / Structured Finance

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Call for comments

Scope welcomes market participants' comments on its proposed methodology. Please send your comments by 27[1] June 2024 to consultation@scoperatings.com.

[1] We have re-published the call for comment on 27 May 2024 and have subsequently extended the call for comment period to 27 June 2024 from 24 June 2024. No other changes were made.

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Summary

This proposed update of the covered bond rating methodology further expands and clarifies the analytical approach for rating covered bonds and similar secured, dual recourse debt instruments. If implemented as proposed changes are not expected to have a rating impact on existing covered bond ratings.

Key changes to the methodology

We are proposing to:

a. clarify the area of application, restricting this methodology to dual recourse debt obligations issued by a financial institution;

b. clarify the key credit factors relevant in our governance support analysis;

c. clarify our standard correlation parameter and recovery rate assumptions for the credit risk analysis of public sector and substitute assets;

d. update and clarify our credit risk analysis of mortgage loans by aligning our fundamental recovery rate analysis with the general structured finance methodology; clarification of our recovery timing assumptions; updates to our correlation framework for concentrated, typically commercial real estate backed mortgage pools and clarification of our generic security value haircuts applicable to portfolios of concentrated mortgage loans;

e. update and clarify our cash flow risk analysis by updating our interest rate framework for covered bonds; updating our indicative foreign currency stresses; updating liquidity premiums for public sector and mortgage assets and our qualitative liquidity risk assessment;

f. update the calculation of the detachment point, i.e. how we determine which part of the loss distribution needs to be covered by the cover pool;

g. further enhance readability and clarity.

1. Areas of application

The methodology applies to debt obligations that benefit from dual recourse, that is, to a financial institution (issuer) and to a ring-fenced cover pool. Such debt obligations include 'European covered bonds' as defined under Directive (EU) 2019/2162, as well as other dual recourse instruments (combined called "covered bonds" from herein). The rating addresses timely payment of interest and principal in accordance with their original terms and conditions. Under the first recourse, the issuer has the obligation to make timely and full payment of interest and principal. Upon a defined trigger event (such as the issuers non-payment or insolvency), an independent and ringfenced estate automatically assumes the payment obligation and ensures with sufficient collateral the full repayment of the instruments. A key analytical consideration is that the ability to make uninterrupted payments on covered bonds will not become impacted by a moratorium or other applicable insolvency proceedings attached to the initial issuer or sponsor. This methodology should be read in conjunction with other relevant methodologies[2] but prevails where ambiguity exists. Other relevant methodological considerations include those needed to establish the credit rating of the first recourse, typically the Financial Institutions rating methodology; methodologies to assess asset specific credit risk not fully covered in this methodology such as public finance, project finance, corporate rating or other asset specific structured finance methodologies. The General Structured Finance Rating Methodology, in particular Appendix VI Legal considerations provides additional considerations in case of non-legislation supported dual recourse instruments.

2. Summary

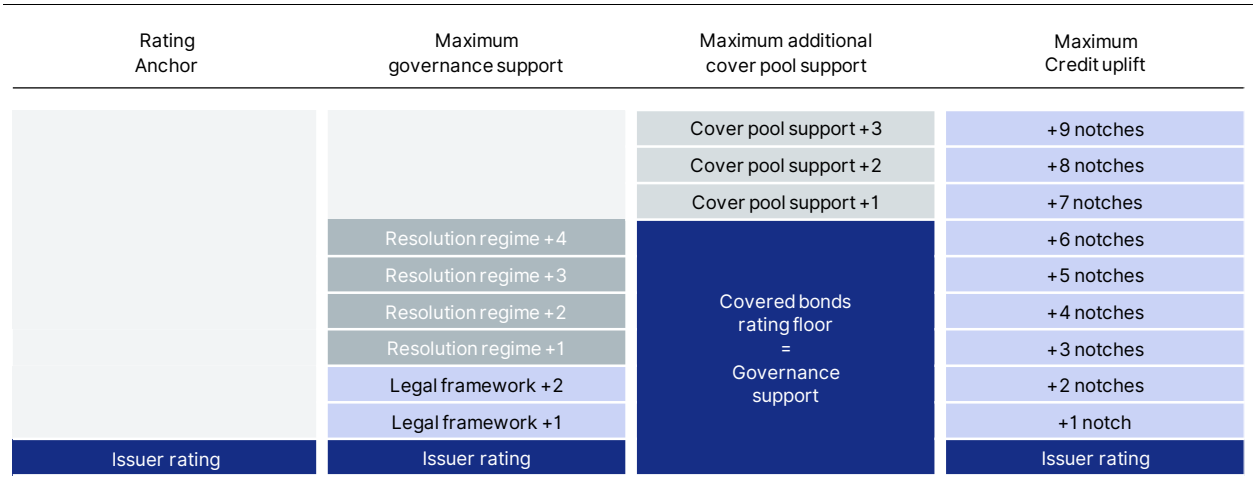
The covered bond rating methodology provides our framework for the rating assessment and regular monitoring of covered bonds. We apply our rating approach across markets to ensure comparability and consistency. The analysis also incorporates credit features specific to the issuer and the jurisdiction. Our covered bond methodology includes the following analytical steps:

A. **The analysis of the issuer** results in a credit rating [3] which establishes the anchor point for additional credit uplift for the covered bonds. The anchor point also provides our view on when the second recourse is needed.

B. **Governance support** reflects how legal and resolution frameworks, including systemic importance considerations, increase the likelihood that a covered bond remains a going-concern funding instrument, even upon the insolvency of or regulatory intervention in the issuer.

C. **Cover pool support** reflects the credit-positive impact of the second recourse.

Figure 1: Building blocks of Scope's covered bond methodology



Source: Scope Ratings

[2] The methodologies are available on www.scoperatings.com.
[3] The issuer credit rating can be a private or public rating established by Scope Ratings and can also refer to an entity that guarantees or explicitly supports payments on covered bonds.

To determine the maximum rating uplift we distinguish between

- instruments where repayment of the attached financial obligations[4] is upon the loss of the first recourse solely contingent on an unmanaged cover pool amortisation and a pass-through structure (hereafter referred to as conditional pass through 'CPT' covered bonds).
- instruments where the repayment is contingent on the refinancing or sale of available collateral which might expose the transaction to market value risk.

For CPT covered bonds, we typically do not constrain the maximum rating uplift, provided the issuer's influence on a covered bond's risk and refinancing structure is mitigated with features similar to those of a structured finance transaction. A common example is a covered bond program that becomes pass-through after meeting certain criteria and has: i) tight replenishment criteria; ii) risk composition limits; and iii) dynamic, committed overcollateralisation. This means the highest covered bond rating is the same as a securitisation with similar asset risk and structural characteristics, but with a floor at the issuer rating.

For non-CPT covered bonds we limit additional credit differentiation from cover pool support at up to three notches above that from governance support, which can be up to six notches. This reflects the possibility that a cover pool's risk management can significantly change over time. Risk and protection provided for investors remains at the issuers' discretion even with limits imposed by the respective covered bond frameworks or contractual obligations.

The rating uplift from cover pool support incorporated into our rating on non-CPT covered bonds may also be constrained by the degree of transparency provided to investors. This depends on i) the complexity in a covered bond programme's risk and protection structure; and ii) the issuer's willingness and ability to provide stakeholders with detailed information on the composition and volatility of risks. We evaluate this interplay and set the maximum uplift based on transparent criteria. We cap cover pool support at the level of governance support if the need to supplement gaps in data with market-based assumptions is excessive. This could be the case for concentrated and bespoke cover pools or covered bond programmes with significant market and counterparty risks[5]. We may withdraw the rating if information on the bank issuer, governance support and cover pool support is significantly constrained[6].

3. Governance analysis

The governance support analysis comprises two areas: i) the legal and structural framework; and ii) the resolution regime and systemic importance analysis. When governance factors are strong, the covered bonds' credit quality far exceeds that of the issuer. For highly rated issuers, governance support can be the primary rating driver. Governance support can elevate a covered bond rating by up to six notches above the issuer rating.

3.1 Legal framework and structural support analysis

The legal framework and structural support analysis covers the relevant aspects before and after an issuer's insolvency. Credit differentiation is based on the clarity of provisions behind the ongoing maintenance of a high-credit-quality cover pool. It also analyses the provisions that ensure a smooth transition from the first to the second recourse, i.e. when the cover pool is the sole source of repayment for a covered bond. This assessment can result in up to two notches of uplift.

The analysis also considers aspects of the domestic insolvency regimes, regulations that may affect the issuer such as consumer protection laws, the enforceability of cover assets, and other aspects indirectly addressed in the covered bond regulations. More details can be found in Appendix I: Legal framework analysis.

3.2 Resolution regime analysis

The analysis of the resolution regime and systemic importance addresses whether statutory provisions may prevent negative repercussions on the covered bonds if regulators where to intervene. A systemically important covered bond issuer is expected to mobilise regulators, supervisors and the private sector to support and proactively avoid uncertainty

[4] Which not only includes the respective financial instrument(s) but also attached hedging, servicing or other contracts necessary to maintain the structure until the maturity of the last outstanding bond.
[5] For further details see Appendix IX: Impact of cover pool information quality on maximum cover pool support uplift.
[6] See Scope's Rating Governance Policy available on www.scoperatings.com.

among investors during a potential resolution. We examine the track record of the proactive and transparent use of available resolution and restructuring tools to determine their likely impact on the covered bonds' credit quality. Further, the resolution regime assessment identifies the importance of relevant covered bond types and issuers in each country, allowing us to determine the incentives for market-led solutions. The analysis also addresses support mechanisms of direct stakeholders for the issuing entity that enhance the likelihood of a going concern of the cover pool.

A sound resolution regime increases the likelihood that covered bonds remain an actively managed, going concern funding instrument, reducing the likelihood that an investor needs to solely rely on the cover pool to receive repayments. Consequently, covered bonds in countries with a well-defined resolution regime and where covered bonds are systemically important have a significantly lower probability of default compared to the issuer.

Our resolution regime and systemic importance assessment can result in up to four notches of credit uplift. More details can be found in Appendix II: Resolution regime and systemic importance analysis .

4. Cover pool support analysis

Following our assessment of governance support, we establish the potential for cover pool support. The credit strength of the covered bond structure must be strong enough to counteract the stresses commensurate with the distance between the issuer rating and the assigned covered bond rating. The more the cover pool supports the covered bond's rating, the more resilient the cover pool's credit performance must be in times of stress.

We calculate an expected loss of the covered bond programme (see Appendix VI: Determining the expected loss) to determine the possible cover pool uplift. This calculation reflects that the issuer has defaulted and recourse to the cover pool is needed[7] (see Appendix VII: Scope's covered bond expected loss model (CobEL)).

We first determine the maximum rating uplift (section 4.1), then perform a credit risk analysis (section 4.2) to identify the relevant asset risks arising from the cover pool and to establish the related inputs for the cash flow risk analysis (section 4.3). In our cash flow analysis, we test the resilience of the covered bond's cash flow structure against stresses commensurate with the applicable issuer rating differentiation (D_0 to D_{max})[8] (Appendix VI: Determining the expected loss and Appendix VII: Scope's covered bond expected loss model (CobEL)). We complement the results of the quantitative analysis with auxiliary risk considerations (section 4.4) and a sensitivity analysis (section 4.5) as they can further constrain the expected rating uplift.

4.1 Cover pool complexity (CPC) category

For non-CPT covered bonds, we establish the maximum possible cover pool-related credit uplift above that from governance support by assessing the interplay between the complexity of a covered bond programme and the transparency provided to stakeholders by the issuer. We use the results of the assessment to determine the appropriate CPC category, which can be either 'low', 'moderate', 'high' or 'highest'. This assessment can result in up to three notches of potential additional cover pool support above that from governance support (see Appendix IX: Impact of cover pool information quality on maximum cover pool support uplift). With governance support providing up to six notches of uplift, a covered bond programme can be rated up to nine notches above the issuer; the distance between the issuer and the covered bond rating can be higher for conditional pass-through programmes.

4.2 Credit risk analysis of cover pool assets

In the second step, we assess asset and portfolio characteristics to determine relevant asset credit risk (including both probability of default and recovery rates).

We assess concentrated cover pools using Scope's portfolio model (Scope PM) – a Monte Carlo simulation model[9]. This approach is used for the credit risk analysis of public-sector cover pools, certain substitute asset sub-pools (see Appendix

[7] We conservatively assume that the issuer is in default when cover pool default rates are high, using the dependency copula (the issuer's cumulative default probability is equal to that of the cover pool) to link the two events.

[8] Starting from the issuer rating or base case (D_0) to the maximum stress level (D_{max}), we apply decreasing stresses to the credit, market and refinancing risks. D_{max} is determined by the sum of governance support and the uplift under our CPC assessment. Stresses are linearly scaled depending on the rating distance between the issuer rating and the maximum rating uplift.

[9] See Appendix III: 'Technical Note on Scope's Portfolio Model (Scope PM)' of the General Structured Finance Rating Methodology, available on www.scoperatings.com.

III: Credit risk analysis of public sector and substitute assets) and other less granular cover pools such as those backed by commercial real estate. This analysis calls for asset-by-asset credit projections, with both detailed and specific assumptions for each asset or class of assets with similar credit characteristics.

Our analysis of homogeneous and granular cover pools (containing residential or similar assets) uses a portfolio approximation approach (parametric default distributions such as normal inverse) using a measure of mean default probability and a variance or correlation parameter. These inputs are calibrated based on historical data and adjusted for our qualitative assessments on cover pool assets. We determine asset credit risk by accounting for the credit and performance indicators of the cover pool assets (see Appendix VI: Determining the expected loss).

For mixed cover pools, we combine the different analytical frameworks. A cover pool primarily of granular residential mortgages can be supplemented in certain jurisdictions by commercial real estate or 'substitute collateral'. Depending on granularity, we analyse the credit risk of the different asset types either by segment or on aggregate.

For the analysis of alternative asset classes securing a dual-recourse debt instrument e.g. loans to small and medium sized enterprises (see also SME ABS Rating Methodology), other financial instruments or infrastructure assets we will where relevant apply analytical credit assessment frameworks laid down in other methodologies (see e.g. General Project Finance Rating Methodology) to determine inputs into the asset credit risk of a covered bond programme.

4.3 Cash flow risk analysis

Our cash flow risk analysis establishes the expected loss of the covered bond structure using our CobEL model (see Appendix VII: Scope's covered bond expected loss model (CobEL)). We analyse the sensitivity of covered bond cash flows towards decreasing stressed assumptions. We determine the minimum rating-supporting overcollateralization that results in a lower or equal expected loss commensurate with the highest achievable rating as per our idealised EL tables. We floor the rating-supporting overcollateralisation on the legal minimum in that country.

The rating-supporting overcollateralisation is compared to the available overcollateralisation (see section 5. Overcollateralisation in Appendix V: Cash flow risk analysis). If the available overcollateralisation cannot support the highest achievable rating, we reduce the potential uplift and apply the relevant, rating dependent stresses until it can (see Appendix VIII: Rating-distance dependent stresses).

The cash flow risk analysis looks at scheduled cash flows[10] and the impact of asset credit and residual market risks (see sections 1. Interest-rate risk assessment and 2. Foreign-exchange rate risk assessment in Appendix V: Cash flow risk analysis), the hedging structure, senior costs for maintaining the cover pool's operations, and other relevant cash flow assumptions such as prepayment or reinvestment risk assumptions (see section 6. Other cash flow assumptions in Appendix V: Cash flow risk analysis).

We analyse the cover pool's ability to ensure uninterrupted covered bond payments under the original terms and conditions. This incorporates the impact of stressed asset sales used to cure liquidity shortfalls[11].

For asset sales, we determine the remaining net present value (NPV) of future cash flows generated by the cover pool. We calculate this NPV by applying a discount curve and asset-specific liquidity premiums (see sections 3. Assessing the impact of asset sales and 4. Incorporating asset liquidity premiums into the impact analysis of asset sales in Appendix V: Cash flow risk analysis). From this NPV, we subtract the proceeds needed to repay the next maturing covered bonds. The remaining performing assets are proportionally reduced. We continue this process until the last covered bond is repaid.

If a covered bond structure prescribes a different mechanism for selling cover assets upon a liquidity shortfall[12], the cash flow analysis addresses the documented mechanisms. In addition, if these options are available, we could factor in the impact of covered bond refinancing to cover liquidity shortfalls and the use of liquidity lines.

[10] If not delivered by the issuer, we project cash flows based on line-by-line or stratified cover pool and covered bond information, complemented with other key credit metrics (e.g. the weighted average life).
[11] Except for conditional pass-through covered bonds, whose repayment obligations switch from bullet to asset repayment-dependent pass-through.
[12] Such as the Selected Asset Required Amount – SARA clause – or Supplemental Liquidity Reserve Accounts – SLRA

4.4 Auxiliary credit considerations

We may adjust the quantitative results and the resulting uplift based on additional credit considerations. Where relevant, we include environmental (including climate risk), social and governance (ESG) considerations into our credit and cash flow risk analyses (see Appendix XI: Environmental, social and governance (ESG) impact analysis. The relative significance of country risk considerations may also influence and ultimately constrain the results of the quantitative analysis (see Appendix XII: Country and Currency risk considerations).

We also determine whether the credit strength of external counterparties providing financial or operational services could have a severe impact on the performance and, ultimately, the creditworthiness of a covered bond. These credit considerations are factored into the cash flow risk analysis if mitigating measures are inadequate. Ultimately, inadequate protection against counterparty risk could constrain the cover pool support rating uplift (see Appendix XIII: Counterparty risk considerations).

Where our analysis relies on industry best practice reporting templates[13] instead of more detailed line by line information, we may apply the most conservative assumptions in line with this methodology. For instance, for the analysis of concentrated portfolios to commercial or public sector assets we will build an estimated portfolio based on the country or debtor type classification. However, in the absence of complementary information we will assume that all obligors / assets are concentrated to one region or industry.

4.5 Sensitivity analysis

To determine the supporting overcollateralization for a given rating we will take into account our forward-looking views on the potential development of the cover pool and covered bond structure and the importance of key credit and cash flow variables.

We test a programme's sensitivity against

- frontloaded defaults[14]
- higher liquidity premiums by stressing the relevant sovereign rating down by one category
- an issuer rating downgrade by one notch

Where relevant we test in addition for e.g. the impact of new issuance activity on mismatches between the cover pool and the rated covered bonds as well as the impact of anticipated changes to the cover pool; lower asset margins at interest reset (long term trough); non-execution of bond extension options or call rights; alternative interest rate developments (see also Appendix V: Cash flow risk analysis) and time subordination risk if a programme is exposed to individual, small sized and long termed bonds by quantifying the level of overcollateralisation needed assuming no loss is tolerated.

High sensitivities against tested variables can result in both the rating and the rating-supporting overcollateralisation being adjusted.

4.6 Monitoring

We analyse the cover pool 'as is' at the time of the reporting. We would, however, adjust for changes to cover pool composition as communicated by the issuer, or if our forward-looking view suggests the need to amend key pool characteristics. Changes often relate to new business strategies (e.g. entry into new segments, or the introduction of loan products with different terms and conditions), regulatory changes (e.g. certain asset types become ineligible), or mergers and acquisitions resulting in a shift in the covered bond programme's risk profile. We update the asset credit analysis at least annually unless changes are immaterial (see Appendix XIV: Monitoring guidelines).

[13] Such as the Harmonised Transparency Template (HTT), see https://www.coveredbondlabel.com/htt
[14] Under high prepayment scenarios not all expected defaults are allocated. Frontloaded defaults ensure higher allocation.

Appendix I: Legal framework analysis

In the first part of the governance support analysis, we analyse whether the legal framework or equivalent legal provisions[15] cover relevant aspects before and after an issuer's insolvency. This analysis can support up to two notches of credit differentiation.

Credit differentiation

To rate a covered bond above the issuer we assess legal considerations that help us to ascertain a smooth transition from the first, to the second recourse:

i) Segregation of cover pool upon insolvency: Clarity that there is a legally valid, binding and enforceable segregation as well as maintenance of cover pool assets and related derivatives upon the issuer's resolution or insolvency (for on-balance-sheet structures), or a valid perfection of transfer and a true sale in the case of covered bonds that use an SPV structure.

ii) Ability to continue payments after issuer insolvency: Documentation on how the covered bond structure facilitates the ability to continuously make payments of interest and principal on the notes and payments on derivatives according to the original terms and conditions[16], even in the event of a resolution, moratorium, or insolvency regarding the issuer. We expect privileged derivatives and liquidity facilities contracted for the benefit of covered bonds to remain valid upon a regulatory-driven restructuring, moratorium or insolvency of the issuer, as well as no automatic acceleration of the covered bonds if an issuer defaults or is placed under a moratorium.

iii) Asset eligibility and risk management principles: Valid and binding asset eligibility and replacement criteria that ensure high-credit-quality assets are included and maintained in the cover pool and that risk management principles address management of market and liquidity risks prior to and after the issuer's insolvency.

iv) Programme enhancements remain available: Requirements that programme enhancements remain available, valid and enforceable vis-à-vis other creditors after a resolution event or insolvency (i.e. overcollateralisation that is higher than either the statutory minimum or other maintenance obligations is maintained and cannot fall back into the insolvency estate of the issuer).

   Neither a regulatory action nor an issuer's event of default impacts the ability to manage the covered bond structure in the best interest of investors. The framework should allow proactive liquidity management, including the ability to sell all or parts of the cover pool for the benefit of covered bond holders. We will examine how, in the case of a regulatory action or an insolvency, a potential conflict of interest between covered bond holders and other debtors is resolved.

v) Covered bond oversight: Independent and regular oversight of the programme structure (asset composition/structural risk) by either the supervisor or an independent trustee.

We will not give any credit to the legal framework assessment where the cover assets' segregation or enforceability may not be legally valid. Full credit differentiation is highly unlikely where characteristics ii) to v) above apply only partially. This limitation reflects the fact that some of the main expectations of a covered bond, such as uninterrupted payment after insolvency or special oversight, are not fully met.

The European covered bond harmonisation[17] provides minimum standards for the legal frameworks applicable to covered bonds. Differences between common and civil law systems, mortgage markets and national discretion persist, however. Also, the directive does not address non-regulated, contractually set up covered bonds. Consequently, our legal framework analysis remains specific to the country and, possibly, the covered bond programme.

[15] For covered bonds without a dedicated legal framework, the analysis of legal and contractual provisions follows the principals in Appendix VI: 'Legal considerations in structured finance' of the General Structured Finance Rating Methodology, available on www.scoperatings.com.
[16] Terms and conditions include both the provisions set out in the legal framework as well as programme- and issue-specific terms and conditions.
[17] Directive (EU) 2019/2162 comprises the principles based on the Covered Bond Directive and a Regulation amending the Capital Requirements Regulation (CRR) regarding the exposures in the form of covered bonds.

Appendix II: Resolution regime and systemic importance analysis

In the second part of the governance support analysis, we assign up to four notches of uplift to reflect the likelihood that an issuer can maintain covered bonds as a going-concern funding instrument.

Credit differentiation

The likelihood that regulatory intervention would preserve the covered bond's credit quality is a key determinant for the associated credit uplift. Factors include:

i) Availability of statutory provisions: Whether the covered bonds are defined in line with statutory provisions in resolution regimes and thus are not immediately impacted by the intervention of a regulator or an insolvency receiver; for countries without a specific resolution framework like the Bank Recovery and Resolution Directive (BRRD)[18], we assess whether supervisors follow a similarly proactive, transparent and predictable resolution approach for a covered bond issuer that requires closer monitoring and is likely to become insolvent. We assess whether a covered bond issuer is more likely to be declared insolvent or whether the general aim is to maintain an issuer and its covered bonds as a going concern.

ii) Strength of statutory provisions: Where statutory provisions make a resolution more likely, we further assess the relevance and degree of support for covered bonds. We see highest support where different debt instruments are transparently defined and ordination for the hypothetical case of a bail-in event and where covered bonds rank amongst the most senior products being exempt from a bail-in.

iii) Systemic importance of issuer: Whether the issuer's business model, systemic importance, liability and capital structure, level of bail-inable debt or incentives suggest regulators will likely use available resolution tools to restructure the issuer in a way that keeps the covered bond programme as a going concern. In this context, we also look at the extent and sustainability of support provided by stakeholders (including the issuer's shareholders). This includes liquidity lines, guarantees, maintenance of the cover pool's quality and overcollateralisation as well as service and operational agreements.

iv) Systemic relevance of covered bonds: Whether covered bonds are systemically important (i.e. used by most banks in a country) and whether this covered bond type is the main refinancing tool for an economically important asset. We also assess whether the issuer is a relevant covered bond issuer and whether covered bonds are an important asset class for domestic investors.

v) Proactive stakeholder community: Whether there is an active domestic stakeholder community (regulators, issuers and investors) that proactively monitors market developments, actively maintains confidence in the product, and possibly encourages improvements in the relevant regulations. In addition to the indirect stakeholders, the analysis also addresses the incentives of direct stakeholders (e.g. shareholders), or documented support mechanisms provided by the direct stakeholders to the issuing entity, that enhance the likelihood that covered bonds continue as going concern. Examples of mechanisms are asset replacement, liquidity support, minimum overcollateralisation and servicing agreements. We assess the clarity and predictability of relevant statutory provisions and the relevant authorities' interpretation of and track record in these.

We will not give any credit to the resolution regime and systemic importance analysis where no statutory provisions or a similar approach are in place preventing covered bonds from being immediately impacted by the intervention of a regulator or an insolvency receiver.

Where i) is met, regulatory action on the issuer is less likely to impact a covered bond as a going concern instrument. This results in a significantly lower likelihood of default, and thus a lower expected loss, translating into up to four additional notches of rating uplift for the covered bonds. Our resolution regime and systemic importance analysis gives benefit to available support mechanisms by granting one notch for each of the four elements from ii) to v).

If certain elements apply only partially or are lagging clarity, the benefits of the resolution regime will be limited, reflecting the increased likelihood of the covered bonds being wound down and the cover pool becoming the sole source of repayment.

[18] Directive 2014/59/EU

Appendix III: Credit risk analysis of public sector and substitute assets

1. Portfolio default risk analysis

We use the Scope PM to analyse heterogeneous cover pools such as public sector cover pools and certain substitute asset sub-pools as covered in section 3 below. The Scope PM analysis framework allows the estimation of default statistics for less homogeneous cover pools, considering the exposure-by-exposure credit quality, amortisation profile and asset correlation assumptions. We use asset level information to analyse the credit risk of heterogenous cover pools including those with public sector exposures. In case only stratified information is available, we analyse a proxy portfolio reflecting the main credit metrics of the pool (e.g. by geographical breakdown, debtor types, granularity, amortisation profile).

Public sector cover pools are often heterogeneous with large single-asset exposures, geographical concentrations and idiosyncratic risks. Depending on the obligor concentration we derive the credit quality based on the following sources:

1. Mapping of external credit risk measures available to Scope[19]
2. Mapping of external credit risk measures available to Scope with consistency checked[20] by Scope's analysts
3. Either i) credit estimate or similar assessments by Scope or its affiliates; or ii) an external rating[21] mapped to Scope's rating scale
4. Either i) public or private rating by Scope; ii) the second-best external rating mapped to Scope's rating scale, if there is more than one external rating available[22], or iii) an external rating if there is only one available, adjusted, if necessary, by sensitivity analysis
5. Public or private ratings by Scope

We establish public or private ratings for larger single exposures, credit estimates or other credit assessments as per Figure 2 .

Figure 2: Standard approach for assessing and monitoring direct single-asset risk by level of concentration

Obligor concentration (% of cover pool balance)	Credit quality derived from:
Less than 2%	All of the above
2% <= exposure <5%	2. to 5.
5% <= exposure <10%	3. to 5.
10% <= exposure < 25%	4. and 5.
Exposure >= 25%	Only 5.

Source: Scope Ratings

Alternatively, for exposures below the sovereign level and sectors typically found in granular public sector cover pools (e.g. hospitals or utilities that are majority owned or guaranteed by the public sector), our sector experts establish relative rankings of credit risk specific to the sector and exposure[23].

When mapping granular exposures, we may use the issuer's internal credit analysis or our own expert-driven credit assessment. Generally, we reflect an issuer's weaker credit assessment of an exposure compared to our assessment, taking into account the issuer's more direct relation to the obligor.

[19] Such external risk measures may be internal rating models of the issuer, portfolio assumptions from vintage data or public ratings from regulated and supervised credit rating agencies. Scope may use those measures and adjust them as necessary.
[20] A consistency check reviews whether the exposures' considered credit quality is consistent with credit quality benchmarks available for the obligor type
[21] Public ratings from regulated and supervised credit rating agencies (CRAs)
[22] If three or more external ratings are available, we may further adjust the mapped rating, if we find that the worst mapped rating diverges by more than one notch from the second-best mapped rating.
[23] Ratings, credit estimates as well as relative rankings are established based on the principals of the relevant methodologies (e.g. Sovereign Rating Methodology, Sub-Sovereigns Rating Methodology or Government Related Entities Rating Methodology).

2. Analytical approach for granular public sector exposures

The portfolio credit analysis using Scope PM establishes credit assessments for cover pool exposures. Public sector cover pools may comprise granular and non-publicly rated sub-sovereign exposures or exposures to government-related entities. In this situation, we establish credit risk measures for individual exposures or generic asset 'types'[24] leveraging from core analytical elements from the respective rating methodologies.

Our individual credit assessments for exposures below the sovereign level starts with our sovereign rating or a similar credit assessment. Our sector experts analyse the respective institutional framework, focusing on: i) institutional support; ii) fiscal interlinkage; and iii) political alignment between the government tiers.

The strength of the institutional framework results in an indicative range for regions – the stronger (weaker) the framework, the narrower (wider) the range vis-à-vis the respective sovereign rating. We rank the regions and adjust the distance to the sovereign rating based on, for instance, blended ratios including GDP per capita, (measured as a percentage of the euro area average) or the regional unemployment rate. Scope analysts may use different references for non-European exposures or make adjustments reflecting regional differences.

We also use our institutional framework assessment for the initial evaluation of lower-tier exposures such as municipalities. Like for regions, we establish adjustments across the board – the stronger (weaker) the framework, the lower (greater) the adjustment vis-à-vis the respective sovereign rating. This adjustment is a starting point and refined in a second step. Additional upward or downward adjustments can reflect additional regional indicators such as the population, GDP per capita (as a percentage of the euro area average) and the unemployment rate.

For public sector or public sector-guaranteed companies, our starting point generally consists of the credit risk assessment of the public sector guarantor or majority owner. For companies that benefit from a direct, unconditional and irrevocable guarantee, we generally align the credit opinion with its direct guarantor. For other eligible public sector exposures, we may make a negative adjustment depending on the relationship between the sponsoring public sector entity and the respective cover pool exposure (based on the entity's legal status and the impact of the liability support mechanism or shareholder structure). For insignificant individual exposures, we may apply conservative assumptions, e.g. unclear ownership structures or only implicit liability support.

3. Analytical approach for substitute assets in cover pools

Cover pools can include substitute assets[25], as certain covered bond frameworks stipulate that liquidity risk be covered within the first 180 days. The share of substitute assets is typically limited by law and eligible assets have regulatory minimum credit quality requirements[26]. Issuers apply more dynamic management to the composition of substitute assets than for the rest of the cover pool, resulting in a higher variation in maturity profiles and credit quality.

We do not include substitute assets into our analysis for programmes where cover pool support is not a key rating driver. This is driven by their volatile level of support – especially under a distressed situation where issuers may tend to limit the addition of costly asset to the cover pool. Therefore, we consider only the credit risk (and cash flows) of the primary collateral.

For programmes relying on cover pool support as a rating driver, we test sensitivities towards the credit quality of substitute assets if i) substitute assets provide a significant share of the cover assets at the reporting date (more than 5% of total cover pool), ii) issuers have a publicly stated minimum committed level, or iii) the cover pool cash flow profile is showing a material liquidity gap for the first 180 days after the reporting cut-off date. In these cases, we either apply the same analysis as for public sector cover pools (if the effective number[27] of substitute assets is higher than 5) or conservatively assume the sub-pool as a single exposure against a financial institution and use the minimum credit quality stipulated by the covered bond legislation, combined with a three-year maturity.

[24] Types refer to small individual exposures to government-related entities in a specific region with similar credit characteristics.
[25] In general, public sector cover pools could also have a sub-pool of substitute assets. Most public sector cover assets already qualify as liquid assets and thus specific substitute asset pools are less common than for mortgage covered bonds and often only comprise unsecured exposures to banks or covered bonds.
[26] The EU covered bond directive requires a minimum credit quality step (CQS) of 2, which is equivalent to a minimum rating of A-. Short-term exposures with maturities below 100 days also can comprise exposures commensurate CQS3 which can be a low as BBB-. Eligibility criteria stipulate that such assets can be sovereigns, sub-sovereigns, other covered bonds, or exposures to regulated financial institutions.
[27] Defined as the inverse of the Herfindahl-Hirschman Index (HHI) of the percentage weights.

4. Portfolio correlation assumptions

Correlation parameters are essential to the Gaussian copula function used to obtain a portfolio's default rate distribution using Scope's PM. For each iteration of the Scope PM's Monte Carlo simulation, we determine asset defaults by comparing a random asset value against a defined threshold derived from the asset maturity and Scope's credit assessment. This random asset value is constructed as a standard Gaussian random variable, defined as a linear combination of standard independent Gaussian random variables. The independent Gaussian random variables comprise a set of market risk factors and an asset-specific component.

Three market risk factors define our default dependency framework, or correlation framework, for public sector and substitute-asset cover pools:

- Global: this reflects macroeconomic influences.
- Country: this high-level geographical factor reflects a common dependency on general economic and political developments domestically and intergovernmental integration between the sovereign and lower tiers.
- Region: obligors active in the same region[28] often have the same business cycle and perspectives.

We use the weights attributed to each factor to determine the interdependence between the public sector entities and reflect the different transfer mechanisms between the sovereign and sub-sovereigns, oversight or guarantee structures. Larger weights on market risk factors imply smaller idiosyncratic risk and contribute a higher probability of widespread default in the collateral pool.

Our indicative average correlation parameters for concentrated cover pools are set out in Figure 6.

Figure 3: Indicative average correlation parameters for concentrated cover pools

Market risk factor	Correlation parameter
Global	2.0%
Country	15.0%
Region	10.0%

Source: Scope Ratings

We consider these correlation parameters in the context of standard European public sector cover pools and eligible substitute assets. If the composition differs significantly, we may adjust the correlation framework or its components. This may be the case where we do have evidence that the public debtors do not benefit from a strong intergovernmental integration or where the underlying does not directly benefit from public support (e.g. Covered Bonds).

5. Recovery rate assumptions for public sector exposures in cover pools

Recovery rates applied to public sector assets reflect stresses that depend on the rating distance between the issuer and the covered bond rating. Stressed recovery rates are linearly scaled between the base case (D_0) and the highest achievable rating distance D_{max}[29]. We generally assume full recovery of defaulted public sector exposures in the base scenario prior to applying rating-distance-dependent stresses (D_0 recovery = 100%). In the most severe stress scenario, we apply asset- and country-specific public sector recovery assumptions. These reflect the borrower's guarantee structures, country-specific transfer and equalisation systems, and the tiering of public-sector exposures. Based on academic research, we generally assume the lowest recovery rates (D_{max} stress) for sovereign exposures with a 40% recovery expectation; for sub-sovereigns and municipalities, the stressed recovery is assumed to be 75%. Where a sub-sovereign or municipal does benefit from a highly integrated institutional framework, resulting in a close alignment of its sovereign creditworthiness, we link the stressed recovery expectation to the level of its sovereign. Further, we assume

[28] Regional level below the sovereign level. Typically referring to NUTS1 aggregation which typically is the level below the sovereign

[29] Assuming the issuer is rated BBB- and the governance support analysis results in an uplift of six notches, the cover pool analysis would allow an additional credit differentiation of three notches. This translates into a maximum rating distance of nine notches between the bank rating and the covered bond rating. The stress scenario commensurate with the highest elevation is denoted in this example as the D9 stress scenario.

50% for public sector companies and other eligible guaranteed exposures. Assumptions reflect the most severe stresses applied in the D_{max} scenario.

Recovery assumptions are designed to assess public finance risks in the specific context of both the cover pool support analysis and the cash flow modelling approach. Recovery rates used in the cash flow simulation reflect the weighted average recovery rates of the individual exposures.

6. Recovery rate assumptions for substitute assets or other assets in cover pools

For substitute assets which can also be used as primary cover assets such as public sector exposures, we use the recovery assumptions as per above. For (unrated) covered bonds with typical collateral complying with minimum overcollateralization, we use a stressed recovery rate of 60%. Other, in particular bank exposures will be assessed on a case-by-case basis reflecting their i.e. seniority (e.g. whether preferred unsecured debt, deposits); terms (whether short or long term) and whether bank accounts benefit from additional protections such as bank-account replacement languages typically seen in securitisations. Standard, unsecured and uninsured bank deposits will be stressed with a 30% recovery.

7. Recovery timing assumptions

Public finance insolvency processes generally differ from those in the private sector. For example, the process in the public sector can take longer; exposures become restructured rather than proceeds from a foreclosed security being received in a lump sum; investors need to make concessions on their interest; and maturities become extended. We assume that public sector payment obligations (principal and interest) would be placed under a moratorium. Following the end of the moratorium, payment obligations would be reinstated at the assumed stressed recovery rate (principal and interest) and the original terms and conditions would be extended by the length of the moratorium. We conservatively assume a moratorium to last 48 months.

Substitute assets may also comprise assets for which we apply different recovery timings. For example, the recovery timing analysis for covered bonds secured by mortgages can be in line with that of the respective asset type.

Appendix IV: Credit risk analysis of mortgage assets

1. Analysis of granular mortgage cover pools

Our preferred method for analysing the credit risk of mortgage-backed loans depends on the homogeneity of the cover pools. We analyse cover pools comprising granular mortgage loans using a portfolio approximation approach with the following inputs: i) a measure of mean default probability; ii) a variance or correlation parameter; and iii) recovery rate assumptions. We also apply this approach to pools of granular, homogeneous commercial real estate-backed mortgage loans. For less granular commercial portfolios with mixed homogeneity (particularly with a cross-country or non-standard asset mix), we may apply our portfolio analysis framework using the Scope PM (see section 'Analysis of concentrated mortgage cover pools' below).

1.1. Portfolio default projections

We analyse the default pattern of granular mortgage pool portfolios using an inverse Gaussian distribution characterised by a mean lifetime default rate and a coefficient of variation[30]. For this purpose we use issuer or country-specific performance information[31] and the asset characteristics of the relevant sub-portfolios. Information we rely on includes i) historical originator performance; ii) loan characteristics assessed through a generic scoring algorithm; iii) originator internal scores or delinquency information based on public (regulatory) reporting; and iv) peer comparisons.

Where performance data is limited to quantify a coefficient of variation, we assume a coefficient of variance between 50%-60%. Our analysis considers the issuer's general risk appetite as well as the characteristics of the mortgage portfolio relative to the market.

1.2. Recovery rate assumptions

We derive mortgage loan recoveries by calculating the security value as the stressed value of the underlying real estate. Under our fundamental recovery analysis we assess the valuation and liquidation risks associated with the underlying security, typically a real estate asset. The analysis results in a rating-conditional haircut to the appraisal value of the security. Such security value haircut has three components: 1) appraisal quality assessment, 2) market-value-risk, and 3) liquidity and other idiosyncratic risks.

We may complement our fundamental approach with a statistical analysis of recovery vintage data or other historical data on the recovery rates of similar assets. In this case we apply recovery rate haircuts of up to 40%[32]. In case of granular, homogeneous commercial real estate-backed mortgage loans we apply recovery considerations in line with concentrated mortgage pools as described in section '2. Analysis of concentrated mortgage cover pools' below.

1.2.1. Appraisal quality assessment

Where a covered bonds does not benefit from regulated valuation standards[33], we assess the quality of property appraisals considering i) the transparency of the appraisal process; ii) the quality of the valuation techniques applied; iii) the age of the appraisals; and iv) the appraiser's incentive to conduct unbiased valuations. Scope generally relies on the latest appraisals from independent third parties to estimate current property values but also takes into account automated valuation methods where they follow a market standard. Where relevant, we capture limitations on appraisal quality through transaction-specific haircuts. For some covered bonds, regulations rely on prudent, through the cycle valuation methods. Where we are provided with such valuations, adjustments will be made to reflect current property values. Seasoned valuations are updated through indexation techniques based on public or private real estate indices.

1.2.2. Market value risk

Forward-looking market value risks are captured through rating-conditional, market-value-decline (MVD) assumptions. Our MVD assumptions are derived based on a quantitative analysis of the underlying house price indices, which comprises three building blocks: First, quantification of stressed assumptions (D_{max}), reflecting a very distressed and remote scenario

[30] The coefficient of variation is defined as the standard deviation divided by the mean.
[31] At a minimum we use performance information from the issuer's annual accounts or country-specific information on unemployment (as provided by the IMF) and mortgage and rent arrears (as provided by Eurostat or similar statistical agencies).
[32] Rating stresses for scenarios between D0 and Dmax are determined by linear interpolation.
[33] E.g. (EU) 2019/2162, chapter 2, Article 6 paragraph 3 and 5

second, base (D_0) assumptions, which generally reflect current market conditions and third, a bi-sectional interpolation between the stressed and base assumptions to derive intermediate stress assumptions. To ensure the consistency of the analysis across jurisdiction, we use public house price indices that are methodologically homogeneous[34].

Illustrative residential MVD assumption benchmarks for several European countries following the below described procedure are laid out in our General Structured Finance Rating Methodology[35]. We may apply transaction specific MVD assumptions which deviate from those benchmarks. Some common examples of instances where we may deviate from such benchmarks are when the collateral assets are non-granular or concentrated in specific regions; if recent movements in the underlying HPI have been particularly strong, or if changes to the macro-economy or to the country´s sovereign rating have been acute.

1.2.3. Stressed (Dmax) MVD assumptions

Our D_{max} residential MVD assumptions reflect a baseline 40% stress applied equally to all jurisdictions or regions. This stress has been calibrated considering maximum house price index (HPI) declines observed across multiple jurisdictions during periods of stress dating back to the second quarter of the 20th century[36]. This baseline stress is then adjusted (upwards or downwards), considering recent HPI-specific dynamics (typically covering the last 15 years) or the current macro-economic context. Specifically, we consider three adjustments to the 40% baseline stress:

1. A potential downward adjustment (i.e. MVD decrease) to reflect the distance between the current HPI and the HPI cycle peak.
2. an upward or downward adjustment for relatively volatile or stable HPIs.
3. a potential upward adjustment which addresses jurisdiction specific macro-economic risks and is assigned using the jurisdiction's sovereign rating.

The combination of these adjustments results in a maximum possible AAA MVD of 60% for any given jurisdiction with an investment grade sovereign rating, which is roughly commensurate with the worst historical drawdown observed by us (Netherlands, 63%, 1921-1936).[37]Exceptionally, we may apply a qualitative overlay to its quantitative approach, for instance if the reliability or quality of the underlying HPI is considered poor, or if the quantitative results are excessively sensitive to the time horizon of the analysis. We also qualitatively floor the minimum AAA MVD at 30%.

1.2.4. Interpolation benchmarks

We consider deterministic interpolation benchmarks to derive intermediate MVD stresses. The vector of choice is subject to an assessment of sectoral and/or macro-economic risks which can be approximated through the countries sovereign rating. We may apply transaction-specific interpolation vectors which deviate from the interpolation benchmarks, particularly when perceived macro-economic risks have strongly evolved. As a general rule, we will frontload MVD stresses along the rating scale, in countries where underlying macro-economic risks and/or real estate price uncertainty are considered high, on a relative basis. Conversely, we will backload MVD stresses along the rating scale in countries where underlying macro-economic risks and/or real estate price uncertainty are considered relatively low.

1.2.5. Periodic update

MVD assumptions reflect a forward-looking view at a specific cut-off date. Therefore, we periodically review its forward-looking MVD assumptions to reflect material changes to the underlying HPI or in the macroeconomic environment.

1.2.6. Liquidity and other idiosyncratic risks

Asset liquidity is a key driver of expected recoveries which is not reflected in our MVD assumptions. Hence, in addition to our stressed MVD we apply a flat fire-sale discount (FSD) assumption. For granular mortgage cover pools we assume a further 20% decline reducing the stressed, current appraisal value after MVD has been deducted. In case of evidence of specific market liquidity, we may apply specific assumptions on a deal-by-deal basis accounting for i) loan-servicer-specific historical evidence of appraisal values relative to the sale price (if available); or ii) specific risks, driven by the ageing of the collateral, asset marketability and quality, information asymmetries, obsolescence, among others. In

[34] The analysis considers house price information provided by the Bank for International Settlements.
[35] AAA stresses are commensurate with D_{max} and CCC with D_0 accordingly.
[36] Among others USA (1926-1941) and UK (1927-1934).
[37] For very-low rated jurisdictions, the maximum possible AAA MVD could go as high as 75%.

addition, we deduct 10% liquidation costs from the estimated gross recovery proceeds. Together with the MVD as per above, these adjustments form our security-value-haircut (SVH).

1.3. Recovery timing

For granular mortgage assets, we assume a 24-month recovery lag following loan default. Mortgage loans ultimately guaranteed by a sovereign body result in a recovery timing assumption according to Appendix III: Credit risk analysis of public sector and substitute assets. Where there are strong indicators, that stressed recovery timings may be positively or negatively impacted (e.g. legislative constrains or supportive digital and efficient enforcement procedures) we may use alternative assumptions.

2. Analysis of concentrated mortgage cover pools

1.1 Portfolio default rate analysis

For concentrated commercial mortgage cover pools, we use the Scope PM's analysis framework. We estimate default statistics for cover pools with low granularity by factoring in the exposure-by-exposure credit quality, amortisation profile and asset correlation assumptions. We use line-by-line cover pool information. In case only stratified information is available, we establish and analyse a proxy portfolio reflecting the main credit metrics of the pool (i.e. geographical breakdown, debtor types, granularity, amortisation profile).

Single exposures in commercial mortgage pools are generally larger than those in typical residential financing. At portfolio level, however, single exposures typically remain granular enough that we can use outcomes from the originator's internal rating models or conservative sector assumptions for our portfolio model's default analysis. In cases of high concentrations on top obligors, we perform additional analyses based on the principles in our CRE Loan and CMBS Rating Methodology[38].

The analysis of concentrated mortgage portfolios follows our principles for public sector cover pools. However, as SMEs or corporates often take out large mortgage loans, we align the correlation parameters to those typically used for similar obligors as per our CLO methodology[39]. Weights attributed to each factor determine the interdependence between the different borrowers. Indicative average correlation parameters for concentrated commercial mortgage pools are set out in Figure 4.

Figure 4: Indicative average correlation parameters for concentrated cover pools

Market risk factor	Correlation parameter
Global	2.0%
Country	5.0%
Industry	20.0%

Source: Scope Ratings

We consider these correlation parameters in the context of standard concentrated mortgage cover pools. If the loan's risk profile differs significantly, we may adjust the correlation framework for this additional risk. In case of high concentrations[40] on top obligors we will perform additional analyses based on the principles in our CRE Loan and CMBS Rating Methodology.

1.2 Recovery rate analysis

[38] See www.scoperatings.com for further information on the CRE Loan and CMBS Rating Methodology
[39] See www.scoperatings.com for further information on the CLO Rating Methodology
[40] See Asset Analysis (CRE loans) in CRE Loan and CMBS Rating Methodology

For concentrated mortgage pools of commercial real estate assets we apply rating-conditional, SVH assumptions ranging between 30% (D_0) and 75% (D_{max}) to the appraisal value of the security. The appraisal value for concentrated cover pools follows the same analytical considerations as for granular mortgage pools.

Our SVH levels include liquidity considerations and sale or liquidation costs. For multifamily property our (D_{max}) stresses are limited to a maximum of 65%. In case of high concentrations[41] on top obligors we will perform additional analyses based on the principles in our CRE Loan and CMBS Rating Methodology. In exceptional cases, our SVH can be higher or lower. This could be the case where the security type indicates exceptional risk (e.g. developer or regionally concentrated) or where the collateral benefits from unusual attributes (e.g. guarantee schemes).

For concentrated mortgage pools we apply the same considerations on recovery timing as we apply for granular mortgage pools.

Appendix V: Cash flow risk analysis

Our cash flow analysis includes a projection of defaults and loss-given-default from the cover pool. The main credit-related parameters include default distribution, the amortisation profile (including different prepayment assumptions), default timing, recoveries, and recovery timing. The analysis also incorporates market-scenario parameters such as interest-rate and foreign-exchange term structures as well as stressed refinancing assumptions. Starting from a base stress case D_0 to a maximum stress case D_{max} we apply the same concept of rating-distance-dependent stresses to market risks such as interest-rate and foreign-exchange risks as well as the liquidity premium[42].

1. Interest-rate risk assessment

The current currency dependent interest forward-rates form the base case (D_0) of our cash flow analysis.

For our assessment, we use a set of deterministic, adverse interest-rate scenarios to identify the scenario that most severely impacts the expected loss.

We first modify for expected developments of the interest rate starting from points between the second and 10th years of the covered bonds' residual life. We then stress the interest rates to 9% and/or minus 1%.

For both upwards (Figure 5) and downwards (Figure 6) scenarios, the stressed rates are applied for a period of two years, after which they start to revert to what we expect to be a long-term mean interest rate. The rates converge to the respective target level within 2 years if rising and 1 years when declining.

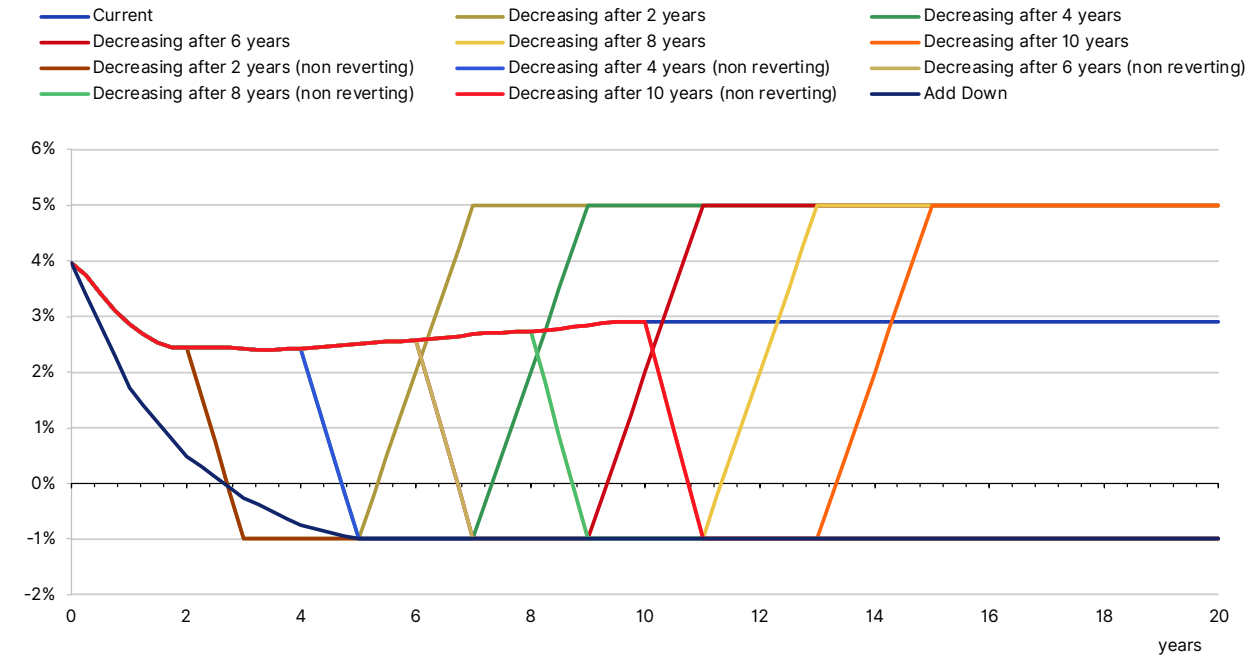
We complement these deterministic interest-rate scenarios with 'lower for longer' and 'higher for longer' scenarios in which the interest rate remains at respectively negative 1% or positive 9% until the pool has matured.

In addition, we test the programmes sensitivities against gradually increasing and decreasing vectors starting from the current 3-month interbank rate level to a perpetual rating-conditional plateau/floor at the end of year five. The AAA plateau and floor are fixed at 9.0% and -1.0%, respectively, with a gradual convergence of the plateau and floor levels to the transaction currency interbank spot rate for lower rating categories. We assume the path to plateau and floor to be frontloaded.

We also may complement these scenarios with additional interest rate scenarios to test the resilience of the covered bond structure to rate changes at different starting points and shapes of stressed term-structures.

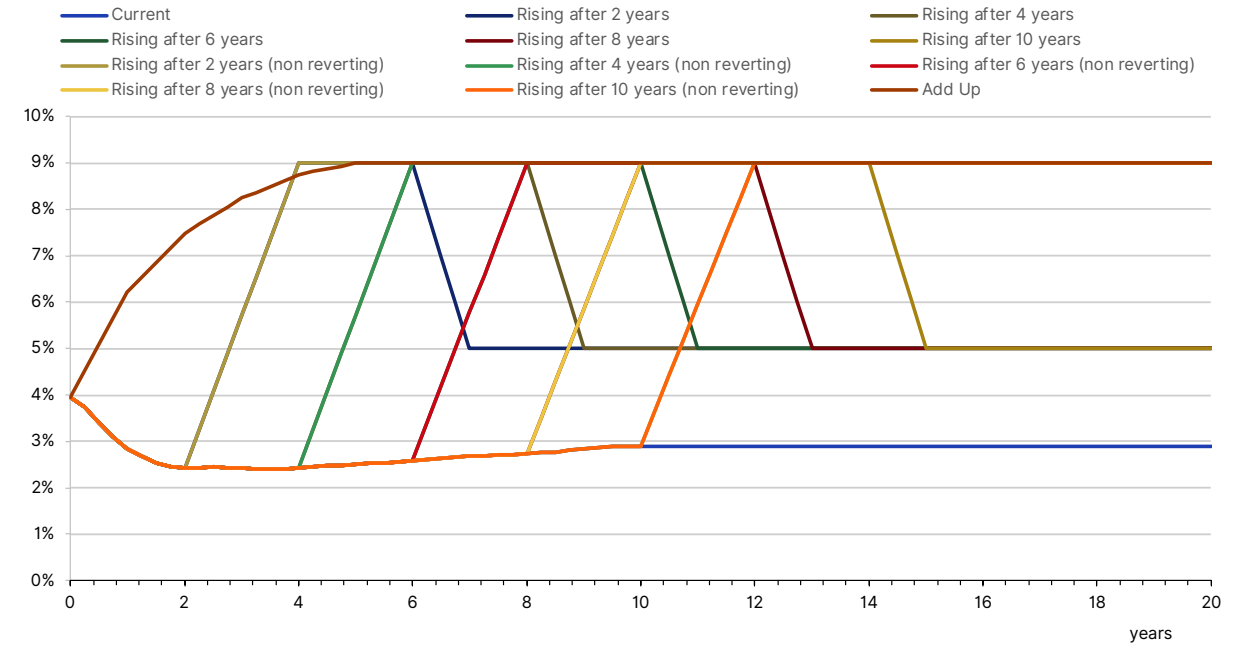
[41] See Asset Analysis (CRE loans) in CRE Loan and CMBS Rating Methodology
[42] See Appendix VIII: Rating-distance dependent stresses

Figure 5: Illustrative rising interest-rate forward curves



Source: Scope Ratings

Figure 6: Illustrative decreasing and lower-for-longer interest rate forward curves



Source: Scope Ratings

2. Foreign-exchange rate risk assessment

Maximum foreign-exchange rate stresses are formed on a case-by-case basis using the principles listed below and will be disclosed in detail in the relevant rating communication. In our base case (D_0) we do not assume any foreign-exchange rate movements.

We test the resilience of the covered bond programme against adverse exchange rate movements based on historical observations over long periods (up to 50 years). We may use a shorter time series if we observe economic or institutional

structural breaks. For the relevant currency pairs, we calculate the highest relative appreciations or depreciations observed for horizons of up to 60 months on a rolling basis, which determine our currency stress for the respective risk horizon.

Starting with the exchange rate as of the reporting period, we deterministically appreciate or depreciate the currency pair until year five, after which we keep the stresses constant. We use extreme scenarios to test the programme's resilience against a strong, sudden increase or decrease in rates over the life of the programme. Depending on the composition of foreign-currency assets or liabilities, we test the cover pool's resilience against either a rise or fall in the relevant currency.

3. Assessing the impact of asset sales

We assume that projected liquidity shortfalls can be covered by asset sales. The amount of asset sales needed is determined by calculating the NPV of a cover pool's projected performing cash flows $CF(t)$, which we convert into the base currency with a projected exchange rate $r_{FX}(t)$ when applicable. We establish the relevant discount factors using the scenario-specific discount curve, to which we add a cover pool-specific liquidity premium (see section 4. Below).

We construct the interest rate scenario-specific discount curve with simple compounding using the day-zero expected forward curve. The calculation of the NPV at period k with a compounding interval $\Delta(t_j)$ is shown in Figure 7.

Figure 7: Net present value of the cover pool

$$\sum_{i>k} \prod_{j=k}^{i-1} \frac{1}{1 + r_{forward}(t_j)\Delta(t_j)} r_{FX}(t_i)\, CF(t_i)$$

Source: Scope Ratings

We apply interest rate stresses consistently by shifting the discount curve in parallel so that the day-zero forward rate of the discount curve matches the corresponding forward rate $r_{forward}(t_k)$.

4. Incorporating asset liquidity premiums into the impact analysis of asset sales

The asset liquidity premiums we add to the interest rate discount curve reflect the different risk perceptions among investors for a given asset type as well as the differences in fungibility and market depth. The discount rates also reflect country-specific elements and systemic importance considerations. The liquidity premium used for discounting cash flows therefore reflects the spreads specific to the issuer's country and type of cover-assets. Figure 8 and Figure 9 show our general assumptions for asset-specific maximum liquidity premiums corresponding to the stress case (D_{max}). Our base case D_0 is typically set at zero, indicating the assets fair value based on their net present value. Stresses for scenarios between D0 and Dmax are determined by linear interpolation.

Bespoke asset liquidity premiums may deviate from the below guidelines if, for example, we observe non-common cover assets (e.g. SME loans) or very significant liquidity shortfalls (e.g. unbalanced newly established covered bond programmes) or a covered bond programme in wind down mode need to resort to repeated asset sales over a long period.

When modelling asset sales, we assume unbiased asset selection. This means that the assets selected for a sale are proportionate to the share of each segment at the time of the sale. The cover pool-specific liquidity premium therefore reflects the different refinancing spreads of the respective cover pool segments, their individual amortisation profile, and the timing of the asset sale.

Our indicative liquidity premium in Figure 8 and Figure 9 reflect a fixed premium over the life of the covered bonds. We do not expect the stressed economic environment to persist until the last covered bond matures, we generally do not use the highest-observed trading spreads. Cover pool-specific adjustments may also reflect the time during which a cover pool depends on asset sales. We believe a more moderate stress can be applied through the transaction's remaining life if a

cover pool has an ongoing need for asset sales over an extended period (generally more than five years),[43]. We calibrated the premiums to allow for a stressed fire sale that provides the cover pool manager enough time to set up an orderly sale that maximises mortgage loan values.

4.1 Public sector liquidity premiums

We determined the public sector asset premiums by analysing the stressed credit spreads (e.g. iboxx swap spreads or sovereign yield spreads) as per Figure 8. The observation period typically covers the European sovereign crisis, which affected most sovereigns, as well as periods during which idiosyncratic or geopolitical events put pressure on trading spreads. The grouping of countries by sovereign rating reflects our general view on the sovereign's credit quality.

Figure 8: Indicative maximum liquidity premiums for sovereign exposure

Sovereign Rating Category	Tier 1 liquidity premium
AAA	100
AA	150
A	300
BBB	500
BB	900
B	1,500

Source: Scope Ratings

For lower tier public sector exposures, we apply a higher premium indicating the smaller and less liquid market. With the sovereign premium as the anchor, we generally add 50 basis points for lower-tier public sector exposures and differentiate between the sovereign (tier 1), federal states, departments and regions (tier 2), municipalities, regional and inter-departmental organisations (tier 3), and municipal- or regional-guaranteed corporations (tier 4). For example, the liquidity premium for a municipality-guaranteed utility (tier 4) in a AAA rated sovereign (tier 1) is generally 250bps. This is derived by adding the sovereign premium – 100bps for tier 1 – to their respective tiers, 50bps (tier 2) + 50bps (tier 3) + 50bps (tier 4).

Covered bonds forming part of the collateral will be treated as tier 2. Assets that do not fall under the above differentiation will be assessed case by case. The weighted average pool-specific liquidity premium, which is based on the current pool composition, is added to the discount curve.

4.2 Mortgage asset liquidity premiums

Our approach for mortgage cover assets is similar, determining maximum liquidity premiums for residential mortgage assets as per Figure 9. For example, our reference point for plain vanilla residential mortgages is the development of country-specific trading spreads (e.g. iboxx indices) for mortgage-covered bonds comprising the same asset type. If a mortgage cover pool's composition tends towards a specific product (e.g. residential vs commercial) or customer (owners vs buy-to-let), we base our assumptions on the development of trading spreads for market-placed securitisation transactions or indices with similar asset types or benchmarking.

[43] A wind-down of a cover pool might take 20-30 years, and weak economic environments, during which the highest trading spreads can be observed, often have not persisted for such long periods.

Figure 9: Indicative maximum liquidity premiums for residential mortgage assets in cover pools

Sovereign Rating Category	Residential liquidity premium
AAA	150
AA	150
A	250
BBB	300
BB	500
B	600

Source: Scope Ratings

Additional premiums will be added for mortgage loans that exhibit features not commensurate with a granular standard residential mortgage portfolio. For instance, we add a premium on top for granular commercial properties (except multifamily) of 200bps. Mortgage loans concentrated to a specific region or non-standard loan type features receive a top up or 50-100bps. In contrast, where loan portfolios benefit from outstanding characteristics, such as e.g. very low loan-to-value or high seasoning reflecting a positive selection vs. the average market's loan products, the liquidity premium can be reduced by 50-100bps.

5. Overcollateralisation

Higher levels of overcollateralisation provide better protection for investors in cases of insolvency. Our methodology aims to avoid the rating volatility caused by an issuer's adverse management of available overcollateralisation. The issuer's ability and willingness to provide such overcollateralisation therefore plays a key role. Depending on the issuer rating, we expect different levels of commitment to account for the currently available overcollateralisation.

We account for current available overcollateralisation for issuers rated at least BBB as they are expected to ensure predictable management of overcollateralisation. In case volatility of overcollateralisation is high and close to the level needed to support the current rating and the issuer does not provide a publicly committed guidance, we will use a stressed low-point overcollateralisation based on prior-year trends.

For issuers rated below BBB, we account for available overcollateralisation if the issuer's communication on overcollateralisation to the capital markets is robust and in line with market expectations. In the absence of such statements, we will adjust down the level of current overcollateralization, taking into account volatility and our forward-looking view on expected overcollateralisation.

We consider the legal minimum overcollateralisation for issuers rated BB or below if they have made no public contractual commitments. Commitments need to be legally binding to ensure an issuer does not act to the detriment of investors. Contractual provisions that partially or collectively allow us to recognise higher overcollateralisation than the regulatory minimum, thus allowing a higher rating uplift, include: i) detailed programme-specific replenishment criteria; ii) structures that reduce refinancing risk (e.g. conditional pass-through structures); and iii) provisions ensuring a dynamic level of overcollateralisation that is commensurate with the risk profile and the rating in question. Such provisions would have to be provided contractually and permanently.

We analyse dormant or discontinued programmes in wind-down to understand whether this decision is rather technical (e.g. driven by a change of law or corporate actions) and whether the issuer continues to actively use covered bond funding with another covered bond programme. For issuers rated above BBB we also give benefit to provided overcollateralization as we expect issuers to continue actively managing overcollateralization levels to avoid impairing capital market access for other covered bond issuances. For issuers rated below we only take into account the legal minimum.

For programmes that are dormant and/or wound down because of strategic decisions to cease business activities, we assess whether the remaining stock (or ability to use substitute assets) allows to provide collateral replenishments and maintenance of sufficient overcollateralization. We also take into account the potential implications in case the issuer

maintains covered bonds with other asset types or the consequences of a not honouring legally robust minimum overcollateralisation commitments. Generally, commitments are expected to protect investors until the maturity of the last covered bond.

6. Other cash flow assumptions

Prepayment rate assumption

The covered bond structure's resilience is tested against constant prepayment rate (CPR) assumptions. Covered bond structures are often most sensitive to very low prepayment assumptions. We use a conservative 1% prepayment assumption as the base scenario. Higher prepayment assumptions may benefit the cover pool analysis as they increase cash accumulation, reducing the need for the issuer to monetise parts of such pools. At the same time prepayments can reduce the available excess spread and expose a covered bond program to "cost of carry". We therefore also test the covered bond programme's risk profiles against higher prepayment rates. As a high CPR stress assumption we either use 15%, or we take higher observed market rates. We may change our approach if a specific asset type, certain macroeconomic expectations (e.g. changes to interest rates), or changes to the loan products make it more or less costly to prepay.

Reinvestment risk

We assume proceeds that are not needed to pay interest or repay maturing covered bonds to be invested at short-term market rates. As cash proceeds must be readily available and likely invested in highly liquid and high-credit-quality assets, we also apply a stress on the short-term market rates.

Where relevant, we will also identify the sensitivity towards investments that yield more than market rate if cash proceeds are sizeable, available for long periods and the programme documentation or legal framework allows re-investment into higher-yielding and longer-dated 'eligible assets'.

Servicing fee

We apply servicing fees specific to the asset type that the cover pool has to pay annually: 10 bps for a pool of less complex public sector cover assets and higher fees for mortgage assets, e.g. 25 bps for the residential segment and 50 bps for the commercial segment (including developers and land). We may apply different fees on a case by case basis (e.g. for very large cover pools that benefit from economies of scale or cover pools with significant shares of export credit agency-guaranteed exposures).

Other considerations

When inputs for the cash flow analysis are not contractually specified, our analysis incorporates them as assumptions based on our qualitative assessment.

7. Short term liquidity risk assessment

Our short-term liquidity risk assessment limits the credit to any additional cover pool support where the risk to short term liquidity shocks and therewith an imminent default of the covered bonds following an issuer default is remote.

Short-term liquidity risk is generally relevant when the payment obligation transitions from the first to the second recourse. Where cover pool support enhances the covered bond rating above governance support factors, we expect covered bonds to either benefit from a dedicated short term liquidity buffer or the ability of a dedicated covered bond manager to extend the maturity of the covered bonds.

Where such mitigants are not present (see also Appendix I: Legal framework analysis, in particular ii to iv) we will not give any credit above governance support. However, the special treatment for most regulated covered bonds makes it unlikely, that mismatch risk in a covered bond programme directly translate into liquidity-driven default risk after an issuer has been designated as non-resolvable and put into liquidation.

Appendix VI: Determining the expected loss

The calculation of loss rates of the cash flow structure for a given default distribution allows us to calculate the expected loss and expected average life of the covered bond structure. Along with our idealised expected loss curves[44], this allows us to determine the covered bond's rating under the given scenario.

The cash flow simulation addresses all default scenarios (ω_i) occurring with probability $p(\omega_i)$ to calculate the respective loss $L(\omega_i)$. The expected loss is then calculated as the probability-weighted sum $\sum_i p(\omega_i)L(\omega_i)$. Only a subset of these scenarios is relevant because the bank, as long as it has not defaulted, will shield the cover pool from losses.

Aggregating the scenarios that include a bank default scenario $\bar{\omega}$ we have:

Figure 10: Expected loss of a covered bond

$$\sum_i p(\omega_i \cap \bar{\omega})L(\omega_i) = \sum_i p(\omega_i)p(\bar{\omega}|\omega_i)L(\omega_i) = \sum_i p(\omega_i)\tilde{L}(\omega_i)$$

Source: Scope Ratings

The conditional probability $p(\bar{\omega}|\omega_i)$ depends on the dependency (correlation) between default scenarios and bank default events. In general, cover pool assets are similar to the bank's assets in terms of composition and therefore are highly correlated. For example, a bank default is more likely if we observe high default rates in the pool. This is also consistent with a worst-case selection approach.

The total unconditional probability of a bank default $p(\bar{\omega})$ – in other words, the probability of the event leading to the detachment of the pool from the bank – needs to be defined externally. We establish the detachment point using our idealised probability default curves, taking into account the issuer rating and the weighted average life of the stressed covered bonds' cash flows[45] .

The threshold default rate dr_T is defined so that the probability of default rates of the cover pool that exceed the threshold rate equate to the bank's default probability or its equivalent $p(dr < dr_T) = 1 - p(\bar{\omega})$. Under the protection of the bank, we then calculate the expected loss as the probability-weighted sum over all default scenarios with a default rate greater than the threshold default rate dr_T.

For further information on the implementation see Appendix VII: Scope's covered bond expected loss model (CobEL).

[44] Scope's expected loss tables are available at scoperatings.com under Definitions & Scales under the Governance and Policies tab.
[45] The stressed covered bond cash flows are driven by our idealised EL tables. For CPT covered bonds they will also depend on the stresses applied to the asset cash flows.

Appendix VII: Scope's covered bond expected loss model (CobEL)

Our CobEL model implements the calculation of a covered bond's expected loss as described in the previous appendix. The expected loss is determined via a numerical integration of the losses under different default rate scenarios, weighted with their respective probability. The algorithm naturally separates into a cash-generating part and a cash-consuming part – each will be described below.

Asset treatment

The model assumes the asset pool is perfectly granular and homogeneous. Assets will generate future cash flows according to assumptions for interest, amortisation payments, prepayments, defaults, recoveries, asset cures along with other market parameters such as foreign-exchange and interest rates. Asset assumptions are specific to the covered bond and recorded as vectors.

We simulate cover pool assets as either performing, delinquent or defaulted. Performing assets pay interest and amortise according to a specified schedule. We exclude defaulted mortgage assets from the asset balance and the assumed recovery will be distributed over time according to a defined recovery schedule. Defaulted public sector or substitute assets are also excluded from the asset balance. However, assets are reinstated following their workout period but are proportionally reduced with the assumed recovery rate.

Assets normally do not change directly from performing status to default; rather, they undergo a period of delinquency. Delinquent assets can fully or partially cure before defaulting. We generally assume a level of liquidity stress by considering that a percentage of assets may become delinquent and cure, i.e. become performing again and pay previously missed payments after a moratorium period, before defaulting.

The performing asset balance for each currency and in each period undergoes the following sequence:

1. Add back cures or recoveries to the opening performing mortgage asset balance
2. Reinstate public sector or substitute assets at the assumed recovery rate for such assets
3. Subtract new delinquent assets from the opening performing balance
4. Calculate interest specific to the asset type over the period based on the resulting performing asset (steps 1 to 3) and cash balances
5. Subtract prepayments over the period
6. Subtract amortisation over the period
7. Remove sold assets from the performing balance

By default, each period corresponds to a calendar month except if the transaction's time-related characteristics need adjustment.

Liability treatment

Our CobEL model has a very flexible description of the priorities of payment for the different covered bond structures. The model features a set of accounts that keeps track of the outstanding liabilities and cash inflows and outflows. The model enables the analysis of not only hard- and soft-bullet covered bonds but also securitisation-like pass-through structures (CPTs).

The available cash is used to pay interest and servicing fees and repay maturing covered bonds. The bonds are paid pro-rata. For multi-currency pools, we convert cash flows into the corresponding foreign-exchange rate at the time of the event. If cash is insufficient to repay principal, interest or expenses, assets are sold based on the present value at the simulation time and considering additional discounts reflecting our assumed liquidity premiums to facilitate timely payment. We reflect the asset sale by proportionally reducing the performing asset balance.

Other functionalities

CobEL allows us to systematically identify and apply the interest-rate and foreign-exchange stress scenarios to which the covered bonds are most sensitive. The model creates the stress scenarios as described in the methodology using a generic distortion parameterisation of the input curves.

The model also calculates the required breakeven overcollateralisation for a given rating by applying a line search algorithm, performing a full re-calculation for each parameter change.

Appendix VIII: Rating-distance dependent stresses

To quantify the credit benefits provided by the cover pool, we analyse the cover pool for resilience against increasing stresses. The severity of the stresses depends on the distance between the potential covered bond rating and the bank rating. We establish a base case stress that identifies the level of risk in the covered bond programme covered by the issuer, which we refer to as the D_0 scenario. The analysis starts with the base case credit loss assumption, includes the current market conditions regarding interest rate developments, and assumes no additional liquidity premiums for asset sales. As mentioned earlier, the highest achievable rating distance, D_{max}, could be as high as nine notches (equating to a D_9 scenario).

However, the highest possible stresses are by construction capped at levels commensurate with a AAA rating and can thus be lower than the maximum stresses corresponding to the maximum uplift D_{max} (see Example 2 below). Iteratively decreasing the stress scenarios provides insight into the covered bond programme's resilience to adverse credit environments. We benchmark the quantitative results of the scenario analysis against our expected loss tables.

Example 1: Testing the cover pool's resilience to a level supporting the full rating distance

Assumption: Issuer rating at BBB- (= D_0); governance support at six notches; maximum cover pool uplift at nine notches (D_{max} = D_9 = six-notch governance support uplift + up to three-notches of additional cover pool uplift attributed to the CPC category of 'low'); nine-notch rating distance between issuer rating and AAA rating, No additional negative adjustment of overcollateralisation due to a lack of public contractual commitment to support the overcollateralization.

We determine the rating-supporting overcollateralisation by applying stresses commensurate with the highest rating uplift (D_{max}). In this case, the most severe credit and market risk stresses are equivalent to a D_9 stress[46]. The CobEL model determines the expected loss of the covered bond programme. If the expected loss for a given level of overcollateralisation is equal to or lower than the idealised expected loss at AAA[47], the scenario test has been passed and the suggested nine-notch credit differentiation is quantitatively supported.

Example 2: Testing the cover pool's resilience to a level lower than the full rating distance

Assumption: Issuer rating at BBB+ (= D_0); governance support at six notches; maximum cover pool uplift at nine notches (D_{max} = D_9 = six-notch governance support uplift + up to three-notches of additional cover pool uplift attributed to the CPC category of 'low'); seven-notch rating distance between issuer rating and AAA rating

The same maximum uplift as in example 1 is possible (D_{max} = nine notches) but the issuer rating is higher. The rating distance to the highest possible rating (AAA) only requires an uplift of seven notches[48].

We determine the rating-supporting overcollateralisation by testing the cover pool's resilience against a scenario in which the maximum uplift is anchored at a stress commensurate with seven notches, corresponding to a D_7 stress (with D_7 equating to seven-ninths of the maximum stresses).

In this example, the highest rating is achieved but stresses are milder than if the target rating was at the maximum distance D_9 from the issuer rating. Applying milder stresses could result in significant changes in the rating-supporting overcollateralisation compared to applying maximum stresses at D_9.

[46] Stress scenarios for rating differentiations between the bank and the maximum achievable covered bond rating are determined by a linear interpolation.
[47] See Scope's expected loss tables available on scoperatings.com. The benchmark is taken from the intersection of the target rating (here: AAA) and the weighted average maturity of outstanding covered bonds.
[48] One additional notch of cover pool support already allows the highest rating to be achieved. If sufficient overcollateralisation is available, cover pool support allows the current rating to be maintained upon an issuer downgrade of up to two additional notches, providing additional rating stability. We often refer to the remaining, currently not needed support as 'unused notches' or the 'rating buffer'

Example 3: Testing the cover pool's resilience if the maximum distance is constrained by governance support uplift

Assumption: Issuer rating at BBB+ (= D_0); governance support at four notches; maximum cover pool uplift at seven notches (D_{max} = D_7 = four-notch governance support uplift + up to three-notches of additional cover pool uplift attributed to the CPC category of 'low'); seven-notch rating distance between issuer rating and AAA rating

The maximum rating distance is seven notches, only achievable if the cover pool can mitigate the highest stresses (D_{max} = D_7). The degree of stress is linearly interpolated between the prevailing base case assumptions (D_0) and the highest stresses (D_7). The highest rating can be achieved if available overcollateralisation can mitigate the highest stresses.

Example 4: Testing the cover pool's resilience if the maximum distance is constrained by cover pool uplift

Assumption: Issuer rating at BBB+ (= D_0); governance support at five notches; additional cover pool uplift is set at two notches due to data limitations; maximum cover pool uplift at seven notches (D_{max} = D_7 = five-notch governance support uplift + up to two-notches additional cover pool uplift attributed to the CPC category of 'moderate'); seven-notch rating distance between issuer rating and AAA rating

The maximum rating distance is seven notches, achievable only if the cover pool can mitigate the highest stresses (D_{max} = D_7). The degree of stress is linearly interpolated between the prevailing base case assumptions (D_0) and the highest stresses (D_7). The highest rating can be assigned if available overcollateralisation can mitigate the highest stresses. If overcollateralisation is insufficient, we will reduce the intensity of stress (D_6 stress, equating to six-sevenths of the maximum stress) and test whether the lower rating can be supported.

Appendix IX: Impact of cover pool information quality on maximum cover pool support uplift

For covered bonds issued under a strong legal framework and that comply with transparency requirements set by regulation and the industry, information is sufficient for a cover pool analysis. Our credit risk analysis generally considers the issuer's underwriting expertise and issuer performance data. In the absence of issuer-specific information, our base case assumptions take recourse to comparable market information, e.g. asset or collateral risk assumptions in structured finance methodologies for similar asset classes, or market data. Our assumptions aim to incorporate credit performance data over long periods that include past credit crises.

We would not grant an additional cover pool support uplift if, for example, information on key risk factors is no longer available, the covered bond programme is very small and unbalanced, the cover pool is highly bespoke and concentrated, and issuance terms and conditions are bespoke and include material market risk features. We may even withdraw the covered bond rating if the cover pool analysis excessively relies on comparable information and/or the level of transparency materially changes during the monitoring review.

Additionally, complexity and transparency can differ significantly between covered bond programmes. Balancing these two variables, we assess the covered bond programmes in terms of the potential additional uplift their cover pools can support. The covered bond programme with the best transparency can support the maximum three-notch uplift. The interplay of complexity and transparency defines the potential additional cover pool-based uplift.

Figure 11: Cover pool complexity (CPC) category

CPC category	Maximum cover pool uplift above that from governance support	Applicability and expected information quality
Low	Plus three notches	Applicable to all covered bond programmes where the following conditions are present: Ongoing availability of detailed, regular, current and forward-looking transparency on key credit and market risk factors; information on lending products; ability to assess the issuers underwriting and credit risk procedures; high visibility on origination and issuance strategy; and full access to all relevant counterparty risk information.
Moderate	Plus two notches	Applicable for low-complexity programmes where the following conditions are present: granular cover assets; common loan and collateral terms across the market; and a balanced covered bond maturity structure that results in a diversified cash flow profile. We expect the issuer to publicly disclose current key risk factors for the respective covered bond programme every quarter using industry best practice reporting templates, preferably supplemented with additional credit risk information in its annual reports; information typically expected for a CPC category of 'low' can be substituted with comparable market information.
High	Plus one notch	Applicable for covered bond programmes with common cover assets where typically at least one of the following conditions is present: high concentration risk as typically seen in commercial mortgage or public finance pools; noticeable foreign-exchange or interest rate risk combined with limited transparency on hedging strategy and counterparty risk mitigation. The rating would be constrained if information on current key risk factors is provided only through industry best practice templates and annual reports as mentioned above.
Highest	No additional cover pool uplift	Applicable for covered bond programmes where at least one of the following conditions is present: the covered bond programme is no longer actively managed and/or in wind-down; cover assets are very bespoke, low granularity and illiquid (i.e. ship or aircraft loans); cover assets have unusual structures (i.e. inflation/market links or reverse mortgages); cover assets exhibit material foreign-exchange exposure; and information provided by the issuer is less frequent than quarterly, irregular and/or at the regulatory minimum for key risk drivers. The rating constraints could become mitigated if access to information is similar to programmes with a 'low' CPC category, allowing for an ongoing assessment of effective risk mitigation.

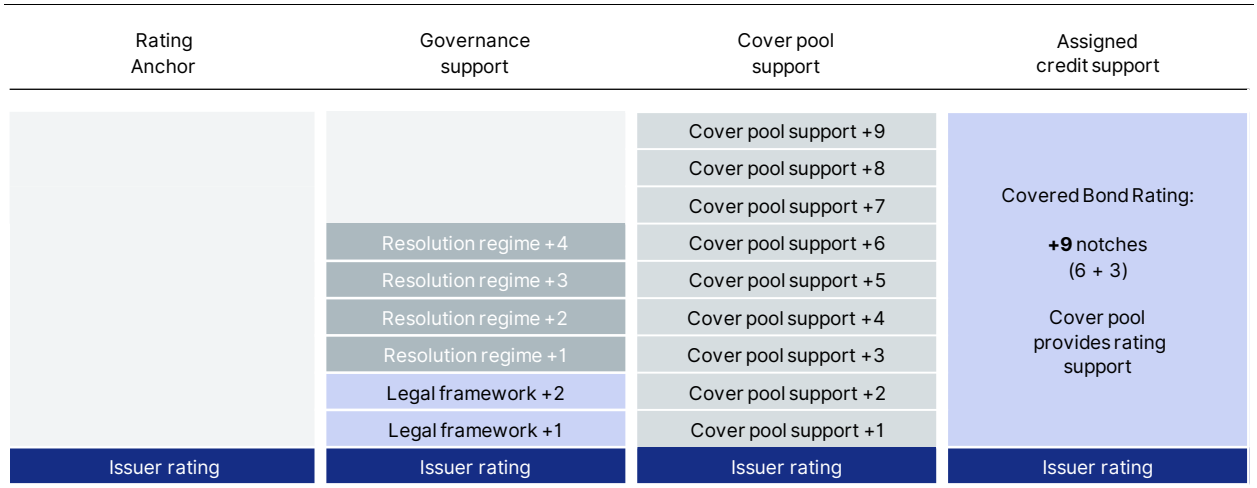
Appendix X: Credit differentiation supported by cover pool assessment – worked examples

The covered bond rating methodology rests on two analytical building blocks. The first block, the governance support analysis, comprises the analyses of the legal framework, resolution regime and systemic importance. The second consists of the cover pool support analysis. The final credit differentiation between the bank rating and the covered bond rating is based on the higher support provided by either of the two. To illustrate, we provide examples on the impact of the primary rating driver for the assigned ratings.

Cover pool-supported covered bond ratings

In this example, the governance support analysis provides a credit differentiation of six notches and the interplay of the covered bond programme's complexity and transparency yields a CPC category of 'low'. This allows a potential additional credit differentiation of up to three notches, with the cover pool support analysis confirming the covered bond programme's strength. Therefore, the cover pool-supported rating can be nine notches above the issuer rating (Figure 12).

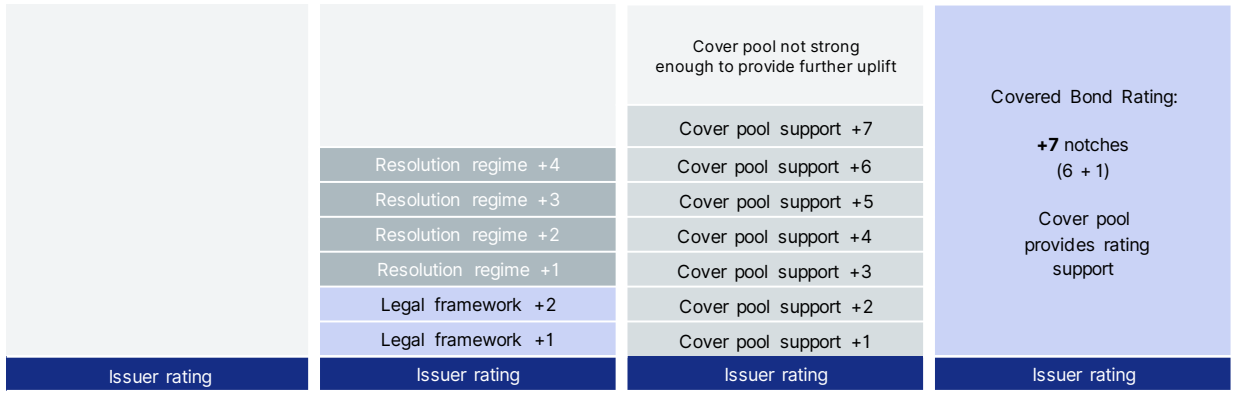
Figure 12: Covered bond rating – maximum uplift supported by the cover pool



Source: Scope Ratings

When cover pool protection can only support a one-notch uplift (Figure 13) as opposed to the maximum three notches, we would assign the lower rating uplift.

Figure 13: Covered bond rating – cover pool provides uplift but not the maximum due to overcollateralisation constraint

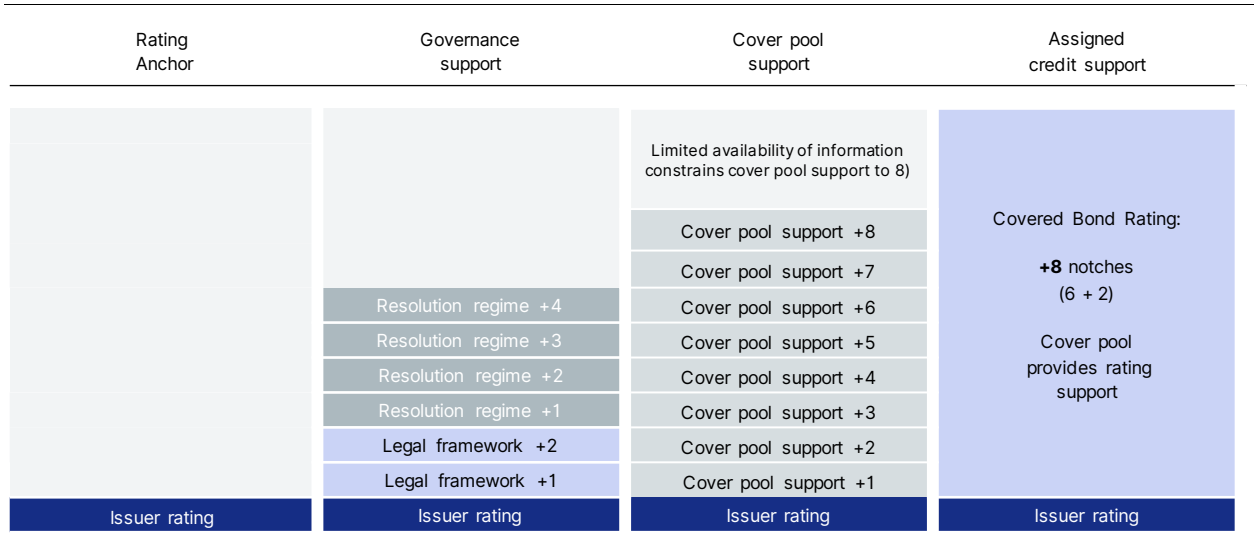


Source: Scope Ratings

In this example, the issuer maintains a low-complexity covered bond programme. Our auxiliary credit considerations confirm that expectations for a covered bond programme with a CPC category of 'moderate' are fully met. These

expectations include a well-seasoned residential mortgage pool; fixed-rate-paying cover assets refinanced with fixed-rate covered bonds; and quarterly transparent information that fully aligns with industry standards such as the ECBC's Harmonised Transparency Template. Here, the cover pool analysis can support a maximum uplift of two additional notches, adding to a total of eight notches (Figure 14).

Figure 14: Covered bond rating – cover pool provides uplift but not the maximum due to lower CPC category

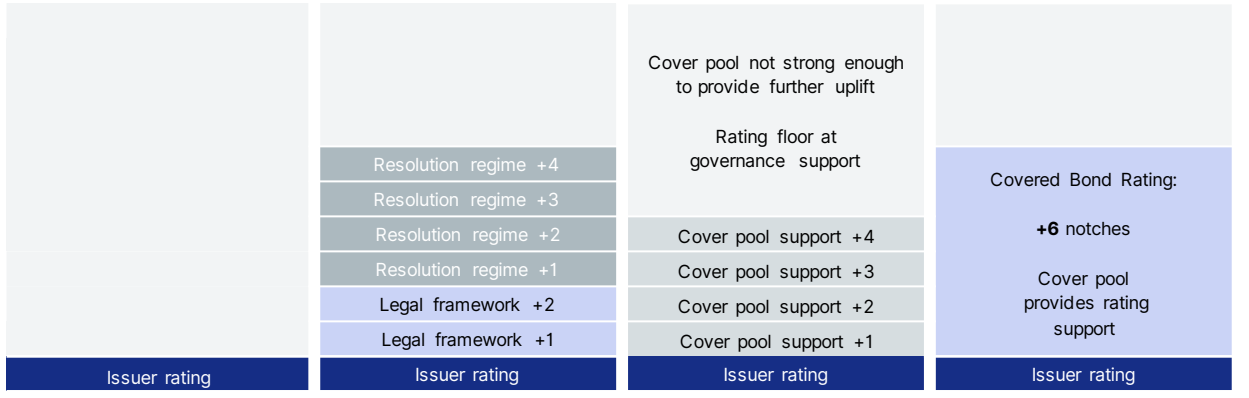


Source: Scope Ratings

Governance support-based covered bond ratings

The credit quality of concentrated cover pools, or covered bond cash flow structures that are unbalanced or insufficiently supported by overcollateralisation, might not allow a high uplift. Similarly, excessive counterparty risk could reduce the support provided by the cover pool support analysis. Cover pool support could therefore be lower than the benefit provided by governance support. In this case, the covered bond rating will primarily reflect governance support. Figure 15 provides an example of a covered bond rating that primarily reflects governance support of six notches.

Figure 15: Covered bond rating – cover pool provides uplift but not as high as governance support



Source: Scope Ratings

Appendix XI: Environmental, social and governance (ESG) impact analysis

Governance considerations such as strength of supervision as well as the prudent management of a covered bond programme's risk[49] and protection[50] structure have always played a major role in the covered bond analysis. They are mainly reflected in governance support, but also reflected in the cover pool support analysis, for example, through the CPC category.

The impact of environmental, climate risk and social factors on a covered bond's collateral are becoming increasingly important for the credit analysis. On the funding side, green and social covered bonds are an integral and growing feature of the wider ESG issuance universe. Cover assets often already comply with environmental and social standards[51] and, if i.e. detailed environmental data such as energy certificates are not yet available, 'use of proceeds' promises can introduce or further increase the share of compliant assets in the cover pools over time. The ability to issue such 'themed' covered bonds can positively influence an issuers' ability to access to capital markets. A positive spread difference ('Greenium') between themed and standard covered bonds remain within single digit ranges to date. They have not been fully assessed to be yet reflected into our determination of relevant liquidity premiums.

For the assessment of asset credit risk, ESG aspects have the potential to become more relevant in the covered bond credit analysis. Buildings, the most common collateral in covered bonds, account for 40% of global primary-energy consumption and 30% of CO_2 emissions. Political developments are strongly focussed on improving energy savings and subsidy schemes as well as more stringent building codes. This will impact both a borrowers' likelihood to default and the value of their loan collateral.

We start to observe that borrowers financing higher energy efficient collateral are treated positively in banks' underwriting criteria. With improved affordability (and benefits from lower energy costs) they tend to receive better credit scores and eventually also be able to (re-) finance at lower interest rates.

Foreclosure proceeds from non-green collateral might become more volatile going forward. Increasing energy efficiency requirements can pressure collateral values due to mandatory refurbishing costs or as EPC gradings might impair their current use. Potential buyers start to factor in such additional costs, thereby lowering potential foreclosure proceeds. Collateral may even become 'stranded', which would have a severe impact on foreclosure proceeds and thus become relevant for the assessment of asset credit risk.

Our asset credit risk analysis is non-mechanistic and uses available performance data. We are guided by issuer specific assessments or academic research to determine the extent of which we can include such ESG factors into the assessment of a borrower's probability of default, collateral value and loss given default. We will incorporate available issuer-specific or market information that robustly supports differences in asset-credit risk between ESG-compliant assets and other assets in the cover pool.

Missing performance information to date most often prevents our credit analysis from distinguishing between standard collateral and ESG-compliant collateral. Even more so, incorporating such information might become a zero-sum game: High energy-efficiency is already mandatory in most markets and factored into valuations; observed credit performance already reflects the likely benefits. Becoming more granular can thus be rating-neutral – unless political developments further intensify.

[49] Including but not limited to the identification and origination of suitable cover assets (including their workout strategy if the borrower has defaulted), the pool composition as well as the issuance structure and the resulting cash flow risk structure.
[50] The most actively managed risk mitigation that also qualifies as a governance factor is the management of the supporting overcollateralisation, see section 5. Overcollateralisation in **Error! Reference source not found.**
[51] Such as the ICMA's Green, Social, Sustainable Bond Principles or similar industry initiatives.

Appendix XII: Country and Currency risk considerations

Country risk considerations

We do not mechanistically limit the maximum rating that a covered bond can achieve by the sovereign rating of the issuer's country or the origin of the cover pool, particularly in eurozone countries. At the same time, credit ratings must adequately and consistently reflect the credit risks of a financial instrument, including risks arising from an issuer or collateral in a country with weak economic fundamentals. Where relevant, our ratings therefore also incorporate an assessment of transfer risk (e.g. risk of capital controls), convertibility risk (e.g. risk of eurozone exit), the risk of an institutional meltdown, and the impact on the covered bond rating.

On a case-by-case basis, we analyse the impact of country risks and its resulting influence on guarantee structures, transfer and convertibility risks, including legal certainty of the rule of law for covered bond ratings. Where relevant, we ensure that our view on the macroeconomic fundamentals of the relevant sovereign[52] are factored into the stresses that support the covered bond ratings.

The importance of country risk may differ between covered bond and bank rating analyses as the cover pool's composition and risk profile are likely to exhibit different risk characteristics from the rest of the issuer's balance sheet. The relative significance of country considerations may also vary among issuers to the extent that the compositions of cover pools vary.

Local- and foreign-currency debt ratings

Unless otherwise specified, our covered bond ratings apply equally to liabilities issued in local and foreign currency.

For covered bonds issued out of countries assessed by Scope with a sovereign credit quality of BB+ and below (non-investment grade), we may assign both foreign and local currency ratings.

For covered bonds issued out of non-investment grade countries, transfer and convertibility risks could play a greater role in determining our local and foreign currency ratings compared to covered bonds located in investment-grade countries. Our local currency and foreign currency ratings may differ if we consider that there is a higher risk that debt denominated in non-domestic currencies would not be reimbursed. This rating differential would capture the risk that an issuer may be prevented from honouring its debt obligation in full and on time due to government-imposed restrictions on foreign-currency payments, leading to a higher risk of default on foreign-currency liabilities.

Conversely, we view transfer and convertibility risks as negligible in investment-grade countries and in the euro area. As a result, in those countries, foreign currency ratings are at the same level as their respective local currency ratings.

Any rating differential between local currency and foreign currency ratings reflects our view of the likelihood of the government imposing capital controls, including restrictions on sourcing foreign currency or transfers of foreign currency to investors. In this case, we will typically cap foreign currency ratings at the level of the foreign currency rating of the sovereign in which the issuer is domiciled.

Conversely, if the issuer has segregated in its covered bond programme adequate foreign currency reserves to repay outstanding foreign currency debt and these resources are sufficiently protected from capital controls (for example via accounts or assets outside the country of residence), the rating may not be constrained by such transfer and convertibility risk considerations.

[52] We consider the economy of the country to which most of the cover assets are sensitive. In general, we expect this to be the country in which the issuer is located.

Appendix XIII: Counterparty risk considerations

Our assessment of the dependency on key counterparties and how this can impact the cover pool analysis is based on our Counterparty Risk Methodology (available on www.scoperatings.com). The guiding principles are the materiality of counterparty risk (excessive, material or immaterial), differentiation between financial risk and operational risk, and the analysis of risk remedies in the specific context of the covered bond transactions.

We analyse whether the performance and creditworthiness of a covered bond could be severely impacted by the inadequate short- or long-term credit strength of such external counterparties. This could constrain the potential benefit from the cover pool. An effective replacement framework or other mechanisms to mitigate structural risk for key agents typically prevent negative impacts. Ineffective remedies result in the quantification of counterparty risk, which can ultimately constrain the benefit from the cover pool for the covered bond rating. This is especially relevant for counterparty obligations that are very significant, bespoke, or are provided by counterparties belonging to the same financial group as the issuer.

However, issuer and investor interests are generally more strongly aligned in covered bond programmes than in structured finance transactions. If the issuer is not in default, the covered bond programme needs to be maintained in line with regulatory requirements. If a counterparty in a covered bond transaction has had its credit quality deteriorate, or has even defaulted, the issuer would need to provide compensation and new proceeds to the cover pool. Therefore, for resolvable banks, the counterparty risk assessment for covered bonds would mainly address rating volatility that may arise from weak or non-performing counterparties.

We expect covered bonds issued by non-resolvable banks or non-investment grade banks to be shielded against counterparty risk in the same way comparable structured finance transactions are. If the provided remedies are ineffective, cannot be sized or residual risk is material, we may link the covered bonds to the respective counterparty's credit risk[53].

[53] In case such a link reduces the cover pool analysis based support below the level indicated by the governance support, governance support will become the primary rating driver. (see Appendix X: Credit differentiation supported by cover pool assessment – worked examples)

Appendix XIV: Monitoring guidelines

The covered bond monitoring process starts immediately after the rating is assigned. Ratings are monitored continuously through high-level checks (i.e. based on quarterly reports provided by the issuer) and reviewed in detail at least once a year or earlier if warranted.

The review takes into account the issuer's credit quality, governance support factors, and the programme's cover pool risks including credit, market, and counterparty risk factors. It also reflects whether the rating is already at the highest level but has recourse to a rating buffer. This could be the case if a highly rated issuer manages the covered bond programme and the combination of rating uplifts allow a higher uplift.

Double recourse for covered bonds also means that as long as the issuer is not in resolution or insolvent the issuer shields the cover pool against changes of its credit quality. For the cover pool analysis, we may therefore use previously established outputs of quantitative models provided:

- Available overcollateralisation provides a significant buffer to the rating-supporting overcollateralisation. For example, if available overcollateralisation is at least twice the rating-supporting level and the absolute difference is at least 10 pp; and
- The covered bond rating has a rating buffer[54] against an issuer downgrade and the resulting constraints arising from the covered bond-specific uplift assessment; and
- There have been no material changes in the economic environment that could impact the collateral (i.e. changes to unemployment, GDP, house prices) or in the legal framework relevant for the enforcement of collateral; and
- There have been no relevant changes to the issuer rating or governance support; and
- Any changes to the composition of the covered bond programme or cash flow structure are immaterial since the last full analysis.

In addition, if changes relate to only a single risk-factor, we may re-run our quantitative models but use parts of the inputs from the previous cover pool analysis. For example, an issuer downgrade by one notch weakens the issuer's ability to shield the cover pool from losses, while increasing the distance between the issuer rating and the target rating. If cover pool-specific risks have remained stable in the meantime, we may re-run our cash flow model using previous cover pool-related model inputs, while only adjusting the lower issuer rating in the model. We perform a full and detailed cover pool analysis every three years at the latest.

[54] We define a rating buffer or unused notches as the additional protection a covered bond rating has but which cannot be factored in as the highest rating is already achieved. Assuming a Bank rating of A minus, governance support of six notches and a highly transparent and low complexity covered bond programme, the maximum rating uplift could be nine notches under our methodology. Because of the high issuer rating only six notches are needed to support the highest rating and there is a "buffer" or three unused notches of rating support.

Upon the downgrade of the bank issuer rating to BBB+ from A-, the covered bonds could still maintain their AAA rating assuming i) an unchanged governance support of six notches and ii) the ability of the cover pooled to support at least one additional notch of cover pool support-based uplift. Upon the downgrade we likely would only update the issuer rating in our cash flow analysis to determine the additional overcollateralisation needed to support the highest covered bond rating.

Appendix XV: Data expectations for cover pool analysis

A cover pool analysis that could result in an additional rating uplift would require at least the following information:

General information

a) Nominal value of cover pool

b) Nominal value of outstanding covered bonds

Cover pool composition

a) Mortgage

b) Public sector

c) Substitute assets

d) Other

Cash flow risk

Cover pool amortisation profile

a) Weighted average life; or

b) Weighted average remaining term to maturity; or

c) Weighted average seasoning

and

d) Breakdown by repayment type

Covered bond amortisation profile

a) Maturity by buckets; or

b) List of outstanding covered bonds

and

c) Overview of the maturity extension options and triggers

Market risk

Currency risk

a) Cover assets, breakdown by currency

b) Covered bonds, breakdown by currency

Interest rate risk

a) Cover assets, breakdown by interest rate type

b) Covered bonds, breakdown by interest rate type

Credit risk

Mortgage cover pool

a) Mortgage type Information
b) Number of loans and obligors
c) Breakdown by loan size
d) Top 10 or 20 obligor concentration
e) Breakdown by country
f) Breakdown by region
g) Breakdown by seasoning buckets
h) Weighted average loan-to-value ratio
i) Breakdown by loan-to-value ratio buckets
j) Non-performing loans

Public sector cover pools

a) Number of loans and obligors
b) Breakdown by loan size
c) Top 10 or 20 obligor concentration
d) Breakdown by country
e) Breakdown by region
f) Breakdown by debtor type
g) Non-performing loans

For concentrated cover pools (e.g. public sector and predominantly commercial mortgage assets), we would need more information on the cover pool's top 10 obligors, including their individual share and debtor type.

We also expect documentation on the current programme and counterparties to be constantly available, as well as clear and publicly transparent communication on the issuer's hedging strategy, if relevant.

We assess any deviations from the expected information in the context of the cover pool's overall risk and complexity. If we deem the deviation immaterial, we may substitute missing information with assumptions based on expert opinion. See Cover pool complexity (CPC) category on how differences between our expectations and the provided information might influence the additional credit differentiation from the cover pool.

Appendix XVI: Glossary

Term	Definition
Issuer or bank rating	Anchor point of our covered bond credit assessment reflecting our view on the likelihood of a regulatory action on the issuer, which is the typical default-like scenario for a bank.
Governance support uplift	Uplift of up to six notches above the bank's issuer rating, reflecting the higher going-concern likelihood of covered bonds, even upon a regulatory intervention in its issuer. Sum of 'legal framework uplift' and 'resolution regime uplift'
Legal framework uplift	Uplift of up to two notches based on the legal framework analysis
Resolution regime uplift	Uplift of up to four notches based on the resolution regime and systemic importance analysis
Covered bond rating floor	Issuer rating plus the governance support uplift (up to six notches)
Cover pool complexity (CPC) category	An assessment reflecting the interplay of complexity and transparency of covered bond programmes, which can limit the potential cover pool support uplift.
Cover pool support uplift	Uplift of up to three notches above the covered bond rating floor based on the cover pool support analysis and the CPC category
Overcollateralisation or OC	Nominal amount of cover assets exceeding the nominal amount of outstanding covered bonds (typically in % of nominal amount of outstanding covered bonds)
Rating-supporting overcollateralisation	Minimum overcollateralisation expected to support the assigned covered bond rating in %
Rating buffer	Number of notches of additional protection a covered bond rating has but which cannot be factored in as the highest rating is already achieved. Based on the distance between the issuer rating and the assigned covered bond rating, and the various uplifts assigned.
Legal framework	A broad system of rules that governs and regulates the issuance and management of covered bonds
Asset segregation	Provisions to effectively ring-fence the cover pool (including cover assets, substitution and liquidity assets, derivatives, and overcollateralisation) from the general insolvency estate in case of an issuer default.
Resolution regime	Regulatory framework of resolution tools for bank failures that safeguard the continuity of the bank's critical functions and financial stability
Scope PM	Scope's Portfolio Model – a Monte Carlo simulation model used to analyse the credit risk of more concentrated asset pools
Mean default rate	The expected issuer-specific lifetime default rate of cover assets
Coefficient of variation	The standard deviation of defaults divided by the mean default rate
CobEL	Scope's cash flow model calculating the expected loss of covered bonds
Asset liquidity premium	Premium added to the interest rate discount curve when calculating the net present value of the cover pool in case of an asset sale
CPT covered bonds	Conditional pass-through covered bonds; covered bonds whose repayment obligations switch from a bullet to an asset repayment-dependent pass-through after certain events
SARA clause	Selected Assets Required Amount clause; legal clause preventing an alternative manager from liquidating cover pool assets above the maturing covered bond's proportional share of total assets.
SLRA clause	Supplemental Liquidity Reserve Amount clause; legal clause specifying the covered bonds liquidity reserve to reduced liquidity risk
Wind-down	We classify covered bond programmes as in wind-down if issuers discontinue to originate eligible cover assets within their business activity or no longer actively issue and manage the covered bond programme.

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