MOODY'S INVESTORS SERVICE

RATING METHODOLOGY

Moody's Approach to Rating Covered Bonds

Summary

This rating methodology replaces *Moody's Approach to Rating Covered Bonds* published in October 2020. The update introduces criteria for applying a new notching uplift to the issuer's Counterparty Risk (CR) Assessment when determining our CB anchor for certain issuers. It also includes a new section that mentions our approach to evaluating the risk from environmental, social and governance considerations, and limited editorial revisions.

This report describes our methodology for covered bond ratings. Our methodology follows a two-step analysis:

» We apply our expected loss covered bond model (EL Model) to determine a maximum potential rating based on (1) the probability that the issuer will cease making payments under the covered bonds (such cessation, a CB anchor event); and (2) the estimated losses that will accrue to covered bondholders should a CB anchor event occur. We express the probability of a CB anchor event as a point on our alpha-numeric rating scale (the CB anchor), which is typically one notch higher than the issuer's CR Assessment.

» We then refine the maximum potential rating that the EL Model produces to account for certain risks, particularly refinancing risk, arising on the occurrence of a CB anchor event. We do so by applying our timely payment indicator (TPI) framework, which limits the rating uplift that covered bonds may achieve over the CB anchor and may constrain the final covered bond rating to a lower level than the maximum potential rating under the EL Model.

Table of Contents:

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» contacts continued on page 54

EL Model

Our EL Model takes into account both the issuer's[1] promise to pay and, after a CB anchor event, the value of the cover pool. While the issuer performs its payment obligations, there will be no loss to covered bondholders. It is only in the scenario where a CB anchor event has occurred that our EL Model determines the value of the cover pool, the key features of which include:

» the cover pool collateral's credit quality

» refinancing risk if funds need to be raised against the cover pool to make payments on the covered bonds

» any interest rate or currency mismatches between the cover pool assets and the covered bond liabilities

We consider each of these factors in the stressful environment that we expect would follow a CB anchor event.

Timely Payment Indicator Framework

We assign a TPI to each covered bond we rate. The TPI reflects the probability that payments on the covered bond will be made in a timely fashion following a CB anchor event and follows a scale that ranges from "Very High" to "Very Improbable". The core of our TPI framework is our TPI table (see Exhibit 1) that indicates the expected maximum rating achievable by a covered bond given its TPI and CB anchor. The TPI determines the number of notches by which a covered bond rating can exceed the CB anchor. We sometimes refer to the maximum rating that is achievable under the TPI framework as the TPI cap.

Our ratings reflect varying degrees of linkage with CB anchors, primarily because as issuer credit quality declines, there is a greater risk that (1) the issuer will default, leading to refinancing risk for the covered bonds; and/or (2) the issuer may exercise its discretion to make decisions that are credit negative for the value of the cover pool. Our TPI assessment considers factors that may reduce or mitigate these risks. Owing to the linkage with CB anchors, if the CB anchor falls below a certain level (which is specific to each programme), we will lower covered bond ratings.

However, the rating cap constraints of the TPI framework will not apply if the risks from issuer discretion and refinancing risk are sufficiently mitigated. For further details on our approach to not applying the TPI framework, see Appendix F4.

1. Our approach to rating covered bonds

Part 1 – EL Model

Our EL Model calculates the probability of a CB anchor event and the subsequent losses (if any) to the covered bonds. Following a CB anchor event, we determine the value of the cover pool, and therefore any losses, assuming a stressed environment.

Operation of our EL Model: Our EL Model looks at a covered bond on a month-by-month basis from its date of issue to its maturity. For each month, we calculate the probability of a CB anchor event[2] occurring and the loss (if any) to the covered bonds following such an anchor event. We then multiply the probability

[1] The term "issuer" may not always refer to the issuer of the covered bonds itself. It may refer to or encompass an entity that has guaranteed, or otherwise directly supported, payment on the covered bonds. Such an entity would typically also be part of the issuer group.

[2] We calculate the monthly default rates, based on the CB anchor, by interpolating from Moody's Idealized Probabilities of Default (see the discussion of Idealized Probabilities of Default and Expected Losses in *Rating Symbols and Definitions*.) A link can be found in the "Moody's Related Publications" section.

of a CB anchor event in each month by the relevant loss (if any) for that month to indicate the expected loss to covered bond investors for each month.[3]

We then discount these amounts and sum those discounted amounts for each month from the time of issue of the covered bond to its maturity.

The resulting number is a model-based calculation of the expected loss of the covered bond, which is one component of our total rating analysis (see Appendix A2 for a simplified example).

CB anchor event and reliance on the cover pool: Following a CB anchor event, payments for the benefit of the covered bonds may rely on the cash flow that the cover pool generates. However, a CB anchor event does not necessarily mean there has been a default on the covered bonds. In most programmes, we expect that an administrator (or a delegate) would manage the cover pool following a CB anchor event.[4]

Cover pool losses that arise after a CB anchor event: The loss following a CB anchor event will primarily depend on (1) the value of the cover pool in relation to the outstanding covered bonds; and potentially (2) any additional unsecured claim against the issuer or any outstanding claim against swap counterparties. In assessing the value of the cover pool, our considerations include (1) the credit quality of the cover pool; (2) the refinancing risk if funds need to be raised against the cover pool; and (3) any interest rate and currency risk to which the cover pool is exposed. We refer to the combination of refinancing risk and interest rate and currency risk as market risk.[5]

Components of our EL Model: Our EL Model thus takes into account the following four key components:

Prior to CB anchor event:

1. **Credit strength of the issuer**

Following CB anchor event:

2. **Value of the cover pool,** which consists of:

» credit quality of the cover pool

» refinancing of the cover pool

» interest rate and currency mismatches

Below, we discuss each of these components in more detail, and the Appendices further expand on this discussion.

[3] For certain jurisdictions, the use of specialist issuers or cover pool holders may create extra complexity. In some cases, an issuer may be a specialised financial institution set up for the purpose of operating the covered bond programme. In these cases, and assuming the issuer does not have its own CR Assessment, the CB anchor would typically be derived from the CR Assessment of the financial institution (or banking group) that was supporting the issuer. In other cases, the issuer is a typical rated financial institution but the cover pool may be held by a special purpose company (SPC) that guarantees payments on the covered bonds. In both these cases, the specialist issuer or SPC respectively would not necessarily cease to perform its obligations under the covered bonds following the supporting financial institution's insolvency. Nevertheless, in both of the above-situations, our analysis does account for the possibility that the loss of parent or issuer support, respectively, may lead to insolvency of the specialist issuer/SPC.

[4] A CB anchor event will not normally lead to an acceleration of the covered bonds. In many cases, the cover pool will survive a CB anchor event, and this event may trigger the appointment of an administrator to administer and service the cover pool. Following a CB anchor event, and pending sale of the cover pool where applicable, the administrator may manage the cover pool or delegate its servicing to other parties. One restriction on the power of the administrator to run the cover pool to maturity of the covered bonds may be the failure of any matching test, which may lead to acceleration (a more detailed description of the matching tests is set out in Appendix E1).

[5] Market risks are the level of losses that Moody's EL Model assumes will affect covered bondholders - following a CB anchor event - as a result of refinancing risks and currency and interest rate mismatches. These losses may also include the general market uncertainties, such as system-wide event risk, and certain legal risks, such as set-off. We consider the market risks figure to be an estimate only, as it is the average of the losses resulting from market risks across the different scenarios run in our EL Model.

3. **Additional risks that our EL Model captures:** For certain programmes, there may be additional risks that do not fall into the above categories. These may be legal risks, such as set-off and commingling. See Appendix F1 for some examples of other adjustments we may make to our EL Model.

4. **Over-collateralisation:** We generally consider over-collateralisation (OC) to be present in a covered bond programme where the nominal or net present value of the cover pool assets exceeds that of the covered bonds. Our EL Model may take into account OC when assessing the expected loss of the covered bonds, depending on whether the OC is committed or uncommitted (see Appendix F2 for an explanation of how we assess whether OC is committed or uncommitted and how much value we give it under our EL Model).

Credit Strength of the Issuer

The credit strength of the issuer is a key component of our EL Model; while the issuer performs its obligations, our EL Model assumes there will be no loss to investors.

Role of CB anchor: Our EL Model calculates the probability of a CB anchor event based on the probability that the issuer, or another entity in the issuer group that supports the issuer, ceases to service its payment obligations under the covered bonds. Further, an issuer's cessation of payments may also be accompanied by the removal of some or all administrative/operational support from the issuer to the covered bonds.

We generally use the issuer's Counterparty Risk (CR) Assessment[6] as a reference point from which we derive the CB anchor, which we express on an alpha-numeric scale that corresponds to our long-term rating scale.

The CB anchor for a covered bond will typically benefit from a one notch uplift over the CR Assessment when, under the applicable bank resolution regime, the authorities are particularly likely to take steps to ensure the continuity of covered bond payments. However, in certain cases, we may apply a higher or lower notching adjustment or use a different reference point to derive the CB anchor, as further described in Appendix A1.

» Appendix A1 explains in detail how we determine the level of the CB anchor.

» Appendix A2 contains a simplified example to illustrate the impact of the CB anchor in our EL Model.

While the issuer performs, we assume no loss to investors: Given the issuer's obligations under the covered bonds, our EL Model assumes that the probability of default on the covered bonds will be no higher than the probability that the underlying issuer will cease to make payments on the covered bonds (i.e., the probability reflected in the CB anchor).[7] Our EL Model assumes that there will be no loss to investors prior to the occurrence of a CB anchor event. However, following a CB anchor event, the analysis switches to the cover pool and, if applicable, any unsecured claim against the issuer.

Issuers provide additional benefits: When rating covered bonds, our EL Model takes into account various issuer and issuer group-related benefits. We discuss these benefits in Appendix B1.

Appendix A2: Appendix A2 contains an illustrative example of how our EL Model combines the CB anchor with the value of the cover pool to reach a rating on the covered bonds

[6] For more information, see our methodology for rating banks and *Rating Symbols and Definitions.* A link to *Rating Symbols and Definitions* and to our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[7] In many cases, the issuer will benefit from either direct or indirect support from the group of which it is a part. In addition, the issuer may benefit from specific aspects of the covered bond law, which may, for example, limit the business activities of the issuer and thus offer investors incremental protection from event risk. An unsecured claim against the issuer will typically also be available to covered bondholders, either in parallel with claims on the cover pool or for any shortfall following realisation of the cover pool.

Value of the Cover Pool

Our analysis relies on the value of the cover pool only if a CB anchor event has occurred.

Part A – Credit Quality of the Cover Pool

The collateral score measures the credit quality of the cover pool and determines the amount of the cover pool written off as a result of asset credit deterioration following a CB anchor event.

The credit quality of the cover pool determines the amount of loss resulting from credit deterioration on the assets in the cover pool. The weaker the credit quality of the assets, the higher the level of expected losses. The credit quality of the cover pool may also affect the level of refinancing risk that our EL Model incorporates. Lower-quality or non-standard asset types in the cover pool may be subject to greater refinancing risk than higher-quality or more standard asset types.

The collateral score measures the credit quality of the cover pool. The collateral score measures the credit deterioration of the assets in the cover pool in the event of a severe recession scenario in the relevant jurisdiction. The higher the credit quality of the cover pool, the lower the collateral score. Collateral scores are typically calculated following the principles set out in our methodologies for individual asset types.

In some instances, covered bond legislations and structures provide a good level of protection, particularly LTV tests for mortgage-backed covered bonds. Covered bond programmes generally have extensive LTV level protection, with most mortgage-backed covered bonds issued against only the first 60%-80% of the valuation of a residential property, or 60% of the valuation for a commercial property.

The majority of covered bonds face substitution risk, as changes in cover pool composition may reduce asset quality. Substitution tests can ensure only assets meeting eligibility criteria are added to the pool, however substitution tests are generally less effective at guarding against other negative developments, such as deterioration in income underwriting standards for mortgage loans. No substitution test comprehensively guards against any and all deterioration in the quality of the cover pool that might result from asset substitution.[8]

Conversely, issuers' ability to substitute stronger-quality assets for those that have deteriorated is an important benefit that we address under "Haircut to the collateral score".

Haircut to the collateral score: To account for, among other things, highly rated issuers' ongoing support for the cover pool, we apply a haircut to the collateral score in certain circumstances. We refer to collateral risk as the collateral score minus the haircut (if applicable); if there is no haircut, the collateral risk is the same as the collateral score.

Appendices C1-C5. Appendices C1-C5 contain further details of how we assess the credit quality of the cover pool, including the collateral score and the haircut to the collateral score.

Part B – Refinancing the Cover Pool

The repayment of principal may rely on the issuer raising funds against the cover pool, creating refinancing risk. The inherent volatility of refinancing risk is the primary reason for the application of our TPI framework.

Refinancing risk arises from maturity mismatch. The natural amortisation of the cover pool assets may not be sufficient to repay principal under the covered bonds. Following a CB anchor event, the repayment of principal may rely on the issuer raising funds against the cover pool, thus creating refinancing risk.

[8] Further protections worth noting are: (1) we would look more critically at any cover pool where the assets, as a matter of general strategy, are originated outside the issuer group; our EL Method assumes that the issuer adopts an *originate-and-hold* strategy; and (2) we may take into account any expected deterioration in the cover pool over time.[9] The approximate probabilities of timely payment for different TPIs are: Very Improbable <25%; Improbable 25-50%; Probable 50-75%; Probable-High 75- 87.5%; High 87.5-95%; Very High >95%.

Where the natural amortisation of cover pool assets alone cannot be relied on to repay principal, our EL Model assumes that the issuer must raise funds against the cover pool, most likely at a discount to the notional value of the cover pool. When we size this discount, we generally assume that any refinancing will take place in a stressed environment.

Components of refinancing risk: Under our EL Model, the following three components determine the level of refinancing risk in a cover pool:

- **The refinancing margin:** Essentially, this is the annual discount a purchaser would require to acquire the assets contingent on the market price of these assets at time of refinancing. The higher the refinancing margin demanded, the greater the refinancing risk. Refinancing margins vary greatly across different markets and factors; as such, material changes in spreads on sovereign debt may broadly impact refinancing margins. Appendix D1 further considers the refinancing margins that we assume in our EL Model.
- **The portion of the cover pool exposed to refinancing risk:** The greater the portion of the cover pool exposed to refinancing risk, the higher the refinancing risk. Where the portion of the cover pool that is potentially exposed to refinancing risk is not contractually limited, we assume at the time of refinancing that the exposure may be higher than the current level. Therefore, regardless of how small the current mismatch between asset and liability maturities, our EL Model typically assumes at the time of refinancing that this amount is in excess of 50% of the cover pool. A further description is in Appendix D2.
- **The average life of the refinancing risk:** This refers to the numbers of years, as of the time of refinancing, that the purchaser will have to hold the assets before either the assets repay or pass the refinancing costs onto the underlying borrowers. The longer the average life, the greater the refinancing risk. Under our EL Model, the average life is typically set at a minimum of five years at the time of a CB anchor event. In many transactions, this average life is substantially longer than five years. A further explanation is in Appendix D3.

Bringing together the components of refinancing risk: A simplified illustration of how our EL Model calculates refinancing risk is as follows:

*refinancing risk = refinancing margin * portion of cover pool exposed to refinancing risk * average life of refinancing risk*

A simplified example in Appendix D4 shows how the loss on the cover pool, resulting from refinancing risk, may be calculated.

Refinancing risk limits covered bond ratings relative to CB anchors. Our EL Model incorporates provision for refinancing risk. However, we have always retained a link between the covered bond rating and the issuer's underlying credit strength because of the volatile nature of refinancing risk. We discuss this further under TPIs below.

Appendices D1-D4. Appendices D1-D4 discuss in more detail, respectively, our calculation of refinancing margins; the portion of the cover pool exposed to refinancing risk; the average life of refinancing risk; and the overall calculation of refinancing risk.

Part C – Interest Rate and Currency Mismatches

Mismatches may arise from the different durations of, and different payment promises made on, the cover pool assets and covered bonds. We consider how much rates may move, the amount of the cover pool/covered bonds affected and the period of exposure.

Following a CB anchor event, investors in covered bonds may be exposed to interest rate and currency mismatches that may arise where the cover pool assets differ from the covered bonds in terms of:

» interest rates and rate durations

» currency denominations

Calculating mismatches under EL Model: Under our EL Model, we determine the amount of interest rate and currency risk that may be present, using the following components:

» **The size of interest rate (or currency) movements:** The size of such movements may increase with the length of exposure to any mismatch, although interest rate and currency mismatches may revert over time. The length of exposure is typically from the point at which a mismatch first materialises (which may be the date a swap terminates) to the point at which the value of the cover pool is realised (which may be the date the cover pool is sold). The length of exposure to any interest rate and currency mismatch depends on the specific characteristics of the covered bonds, the cover pool and the hedging arrangements in place. Appendix E3 contains examples of how we may stress the size of interest rate and currency movements.

» **The portion of the assets with interest rate (or currency) mismatches:** The greater the percentage of the covered bonds or cover pool exposed to interest rate or currency mismatches, the higher the overall impact of the risk. Our EL Model will typically look at the level of the mismatch based on the current programme information and assume that this is the level of mismatch at the time of a CB anchor event. Therefore, prior to the CB anchor event, the level of interest rate (or currency) mismatches may increase or decrease if the issuer either adds new assets to the cover pool or issues new covered bonds.

» **The average life of the interest rate mismatch (interest rate risk only):** This is the remaining average life of the interest rate mismatch that we expect at the time of refinancing. The longer the average life of the interest rate mismatch, the greater the credit risk. Our EL Model generally sets the average life based on the current composition of the cover pool; and so, the modelled average life may increase or decrease as the issuer adds new assets to the cover pool. However, our EL Model usually assumes a minimum average life of assets of five years at the point of a CB anchor event.

Bringing together the components of interest rate and currency mismatches: A simplified illustration of how our EL Model calculates interest rate and currency risk is as follows:

*interest rate risk = interest rate movement * level of mismatch * average life of interest rate risk*

*currency risk = currency movement * level of mismatch*

Therefore, the primary determinants of currency risk are the first two components above, while all three components above are involved in assessing interest rate risk.

Appendices E1-E4. Appendices E1-E4 contain further details on, respectively, the role of interest rate and currency mismatches; the role of hedging arrangements; interest rate and currency movements that we apply under our EL Model; and a simplified example of how we calculate the overall loss on the cover pool resulting from interest rate and currency risks.

Part 2 – TPI Framework

A TPI measures the likelihood of timely payments to covered bondholders following a CB anchor event. The TPI framework limits the number of notches by which a covered bond rating can exceed the CB anchor. Following a CB anchor event, refinancing risk is the single most important risk to timely payment for most programmes.

Defining TPIs. A TPI is our assessment of the likelihood of timely payment of interest and principal to covered bondholders following a CB anchor event. TPIs are Very High, High, Probable-High, Probable,

Improbable and Very Improbable.[9] A TPI of Very High, for example, means that there is a very high likelihood – corresponding to a probability exceeding 95% – of timely payments on covered bonds following a CB anchor event.

The TPI framework limits the number of notches by which a covered bond rating can exceed the CB anchor.

TPIs look to the environment following a CB anchor event.

We assess risks to timely payment in the environment following a CB anchor event. Following such an event, we assume that the issuer can no longer make payments on the covered bond from its general resources. We therefore assume that the issuer will make payments to bondholders using funds deriving from, or proceeds raised against, the cover pool or that payments will follow from third-party support for the covered bond programme.

Rationale for TPIs #1: Refinancing risk

Primary reason for TPI framework. After a CB anchor event, the single most important risk to timely payment for most programmes is the existence of refinancing risk.

Refinancing risk constrains TPIs, owing to the many uncertainties that are likely to arise if the cover pool needs to be refinanced following a CB anchor event. Following a CB anchor event, the cover pool may be relatively illiquid, and it may be unclear whether there are any persons willing to provide funding for the cover pool or any buyers. Even if there is a buyer/lender, it is difficult to determine whether a refinancing would be successful, at a price sufficient to prevent losses. In addition, any delay or failure to refinance the cover pool could lead to missed payments or a default after which covered bonds may accelerate or be subject to an asset fire-sale, further increasing the risk of losses to investors. Consequently, we generally do not assign our highest TPIs to a covered bond unless significant mitigants to refinancing risk exist.

Rationale for TPIs #2: Issuer discretion

The second main reason we apply the TPI framework is "issuer discretion", or the issuer's ability to make changes to a covered bond programme prior to a CB anchor event. The discretion is usually sufficiently broad so that the issuer could make material negative changes without breach of the relevant covered bond law or the programme documentation. Examples of such changes include (1) increasing the mismatch between assets and liabilities, and hence increasing refinancing risk; (2) entering new contracts, particularly hedging contracts, that could materially change the hedging profile of the programme; and (3) adding new assets of lower credit quality to the cover pool.

Other risks to timely payment. Other risks to timely payment at the time of a CB anchor event include:

- Events of default or termination of swaps. Furthermore, many swap counterparties are in the same group as the issuer.
- The risk that bonds will accelerate and become due before their original maturity (whether by operation of law or contract), resulting in a fire-sale of cover pool assets.
- Operational risk. In the aftermath of a CB anchor event, there may be disruption while an administrator takes over and makes arrangements for the cover pool.
- Uncertainty as to whether features of a covered bond law intended to promote timely payments will work. Many of these features remain untested.

[9] The approximate probabilities of timely payment for different TPIs are: Very Improbable <25%; Improbable 25-50%; Probable 50-75%; Probable-High 75- 87.5%; High 87.5-95%; Very High >95%.

Appendix F3: Appendix F3 discusses in more detail the main factors that influence our assessment of TPIs based on the legal and contractual frameworks in different jurisdictions and other features that may be present in programmes.

Determining the TPI: We consider every covered bond programme in the context of the legal, structural and systemic framework in which it exists. Features that mitigate timely payment risks will differ between jurisdictions and individual transactions.

When determining TPIs, we divide our process into two stages, as described below:

» **Jurisdiction analysis:** We first consider the specific features that exist in the jurisdiction of covered bond issuance. These features tend to be consistent across all or most programmes in the jurisdiction and may include the level of systemic support for covered bonds in a jurisdiction. We will also consider specific features of the law, in particular where these aim to reduce refinancing risk that may arise following a CB anchor event.

» **Programme-specific analysis:** We then look at individual programme features and benchmark these against the other programmes in the jurisdiction and between jurisdictions where appropriate. Examples would be the use of contractual features, such as maturity extensions that may improve the probability of making timely principal payments, and reserve funds that may improve the probability of making interest payments, in each case following a CB anchor event.

The effect of the TPI framework on the covered bond rating: The TPI framework caps covered bond ratings to a certain number of notches above the CB anchor. We sometimes refer to the TPI framework as determining the degree of linkage between the issuer and the covered bonds. In general, higher TPIs imply less linkage; the covered bond is more likely to remain highly rated even when the CB anchor falls. Conversely, lower TPIs imply greater linkage; the covered bond rating will generally fall more closely in line with the CB anchor. Exhibit 1 below (the TPI table) provides guidance as to the maximum achievable covered bond rating under the TPI framework for different CB anchor and TPI levels.[10]

In some cases, particularly when the CB anchor is below Baa3, the final position of the TPI cap may require more detailed case-by-case analysis because lower-rated issuers tend to face more idiosyncratic challenges in managing credit risks in a covered bond than higher-rated issuers. As a result, our analysis for issuers with lower CB anchors relies more on the credit position of a covered bond in its current circumstances. In general, we seek to apply an analysis that is sufficiently flexible to account for any relevant factors. The bands indicated by the TPI table give guidance here but, as with all rating outcomes indicated by the TPI table, they are not definitive.

[10] If the CB anchor is below B3, we determine the TPI cap on a case-by-case basis.

EXHIBIT 1
TPI Table

CB anchor	TPI					
	Very Improbable	Improbable	Probable	Probable-High	High	Very High
A1 or above	Aaa	Aaa	Aaa	Aaa	Aaa	Aaa
A2	Aa1	Aa1	Aaa	Aaa	Aaa	Aaa
A3	Aa2	Aa2	Aaa	Aaa	Aaa	Aaa
Baa1	Aa3	Aa3	Aa1	Aa1	Aaa	Aaa
Baa2	A1	A1	Aa2	Aa2	Aa1	Aaa
Baa3	A3	A2	A1	Aa3	Aa2	Aa1
Ba1	Baa1-Baa3	A3-Baa2	A2-Baa1	A1-A3	Aa3-A2	Aa2-A1
Ba2	Baa2-Ba1	Baa1-Baa2	A3-Baa2	A2-Baa1	A1-A3	Aa3-A2
Ba3	Baa3-Ba2	Baa2-Baa3	Baa1-Baa3	A3-Baa2	A2-Baa1	A1-A3
B1	Ba1-Ba3	Ba1-Ba2	Baa3-Ba2	Baa1-Baa3	A3-Baa2	A2-Baa1
B2	Ba2-B1	Ba1-Ba3	Ba1-Ba3	Baa2-Ba1	Baa1-Baa3	A3-Baa2
B3	Ba3-B2	Ba2-B1	Ba1-Ba3	Baa3-Ba2	Baa2-Ba1	Baa1-Baa3

Source: Moody's Investors Service

How to read Exhibit 1

We express the CB anchor shown in the Y-axis on an alpha-numeric scale that corresponds to our long-term rating scale. For example, if the CB anchor is one notch above the CR Assessment and the issuer's CR Assessment is Baa2(cr), the CB anchor to be considered in Exhibit 1 is Baa1.

Taking a couple of examples:

» If there is a reasonable prospect of timely payment following issuer default, we may assign a TPI of Probable. The TPI table then indicates a range of possible TPI caps depending on the CB anchor. We do not expect covered bonds with a CB anchor of Baa1 or below and a TPI of Probable to achieve a Aaa rating. This would be the case even if the output of our EL Model is Aaa.

» If there is a limited likelihood of timely payment on the covered bonds following a CB anchor event, we may assign a TPI of Very Improbable. We do not expect covered bonds with a CB anchor of A2 or below and a TPI of Very Improbable to achieve a Aaa rating.

De-linkage from the TPI: We may disapply our TPI framework for covered bonds with certain characteristics. Appendix F4 discusses in more detail our approach to rating covered bonds without linkage to the issuer via the TPI.

TPIs may affect our EL Model results: A late payment on covered bonds following a CB anchor event may directly affect the value of the cover pool under our EL Model by triggering the acceleration of all bonds issued under a programme. Acceleration may, in turn, trigger a more immediate refinancing requirement. Our EL Model addresses this risk by sizing an amount of collateral that may mitigate the risk of acceleration, based on the risk to timely payment. Hence, in our EL Model, we may assign a probability of acceleration risk materialising that is in line with the TPI assigned to the programme. See Appendix E2 for a further discussion on how we assess these probabilities in our EL Model.

Other Rating Considerations

Our rating committees will consider any other factors that they deem relevant to the analysis.

Country Risk

The country in which the cover pool assets or issuer is located could introduce systemic economic, legal or political risks to the transaction that could affect payment to investors under the covered bonds. In addition to considering aspects of these under our methodology, we incorporate such risks into the analysis by applying our local or foreign currency country risk ceilings in accordance with our sovereign ceiling methodology.

Additional Risk Factors

The presence of certain additional risk factors may result in a covered bond rating that is lower than the rating we would otherwise assign pursuant to the EL model and TPI framework (as applicable). For further details see Appendix G.

Environmental, Social and Governance Considerations

Environmental, social and governance (ESG) considerations may affect the ratings of covered bonds. We evaluate the risk following our cross-sector methodology that describes our general principles for assessing these ESG issues[11] and may incorporate it in our analysis.

2. Monitoring

In monitoring covered bonds ratings, we generally apply the key components of this methodology as described in the preceding sections.

In particular, we may reassess the credit quality of the covered bonds following (1) any changes to the CB anchor, the sovereign creditworthiness or the country risk ceilings;[12] and (2) updates to the programme on the basis of reporting data provided periodically by the issuer which contains programme-specific performance information; and (3) other material changes to key components of the programme.[13]

Certain components of the analysis conducted in the determination of initial ratings, such as (but not limited to) an initial review of loan underwriting practices will in most instances not be re-reviewed during the monitoring process unless material new information indicates that a reconsideration is warranted.

[11] A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[12] For more information, see our cross-sector methodology for assessing sovereign risk. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[13] For example, in methodologies where models are used, modeling is not relevant when it is determined that (1) a transaction is still revolving and performance has not changed from expectations, or (2) all tranches are at the highest achievable ratings and performance is at or better than expected performance, or (3) key model inputs are viewed as not having materially changed to the extent it would change outputs since the previous time a model was run, or (4) no new relevant information is available such that a model cannot be run in order to inform the rating, or (5) our analysis is limited to asset coverage ratios for transactions with undercollateralized tranches, or (6) a transaction has few remaining performing assets.

Appendix A1: The CB Anchor

Definition of CB anchor: The CB anchor refers to the probability of a CB anchor event occurring. A CB anchor event occurs when the issuer, or another entity in the issuer group that supports the issuer,[14] ceases to service the debt obligations under the covered bonds. This may also be accompanied by the removal of some or all of the issuer's administrative/operational support for the covered bonds. We note that a CB anchor event does not necessarily mean there has been a late or missed payment on the covered bonds. For example, a CB anchor event would occur in circumstances when cover pool assets are used to make payments on covered bonds (so there is no missed payment) but, due to the financial condition of the issuer, covered bond payments would be missed without the benefit of a ring-fenced cover pool. We express the CB anchor on an alpha-numeric scale that corresponds to our long-term rating scale.

CR Assessment as the reference point: We generally use the issuer's CR Assessment as a reference point to determine the CB anchor.[15] In a banking resolution, we expect the key operations of the financial institution will continue to function, and it will honor certain payment obligations and contractual commitments, including covered bonds, even while losses are imposed on senior unsecured debt or junior deposits.

Notching uplift based on expectation of favorable resolution measures: The CB anchor is usually the CR Assessment plus one notch for covered bonds that fall under the EU's Bank Recovery and Resolution Directive (BRRD)[16] or a resolution regime providing an equivalent level of protection for covered bonds, reflecting the relevant resolution regimes' legislative frameworks in relation to covered bonds.

We assess whether the relevant resolution regime has features that likely will result in more favorable measures for covered bonds relative to other obligations covered by CR Assessments and enable a financial institution in resolution, or a transferee of its obligations, to continue paying covered bonds. Examples of such features under the BRRD include:

- Covered bonds and covered bond swaps are excluded from bail-in, and cover pool segregation and funding are to be protected in resolution.[17]
- Resolution tools facilitate keeping covered bond obligations in a going concern entity or, alternatively, transferring them to a third-party buyer or a bridge bank.
- Covered bonds are protected against (among other things) cancellation, modification or partial transfer of assets, rights and liabilities that form part of the covered bond (or structured finance) arrangement.[18]
- Authorities can provide financial support if the financial institution's liabilities, up to and including senior unsecured debt, are not sufficient to absorb all losses of a financial institution in resolution, and the required minimum of liabilities and own-funds have been bailed-in or written down.[19]

We assess the relevant authorities' willingness to support covered bonds. We expect that EU authorities are particularly likely to take steps to ensure the continuity of covered bond payments when the financial institution supporting the bonds is in resolution. This view is supported by the history and characteristics of the European covered bond markets. For example, covered bonds often fund assets that are part of the issuer's core business activities, such as prime mortgage lending; and in a number of European countries, a

[14] The term "issuer" may not always refer to the issuer of the covered bonds itself. It may refer to or encompass an entity that has guaranteed, or otherwise supported, payment on the covered bonds. Such an entity would typically also be part of the issuer group. Also, in many cases the issuer will benefit from either direct or indirect support from the group of which it is a part. In addition, the issuer may benefit from specific aspects of the covered bond law, which may, for example, limit the business activities of the issuer and thus offer investors incremental protection from event risk.

[15] For more information, see our methodology for rating banks and also *Rating Symbols and Definitions*. A link to *Rating Symbols and Definitions* and to our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[16] For more information, see Directive 2014/59/EU of the European Parliament and the Council establishing a framework for the recovery and resolution of credit institutions and investment firms, 15 May 2014.

[17] Article 44(2).

[18] Article 79.

[19] Article 44 (4) to (7).

substantial proportion of financial institutions' funding for mortgage finance is in the form of covered bonds. Furthermore, covered bonds receive favorable capital and liquidity treatment under EU bank regulation, both reflecting and supporting their profile as low risk instruments. EU authorities' desire to maintain solid foundations for preferential regulatory treatment was a driving force behind the 2019 covered bond directive[20] that supports minimum quality standards for covered bonds across the EU.

In certain cases, we may not add the notching uplift under this section (or may apply a negative notching adjustment to the CR Assessment), due to one or more country or programme-specific features that indicate the relevant covered bonds are less likely to benefit from favorable measures following a failure of the issuer. Examples of such features include:

» the collateral for covered bonds is of low quality or insufficient;

» the covered bonds do not fall under a recognized legal regime.

Additionally, we may not apply the notching uplift under this section if the CR Assessment already incorporates material covered bond support factors.

Notching uplift based on potential benefit of bail-in: In addition to any other notching uplift to the CR Assessment under this appendix, we may apply an uplift in cases where our CR Assessments for banks in the relevant country do not fully reflect the potential benefit to covered bondholders of a bail-in of certain obligations, such as junior deposits, that are not covered by CR Assessments. We determine whether to apply an uplift under this paragraph, and the magnitude of any uplift, on a case-by-case basis considering all applicable factors. These factors generally include (1) the positioning of the issuer's CR Assessment relative to its Adjusted Baseline Credit Assessment (Adjusted BCA) and the rating of obligations, such as junior deposits, that might be bailed in, and (2) the potential for government support. Any uplift that we apply under this paragraph generally ranges from one to three notches, as shown by the illustrative examples in Exhibit 2.

EXHIBIT 2

Illustrative Examples of Notching Uplift Based on Potential Benefit of Deposit Bail-in

	Example 1	Example 2	Example 3	Example 4
Assumed CR Assessment	Baa1(cr)	Baa1(cr)	Baa1(cr)	Baa1(cr)
Assumed junior deposit rating	Baa1	Baa1	A3	A2
Assumed Adjusted BCA	Ba1	Baa1	Baa1	Baa1
Uplift based on potential benefit of deposit bail-in	0	1	2	3
CB anchor	Baa1	A3	A2	A1

Note: For simplicity, each example assumes (1) the issuer is a universal bank, (2) there is no material potential for government support and (3) no uplift based on the expectation of favorable resolution measures. The examples are illustrative only and do not necessarily reflect the notching uplift we may apply in consideration of all applicable factors for a specific issuer.

Source: Moody's Investors Service

Alternatives to a public CR Assessment of the covered bond issuer: Some covered bond issuers, often credit institutions specialized in issuing covered bonds, do not have a public CR Assessment but do have:

» a private monitored CR Assessment; or

» credit linkage to a parent financial institution or other entity that has a binding obligation to support the obligations of the issuer

[20] See Directive 2019/2162/EU.

In such cases, we may use the relevant private CR Assessment, or support provider's CR Assessment, as the reference point to determine the CB anchor.

If we do not assign a CR Assessment to the issuer or a suitable support provider, we may determine the CB anchor using an equivalent proxy to measure credit exposure to the issuer or a suitable support provider, including, when appropriate, using the senior unsecured debt rating, deposit rating or Adjusted BCA as a reference point.[21] We may decide on a case-by-case basis to add a notch uplift to any such reference point to determine the CB anchor.

[21] We cannot determine the CB anchor using a credit estimate. For more information, see our cross-sector methodology for the usage of credit estimates. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Appendix A2: The Expected Loss Approach – Dual Support

Dual support

Under our EL Model, we determine the credit strength of the covered bonds by the combination of the credit strength of the issuer and the value of the cover pool. The aim of this appendix is to show how our EL Model combines a CB anchor with the expected value of the cover pool through a number of simplified worked examples. Examples of further contributions that the credit strength of the issuer makes to the credit strength of the covered bonds are in Appendix B1. Please note that the examples below do not reflect specific/particular circumstances, but rather illustrate how these two components are combined in the EL Model.

The examples are based on a number of simplifying assumptions, including:

» Following a CB anchor event, recovery will arise only from the cover pool (i.e., no recovery is assumed from an unsecured outstanding claim against the issuer or, if relevant, other group companies or guarantors).

» The covered bond is a bullet bond with a three-year maturity.

» At the time of issue, the nominal balance of the cover pool matches the nominal balance of the covered bond outstanding (i.e., there is no OC).

» Cash flows that arise at a future date have not been discounted back to present value.

The examples make use of Moody's Idealized Probabilities of Default and Moody's Idealized Expected Losses.[22]

The specific inputs in the examples are in Exhibit 3 below.

EXHIBIT 3

Example-Specific Inputs

	Assumed CB anchor	Cover pool losses
Example 1	A2	3%
Example 2	A2	12%
Example 3	Baa2	3%
Example 4	Baa2	12%

Source: Moody's Investors Service

To explain how we obtained the covered bond rating, we consider Example 1:

The first step is to calculate the probability of a CB anchor event in each year of a three-year covered bond. We take these probabilities from the table containing Moody's Idealized Probabilities of Default. As seen from Exhibit 3, for an issuer with a CB anchor of A2, the probability of a CB anchor event in year one is 0.011% and the probability of a CB anchor event in year two is 0.059%. The probabilities in the table containing Moody's Idealized Probabilities of Default are cumulative (e.g., 0.070% - 0.011% = 0.059%).

For this example, we assume the loss of the cover pool following a CB anchor event is 3%. To calculate the expected loss for each of the years of the life of the covered bond, we calculate the product of this 3% and the probability of a CB anchor event in each year of the life of the covered bond. We then calculate the aggregate expected loss by summing the expected losses for each of the three years of the life of the covered bond.

This example is reproduced in Exhibit 4 below.

[22] For more information, see the discussion of Idealized Probabilities of Default and Expected Losses in *Rating Symbols and Definitions.* A link can be found in the "Moody's Related Publications" section.

EXHIBIT 4

Expected Loss Calculation for Example 1

Year	Probability of CB anchor event	Cover pool losses	Expected loss on covered bond
1	0.011%	3%	0.000%
2	0.059%	3%	0.002%
3	0.152%	3%	0.005%
Cumulative Expected Loss of the covered bond			**0.007%**

Source: Moody's Investors Service

We then map the cumulative expected loss of the covered bond to the corresponding three-year rating in the table containing Moody's Idealized Expected Losses. In this case, the mapping results in a Aa1 rating, which is four notches above the CB anchor.

We can apply the equivalent calculations to each example to obtain the results shown in Exhibit 5 below:

EXHIBIT 5

Maximum Achievable Rating Based on Expected Loss

	Example 1	Example 2	Example 3	Example 4
CB anchor (A)	A2	A2	Baa2	Baa2
Cover pool losses (B)	3%	12%	3%	12%
Rating of covered bonds based on expected loss (C)	Aa1	Aa3	Aa3	A2
Number of notches between A and C (D)	4	2	5	3

Source: Moody's Investors Service

The above examples show how both the credit strength of the issuer and the quality of the cover pool can affect the number of rating notches between the CB anchor and the rating on the covered bonds.

These examples have assumed a certain level of loss on the cover pool following a CB anchor event. The primary focus of the balance of this report is to describe in more detail how we calculate this loss. The section on TPIs above and in Appendix F4 explains how the application of our TPI caps may limit the number of notches in (D) above.

Loss Benchmarks

In evaluating the model output for covered bonds, we select loss benchmarks referencing the Idealized Expected Loss table[23] using the Symmetric Range, in which the lower-bound of loss consistent with a rating category is the midpoint (strictly, the geometric mean) between the Idealized Expected Loss of the rating category and the Idealized Expected Loss of the next higher rating category. The upper-bound of loss is analogously determined as the geometric mean between the Idealized Expected Loss of the rating category and the Idealized Expected Loss of the next lower rating category. Mathematically, the benchmark boundary is computed as an equal 50/50 weighting on a logarithmic scale. That is, the benchmark boundaries of loss appropriate for evaluating rating category R are given by:

$$[1]\ Rating\ Lower\ Bound_R = exp\{0.5 \cdot \log(Idealized\ Expected\ Loss_{R-1}) + 0.5 \cdot log(Idealized\ Expected\ Loss_R)\}$$

[23] For more information, see the discussion of Idealized Probabilities of Default and Expected Losses in *Rating Symbols and Definitions.* A link can be found in the "Moody's Related Publications" section.

$$[2]\ Rating\ Upper\ Bound_R = exp\{0.5 \cdot \log(Idealized\ Expected\ Loss_R) + 0.5 \cdot log(Idealized\ Expected\ Loss_{R+1})\}$$

Where:

- *Rating Lower BoundR means the lowest Idealized Expected Loss associated with rating R and the expected loss range of rating R is inclusive of the Rating Lower BoundR.*
- *Rating Upper BoundR means the highest Idealized Expected Loss associated with rating R and the expected loss range of rating R is exclusive of the Rating Upper BoundR.*
- *R-1 means the rating just above R.*
- *R+1 means the rating just below R.*
- The Rating Lower Bound for Aaa is 0% and the Rating Upper Bound for C is 100%. These are not derived using the formula.

Appendix B1: The Contributions of the Issuer

Our EL Model takes into account the following issuer or issuer group-related benefits when rating covered bonds.

» **The issuer is obliged to make payments on the covered bonds.** The minimum rating that a covered bond should achieve is equivalent to the probability that the issuer backing the covered bond will continue to meet its payment obligations. Our EL Model takes into account the probability of a CB anchor event during the life of the covered bonds, and assumes that, prior to a CB anchor event, the issuer will make payments in full and in accordance with its contractual obligations. We therefore assume there will be no losses to covered bond investors as long as there is no CB anchor event.

The CB anchor determines the probability of the issuer meeting its covered bond obligations. We discuss the CB anchor in Appendix A1, and the way we incorporate this benefit into our EL Model in Appendix A2.

» **The "haircut" to the collateral score.** One of the key inputs into our EL Model is the credit quality of the cover pool, which we measure by a collateral score. For higher-rated issuers, we may apply a haircut to this collateral score, which means that the EL Model assumes that a lower level of losses would be modelled as a result of the credit deterioration of the assets in the cover pool than are implied by the standalone collateral score (we refer to the haircut score as collateral risk). The reason for this haircut is that the role of the issuer supporting a covered bond is typically more important than the role of a guarantor. For example, over and above its obligation to make payment on the covered bonds, the issuer supporting a covered bond may be required to buy out loans in arrears or default. The issuer may also choose to support the programme or be required by law or contract to add further loans into the cover pool should, for example, asset valuations fall. See Appendices C4 and C5 for a discussion of the collateral score haircut.

» **Any recoveries from a senior unsecured claim against the issuer.** Under our EL Model, the losses we calculate following a CB anchor event may take into account any unsecured claim that may be pursued against the issuer's estate and, if relevant, against other group companies, or guarantors.[24] This claim may follow any realisation of the cover pool.

[24] Recourse to an unsecured claim will not always be appropriate. One example of this is where there is a rated entity supporting the issuer via a liquidity line; the unavailability of such a liquidity line following default of the rated entity would not normally give rise to an unsecured claim against that entity.

Appendix C1: The Collateral Score

The credit quality of the assets in the cover pool is one of the main inputs into our EL Model. We carry out an analysis of the cover pool's credit quality and calculate a score (collateral score) based on a number of assumptions and considerations. This collateral score (after any applicable haircut – see Appendix C4) determines the level of losses assumed to arise after a CB anchor event in our EL Model. Under the model, we assume these losses occur equally over the four years following the CB anchor event. We calculate the collateral score using techniques similar to those used in structured finance transactions. The method of calculation will vary depending on the type of collateral in the cover pool and on the jurisdiction or market in which it is located.

The collateral score measures the level of credit deterioration of the assets in the cover pool that is consistent with the theoretical highest rating achievable in the jurisdiction. The higher the credit quality of the cover pool, the lower the collateral score.

For the purpose of calculating the collateral score, our analysis therefore isolates the credit deterioration of the assets in the cover pool. As such, we assume that:

» There is no support from the issuer and issuer group.

» No forced sale is required to make timely payments on the covered bonds (i.e., no refinancing risk – the assets in the cover pool can amortise naturally over their term).

» There are no interest rate and currency mismatches between the cover pool and the covered bonds.

For highly rated sovereigns, the rank ordering of collateral scores between different asset types will typically be as follows (ranging from highest credit quality to lowest credit quality)[25]

» public-sector obligations;

» residential mortgage loans;

» commercial mortgage loans.

[25] However, in many transactions, there are exceptions to this rank ordering.

Appendix C2: Collateral Score Determination for Public-Sector Cover Pools

In order to assess the collateral score for covered bonds backed by public-sector assets, we generally use a Monte-Carlo simulation which generates a transaction-specific loss distribution for the cover pool. The distribution is mainly driven by the expected loss on each individual obligor and the correlation framework amongst the obligors.

We also generally apply an additional stress to the cover pool losses to account for an economic shock following a government default if covered bonds are rated above the sovereign and the sovereign is rated below Aa3.

Assessing expected losses on individual exposures

In order to assess the expected loss on each individual claim included in the cover pool, we map each individual obligor's rating (or other measure) into a default probability for a given time horizon using Moody's Idealized Probabilities of Default. In scenarios where the obligor defaults, we apply a recovery rate assumption.

Default probabilities

Default probabilities are derived from different sources.[26] If we assign a public or private monitored rating to an obligor, we derive the default probability of this obligor by using Moody's Idealized Probabilities of Default.

In the absence of default probabilities inferred from our ratings, we base our analysis on credit estimates or estimates of obligor default probability:

- **Credit estimates:** credit estimates are usually used for unrated aggregated exposures which account for 3% or more of the total cover pool balance.[27]
- **Estimates of obligor default probability:** For aggregated exposures that represent less than 3% of the total cover pool balance, we generally estimate an obligor's probability of default based on Q-scores. For obligors eligible to be included in public-sector cover pools, we normally derive generic average Q- Scores that are obligor type and country specific.[28]

Obligor types and support provided by guarantors or other public sector entities

We typically consider the default probability of the primary debtor of the asset. However, we may also take into consideration the default probability of a guarantor or another entity providing support to the primary debtor as the reference point for assessing the default probability of the primary debtor, in particular when the primary debtor is not a public-sector entity.[29]

The default probability of such supporting entity will be assessed as described in the section "default probabilities" above. To derive the default probability of a primary debtor based on the supporting entity's default probability, we may decide to make adjustments due to the level of support granted by such entity to the primary debtor. We usually aggregate individual obligor's exposures based on the same supporting

[26] For the definition of Moody's ratings, credit estimates and Q-scores, see *Rating Symbols and Definitions.* A link can be found in the "Moody's Related Publications" section.

[27] For more information, see our cross-sector methodology for the usage of credit estimates. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[28] Other methods for deriving the obligor's default probability may also include the consideration of the obligor's guarantor, sponsor or shareholder rating, credit estimate or other default probability measure.

[29] Support may take different forms, in particular a full or partial guarantee of the primary debtor's obligation, or may result from a significant level of ownership, sponsorship, control, a special charter, a public policy function, or mandate to act on behalf of a public-sector entity. Alternatively, cover pool eligibility may be achieved where taxes can be raised or fees are allocated to obligors that are neither central, nor regional, nor local governments. Examples of such obligors eligible in cover pools include, without limitation, government recognized religious communities, universities, water and sewage boards in public ownership, as well as export credit agencies.

entity. In the absence of a Moody's rating, a credit estimate or other estimates of obligor default probability, we may consider any available relevant information to assess the credit quality of the cover pool asset.

Recoveries

We generally apply a fixed recovery rate of 45% for all obligors.

Other asset characteristics

We may consider other obligor's specific characteristics in the collateral score calculation, such as the amortisation profile of the assets. For instance, fully or partly amortising loans typically have a lower severity than non-amortising loans (i.e., bullet loans) as obligors start repaying principal before the loan maturity.

Loss distribution

To calculate the loss distribution, we use a multi-factor time-to-default model that utilises a Monte-Carlo simulation.

We use an asset correlation framework for the modelling of correlations between public-sector assets. These correlation assumptions are based primarily on the country and regional location of the obligors in a cover pool. We normally model 2% global correlation, 3% country correlation and 15% regional correlation. Therefore, obligors in the same region typically have an asset correlation of 20% and obligors in different regions of a same country a 5% asset correlation.

Once the loss distribution is calculated, the collateral score is usually derived by calculating a percentile of the loss distribution corresponding to the expected loss of a Aaa rating.

Sovereign risk

We typically apply an additional stress to the cover pool losses if a majority of obligors is located in a country with a government bond rating below Aa3, and the covered bonds are rated above the country's government bond rating. In this situation, we will usually set a floor to cover pool losses at 50%.

Other factors

Very concentrated pools may require an ad-hoc analysis as generic recovery rates and correlation assumptions may not be applicable.

Appendix C3: Collateral Score Determination for Commercial Real Estate Cover Pools

This appendix describes our approach to determining the collateral score for cover pools, or portions of cover pools, consisting of commercial real estate (CRE) mortgage loans secured over properties located in EMEA. We may also apply this approach for cover pools, or portions of cover pools, consisting of CRE mortgage loans secured over properties located outside the EMEA region if the underwriting standards applied to those assets are analogous to the standards applied to assets based in EMEA.

We generally determine an expected loss for each individual CRE mortgage loan and then simulate a loss distribution for the cover pool. We may aggregate individual loans at property or borrower level, and, if we do not receive loan-level data, we may derive assumed characteristics for individual loans from stratified data. For mixed cover pools of residential and CRE mortgage loans, we generally assess the residential portion of the cover pool separately by following the principles set out in our RMBS rating methodology.

Expected Losses on Individual CRE Mortgage Loans

We determine the expected loss for individual CRE mortgage loans in consideration of default probabilities and recoveries, which we describe below.

Default Probabilities

For each CRE mortgage loan, we generally derive the default probabilities from property and loan characteristics including:

- loan-to-value (LTV) ratio (after applying property value haircuts)
- property type
- borrower type
- loan origination date
- loan repayment terms
- interest rate type
- currency mismatches
- loan performance

Similar to our EMEA CMBS rating approach, we derive the term default probability and refinancing default probability for each CRE mortgage loan. We generally use the LTV ratio (after applying property value haircuts) as the main variable to determine the probability that the loan will experience a debt service payment default during its term (term default probability). For loans that do not fully amortize over their terms, we also use the LTV ratio as the main variable to determine the probability that the loans will not be repaid or refinanced at the maturity (refinancing default probability). When assessing default probabilities, we typically derive a combined LTV considering all loans that are secured on the same property, including loan parts outside of the cover pool.

We typically cap the rating proxy implied by the term default probability at low-investment-grade default risk and the refinancing default probability at sub-investment-grade default risk. We may apply additional caps and floors or other adjustments to account for relevant factors that are not addressed in the analysis described above. For example, we may adjust default probabilities if the cash flow generating abilities of properties, borrowers or sponsors are not sufficiently reflected in our LTV-based default probability assessments.

Recoveries

Starting from the remaining cover pool loan balance at the time the CRE mortgage loan defaults, we generally estimate the recovery amount for each individual loan as the property value (subject to the property value haircuts and modelled property value movements described below) minus deductions for recovery costs, accrued interest and prior ranks, distributed pro-rata among equal-ranking exposures.

Property Value Haircuts

CRE values vary over the market cycle, notably through fluctuations in the yield expectations of CRE investors. Therefore, certain issuer-reported CRE values may be inflated due to market conditions. When determining default probabilities and recoveries, we typically haircut these property values to derive a through-the-cycle property value for use in our credit analysis. By way of exception, we generally do not haircut, and may instead apply an upward adjustment, to property values provided to us under a well-defined and tested regulatory lending value framework that we view as market-cycle neutral.[30]

Our determination of property value haircuts typically involves three steps: (1) calculation of a haircut based on CRE property yield data and the minimum yield concept, (2) adjustment of the haircut as needed to account for an unusual CRE risk premium, and (3) incorporation of a qualitative adjustment as needed in specific situations. We generally apply steps 1 and 2 using yield data for the country in which the relevant property is located. However, where appropriate, we may instead take the average of the haircuts obtained by applying steps 1 and 2 using yield data for one or more other suitable countries. The three steps are set out further below.

Step (1): CRE property yield data and minimum yield concept. The haircut based on comparing CRE property yield data for country n and time t with the minimum yield for country n is calculated as follows:

FORMULA 1

Step 1: Haircut Calculation Based on Market Yield and Minimum Yield Concept

$$Haircut_{n,t} = 1 - (Market\ Yield_{n,t} / Minimum\ Yield_n),\ for\ Market\ Yield_{n,t} < Minimum\ Yield_n$$

Where:

» $Market\ Yield_{n,t}$: average CRE property yield observed in country n and time t

» $Minimum\ Yield_n$: minimum yield that we view as commensurate with through-the-cycle values in country n.

Source: Moody's Investors Service

The haircut is generally based on a comparison of (i) the average CRE property yield observed in the market during the calendar year in which the issuer-reported value was provided (the Market Yield)[31] and (ii) the minimum yield that we view as commensurate with through-the-cycle values (the Minimum Yield). A low Market Yield relative to the Minimum Yield suggests that the issuer-reported value was provided during a peak in the CRE market cycle, hence leading to a higher haircut.

We typically determine both the Market Yield and Minimum Yield by reference to yields on properties in the relevant country that are broadly representative (in terms of type, location and quality) of CRE properties that typically secure mortgage loans funded by covered bonds. We determine the Minimum Yield by reference to our EMEA CMBS rating approach[32] and typically ranges from 5.0% to 9.0% for good-quality investment properties located in the main European countries.

Step (2): CRE risk premium. If the relevant CRE risk premium deviates from the historical range, we may adjust the haircut calculated under step 1 above. The CRE risk premium is the gap between the Market Yield

[30] Such as the German Beleihungswertermittlungsverordnung as implemented on 12 May 2006.

[31] When we determine the Market Yield, we generally use various yield data points across the calendar year in which the issuer-reported value was provided. However, if our analysis occurs during the calendar year in which the issuer-reported value was provided (or otherwise at a time when some or all of the market yield data for that year is not yet available), we may (1) use yield data points over a shorter period and/or data points from a previous year or (2) make an approximation.

[32] The minimum yield values used in our EMEA CMBS rating approach range from 4.25% to 12.0% for major property types in the main European countries.

(as described above) and the average long-term government bond yield observed in the relevant country during the relevant period.[33] We typically reference quarterly long-term government bond yields and may adjust them to account for outliers. If the CRE risk premium is below (above) the lower (upper) bound of the historical range, we may increase (decrease) the haircut by an adjustment factor. This factor is typically expressed as the difference between the lower (upper) bound of the historical range and the CRE risk premium as a percentage of the lower (upper) bound. A low CRE risk premium relative to the historical range suggests that issuer-reported values may be inflated due to market conditions and generally results in a higher haircut.

FORMULA 2

Step 2: Haircut Calculation Adjusted for CRE Risk Premium

$$Haircut_{n,t}\ Adjusted\ for\ CRE\ Risk\ Premium = Max\ [0,\ Haircut_{n,t} * (1 + Adjustment\ Factor)]$$

Where for a given historical range [x, y] of the CRE risk premium:

» *Adjustment Factor = (x – CRE risk premium)/x, if CRE risk premium < x*

» *Adjustment Factor = (y – CRE risk premium)/y, if CRE risk premium > y*

» *Adjustment Factor = 0, if CRE risk premium falls within the historical range [x, y].*

Source: Moody's Investors Service

Step (3): Qualitative adjustment. We may apply a qualitative adjustment to the haircut derived in steps 1 and 2 where data is more limited or where other market information suggests that the property value haircut calculated in steps 1 and 2 overstates or understates the risk of a negative CRE price correction.

By way of example, we may determine a qualitative adjustment in consideration of a rapidly changing macroeconomic environment which might affect the cash flow generating abilities of properties, borrowers or sponsors, a structural shift in supply and demand for particular property types, the actual property value movements observed in the relevant country or the expected level of CRE property market liquidity. We may also apply caps and floors to the haircut calculation or use alternative approaches to reflect the CRE risk premium adjustment.

Loss Distribution

To calculate the pool loss distribution, we typically use a multifactor time-to-default model that utilises a Monte Carlo simulation. In each Monte Carlo trial, we simulate the time-to-default and recovery rate upon default for each underlying CRE mortgage loan. Similar to our EMEA CMBS methodology, we model future property value movements using a Vasicek mean reverting stochastic analysis.

We typically use an asset correlation framework to determine the default probability and recovery of CRE mortgage loans, which is consistent with our EMEA CMBS methodology. Our correlation framework assumes a global correlation between CRE mortgage loans ranging from 10% to 20%, an additional correlation for CRE mortgage loans within the same country ranging from 5% to 15% and a further additional correlation for CRE mortgage loans within the same property type ranging from 3% to 10%.

Once we establish the pool loss distribution, we typically derive the collateral score as the higher of (1) the attachment point that corresponds to the percentile of the loss distribution reflecting the maximum amount of losses consistent with a Aaa rating, and (2) a floor amount, which we generally set at 10%.

[33] We generally use government bond yield data points across substantially the same period that we reference in our determination of the corresponding Market Yield (see footnote 33).

Other Factors

When we determine collateral scores, we consider all relevant quantitative and qualitative factors and may apply alternative approaches as appropriate, including country and programme-specific assumptions, caps and floors. Examples of alternative approaches we may apply include: (1) collateral score floors for cover pools with high exposures to property development risks, reflecting that loans financing development projects are typically riskier than those financing established investment properties; (2) high collateral scores in relation to portions of cover pools that consist of CRE mortgage loans backed by properties for which there is insufficient available CRE information for us to apply our standard approach; and (3) a more refined analysis of large exposures, consistent with our EMEA CMBS rating approach, for highly concentrated pools of CRE mortgage loans. Additionally, we may adjust the collateral score on a case-by-case basis when the cover pool consists of multi-jurisdictional loans with material exposures to CRE in one or more countries with local currency ceilings substantially lower than the maximum achievable rating of the covered bonds.

Appendix C4: Haircuts to Collateral Scores

We may reduce the stress imposed on the credit quality of the cover pool (i.e., apply a haircut to the collateral score) to give a reduced score referred to as collateral risk. The higher the haircut, the lower the collateral risk in our model. The rationale for the haircut may be either dependent on the covered bond rating or independent of the covered bond rating.

Haircuts dependent on the covered bond rating

If a covered bond rating is below Aaa, we typically use a haircut to reduce the collateral score so that the reduced score (i.e., the collateral risk) reflects the theoretical credit enhancement that is consistent with such lower rating.

However, we limit the size of this haircut where covered bonds are exposed to material levels of refinancing risk, owing to the high volatility of refinancing risk.

Haircuts independent from the covered bond rating

Regardless of the covered bond rating, we may apply a haircut to the collateral score and use the resulting collateral risk in our EL Model. The primary reason for this, as discussed under Appendix B1 above, is that an issuer may provide support for its covered bonds that goes well beyond its obligation to make payment on them. An important example of this is that the issuer may opt, or be required, to buy out (or add more collateral to compensate for) loans in arrears or in default, or loans that have come to exceed the LTV threshold. The issuer's actions may mean that, prior to a CB anchor event, some of the losses that would have otherwise arisen on the cover pool will have been made whole by the issuer. A further example of support is that, in the majority of cases where ratings of covered bonds have come under pressure, issuers have added additional enhancement to cover pools.

Haircuts that are independent from the covered bond rating are normally limited to issuers with higher CB anchors. The reason for this is that the higher the rating of the issuer, the greater its capacity to protect the cover pool from credit deterioration and other impairments.

For further details on the levels of haircuts and the method for calculation of the collateral score, see Appendix C5.

Appendix C5: Determining the Haircuts to Collateral Scores

We generally apply a haircut to the collateral score for the reasons described in Appendix C4. The application and size of the haircuts depend on, amongst other things:

» the level of correlation between the issuer and the cover pool

» the CB anchor

» whether the transaction is subject to refinancing risk

The following general rules apply to haircuts to collateral scores where a transaction is exposed to material levels of refinancing risk:

1) High correlation (would typically apply to mortgage-backed covered bonds)

   Under high correlation, the haircut applied to the collateral score would typically be either 0% or 33%.

   i. We generally apply a 33% haircut when either (a) the covered bond rating is Aaa and the CB anchor is A3 or above; or (b) the covered bond rating is below Aaa and we do not apply a 0% haircut under (ii) below.

   ii. We generally apply a 0% haircut when either (a) the covered bond rating is Aaa and the CB anchor is below A3; or (b) the covered bond rating is at the relevant country ceiling and the CB anchor is B1 or below.

2) Low correlation (would typically apply to public-sector-backed covered bonds)

   Under low correlation, the haircut applied to the collateral score is typically 0%, 33%, 45% or 50%. When covered bonds are rated Aaa, we generally limit the haircut to 0%, 33% or 45%.

   i. We generally apply a 50% haircut when the covered bond rating is below Aaa and (iv) below does not apply.

   ii. We generally apply a 45% haircut when the covered bond rating is Aaa and the CB anchor is A3 or above.

   iii. We generally apply a 33% haircut when the covered bond rating is Aaa and the CB anchor is Baa1 to Baa3.

   iv. We generally apply a 0% haircut when covered bond rating is at the relevant country ceiling and the CB anchor is B1 or below.

We may apply higher haircuts in the case where covered bonds are exposed to no, or minimal, refinancing risk.[34]

A simple example of the effect of the haircut to the collateral score under our EL Model is shown in Exhibit 6. It is based on the following assumptions:

» The covered bond rating is Aaa.

» At T(0), the issuer's CR Assessment is A3(cr), and the CB anchor is the CR Assessment plus one notch; then, at T(+1), the CR Assessment is downgraded to Baa2(cr) and the CB anchor continues to be the CR Assessment plus one notch.

» The collateral score is 10%.

» There is high correlation between the issuer and the cover pool.

[34] For example, the collateral score in a mortgage-backed delinked covered bond structure should be broadly aligned with the level that would be obtained using our MILAN methodology for RMBS. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

EXHIBIT 6

Example of Collateral Risk Calculation

Time	CR Assessment	CB Anchor	Collateral Score	Haircut	Collateral Risk
T(0)	A3(cr)	A2	10%	33%	6.7%
T(+1)	Baa2(cr)	Baa1	10%	0%	10%

Source: Moody's Investors Service

We would then use the resulting collateral risk in our EL Model as the loss on the assets in the cover pool arising from credit quality deterioration.

Appendix D1: The Refinancing Margins

A refinancing margin may be seen as the annual discount that a purchaser would require to acquire the cover pool assets, owing to the market price of such assets at the time of refinancing. Our EL Model determines refinancing margins, taking into account, amongst other things, the following considerations:

- **Legislation and contract-specific considerations:** In jurisdictions where the legislation or contractual structure is relatively more/less supportive of the process of sale of collateral in the cover pool following a CB anchor event, we may lower or increase refinancing margins correspondingly. Examples of features that may materially reduce refinancing risk include the ability to sell the cover pool with liabilities attached and extension periods on the due date of liabilities in a programme.
- **Covered bond market support:** The depth of a covered bond market and its importance as a source of funding to a country's banks may materially affect the refinancing margins experienced when a cover pool is refinanced. This does not necessarily mean that banks will acquire cover pools at a loss, but that banks may be more willing to acquire a cover pool at what may be described as a long-term break-even price.
- **Sovereign credit risk:** We may increase or reduce refinancing margins in response to material changes in sovereign credit risk.
- **The time period available for refinancing:** Our EL Model assumes higher refinancing margins if the time period until refinancing is six months or less. Such a time period may result when a CB anchor event occurs within six months of the legal final maturity of any covered bonds or if the covered bonds are accelerated.
- **The type and quality of collateral in the cover pool:** Certain types of collateral in the cover pool will trade at different refinancing margins than others, under similar trading conditions and circumstances. In particular, refinancing margins may prove to be particularly volatile for lower-quality or non- standard loan types.

When assessing the refinancing risk of a transaction, our EL Model builds in a cushion against this risk. However, the uncertainty surrounding refinancing risk means that we do not believe there is a very high certainty that any covered bond exposed to material levels of refinancing risk would receive all payments on a timely basis. This volatile risk is the primary reason that if a CB anchor falls below a certain level, the covered bond rating may start migrating to reflect the increased likelihood that refinancing risk will ultimately be realised. This is discussed further in the section on TPIs above and in Appendix F4 below.

Calculating the refinancing margins

When assessing the refinancing margins used in our rating approach we may consider various indicators including covered bond indices, spreads for government bonds, individual trading prices for covered bonds, government credit default swap premiums and spreads for non-covered bond instruments backed by assets similar to those found in cover pools backing covered bonds. In addition, we make jurisdiction and programme-specific adjustments to ensure consistent treatment within and between jurisdictions, and also to take into account programme-specific issues that may not be reflected in other data considered. In markets where covered bonds remain reasonably liquid, we normally size the average refinancing margin used in a jurisdiction from the relevant data to a level of confidence of at least 95%. In markets where covered or government bond trading is illiquid we may apply a set ceiling stress, which may be 1,000 bps.

The refinancing margin is determined through a two-step process:

» The base refinancing margin. We have base refinancing margins that generally apply to all covered bond programmes.

» The programme-specific adjustment. The base refinancing margin is then adjusted by a programme-specific adjustment that will take into account both jurisdiction-specific and programme-specific features.

1) Base refinancing margins

The following data are the annual base refinancing margins (in basis points rounded to the tenth of a bps) that we typically apply in our EL Model.

EXHIBIT 7

Base Refinancing Margins

	Residential Mortgages	Commercial Mortgages	Public-sector Loans
< 6 Months	100bps	130bps	50bps
> 6 Months	80bps	100bps	30bps

Source: Moody's Investors Service

The three columns represent the three most prominent collateral types found in cover pools. The rows refer to the time available to complete refinancing.

By way of example from the data, consider the following scenarios and conclusions:

» In circumstances where a refinancing needs to be completed within six months of the CB anchor event, our EL Model will apply a base refinancing margin to the cover pool of residential mortgages in an amount of around 100 basis points.

» In circumstances where a refinancing needs to be completed in a period of more than six months following the CB anchor event, our EL Model will apply a base refinancing margin to the cover pool of residential mortgages in an amount of around 80 basis points.

A further stress may be applied to refinancing margins for those cover pools that require refinancing within a period of less than four months following a CB anchor event. In these circumstances, the refinancing margins may increase by up to the following amounts:

EXHIBIT 8

Refinancing Stress

Refinancing Stress Increase	Time Available to Complete Refinancing
100%	Up to two months
75%	From two up to three months
50%	From three up to four months
25%	From four up to six months

Source: Moody's Investors Service

If a CB anchor event occurs a very short period before a covered bond is due, we may conclude that timely refinancing is not likely. In addition, for most covered bond programmes, we would expect an administrator to extend the servicing period past the due date of a covered bond if a sensible sales price could not be achieved by the maturity date. This has been considered in the sizing of refinancing margins (see Appendix F4).

2) Programme specific adjustments

We then make a programme-specific adjustment to all transactions, broken down into two steps: first we apply a jurisdiction-specific adjustment, and then we make further programme-specific adjustments.

Jurisdiction-specific adjustments (or multipliers) may take into account the typical programme structures found in a jurisdiction. The lowest jurisdiction multiplier we apply to covered bonds with material refinancing risk is that for Germany, where the base refinancing margin is doubled. Other jurisdictions have substantially higher multiples.

On top of the jurisdiction-specific adjustment, we then make a further transaction-specific adjustment. Individual transactions may have lower or higher multipliers (see list of adjustment factors considered at the start of this section). Higher multiples, in some cases substantially higher, are likely where cover pools comprise lower-quality or less standard asset types.

Appendix D2: Portion of Cover Pool Exposed to Refinancing Risk

The portion of the cover pool exposed to refinancing risk will depend on how well matched the principal collections from the assets in the cover pool are to the principal payments due on the covered bonds (the liabilities). This is sometimes referred to as asset liability matching.

A key consideration is how strong this asset liability matching will be following a CB anchor event. Effective matching today does not guarantee effective matching at time of a CB anchor event.

Asset liability matching may deteriorate markedly and quickly. For example, if an issuer decides to issue a material amount of covered bonds with short dated maturities, this may have an immediate and materially adverse effect on the matching in the programme. Given that the deterioration of matching is possible as an issuer's finances become increasingly stretched we usually limit the benefit given to the current matching under a covered bond programme, except to the extent this is legally binding. Other reasons that matching may change markedly over time include changes in the level of principal prepayments for assets in the cover pool and changes in the OC in the cover pool.

Given the uncertainties around the level of the potential gap in asset liability matching at the point of refinancing, we do not normally assume that the current matching gap in the programme will be the matching gap at the point of a CB anchor event. In those transactions with material refinancing risk and where matching is not legally binding, our EL Model typically assumes that a minimum of 50% of the cover pool is affected by refinancing risk.[35]

[35] An example of an exception is where an Asset Liability Matching gap is unlikely to deteriorate markedly within a short timeframe.

Appendix D3: Average Life of Refinancing Risk

Under our EL Model, the average life of the refinancing risk depends on the related timeframe over which a refinancing entity would have to fund the cover pool assets without being able to pass its cost of funds through to the obligors in the cover pool. For example, if the purchaser decides that the current margin generated by a pool of assets is 1% short of where the market is now pricing these, the purchaser may demand a 1% discount for each year of the remaining average life the cover pool. However, if the purchaser is able to pass any increased refinancing costs to the underlying obligors in the cover pool, the purchaser's exposure period could arguably be limited to how quickly it can do this.[36]

Consider the following examples. For all examples we assume that, at the time of refinancing, the entire cover pool is subjected to a refinancing margin of 2%, and in addition for each individual example we make the following additional inputs:

» For example 1: The cover pool comprises fixed-rate mortgages. The average life remaining before the fixed rate on these mortgages can be changed is 10 years.

» For example 2: The cover pool comprises floating-rate mortgages. The average life remaining before the rate on these mortgages can be changed is 15 years (this may be the case where a product has a rate linked to the central bank rate with a margin preset for the life of the loan).

» For example 3: The cover pool comprises floating-rate mortgages. The lender has the ability to reset the rate on these mortgages with 30 days' notice, and this right to reset the mortgage rate passes to any administrator or purchaser that may take over the cover pool.

» The amount of the cover pool that would be written off because of refinancing risk in these three examples is as follows:

  – In example 1: 2% * 10 = 20%

  – In example 2: 2% * 15 = 30%

  – In example 3: 2% * 30/360 = <0.2%

Our EL Model typically sets the minimum average life of refinancing risk at five years at the time of a CB anchor event.

[36] The average life is used for illustrative purposes as a proxy for the price sensitivity driven by refinancing and interest rate risk. Our EL Model takes into consideration the discounting of future cash flows when assessing such risks.

Appendix D4: Example: Calculating Refinancing Risk

This appendix presents a few simplified examples to show how the three main risk drivers can combine to show the effect of refinancing risk. A simplified illustration of how our EL Model calculates refinancing risk is as follows:

Refinancing risk = refinancing margin * amount of cover pool exposed * average life of refinancing risk

The matrix below calculates refinancing risk according to this formula using the inputs below in various combinations:

» Refinancing margin of 2% and 3% (see Appendix D1 for more information).

» Portion of cover pool affected is 50% and 100% (see Appendix D2 for further explanation).

» Average life of refinancing risk is 5 years and 10 years (see Appendix D3 for further explanation).

EXHIBIT 9

Examples of Refinancing Risk Calculation

Refinancing Margin	Portion of Cover Pool Affected	Average Life of Refinancing Risk	Refinancing Risk
2%	50%	5	5%
2%	50%	10	10%
2%	100%	5	10%
2%	100%	10	20%
3%	50%	5	7.5%
3%	50%	10	15%
3%	100%	5	15%
3%	100%	10	30%

Source: Moody's Investors Service

Appendix E1: Impact of Interest Rate and Currency Mismatches in our EL Model

Interest rate and currency mismatches between covered bonds and the cover pool may arise where the cover pool assets have different interest rates and rate durations, or different currency denominations, compared to the covered bonds.

Specific examples of some of the material interest rate and currency mismatches to which covered bonds are exposed are discussed below.

» Under our EL Model, analysis of interest rate and currency mismatches following a CB anchor event is undertaken in respect of two time periods as follows:

» Those mismatches that arise after a CB anchor event and prior to any refinancing of part or the whole of the cover pool.

» Those mismatches that arise on refinancing of part or the whole of the cover pool.

Interest rate and currency mismatches that arise after a CB anchor event and prior to any refinancing of the cover pool

During the period prior to the refinancing of the cover pool, our EL Model will assess whether any interest-rate and currency mismatches that arise may lead to an acceleration of the covered bonds. This may occur as follows:

» Mismatches may lead to cash flow deficiencies. For example, interest rate or currency movements might lead to collections from cover pool assets being insufficient to pay interest and/or, in the case of currency differences, principal on the covered bonds. A missed payment could in turn lead to acceleration of all payment obligations under the covered bonds, whether or not then due until then.

» Mismatches materialising may affect compliance with any matching test the covered bonds may be subject to. Failure of a matching test may lead to acceleration of payment obligations under the covered bonds. Typical methods of calculation for a matching test may include (1) notional value matching, which will not be affected by any changes in interest rates, but may be affected by changes in currency exchange rates and (2) net present value matching, which may be affected by both interest rate and currency exchange rate changes. Where net present value matching is applicable, our EL Model may recalculate the net present value of the cover pool and covered bonds on a periodic basis to check for failure of the matching test.

Interest rate and currency mismatches that arise on refinancing of the cover pool

Under our EL Model, if part or the whole of the cover pool is subject to refinancing either to meet the principal payment due on a covered bond or following acceleration, then various interest rate and currency mismatches may crystallise.

Our EL Model will measure the extent of the risk to the covered bonds in different ways depending on the nature of the mismatches.

Interest rate risks

The exposure to interest rate movements at the time of refinancing will depend on the mismatch that exists between covered bonds and the cover pool. Situations in which material levels of exposure to interest rate movements arise include:

» Where interest rates applicable to the collateral in the cover pool are based on a fixed rate with a long maturity (assuming no reset).

» Where interest rates applicable to (1) the collateral in the cover pool are either based on a short maturity or are floating; and (2) the covered bonds are based on a fixed rate with a long maturity (assuming no reset).

In the first bullet above, a loss on the cover pool may arise in respect of a rising interest rate environment. By contrast, in the second bullet, the loss to the cover pool may arise in respect of a falling interest rate environment. Our EL Model considers scenarios of both rising and falling interest rate environments and assumes application of the scenario with the more stressed result. Appendices E3 and E4 describe the levels of interest movements considered in our EL Model as well as setting out the relevant workings of our EL Model for exposure to interest rate risks. Appendix E4 provides an example of the effect of interest rate mismatches.

Currency risks

Currency risk at the time of refinancing depends on the level of currency mismatch between the assets and the liabilities at this time. Appendices E3 and E4 describe the levels of currency movement considered in our EL Model as well as setting out the relevant workings of our EL Model. Appendix E4 provides an example of the effect of currency mismatches.

Appendix E2: Hedging Arrangements

Our EL Model analyses the effect of interest-rate and currency mismatches that may arise between the covered bonds and the cover pool following a CB anchor event. There are two possible scenarios:

» Hedging in place, in which case the probability that bondholders will be exposed to the effect of market rate movements depends on the strength of the hedging arrangements and the likelihood that the issuer[37] will fail to make its swap payments.

No hedge in place, in which case we model the effect of market rate movements without the benefit of any hedging.

Probability of becoming unhedged following a CB anchor event

For the majority of covered bond transactions where we give value to swaps, we model some probability that hedging will be lost following a CB anchor event.

Hedging may be lost following a CB anchor event if: (1) the counterparty defaults and is not replaced; or (2) the issuer becomes a defaulting party under the swap.

Loss of hedging because of swap counterparty default

The key drivers for the probability of becoming unhedged because of counterparty default following a CB anchor event are:

» The probability that a swap counterparty will be replaced either before or shortly after it defaults, which principally depends on the applicable requirements for the counterparty to replace itself and/or post collateral upon breaching certain rating triggers.[38]

» Whether the swap counterparty is external or internal to the issuer group. If the swap is external to the issuer group, we generally express the benefit of joint support as a percentage representing the probability that the counterparty will default following a CB anchor event.

Loss of hedging because of issuer default

The key driver for the likelihood of a loss of hedging resulting from the issuer being a defaulting party under a swap is the probability that the issuer will have insufficient available cash to make timely swap payments following a CB anchor event. This would typically trigger a "failure to pay" event of default.

The likelihood of such an event is linked to the probability of a late payment on covered bonds, which is signalled by the TPI: the higher/lower the TPI, the lower/higher the probability of the covered bonds defaulting after a CB anchor event. For most covered bonds we assume that an issuer will fail to make its swap payments whenever it defaults on its payments to covered bonds and therefore the probability of a failure to pay event is generally a direct translation from the TPI. By way of exception, suitable provisions in the swap documents can reduce this probability.

An issuer may also become a defaulting party by reason of bankruptcy, cross default or default under specified transaction.[39] If the swap counterparty is external to the issuer group, and may therefore be a non-defaulting party following a CB anchor event, the application of any of these events of default - which are

[37] In this Appendix, the term 'issuer' acting as swap counterparty may not always refer to the issuer of the covered bonds itself. It may refer to an SPV in which the cover pool is ring-fenced for the benefit of covered bondholders and which enters into hedging arrangements.

[38] We generally determine the probability of such replacement in accordance with our cross-sector methodology for assessing counterparty risk, which expresses the value of replacement-enabling features in terms of notching uplifts. For this purpose we: (1) map the applicable notching uplift to a percentage; and (2) generally do not apply any notching haircut on account of inconsistencies between the swap documents and the linkage-related provisions of our model swap framework, as we expect issuers will take steps to ensure that downgraded counterparties take effective remedial action.

[39] Sections 5(a)(v),(vi) and (vii) of the ISDA Master Agreement.

typically disapplied in covered bonds transactions - presents an additional scenario in which the transaction may become unhedged.[40]

The occurrence of a swap event of default with respect to an issuer usually entitles the counterparty to terminate the swap. Therefore, we generally assume that the probability of becoming unhedged in connection with a particular event of default equals the probability of that event occurring. However, we do not expect that a counterparty will terminate a swap if it would be required to make a termination payment. Therefore, if there is a good prospect of a swap being out-of-the-money for the counterparty at the time of issuer default, we reduce the probability of becoming unhedged by 50%.[41]

Severity of loss resulting from becoming unhedged following a CB anchor event

We estimate the loss resulting from becoming unhedged by stressing the evolution of relevant market variables over the unhedged period. Where hedging is lost because of a failure to pay, we assume an unhedged period of up to six months, being the expected time from failure to pay to liquidation of the cover pool. In all other cases, we assume an unhedged period equal to the weighted average life of the covered bonds.

[40] We expect that any replacement swap will exclude these events of default, in line with general market practice.

[41] Where the issuer is rated A3 or above, we generally apply this reduction even if the swap is presently in the money for the counterparty.

Appendix E3: Interest Rate and Currency Stresses

Interest rate stresses

The level of interest rate stress used in our EL Model depends on the exposure period.[42] This period is the length of time during which we assume that covered bonds will be exposed to changes in interest rates. The base rates used in our EL Model over different exposure periods are, approximately:

EXHIBIT 10

Base Cumulative Interest Rate Changes

Exposure Period (years)	Cumulative Interest Rate Increase/Decrease
1	1.65%
2	2.25%
3	2.75%
4 and above	3.00%

Source: Moody's Investors Service

To understand two particular results from the table:

» Our EL Model may increase and decrease interest rates by an average of around 3% when the exposure period is five years.

» Our EL Model may increase and decrease interest rates by an average of around 2.25% when the exposure period is two years.

Our EL Model looks separately at the effect of the increasing and decreasing interest rates on the expected loss of the covered bonds and takes the path of interest rates that leads to the harsher result on the expected loss of the covered bonds. This is because covered bonds will be affected differently by varying interest rate environments, depending on whether the cover pool or covered bonds are subject to fixed or floating rates of interest, and the duration gap between covered bonds and the cover pool.

To understand the effect of the interest rate changes in Exhibit 10 above on our EL Model, Appendix E4 provides a simplified illustration of how these might be seen to affect the loss on the cover pool at the time of refinancing.

Currency stresses

The stress applied by our EL Model to currency mismatches also depends on the length of time assumed for the exposure period, except that for currency risks this may be the period between a CB anchor event and the time of refinancing of the cover pool (as matching tests may ensure currency rate risks are hedged up to the point of a CB anchor event). Examples of base currency stresses that may be applied are as follows:

EXHIBIT 11

Cumulative Adverse Currency Exchange Rate Movements

Exposure Period (In Years)	Cumulative Adverse Currency Exchange Rate Movements
1	15%
2	25%
3 and above	30%

Source: Moody's Investors Service

[42] The exposure period will usually be determined by the type of matching test that is being run by the issuer. So, for example (1) In those circumstances where the matching test that is applied prior to a CB anchor event is based on net present values (or an equivalent approach), the exposure period will extend from the point of the CB anchor event until the time of refinance of the cover pool; (2) In those circumstances where the matching test that is applied prior to the CB anchor event is not based on net present values (or an equivalent approach), the exposure period will extend from the time of issue of covered bonds until the time of refinance of the cover pool.

For both interest rate and currency movements, our EL Model assumes that movements in interest rates or currencies do not increase linearly over time. Given this tendency, our EL Model caps exposure to currency and interest rate risks at the three and four year stress levels respectively.

The interest rate and currency stresses above are indicative of the base stresses that we may use in our EL Model. Where interest rate and currency risks are particularly material and a key determinant of the overall losses in our EL Model, we may apply higher stresses.

Appendix E4: Example: Calculating Interest rate and Currency Risk

This appendix presents a few simplified examples to show how the three main risk drivers can combine to show the effect of interest rate and currency risk. A simplified illustration of how our EL Model calculates interest rate and currency risk is as follows:

» For interest rate risk: interest rate movement * level of mismatch * average life of interest risk.

» For currency risk: currency movement * level of mismatch.

The matrix below calculates interest rate and currency risk according to this formula using the inputs below in various combinations:

» Interest rate movements are 1.65% and 3% (see Appendix E3 for more information).

» Currency movements are 5% and 30% (see Appendix E3 for more information).

» Level of mismatch is 10% and 100%.

And for interest risk only:

» Average life of Interest rate risk is 5 years and 10 years.

EXHIBIT 12

Interest rate Risk

Interest rate Movement		Level of Mismatch		Average Life of Interest rate Risk		Interest rate Risk
1.65%	*	10%	*	5	=	0.8%
1.65%	*	10%	*	10	=	1.6%
1.65%	*	100%	*	5	=	8.2%
1.65%	*	100%	*	10	=	16.5%
3%	*	10%	*	5	=	1.5%
3%	*	10%	*	10	=	3.0%
3%	*	100%	*	5	=	15.0%
3%	*	100%	*	10	=	30.0%

Source: Moody's Investors Service

EXHIBIT 13

Currency Risk

Currency Movement		Level of Mismatch		Currency Risk
5%	*	10%	=	0.5%
30%	*	10%	=	3.0%
5%	*	100%	=	5.0%
30%	*	100%	=	30.0%

Source: Moody's Investors Service

Appendix F1: Other Adjustments to EL Model

There are a number of further ways in which we may adjust our EL Model, by the rating committee, to either allow for flexibility in programmes or recognise particular risks. Examples include:

» Our EL Model is such that the issuer has a certain amount of leeway when issuing covered bonds of different maturities. We generally assume that the issuer will require flexibility to issue covered bonds of different maturities over time.

» We may adjust the collateral score to assume a certain limited deterioration in cover pool quality. This may, for example, be the case when we expect that lower-quality collateral will be included in the cover pool in the future.

» Our EL Model may limit the benefit from the gross margin generated by the cover pool to our current view on the long-term sustainable margin.

» We may model risks in a way which assumes that only the pro-rata share of any covered bond's OC is available to it. Following a CB anchor event, an administrator of the cover pool might have the power to use all or a disproportionate amount of OC to pay down a single covered bond, even though there may be later-maturing covered bonds.

» When assessing interest rate risk, our EL Model assumes that the base interest rate is set at a long-term average level. The level of interest rate stress that a covered bond programme will experience under our EL Model is a function of this base interest rate.

» Our EL Model contains some general assumptions on a range of various indicators, such as the potential ranges of average lives of refinancing, interest rate and currency risks, the potential ranges of prepayment rates, interest rates, margins and risk horizons. These assumptions are usually set in ranges around long-term averages, although the assumptions may vary as needed by programme. For example, prepayment rates may be set assuming a certain CPR for variable-rate residential mortgage loans, although a range around this level corresponding to observed CPR volatility may be considered. Long-term interest rate and margin assumptions reflect historical averages and volatilities, as well as our forward-looking views, as do margins. As with interest rates, we generally use a common assumption with respect to covered bond tenor, although variations may be employed as needed.

Appendix F2: Over-Collateralisation – Committed and Uncommitted

We distinguish between OC in the cover pool which is committed and uncommitted.

Committed OC

We generally regard OC as committed if the issuer has an obligation to maintain it at the committed level prior to a CB anchor event. Applicable legislation or the terms of the programme may create this obligation. When assessing whether OC is committed, we may take into account different types of obligations in the context of the relevant jurisdiction. However, the nature of the commitment should normally be that the OC commitment cannot be reversed or reduced at the discretion of the issuer without the issuer (or its directors) facing material negative consequences.[43]

Uncommitted OC

Uncommitted OC may be removed at the issuer's discretion in the course of its operations. Uncommitted OC may also be removed at the behest of a third party with authority or influence over the issuer, such as a court or regulator. In general, removal of uncommitted OC will be subject to few, if any, constraints and no material legal impediments.

In the period running up to an issuer failure, uncommitted OC may be particularly vulnerable. The directors of the issuer may decide to remove such OC voluntarily or in order to meet their duties as directors to maintain the solvency of the issuer. For example, the issuer may remove cover pool assets to use them as collateral to raise funds via repo in the market or with the central bank.

Following a CB anchor event, we normally expect uncommitted OC to remain in the cover pool. At this stage uncommitted OC may be subject to further legal provisions, such as a requirement to release "excess" cover pool assets to pay unsecured creditors. We assess such provisions on a case-by-case basis.

Cases where we may give full value for uncommitted OC

We may give full value to uncommitted OC when conditions (1) and (2) below are met:

(1) the CB anchor is A3 or above;

(2) the covered bonds are issued under a specific covered bond law

For certain jurisdictions with covered bond laws that rely on (1) a specific contractual structure being in place; and (2) mechanisms for segregation of the cover pool and treatment of cash flows on the occurrence of a CB anchor event that are established primarily by contractual documents, we may give no value to uncommitted OC.

Cases where we may give some value for uncommitted OC

Where only condition (2) of the preceding section is met (and so we do not give full value for uncommitted OC), we may give some value to available uncommitted OC, provided that the covered bond rating is below Aaa.

The value we may give for uncommitted OC in such cases is typically limited to a one to two notch uplift of the covered bond rating over and above the rating that would be achievable if the EL Model gave no value to uncommitted OC (subject to any TPI constraint). Considerations as to the amount of benefit we would

[43] Examples of where committed OC could potentially be removed prior to a CB anchor event include: (1) where OC may be removed if we no longer rate the relevant issuer's covered bonds; (2) where OC may be reduced once all covered bonds issued with an original rating that relied upon the (previous) higher OC level have been repaid, leaving only covered bonds issued with an original rating consistent with reduced committed OC; (3) where the OC can be removed if the issuer attains a CB anchor level at which we may give full reliance to uncommitted OC; (4) where bondholders allow the OC to be removed/reduced; and (5) where, following the OC removal, the EL Model results are consistent with the rating assigned when the committed OC was put in place. These examples are for illustration as we would consider all factors relevant to the commitment on a case-by-case basis.

give to the uncommitted OC include (1) the strength of regulatory oversight under the covered bond law;(2) the systemic importance of the covered bonds; (3) the amount of collateral available; and (4) the ease with which collateral may be moved into and out of the cover pool prior to a CB anchor event.

Appendix F3: Timely Payment Indicators

A TPI is our assessment of the likelihood that timely payments will be made to covered bondholders following a CB anchor event. A key factor in determining the TPI for a programme is the existence of refinancing risk. Refinancing risk may arise whenever the maturities of covered bonds are shorter than the maturities of cover pool assets. Additional factors may increase or reduce refinancing risk, and in some cases present additional risks to timely payment. We discuss these determinants of TPIs in more detail below.

Determinants of TPIs

TPIs vary from programme to programme. The main factors we consider when determining TPIs are:

» refinancing risk

» strength of legislation or contract

» government and financial market support

» hedging

» assets type

» other factors

Factor 1: Refinancing Risk

The repayment of principal may rely on funds being raised against the cover pool, creating refinancing risk. Furthermore, other risks to timely payments may trigger or otherwise exacerbate refinancing risk.

Refinancing risk constrains TPIs because of the many uncertainties that are likely to arise if cover pool assets need to be refinanced following a CB anchor event. For example, following a CB anchor event the financial system may be stressed and cover pool assets illiquid. In such an environment it may be unclear whether there are any buyers or persons willing to provide funding for the cover pool. Additionally, it is difficult to determine whether a refinancing would be successful and at what price. In addition, any delay or failure to refinance the cover pool assets to create liquid funds to repay covered bondholders and other senior creditors could lead to missed payments or a default of the covered bonds. If a default or late payment occurred the covered bonds may accelerate or be subject to an asset fire-sale, further increasing the risk of losses to investors. As a consequence of considerations such as these we usually do not assign TPIs of Very High unless significant mitigants to refinancing riskexist.

One example of a covered bond where refinancing risk is restricted is the pass-through bond. Following a CB anchor event, these bonds only repay principal when equivalent cash flows are received from the cover pool, placing limited reliance on the timely raising of finance. Covered bonds that are not subject to the TPI framework would include pass-through features (see Appendix F4 for more details).

Factor 2: Strength of Legislation/Contract

The strength of the covered bond legislation (and any relevant general legislation) or contractual provisions that apply in a covered bond jurisdiction may have a material effect on our assessment of the TPIs.

The law or contracts supporting a programme may contain a number of arrangements which may ease the process of making payments to bondholders on a timely basis. These may include provisions that give greater flexibility for refinancing to make principal payments, for example:

A minimum refinancing period

» A refinancing period would give an administrator an opportunity to organise financing for any principal payments due. This may be achieved through extended legal maturity (soft bullet) or pre-maturity test (hard bullet).

Ability of Administrator to

» Sell whole or part of pool: the administrator is empowered to sell the whole or a part of the cover pool in order to make a principal payment.

» Borrow against the pool: the administrator is empowered to borrow funds against the cover pool in order to make a principal payment.

» Sell the pool and covered bonds as a package: the administrator is empowered to sell the cover pool and covered bonds to a third party that will take over the operation of the programme.

» Borrowing against the pool ranks senior: if the administrator can borrow against the cover pool, and this additional borrowing ranks senior to the covered bonds, then borrowing should be easier to arrange as the lender benefits from stronger security.

Provisions that reduce the risk that funds will not be available generally for timely payment, for example

» Coverage of commingling: legal or contractual provisions might address commingling risk giving the administrator of the cover pool clear legal rights and operational access to cover pool proceeds.

» NPV test: up until a CB anchor event, this test should ensure that the projected cash flows from the cover pool over the life of the cover pool assets exceed the amounts due on the covered bonds over their life. This test is only a very general indicator of the potential support for timely payment.

» Periodic matching test: while the issuer performs, this test should ensure that, for each period of the outstanding life of the covered bonds, the projected cash flows from the cover pool exceed the amounts due on the covered bonds, at least on an interest basis.

» Dedicated liquidity reserves: provisions that require the issuer to hold a certain amount of liquid assets to ensure it can meet its short-term liabilities following a CB anchor event. These may be in the form of either a segregated reserve (in cash or liquid assets) or a mechanism or trigger to create or build up such a reserve.

Provisions that strengthen further the role and powers of the administrator, for example

» Covered bond law specifies the ability to appoint the administrator pre-CB anchor event: the ability to pre-appoint an administrator may grant the administrator additional time in which to organise payments to covered bondholders when they fall due post CB anchor event.

» Dedicated administrator to service covered bondholders: the ability to appoint a dedicated cover pool administrator may reduce the conflicts of duty of a general administrator. It may be less valuable, however, if the general administrator can impede the operations of the cover pool administrator.

» Government-related body acts as servicer of last resort: provision for this in the law should ensure there is a servicer available to run the cover pool should no other party be found to take on this obligation.

» Contractual provisions included in the documentation that provide for the appointment of a back-up administrator, servicer and/or cash manager upon certain trigger events.

Factor 3: Government and Financial Market Support

Following a CB anchor event, payments on covered bonds may be supported by third party intervention from authorities or financial market participants. Typically, such intervention is based on avoiding a deeply discounted sale of the underlying assets and/or default on the covered bonds caused by insufficient liquidity. We usually assume this type of support will be more likely in jurisdictions where covered bonds are an important funding tool with a strong performance history.[44] Furthermore, in such high support jurisdictions, if the covered bond law itself is also stronger than average the two factors together may strongly underpin the setting of the TPI (see Factor 2: Strength of legislation/contract).

However, the support described above may not be available in jurisdictions where the sovereign is not highly rated and, as a result of their constrained finances, the government and financial institutions may be less able to support timely payments to covered bondholders. The cost of funds may have become prohibitively high, or other priorities might restrict the ability to arrange liquidity finance. Furthermore, the strength of the financial system in general may be negatively affected as sovereign creditworthiness weakens, as the strength of the sovereign determines the ability of the sovereign to provide support to the financial system.

Factor 4: Hedging

Hedging arrangements may positively or negatively affect the TPI. While the presence of swaps may be credit positive for a programme, from a timely payment perspective swaps may have a negative impact. The reasons for this include the risk that swaps may hinder the sale of the assets or liabilities where such a sale requires the consent of the swap counterparty, which may not be forthcoming. This risk may negatively impact or even cap a TPI, in particular where the programme is exposed to either material interest rate or currency risks.

In addition, where the issuer or an entity in the issuer group provides a swap, we may consider this as limiting the benefit of the swap for TPI purposes.

Factor 5: Type of Assets

The type of collateral backing a transaction will also affect the TPI, because some assets are easier to sell following a CB anchor event. In particular, this will be the case where assets comprise traded bonds and where these bonds are backed by a highly rated government (or similar) guarantee.

The type of collateral may be an important driver of the TPI. For example, where material refinancing risk exists and we believe that it is highly unlikely cover pool assets will be sold in a timely manner, the TPI may be Very Improbable, regardless of other mitigating features.

Factor 6: Other Factors

There are many other factors that may influence the TPI assessment and the application of TPIs. Examples of other factors include:

» Informal timely payment arrangements. As discussed above, timely payment of principal may be provided through law or by contract – for example, through an extended refinancing period (see Factor 3: Strength of legislation/contract above). If this is not the case, we may also give benefit to liquidity gap analysis where this shows that cash flows (including principal redemptions) are adequately covered by a combination of expected payment receipts and suitably liquid assets. For these purposes, we may consider highly rated public-sector loans to be suitably liquid assets. However, where these arrangements are not considered committed, this benefit may be limited.

[44] Although in practice, this type of support has been provided in a number of jurisdictions where covered bonds have not had this importance.

- **Correlation between the performance of the issuer and the cover pool.** The less reliant the issuer is on the cover pool asset performance, the higher the probability that timely payments will continue following a CB anchor event.
- **Additional OC.** The TPI determines the maximum rating that a covered bond programme can achieve with its current structure and allowing for the addition of a reasonable amount of OC. However, large amounts of OC may allow for case-by-case adjustments, particularly for lower-rated issuers.
- **Current credit position.** When applying the TPI framework, the current credit position of a covered bond may be more relevant for lower-rated issuers than for higher-rated issuers, and lead to a wider range of rating outcomes. One reason for this is that we may conclude that lower-rated issuers are less able to actively manage the credit risks in a covered bond than higher-rated issuers. For lower-rated issuers, we therefore place more focus on factors that may impact the current credit position of the covered bond.

Appendix F4: Analysis of TPI-delinked Covered Bonds

Non-application of the TPI framework

For covered bonds with certain features we may not apply the TPI framework and, as a result, these covered bonds would be materially delinked from the issuer's CB anchor ("TPI de-linkage"). For a covered bond that is TPI-delinked, we would typically give limited recognition to the issuer's role or support function as described in Appendices A1 and B1. However, to account for highly rated issuers' ongoing support for the cover pool, we would typically continue to apply the haircut to the collateral score.

Achieving TPI de-linkage

There are two main reasons why we apply the TPI framework to covered bonds: (1) refinancing risk; and (2) the role of the issuer.[45]

For a covered bond to achieve TPI de-linkage we consider whether refinancing risk and the risks around the role of the issuer have been sufficiently neutralised to negate their impact on the covered bonds. Broadly, we may apply TPI de-linkage where we conclude that such risks have been removed or reduced to the same level as in an equivalent securitisation transaction.

Refinancing risk[46]

For refinancing risk to be removed sufficiently to achieve TPI de-linkage we consider whether refinancing risk has been reduced to the level typical of a securitisation transaction. Principal repayments in securitisation transactions are normally based on the cash flows received from the assets, thus creating an internal liquidity source for repayment and avoiding the need to find any alternative liquidity source. An equivalent outcome may be achieved for a covered bond where the typical hard or soft bullet repayment of principal is replaced with a pass-through, or conditional pass-through structure. Such a structure makes repayment of principal after a CB anchor event conditional upon receiving equivalent cash flows from the assets.[47]

The adoption of a pass-through or equivalent structure[48] for a covered bond can only remove refinancing risk if the structure is sufficiently robust. In particular, we consider investors' exposure to operational risks, such as risks to cash flow management or servicing. We discuss operational risks further below.

Role of the issuer

Covered bonds are linked to the role of the issuer because of (1) the impact the issuer can have on the programme prior to a CB anchor event (issuer discretion) and (2) the impact of the issuer's insolvency[49] itself on the covered bonds (legal/operational/counterparty risks).

[45] See Part 2 – TPI Framework for further details.

[46] See Appendix F3: Timely Payment Indicators for further details.

[47] Payments of principal may be pass-through from inception or become pass-through upon a CB anchor event, however prior to the CB anchor event the bondholders would continue to benefit from the issuer's obligation to make the principal payments.

[48] An alternative method to achieve a pass-through structure that allows a more certain timing of principal payments is matching the maturity profiles of cover pool assets and covered bond liabilities. For long-paying assets such as mortgage loans, this may be achievable for highly seasoned pools that generate sufficient principal receipts to cover principal payments on covered bonds. Such an asset/liability profile may take considerable time to achieve and require a high degree of ongoing maintenance. We view asset/liability matching as a possible casualty of an stressed funding environment (see Appendix D2). Hence, we may consider that asset/liability matching can remove refinancing risk, but only if the issuer is legally and credibly committed to maintaining it to within a comfortable margin.

[49] Assuming issuer insolvency leads to a CB anchor event.

Issuer discretion

Until a CB anchor event, the issuer can materially change the nature of its covered bond programme thereby affecting the cover pool's credit quality as well as overall market risks.

Broadly, we will consider that for TPI de-linkage the use of structural features equivalent to those found in securitisations can sufficiently mitigate the risk of the issuer making credit-negative choices. Examples of features that are typically used to mitigate sponsor discretion in a master trust are commitments from the sponsor (seller, servicer, cash manager etc.) to:

» not issue further notes if this would negatively impact the credit quality of existing notes;

» ensure a certain level of hedging, with appropriate mitigation of counterparty risk, is in place in relation to the assets and/or any note that is issued;

» in relation to material changes to the programme such as the addition of a seller, change in counterparty, addition of contracts, structural changes etc., ensure that such alterations do not negatively impact the credit quality of existing notes;

» in relation to new assets added to the cover pool, ensure such assets comply with strict eligibility criteria[50] and, where applicable, concentration limits or other relevant criteria;

» in relation to the cover pool generally, comply with credit quality parameters, tests and triggers to maintain credit quality. For example, a minimum yield trigger, or a minimum score for overall asset quality. Breach of such tests may prevent further asset acquisition/note issuance.

The above examples are not exhaustive and we assess all features present in the structure on a case-by-case basis.[51] For example, if some risks linked to issuer discretion are not covered we may model these risks.[52]

Operational, counterparty and legal risk at issuer insolvency

Operational, counterparty and legal risks that come into play upon an issuer insolvency (assuming a CB anchor event occurs) can normally be traced back to the disruption and legal impact of insolvency proceedings on the covered bond programme. Certain features typically in place in securitisation transactions can mitigate these risks. Examples of such features include:

OPERATIONAL AND COUNTERPARTY RISKS

» disruption to servicing or cash management: mitigated by contemplation of a back-up servicer, or back-up servicer facilitator, and back-up cash manager upon certain credit-linked trigger levels;

» short-term cash flow disruption: some liquidity may be held within the transaction, for example by including a liquidity reserve;

» termination of swap agreements because of counterparty risk: swap criteria are used to assess the degree of linkage to counterparty risk;

» default by an account bank: inclusion of credit-linked triggers for replacement of account banks;

[50] Such eligibility criteria would generally be more restrictive than under a typical covered bond law. However we may still take into account covered bond law provisions that, for example, restricted LTVs on mortgage-backed assets (LTV restrictions are not common in RMBS transactions).

[51] For more information, see our methodology for rating RMBS using the MILAN framework. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section. Further, as a TPI delinked covered bond's credit quality is likely to depend more on the cash flows from the underlying assets compared to a traditional covered bond, we may from the outset undertake the same level of asset analysis as for an equivalent securitisation transaction. This could involve agreed-upon procedures (AUP) where data on underlying loans are checked by a reputable audit firm on a significant sample.

[52] We may take an approach whereby we assume certain asset/liability characteristics (e.g., interest rates, foreign exchange exposure) are stressed to the level permitted by the covered bond law, or other relevant parameters, and model whether the transaction has the level of OC necessary to cover future deterioration up to the level of such stresses/parameters.

LEGAL RISKS

» Set-off risk: may be mitigated through the use of some form of reserve, or we may otherwise assess it. In some cases, the covered bond law prohibits set-off.[53]

» Commingling risk: if the issuer enters insolvency proceedings, collections relating to cover pool assets may become commingled with the issuer's other funds if they flow through the same account. The funds may then be retained in the issuer's insolvency estate as unsecured claims. This risk may be mitigated, for example by redirecting obligor payments into a segregated account upon a trigger, or we may model this risk.[54]

» Claw-back risk: transfers of assets or cash to the cover pool may be challenged in an issuer's insolvency proceedings under claw-back laws. Typical features that mitigate this risk in securitisation transactions would be requirements that any assets be purchased for a fair value and for solvency certificates from the seller.

Analysis of legal risks may be similar to the equivalent analysis for covered bonds that are TPI linked. However, we may assume a higher level of mitigation will be necessary where legal risks may threaten timely payments.

Risks and benefits specific to covered bonds

For TPI delinked covered bonds there may be covered-bond specific risks that require additional consideration. In these cases, we consider the following potential additional risks and benefits and assess the inter-play between the relevant covered bond law and the transaction's structural features.

Risks may arise if (1) the cover pool is not legally and operationally isolated to the same extent as if it was held by a special-purpose vehicle; or (2) the relevant covered bond law might prevent any de-linkage feature from taking effect, e.g., if the issuer's administrator did not permit a back-up servicer to take over the management of the cover pool.

Conversely, covered bond laws may provide certain benefits that remove or reduce the need to have contractual arrangements in place to address certain risks. Examples could be prohibitions on set-off, removal of claw-back risk, and duties on the issuer's administrator to protect the interest of covered bondholders.

EL Modelling

Where a covered bond achieves TPI de-linkage, we may modify or substitute our EL Model to take account of the reduced level of linkage to the issuer. Accordingly, we may make the following adjustments to our modelling:

» remove the value we would otherwise attribute to the issuer's primary obligation to make payments under the covered bonds. This payment obligation relies on the issuer's credit strength and therefore is a primary source of linkage to the issuer in our EL Model;[55]

» remove the refinancing-risk component from our quantitative modelling, as we would not expect this risk to feature in a delinked structure;

» only give credit in our modelling for the level of OC that is either (1) in place in a form we consider committed; or (2) required under the covered bond law.

[53] For more information, see our cross-sector methodology for assessing counterparty risk in structured finance, including set-off risk. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[54] For more information, see our cross-sector methodology for assessing counterparty risk in structured finance, including commingling risk. A link to a list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

[55] As a result, for the cash flow modelling of certain TPI-delinked transactions, we may use the modelling approach and loss benchmarks described in the relevant methodology for an underlying asset class instead of using our EL model. A list of our sector and cross-sector methodologies can be found in the "Moody's Related Publications" section.

Combining linked and delinked rating approaches

Under our approach, TPIs and TPI de-linkage are not mutually exclusive over time. For instance, covered bond programmes that are initially rated on a linked basis due for example to limited OC - even if the structure includes structural de-linkage features (including a pass-through or conditional pass through structure or equivalent) - may subsequently move to a delinked rating provided that the level of OC is then commensurate with the covered bond rating under this approach.

Appendix G: Covered Bond Ratings that are Lower than the Ratings that would Otherwise be Assigned Pursuant to the EL Model and TPI Framework

In some cases, the covered bond rating may be lower than the rating that would otherwise be assigned pursuant to the EL model and TPI framework (as applicable).[56] This may be the case regardless of whether covered bonds are issued under a covered bond legal framework.

The following examples illustrate circumstances that make it more likely that a rating committee will assign a rating that is lower than would otherwise be achievable, and that is typically only one or two notches above the CB anchor.

Structural, legal and operational features: material uncertainties as to the effectiveness of the segregation of and access to the cover pool on the occurrence of a CB anchor event. For instance:

- there may be material uncertainty as to whether mechanisms embodied in the transaction documentation or in the law will successfully ensure full and timely access to the cover pool after a CB anchor event, in particular if the issuer is subject to insolvency proceedings. In certain structures, we may consider that the probability of default of the covered bonds is the same as the CB anchor, and the uplift that the covered bond rating can achieve over the CB anchor would primarily result from the expected recoveries on the cover pool;
- it may be difficult to assess the losses for covered bondholders due to the claims of other creditors that rank prior to or equal with the covered bonds;
- there may be a material risk of servicing disruption after a CB anchor event.[57]

Collateral value and refinancing risk: material uncertainties around the market value of the collateral in the cover pool after a CB anchor event. For instance:

- it may be very difficult to assess collateral value and refinancing risk in a stressed environment due to factors such as high volatility of historic market prices, cross-currency volatilities or significant changes in the market over time;
- we may receive limited information that we can use to monitor the cover pool value;
- there may be a very high correlation between the issuer's credit quality and the cover pool value.

Multiple uncertainties: combination of multiple uncertainties impacting significant factors that we consider in our analysis. If multiple uncertainties are present, we may consider that the combined effect of these uncertainties means we are unable to assign the ratings that would otherwise be achievable.

The above examples are not exhaustive, and we assess risks present in a covered bond programme on a case-by-case basis.

[56] This appendix may also apply to transactions outside the TPI framework (as per Appendix F4).

[57] For example, if the credit quality of potential alternative servicers is weak or unknown.

Moody's Related Publications

Credit ratings are primarily determined through the application of sector credit rating methodologies. Certain broad methodological considerations (described in one or more cross-sector rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments. A list of sector and cross-sector credit rating methodologies can be found here.

For data summarizing the historical robustness and predictive power of credit ratings, please click here.

For further information, please refer to *Rating Symbols and Definitions*, which includes a discussion of Moody's Idealized Probabilities of Default and Expected Losses, and which is available here.

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