MOODY'S
INVESTORS SERVICE

RATING METHODOLOGY

Moody's Rating Approach to Covered Bonds

Table of Contents

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» contacts continued on the last page

INTRODUCTION

This report presents an in-depth description of Moody's current methodology for covered bond ratings. This methodology has not required material revision since it was first published in 2005 (Moody's Rating Approach to European Covered Bonds), having proved robust during recent times of market stress.

However, the report brings together for the first time in a single publication the various elements of the methodology, some of which have been the subject of separate publications over the last five years. In addition, some features of the methodology have been adjusted, such as refinancing margins, and some, such as Timely Payment Indicators, have been explained more transparently. Details of these are on page 2 under "*What has changed since the 2005 Report?*".

This report also further improves transparency by disclosing more information on the key risk components that could impact the collateral backing the covered bonds (the "**Cover Pool**") following Issuer Default[1]. Examples of these include:

» We publish the average write-off that we apply in our modelling to Cover Pools across all covered bond programmes due to (i) the credit quality of the Cover Pool; and (ii) the refinancing of the Cover Pool and interest and currency mismatches. In doing so, we highlight that the losses modelled for both refinancing the Cover Pool and interest and currency mismatches are more material than those modelled due to the credit quality of the Cover Pool.

» We break down refinancing risk into its component parts. For instance, *Appendix D4* contains a number of examples that illustrate the three components that are taken into account when assessing refinancing risk. These three components are: (i) refinancing margins; (ii) the portion of the Cover Pool exposed to refinancing risk; and (iii) the average life of refinancing risk. If any one of these components is low, the level of refinancing risk being modelled will be low.

SUMMARY OF COVERED BOND METHODOLOGY[2]

Moody's rating for a covered bond is determined after applying a two-step process:

» We arrive at a rating for the bond using our expected loss method, employing a largely quantitative calculation of expected loss under the Moody's Expected Loss Covered Bond Rating Model ("**Moody's EL Model**").

» We may then cap the rating arrived at using Moody's expected loss method by applying our **Timely Payment Indicator** ("**TPI**") framework. The maximum rating that can be achieved under Moody's TPI framework is referred to as the **TPI Cap**.

At present, the large majority of ratings are determined solely by Moody's EL Model because for most programmes the TPI Cap is currently Aaa.

MOODY'S EL MODEL

A covered bond benefits from (i) a promise to pay by the Issuer; and (ii) in the event of an "**Issuer Default**"[3], the economic benefit of a pool of collateral (the "**value of the Cover Pool**")[4].

Moody's EL Model takes both these benefits into account. Under Moody's EL Model, while the Issuer performs its payment obligations, there will be no loss to covered bondholders. It is only following Issuer Default that Moody's EL Model switches to the analysis of the value of the Cover Pool, the key features of which include:

» The credit quality of the collateral in the Cover Pool;

» Refinancing risk in the event that funds need to be raised against the Cover Pool; and

» Any interest rate or currency mismatches.

Moody's considers each of these factors in the stressful environment that is expected to follow an Issuer Default.

The value of the Cover Pool is always expected to be positive. Therefore, the covered bonds are typically rated higher than the Issuer[5].

MOODY'S TIMELY PAYMENT INDICATOR (OR "TPI")

A TPI is Moody's assessment of how likely a covered bond is to receive timely payments following Issuer Default and ranges from "Very High" to "Very Improbable". Under our TPI framework, a TPI determines the maximum number of rating levels by which a covered bond rating can exceed the rating of the underlying Issuer.[6] The maximum rating that is achievable under the TPI framework is referred to as the **TPI Cap**.

Through the TPI, Moody's covered bond ratings are linked to the rating of the underlying Issuer. Moody's has to date not rated any covered bond as "delinked" from the underlying Issuer.

A number of factors are relevant to determining a TPI, but refinancing risk is particularly important. To date Moody's has not assigned its highest TPI score of Very High to any covered bond that is exposed to material levels of refinancing risk.

WHAT HAS CHANGED SINCE THE 2005 REPORT?

This report incorporates information from the following publications:

» Refinancing risk updates published in February 2008 and April 2009[7]. In these updates, Moody's increased the refinancing margins and simplified the application of these margins in our methodology. The impact of these changes is mainly seen in Appendices D1 to D4. The only rating impact following these changes was that the covered bonds in a single programme were downgraded to Aa1 from Aaa.

» Timely Payment in Covered Bonds following Sponsor Bank Default, published in March 2008. Moody's only assigns its highest ratings to covered bonds where these are also supported by a highly rated Issuer. This report focused on explaining why we have always rated covered bonds as a product linked to the underlying Issuer and how different covered bond ratings may be expected to react if the rating of the underlying Issuer changes. The majority of the report is now incorporated into this in-depth rating methodology.

» Moody's Assessment of Swaps as Hedges in the Covered Bond Market, published in September 2008. This report summarised our assessment of the protection provided by a swap against interest and/or currency risk into six key credit questions, and also discussed our modelling approach to swaps. The aspects relating most directly to Moody's modelling approach are reproduced in Appendix E2.

MOODY'S RATING APPROACH FOR COVERED BONDS

The primary determinant of a Moody's covered bond rating is the expected loss as measured under Moody's EL Model. This calculates the probability of an Issuer Default and the subsequent losses (if any) to the covered bonds. Following Issuer Default the value of the Cover Pool, and therefore any losses, will be determined assuming a stressed environment.

Moody's EL Model looks at a covered bond on a month-by-month basis from its date of issue through to its legal final maturity. For each month, Moody's calculates the probability of an Issuer Default based on the Issuer's senior unsecured rating[8] and the loss (if any) to the covered bonds following such default. The probability of Issuer Default in each month is then multiplied by the relevant loss (if any) for that month to give the expected loss to covered bond investors for each month.

These amounts are then discounted and the discounted numbers summed for each month from the time of issue of the covered bond to its legal final maturity.

The resulting number gives the expected loss to the covered bond, on which Moody's rating is based (see *Appendix A1* for a worked example of how Moody's EL Model combines the benefit of an Issuer's probability of default with the value of the Cover Pool to reach a rating on the covered bonds).

In Moody's approach, an Issuer Default is assumed to have the effect of creating a stand-alone Cover Pool that may need to be administered by a newly appointed party. It is important to stress that Issuer Default does not necessarily mean there has been a default on the covered bonds. In most programmes we expect that an administrator (or its delegate) would manage the Cover Pool following an Issuer Default. Further, in some structures (a) an Issuer may be a limited purpose company set up for the purpose of operating the covered bond programme, in which case Issuer Default would typically refer to the default of a bank that was supporting the Issuer; or (b) the Cover Pool may be held by an special purpose company (SPC)[9] which guarantees payments on the covered bonds. In these cases neither the Issuer nor the SPC would necessarily be expected to follow the supporting bank into insolvency.

The loss following Issuer Default will depend on (i) primarily, the value of the Cover Pool in relation to the outstanding covered bonds and (ii) potentially, any outstanding claim against the Issuer or swap counterparties. The analysis of the value of the Cover Pool will be considered in the context of the Issuer Default and thus assumes a stressed environment. In assessing the value of the Cover Pool, Moody's considers (i) the credit quality of the Cover Pool, (ii) the refinancing risk if funds need to be raised against the Cover Pool, and (iii) any interest rate and currency risk to which the Cover Pool is exposed. Analysis of (i) to (iii) will include consideration of any impact of legislative provisions and contractual commitments, which includes the role of an administrator in administering cashflows and servicing the Cover Pool as well as any incremental cost of such process.

Moody's EL Model thus comprises the following four key categories, which are each briefly discussed below as well as in more detail under similar headings in the Appendices.

Prior to Issuer Default:

» **Credit strength of the Issuer.**

And, following Issuer Default, and together making up the value of the Cover Pool:

» **Credit quality of the Cover Pool.**

» **Refinancing the Cover Pool.**

» **Interest rate and currency mismatches.**

The first step in determining a Moody's covered bond rating is the **Moody's EL Model,** but there is a second step whereby this rating may be capped within a set number of notches from the rating of the underlying Issuer. This is discussed further under **Timely Payment Indicators** below.

Credit Strength of Issuer

While the Issuer performs its obligations, Moody's EL Model assumes there will be no loss to investors.

Given the Issuer's obligation to make payments under the covered bonds, Moody's EL Model assumes that the probability of default on the covered bonds will be no higher than the default probability of the underlying Issuer[10]. During the life of a covered bond, Moody's EL Model calculates the probability of Issuer Default based on the Issuer's senior unsecured rating. Moody's EL Model assumes that when the Issuer performs its obligations throughout the life of the covered bond there will be no loss to investors. However, in the event of an Issuer Default, the analysis switches to the Cover Pool and, if applicable, any unsecured claim against the Issuer.[11]

When rating covered bonds, the Moody's EL Model takes into account various Issuer and Issuer group-related benefits in addition to the senior unsecured rating of the Issuer. These are discussed in *Appendix B1*, and *Appendix A1* demonstrates with examples the practical application of such benefits in Moody's EL Model.

Not every covered bond Issuer has a senior unsecured rating from Moody's. Some covered bond Issuers may be unrated special purpose entities that specialise in the issuance of covered bonds on behalf of the owner bank or grouping of banks, whereas other Issuers may have private (i.e. non-published) monitored ratings[12]. In the case of the former, equivalent covered bond Issuer ratings are determined from (i) the ratings of the owner bank(s) and (ii) the strength of the linkage between the issuing entity and the owner bank(s). Please see

Moody's rating methodology "Moody's Approach to Rating Financial Entities Specialised in Issuing Covered Bonds" (August 2009)[13] for further explanation.

The decision whether to publish the rating is at the discretion of the Issuer. Moody's considers publication desirable in the interests of improving transparency and understanding of its covered bond ratings.

Value of the Cover Pool

It is only following Issuer Default that Moody's EL Model switches to the analysis of the value of the Cover Pool. The analysis of the value of the Cover Pool will be considered in the context of the Issuer Default and thus assumes a stressed environment.

Part 1 – Credit Quality of the Cover Pool

The credit quality of the Cover Pool determines the amount of the Cover Pool written off due to credit deterioration after Issuer Default. It is measured by the Collateral Score of the Cover Pool assets.

The credit quality of the Cover Pool determines the amount of loss due to credit deterioration on the assets in the Cover Pool that Moody's EL Model assumes will accrue after an Issuer Default. The credit quality of the Cover Pool may also impact the level of refinancing risk modelled under Moody's EL Model – lower-quality or non-standard asset types in the Cover Pool may suffer greater refinancing risk than higher-quality or more standard asset types.

The credit quality of the Cover Pool is measured by the **Collateral Score**. The Collateral Score is Moody's opinion of how much credit enhancement is needed to protect against the credit deterioration of assets in a Cover Pool in order to reach a theoretical Aaa expected loss, assuming those assets are otherwise unsupported. The higher the credit quality of the Cover Pool, the lower the Collateral Score.

Determinants of the Collateral Score for mortgage-backed covered bonds may include:[14]

» **Affordability underwriting** applied to a borrower taking out a loan, in particular the cash flow cover in the case of residential and commercial mortgages. The eligibility criteria in general have few limitations on the income underwriting of loans. However, in the majority of covered bond programmes, income from a borrower or property is verified to an independent source, and confirmed to be sufficient to cover both interest and principal over the life of the loan.[15]

» **Loan to value ("LTV")**. The LTV affects both the frequency and severity of default. Covered bond programmes generally have extensive protections on LTV levels, with most covered bonds issued against only the first 80% of the valuation (or below) of a residential property, or 60% of the valuation for a commercial property. However, these limits may have a lower value where over-collateralisation may be in the form of assets above these LTV thresholds.

» **Quality of the valuation.** The credit protection from conservative LTVs will be impacted by the quality of the valuation of the property securing the loan. In some markets, the covered bond law details the requirements for valuations. In other markets, the eligibility criteria offer limited protection on the quality of valuations.[16]

Determinants of the Collateral Score for public-sector covered bonds may include:[17]

» **Credit strength of the public-sector entities.** Public-sector covered bonds are typically backed by claims against public-sector entities or debt guaranteed by such entities.

» **Concentration in the Cover Pool:** Concentration, both in terms of geographical and borrower concentration impacts the risk profile of a Cover Pool. The likelihood of significant losses increases with the level of concentration.

A risk faced by the majority of covered bondholders is substitution risk. Moody's may assess a Cover Pool based on its current strength.[18] However, the quality of the assets in the Cover Pool (reflected in the Collateral Score) may be subject to change over time as new assets are added to the Cover Pool.

In some instances, a good level of protection is afforded by legislations and structures – in particular, in terms of loan to value tests. However, substitution tests are generally less effective at guarding against other characteristics – such as a deterioration in income underwriting standards – and, anyway, no substitution test comprehensively guards against any deterioration in the quality of the Cover Pool due to substitution.

Moody's may monitor a Cover Pool with increasing frequency as the underlying Issuer is downgraded.[19] See *Appendices C1-C4* for further details of how Moody's assesses the credit quality of the Cover Pool.

The average Collateral Score used in Moody's EL Model is around 12.3% for Cover Pools backed by residential and commercial mortgage collateral, and 7.8% for Cover Pools backed by public sector assets.[20] These numbers exclude the losses that are modelled due to refinancing risk and interest and currency risk, which are both discussed, in turn, below.

Part 2 – Refinancing the Cover Pool

The repayment of principal may rely on funds being raised against the Cover Pool – creating refinancing risk. At what price will these funds be raised? The inherent volatility of refinancing is the primary reason for the application of Moody's TPI framework.

Following an Issuer Default, the repayment of principal may rely on funds being raised against the Cover Pool, thus creating refinancing risk. The reason for this is that the expected maturity of the assets in the Cover Pool is generally longer than that of the covered bonds. In other words, the "natural" amortisation of the Cover Pool assets may not be sufficient to repay principal under the covered bonds.

Where the "natural" amortisation of Cover Pool assets alone cannot be relied on to repay principal, Moody's EL Model assumes that funds must be raised against the Cover Pool, most likely at a discount to the notional value of the Cover Pool. When sizing this discount, it should be considered that the funds must be raised in the environment following the default of the Issuer. This is likely to be a stressed environment.

Under Moody's EL Model, the level of refinancing risk in a Cover Pool is determined by the following three components:

» **The refinancing margin**. The higher the refinancing risk, the greater the refinancing margin. Under Moody's EL Model, the refinancing margins are, on average, around 3.4% for mortgage-backed and 1.8% for public sector-backed covered bonds (annualized). Further, refinancing margins vary by more than a factor of three across all jurisdictions. Refinancing margins assumed in Moody's EL Model are considered further in *Appendix D1*.

» **The portion of the Cover Pool exposed to refinancing risk**. The higher the amount 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, ***Moody's EL Model typically assumes that this amount is in excess of 50% of the Cover Pool***. A further description is set out in *Appendix D2*.

» **The average life of the refinancing risk** – this refers to the average remaining life of the Cover Pool at time of refinancing. The longer the average life, the greater the refinancing risk. Under Moody's EL Model, the average life is typically set at a minimum of 5 years at the time of Issuer Default. In many transactions, this average life is substantially longer than 5 years. A further explanation can be found in *Appendix D3*.

A simplified illustration of how Moody's EL Model calculates refinancing risk is as follows:

*refinancing margin * portion of Cover Pool exposed to refinancing risk * average life of refinancing risk*

All of these three factors thus play a critical role in assessing refinancing risk. A simplified example in *Appendix D4* shows how the loss on the Cover Pool due to refinancing risk may be calculated.

By assessing refinancing risk in a transaction, Moody's EL Model builds in a cushion against this risk. The average loss modelled into Moody's EL Model for both refinancing risk and interest and currency mismatches is around 15.5% for Cover Pools backed by residential and commercial mortgage collateral, and 12.7% for Cover Pools backed by public-sector debt[21]. Numbers per transaction vary widely per transaction. These losses are over and above those resulting from the credit quality of the Cover Pool.

While Moody's EL Model incorporates provision against refinancing risk, it is primarily due to the volatile nature of refinancing risk that Moody's has always capped the rating uplift of a covered bond over and above the rating of the underlying Issuer. Moody's has never assigned its highest ratings to any covered bond that lacks the support of a highly rated Issuer. This is discussed further under Timely Payment Indicators below.

Part 3 – Interest Rate and Currency Mismatches

Mismatches may arise from the different durations and different payment promises made on the Cover Pool assets and the covered bonds. Moody's considers how much rates may move, how much of the Cover Pool/covered bonds are affected and the period of exposure.

Following an Issuer Default, investors in covered bonds may be exposed to interest rate and currency mismatches which may arise from the different durations and different payment promises made on the Cover Pool assets and the covered bonds.

Under Moody's EL Model, the level of interest rate and currency risks is determined by the following components:

» **The size of interest rate (or currency) movement**. The size of such movement is likely to be greater the longer the exposure to any mismatch. The length of exposure is typically measured from the point at which a mismatch first materialises (which may be the date a swap terminates) to the point in time at which the value of the Cover Pool is realised (which may be the date the Cover Pool is sold). While interest rate and currency mismatches may revert over time, larger movements are increasingly likely over longer time periods. The length of exposure to any interest rate and currency mismatch depends on the specific characteristics of the covered bonds and the Cover Pool backing the covered bonds and, in addition, the hedging

arrangements in place. Examples of interest rate and currency stresses are found in *Appendix E3*.

» **The portion of the assets with interest rate (or currency) mismatches**. The greater the percentage of the covered bonds and/or Cover Pool exposed to interest rate or currency mismatches, the higher the additional risk. Moody's 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 the Cover Pool is sold. This means that the level of interest rate (or currency) mismatches may increase or decrease as new assets are added to the Cover Pool or new covered bonds are issued.

» **The average life of the mismatch** (in the case of interest rate risk only). This is the remaining average life of the interest rate mismatch that is expected at the time of refinance. The longer the average life of the interest rate mismatch, the greater the credit risk. Moody's EL Model generally sets the average life based on the current composition of the Cover Pool, although the modeled average life may increase or decrease as new assets are added to the Cover Pool. However, Moody's EL Model does assume a minimum average life of assets of 5 years at point of Issuer Default and may also take into account any expected deterioration in the average life of any mismatch.

A simplified illustration of how Moody's 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 rate risk*

For 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. A simplified example in *Appendix E4* shows how the loss on the Cover Pool due to interest rate and currency risks may be calculated.

The average loss modelled into Moody's EL Model for both refinancing risk and interest rate and currency risk is discussed under *Part 2 - Refinancing the Cover Pool* above.

Appendix E1 provides a fuller explanation of the role played by interest rate and currency mismatches, *Appendix E2* considers the role of hedging arrangements, and *Appendix E3* looks at the interest rate and currency movements applied under Moody's EL Model.

Part 4 – Summary

Summarising and combining the above results, the losses following Issuer Default that are, on average[22], modelled under Moody's EL Model are set out in Table 1 (see below for further explanation of the table):

TABLE 1

	POOL BACKED BY RESIDENTIAL & COMMERCIAL ASSETS	POOL BACKED BY PUBLIC-SECTOR ASSETS
Collateral Score Post Haircut	8.4%[23]	4.3%[24]
Refinancing Risk and Interest Rate & Currency Mismatch	15.5%	12.7%
Total	23.9%	17.0%

The "Collateral Score Post Haircut" is a reduced Collateral Score applied in certain circumstances, usually to recognise the enhanced role of a highly-rated Issuer (for details see *Appendices C2 and C3*). Further, the numbers above include additional losses, that are modelled for certain programmes, related to legal risks such as set-off and commingling or other occasional risks not captured by the above analysis.

Timely Payment Indicators (or TPIs)

A TPI measures the likelihood of timely payments to covered bondholders following Issuer Default. The TPI determines the maximum number of rating levels by which a covered bond rating can exceed the rating of the underlying Issuer. Following Issuer Default, the single most important risk to timely payment for most programmes is the existence of refinancing risk.

A "Timely Payment Indicator" or "TPI" is Moody's assessment of the likelihood that timely payment of interest and principal would continue to be made to covered bondholders following Issuer Default. TPIs range from "Very High" to "Very Improbable". A TPI of "Very High", for example, simply means that in Moody's view there is a very high likelihood of timely payments on covered bonds following Issuer Default.

TPIs are always determined in relation to the time following Issuer Default. As long as the Issuer is solvent and performing, there should be no question of timely payments not being made on the covered bonds. Therefore Moody's believes that having a highly rated financial institution backing a covered bond programme is an important benefit. Indeed, we have not assigned our highest ratings to any covered bond that was not backed by a highly rated Issuer. It is following Issuer Default that risks to timely payment arise. Following Issuer Default the Issuer can no longer be relied on and payments to bondholders will therefore rely on external support, liquidity and the legal/contractual framework to support timely payment from the Cover Pool.

Following Issuer Default, the single most important risk to timely payment for most programmes is the existence of refinancing risk. Refinancing risk was discussed under the Refinancing Risk section above and is the primary reason Moody's applies the TPI framework. We recognise that refinancing risk cannot be quantified to a Aaa level of confidence and therefore, in the absence of a highly rated Issuer, we will not maintain a **Aaa** rating on a bond where material refinancing risk exists.

Other risks to timely payment include:

» Failure of servicing and cash management – back-up arrangements (if they exist) are rarely fully operational from the outset.

» Events of default and/or termination of swaps – few examples exist of "perfect" swaps. Further, 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 under law or contract).

» Uncertainty whether features of a covered bond law intended to promote timely payments will work. Many of these features remain untested.

» The large amount of discretion that Issuers have to make changes to the programme as Cover Pool assets usually revolve and new contracts (in particular hedging contracts) may be entered into that could materially change the hedging and/or refinancing profile of the programme.

These and other risks are discussed in *Appendix F4*.

Unless TPI risks are mitigated, payments under covered bonds are likely to be delayed or missed and they may suffer a default in the aftermath of an Issuer Default. Features that mitigate TPI risks will differ between jurisdictions and individual transactions.

When assessing TPIs, Moody's applies a two-stage analysis:

» **Jurisdiction analysis.** We first consider the specific features that exist in the jurisdiction of issuance. These tend to be consistent across all or most programmes in the jurisdiction. An example of this would be under the Pfandbriefe law in Germany, where Issuers are required to maintain sufficient liquid assets to cover cash outflows over the subsequent six months.

» **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. An example would be the use of maturity extensions or reserve funds for individual programmes.

As a result, Moody's considers every covered bond programme in the context of the legal, structural and systemic framework in which it exists. TPI features that are generally consistent across jurisdictions are identified in *Appendix F4*, Table 1.

Rating Impact of a TPI

TPIs cap covered bond ratings to a certain number of rating levels above the Issuer rating. This is then the maximum rating achievable for the programme or **TPI Cap**.

The higher the TPI, the longer the covered bond can remain highly rated when the Issuer's rating falls. Conversely, for lower TPIs, the covered bond rating can be expected to fall sooner following a decline in the Issuer's rating. We sometimes refer to the TPI in this sense as the degree of "linkage" between the Issuer and the covered bonds.

The relationship between the Issuer rating, the TPI and the TPI Cap is set out in the table below

TABLE 2
Rating Constraints (TPI Caps)

ISSUER RATINGS	TIMELY PAYMENT INDICATORS					
	Very Improbable	Improbable	Probable	Probable-High	High	Very High
A1	**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	**Baa3**	**Baa2**	**Baa1**	**A3**	**A2**	**A1**
Ba2	**Baa3**	**Baa2**	**Baa1**	**A3**	**A2**	**A1**
Ba3	**Baa3**	**Baa2**	**Baa1**	**A3**	**A2**	**A1**
B1	**Ba3**	**Ba2**	**Ba1**	**Baa3**	**Baa2**	**Baa1**
B2	**Ba3**	**Ba2**	**Ba1**	**Baa3**	**Baa2**	**Baa1**
B3	**Ba3**	**Ba2**	**Ba1**	**Baa3**	**Baa2**	**Baa1**

How to read Table 2: on the x axis are the TPIs ranging from "Very Improbable" to "Very High". On the y axis are the ratings of the underlying Issuer. Looking at a couple of examples:

Example 1: If there is a limited likelihood of a timely payment on the covered bonds following an Issuer Default, a TPI of "Very Improbable" will be assigned. In this case, the TPI Cap would be extracted from under the column with a TPI of "Very Improbable". As seen in the table above, the TPI Cap also depends on the rating of the Issuer. An Issuer with a TPI of "Very Improbable" and a rating of less than A1 could not achieve a Aaa covered bond rating, regardless of the expected loss analysis.

Example 2: If the likelihood of a timely payment on the covered bonds following an Issuer Default is assessed as being "Probable-High", an Issuer rated Baa1 would have a TPI Cap of Aa1. Thus a Aaa covered bond rating could not be achieved, even if the expected loss analysis suggested a Aaa rating was appropriate.

Moody's Approach to TPIs in existing programmes

We publish TPIs in our quarterly performance overviews for each rated programme and these were also reproduced for all programmes in Moody's recently published covered bond year in review[25].

As the majority of covered bonds enjoy TPI Caps of Aaa, most of our covered bond ratings are determined by Moody's EL Model. Most programmes have a TPI of "Probable" or "Probable-High" and corresponding TPI Caps that remain Aaa as long as the Issuer is rated single-A or better. Programmes with the highest TPIs (such as "Very High" or "High") can retain a TPI Cap of Aaa Cap as long as the Issuer rating remains in the high Baa range.

In theory, it is possible for a programme to be fully de-linked from the Issuer's rating so that the TPI Cap always remains Aaa. However, to date, Moody's has not considered any TPI for a programme as strong enough to achieve this.

Appendix A1: The Expected Loss Approach – Dual Support

Under Moody's EL Model, the credit strength of the covered bonds is determined by the combination of (i) credit strength of the Issuer, and (ii) the value of the Cover Pool. The contribution from the Issuer includes the three components listed in *Appendix B1*, and the first of these is the Issuer's probability of default. The aim of this appendix is to show how Moody's EL Model combines an Issuer's probability of default with the expected value of the Cover Pool through a number of worked examples. It should be noted that the examples below are not intended to be a reflection of specific/particular circumstances, but rather illustrative of how these two components are combined in Moody's EL Model.

The examples are based on a number of assumptions which include the following, amongst others.

» The Issuer will have a senior unsecured long-term rating of either **A2** or **Baa2**.

» Following Issuer Default, recovery will arise only from the Cover Pool (i.e. no recovery is assumed from a full-recourse unsecured outstanding claim against the Issuer or, if relevant, other group companies or guarantors).

» The covered bond issued is a 'bullet bond' that has 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 over-collateralisation).

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

» For the purposes of the example, following Issuer Default, losses in respect of the Cover Pool are assumed at a level, respectively, of 3% and 12%[26] of the Cover Pool[27].

The examples will make use of Moody's idealised tables for probability of default ("Moody's PD Tables") and expected loss ("Moody's EL Tables"), which are included in this report in *Appendix F1*.

The results of the following four examples are shown below.

TABLE 1

Example 1: assumes Issuer rated	A2	And, following Issuer Default, losses on the Cover Pool	3%
Example 2: assumes Issuer rated	A2	And, following Issuer Default, losses on the Cover Pool	12%
Example 3: assumes Issuer rated	Baa2	And, following Issuer Default, losses on the Cover Pool	3%
Example 4: assumes Issuer rated	Baa2	And, following Issuer Default, losses on the Cover Pool	12%

To show how these results were obtained, Example 1 is considered.

The first step is to calculate the probabilities of default of the Issuer over the life of a three-year covered bond. These are taken from Moody's PD Tables, which are found in *Appendix F1*. As seen from this table, the probability of default of an **A2**-rated Issuer in one year is 0.011%, and the probability of this Issuer defaulting in year two is 0.059% (the probabilities in the Moody's PD Tables are cumulative, i.e. 0.070% - 0.011% = 0.059%).

For this example, the loss of the Cover Pool following Issuer Default is simply assumed to be 3%. To calculate the expected loss for each of the years of the life of the covered bond, the product of this 3% and the probability of default for each year is calculated. The aggregate expected loss is then calculated by summing the expected losses for each of the three years of the life of the covered bond. For simplicity in this example no discounting was applied to calculate the final expected loss.

This example is reproduced in table form below.

TABLE 2

YEAR	PROBABILITY OF ISSUER DEFAULT	LOSS ON COVER POOL FOLLOWING ISSUER DEFAULT	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%**

The cumulative expected loss of the covered bond is then mapped to the corresponding three-year rating in the Moody's EL Tables. In this case, this results in a **Aa1** rating, which is four notches above the Issuer's rating.

Accordingly, the following results arise from applying these steps to each example.

Example 1

a) Issuer senior unsecured rating **A2**

b) Loss in respect of Cover Pool 3%

c) Rating of covered bonds based on expected loss **Aa1**

d) Number of notches between a) and c) 4

Example 2

a) Issuer senior unsecured rating **A2**

b) Loss in respect of Cover Pool 12%

c) Rating of covered bonds based on expected loss **Aa3**

d) Number of notches between a) and c) 2

Example 3

a) Issuer senior unsecured rating **Baa2**

b) Loss in respect of Cover Pool 3%

c) Rating of covered bonds based on expected loss **Aa3**

d) Number of notches between a) and c) 5

Example 4

a) Issuer senior unsecured rating **Baa2**

b) Loss in respect of Cover Pool 12%

c) Rating of covered bonds based on expected loss **A2**

d) Number of notches between a) and c) 3

The above examples show how both the credit strength of the Issuer and the quality of the Cover Pool can impact the number of rating notches between the senior unsecured rating of the Issuer and the rating of the covered bonds.

These examples have assumed a certain level of loss on the Cover Pool following Issuer Default. The primary focus of the balance of this report is to describe in more detail how Moody's calculates this loss. The section on TPIs above and in *Appendix F4* explains how the numbers in (d) above may be separately limited by the application of Moody's TPI Caps.

Appendix B1: The Contributions of the Issuer

Moody's EL Model will take into account various Issuer or Issuer group-related benefits when rating covered bonds. The following may be considered in this respect.

» The probability of default of the Issuer. The minimum rating that a covered bond should achieve is equivalent to the probability of default of the Issuer backing the covered bond. Moody's EL Model calculates the probability of Issuer Default during the life of the covered bonds, and assumes that, prior to an Issuer Default, the Issuer will perform its payment obligations under the covered bond programme. Moody's therefore assumes there can be no losses to covered bond investors as long as there is no Issuer Default.
The way this benefit is incorporated into Moody's EL Model is discussed in *Appendix A1*.

» The "haircut" to the Collateral Score. One of the key inputs into Moody's EL Model is the credit quality of the Cover Pool, which is measured by a Collateral Score. For highly rated Issuers, a "haircut" may be applied to this Collateral Score, which effectively means that Moody's EL Model assumes that a lower level of losses would be modelled as a result of the credit deterioration of the Cover Pool than are implied by the stand-alone Collateral Score. A 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. 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 and/or default. The Issuer may also be required by law or contract to add further loans into the Cover Pool should valuations of assets fall. See *Appendices C2 and C3* for a discussion of the Collateral Score haircut.

» Any recoveries from a senior unsecured claim against the Issuer. Under Moody's EL Model, loss following Issuer Default may take into account, amongst other considerations, any full-recourse unsecured outstanding claim against the Issuer (and, if relevant, other group companies, or guarantors), if applicable[28]. This claim may follow any realisation of the Cover Pool.

Appendix C1: The Collateral Score

One of the key inputs into Moody's EL Model is the credit quality of the Cover Pool. The Cover Pool's credit quality will be assessed as part of Moody's analysis, and a score (Collateral Score) calculated and determined based on a number of assumptions and considerations. This Collateral Score (after any applicable haircut – see *Appendix C2* below) then determines the level of losses assumed to arise after Issuer Default in Moody's EL Model. Under the model, these losses are assumed to occur equally over the four years following Issuer Default. The Collateral Score is calculated by Moody's 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 also the jurisdiction or market in which it is located.

The Collateral Score can be seen as a representation of how much credit enhancement may be required to protect the **Aaa** rating of otherwise unsupported assets against a credit deterioration of the assets in the Cover Pool. The higher the credit quality of the Cover Pool, the lower the Collateral Score. Limiting the analysis to the credit deterioration of the assets in the Cover Pool means 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 are allowed to amortise naturally over their term); and

» There are no interest and currency mismatches between the Cover Pool and the covered bonds.

So, for example, assuming that the credit enhancement required for such a Cover Pool to achieve a **Aaa** rating is 5%, the Collateral Score would be 5%. The higher the credit quality of the Cover Pool, the lower the enhancement required to protect against a credit deterioration of the assets and therefore the lower the Collateral Score.

The rank-ordering of Collateral Scores between different asset types will typically be as follows (ranging from Collateral Scores of highest credit quality to lowest credit quality).

» Public-sector obligations.

» Residential mortgages.

» Commercial mortgages.

However, in many transactions there are exceptions to this rank ordering. For further information on Collateral Scores for specific transactions see Moody's quarterly Performance Overviews.

Appendix C2: What are Haircuts to Collateral Scores?

For certain investment-grade Issuers, Moody's may reduce the stress imposed on the credit quality of the Cover Pool, or in other words apply a "haircut" to the Collateral Score. The haircut will apply either:

» as a result of the covered bond rating; or

» independently of the covered bond rating.

Haircuts that Result from the Covered Bond Rating

When assigning an initial rating which is lower than **Aaa**, Moody's may use a Collateral Score that represents the enhancement consistent with a risk level lower than **Aaa**. Moody's will not apply this type of haircut where covered bonds suffer from material levels of refinancing risk, due to the high level of volatility around refinancing risk.

Haircuts that are Independent from the Covered Bond Rating

Regardless of the covered bond rating, Moody's may apply a haircut to the Collateral Score. The primary reason for this, as discussed under *Appendix B1* above, is that an Issuer normally provides 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 loans in arrears and/or in default. Accordingly, prior to Issuer Default, 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 large majority of cases where ratings of covered bonds have come under pressure, Issuers have added additional enhancement to Cover Pools. These are important benefits that have not been incorporated in other parts of Moody's EL Model.

Further reasons for the haircut include:

» Not every Issuer Default will expose the Cover Pool to a **Aaa** stress scenario. An Issuer could default for reasons other than the stressed performance of the collateral in the Cover Pool.

» In determining the stress, Moody's will give value to the Issuer's status as a regulated entity and any expected benefits that accrue from this. This may be the case even where we consider the credit quality of the Issuer to be highly correlated to the Cover Pool.

Haircuts are normally limited to highly rated Issuers. The reason for this is that the higher the senior unsecured rating of the Issuer, the greater is its capacity to protect the Cover Pool from credit deterioration and other impairments.

The level of the haircut and the method for calculation of the Collateral Score haircuts are further described in *Appendix C3*.

Appendix C3: The Haircuts to Collateral Scores

Moody's may apply a haircut to the Collateral Score. The application and size of the haircut depend on, amongst other things:

» the level of correlation between the Issuer and the Cover Pool;

» the rating of the Issuer; and

» whether the transaction suffers from refinancing risk.

The following general rules apply to haircuts to Collateral Scores where a transaction is exposed to material levels of refinancing risk (i.e. programmes under which liabilities with bullet maturities are issued):

1) HIGH (STANDARD) CORRELATION (currently applied to mortgage-backed covered bonds)

Under high (which Moody's considers standard) correlation, the haircut applied to the Collateral Score will be either 0% or 33%.

The 33% haircut may be applied in the following situations:

i. When the covered bond rating is **Aaa**, if the rating of the Issuer is **A3** or above;

ii. When the covered bond rating is below **Aaa**, where the Issuer is investment grade rated.

2) LOW CORRELATION (currently applied to public sector-backed covered bonds)

Under low correlation, the haircut applied to the Collateral Score is 0%, 33%, 45% or 50%. When covered bonds are rated **Aaa**, haircuts will be limited to 0%, 33% or 45%.

The 50% haircut may be applied in the following situation:

iii. When the covered bond rating is **Aa1** or below, if the rating of the Issuer is **Baa3** or above;

The 45% haircut may be applied in the following situation:

iv. When the covered bond rating is **Aaa**, if the rating of the Issuer is **A3** or above;

The 33% haircut may be applied in the following situation:

v. When the covered bond rating is **Aaa**, if the rating of the Issuer is in the **Baa** range.

Exception: Further haircuts may be applied in the case where a transaction suffers no or minimal refinancing risk.

A simple example of the effect of the haircut to the Collateral Score on **Aaa** enhancement under Moody's EL Model is given below. It is based on the following assumptions

» the covered bond rating is **Aaa**

» the Issuer rating is initially **A2** at T(0) and is subsequently downgraded to **Baa1** at T(+1)

» the Collateral Score is 10%

» there is high correlation between the Issuer and the Cover Pool

TABLE 1

TIME	ISSUER RATING	COLLATERAL SCORE	HAIRCUT	POST-HAIRCUT COLLATERAL SCORE
T(0)	A2	10%	33%	6.7%
T(+1)	Baa1	10%	0%	10%

The post-haircut Collateral Score would be then be used in Moody's EL Model as the loss on the assets in the Cover Pool due to credit quality deterioration.

Appendix D1: The Refinancing Margins

The refinancing margin may be seen as the annual discount that a purchaser would require before acquiring the assets in the Cover Pool. In Moody's EL Model, the determination of refinancing margins will take into account the following considerations, amongst others:

» Legislation and contract-specific considerations. For those jurisdictions where the legislation or structure is more/less supportive than others of the process of sale of collateral in the Cover Pool following Issuer Default, refinancing margins may be correspondingly lowered/increased. 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 (see *Table 1* in *Appendix F4* for a jurisdiction-by-jurisdiction analysis).

» 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 impact 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.

» The time period available for completion of the refinancing**.** Higher refinancing margins are assumed in Moody's EL Model, if the time period to complete refinance is six months or less. This may arise where Issuer Default occurs within six months of the legal final maturity of any covered bonds.

» The type and quality of collateral in the Cover Pool**.** In Moody's experience and as shown in historical data, 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, Moody's EL Model builds in a cushion against this risk. However, the uncertainty surrounding refinancing risk means that Moody's does not believe there is a very high certainty that any covered bond exposed to refinancing risk would receive all payments on a timely basis. This volatile risk is the primary reason that covered bond ratings rely so heavily on Issuer ratings, and the main reason why if an Issuer rating falls below a certain rating level, a Moody's covered bond rating may start migrating. This is discussed further in the section on TPIs above and in *Appendix F4, Timely Payment Indicators* below.

Calculating the Refinancing Margins

When assessing the refinancing margins used in Moody's rating approach, the primary reference points used are:

» for mortgage-backed covered bonds, covered bond trading indices; and

» for public sector-backed covered bonds, covered bond trading indices and trading levels for public sector debt.

Moody's also considers a number of further reference points when sizing refinancing margins, particularly where information on covered bond trading indices and public sector debt levels is more limited. These may include individual trading prices for covered bonds, government CDS premiums, and RMBS spread levels. We also make jurisdiction and deal-specific adjustments to ensure consistent treatment within and between jurisdictions, and also to take into account deal specific issues that may not be reflected in data that relies on indices. We look to size refinancing margins to a confidence level of at least 95% based on data available.

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

» The **Base Refinancing Margin.** Moody's has base refinancing margins that generally apply to all covered bond programmes.

» The **Deal-Specific Adjustment**. The base refinancing margin is then adjusted by a deal-specific adjustment that will take into account both jurisdiction-specific and deal-specific features.

1) Base Refinancing Margins

The following data are the annual base refinancing margins (in basis points) that are applied in Moody's EL Model.

TABLE 1

	RESIDENTIAL MORTGAGES	COMMERCIAL MORTGAGES	PUBLIC SECTOR LOANS
< 6 MONTHS	100bps	130bps	50bps
> 6 MONTHS	80bps	100bps	30bps

The following may be considered in respect of the above data.

» 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 6 months of the Issuer Default, Moody's 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 greater than 6 months following the Issuer Default, Moody's 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 Issuer Default. In these circumstances, the refinancing margins may increase by up to the following amounts:

TABLE 2

REFINANCING STRESS	TIME AVAILABLE TO COMPLETE REFINANCING
100%	One Month
75%	Two Months
50%	Three Months
25%	Four Months

If an Issuer Default occurs a very short period before a covered bond is due, we may conclude that timely refinancing is not possible. 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 also *Appendix F4, Moody's Timely Payment Indicators*).

2) Deal-Specific Adjustments

A deal-specific adjustment is then made to all transactions. These can be broken down into two steps: first a jurisdiction-specific adjustment is applied, and then further transaction-specific adjustments are made.

Jurisdiction-specific adjustments (or multipliers) may take into account the typical deal structures found in a jurisdiction. The lowest jurisdiction multiplier is that applied to Germany, which doubles the base refinancing margin. Some mainstream jurisdictions assessed as having higher refinancing risk have been assessed to have much higher jurisdiction multipliers, in some cases tripling and quadrupling the base refinancing margins.

On top of the jurisdiction-specific adjustment, a further transaction-specific adjustment is then made. 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 expected where Cover Pools are made up of lower-quality or less standard asset types.

3) Current Refinancing Margins

The average refinancing margins currently used in Moody's EL Model across some of the major covered bonds markets are around[29]:

» For mortgage-backed covered bonds: France 180bps; Germany 180bps; Italy 400bps; Netherlands 260bps; Norway 180bps; Portugal 330bps; Spain 370bps; Sweden 200bps; and UK 370bps.

» For public sector-backed covered bonds: Austria 250bps; France 140bps; Germany 100bps; and Spain 250bps.

These "averages" have been calculated in two steps.

Step 1: First the "average" refinancing margin across all scenarios modelled for an individual covered bond programme is calculated (note that refinancing margins may vary by over 100 percentage points across different scenarios for the same covered bond depending on the length of time to complete refinancing in any given scenario).

Step 2: Then to calculate the average refinancing margin for a jurisdiction, the mean of all the "averages" determined in step 1 is computed.

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 Matching will be following Issuer Default. Just because effective Matching is in place currently, would it be prudent to assume that this would continue to be the case at the time of Issuer Default? It is following Issuer Default that refinancing risk will become a concern to investors. Prior to Issuer Default, the Issuer will be responsible for addressing any Matching gaps.

Asset Liability Matching may deteriorate markedly and quickly. For example, if an Issuer decides to issue further short-dated jumbo covered bonds, this may have an immediate and materially adverse impact on this Matching in a covered bond programme. During the early stages of the current credit crunch, a number of Issuers took advantage of one of the only funding tools then available: issuing short-dated covered bonds even when this weakened the Matching across the covered bond programme. Given that the deterioration of Matching is expected as an Issuer's finances become increasingly stretched, Moody's typically limits the benefit given to the current Matching under a covered bond programme except to the extent this is contractually committed. Other reasons why Matching may change markedly over time include the extent of principal prepayments for assets in the Cover Pool and the over-collateralisation in the Cover Pool, both of which may change over time.

Given the uncertainties around the level of the potential Matching gap at the point of Issuer Default, Moody's does not assume that the current Matching gap in the programme will be the Matching gap at the point of Issuer Default. In those transactions that suffer from material refinancing risk (i.e. in programmes under which liabilities with bullet maturities are issued) and where Matching is not contractually committed, Moody's EL Model typically assumes that a **minimum of 50% of the Cover Pool is affected by refinancing risk**.[30]

Appendix D3: Average Life of Refinancing Risk

Under Moody's EL Model, the average life of the refinancing risk depends on the length of the related risk faced by the purchaser of (all or part of) 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 refinance costs to the underlying borrowers in the Cover Pool, the purchaser's exposed period could be argued to be limited to how quickly he/she can pass on any stressed refinancing cost onto the underlying borrowers.[31]

Consider the following examples. For all examples it is assumed that, at the time of refinance, the entire Cover Pool is subjected to a refinancing margin of 2%, and in addition for each individual example, the following additional assumptions are made:

» For example 1: The Cover Pool is made up of 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 is made up of 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 is made up of 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 is written off due to 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%

Moody's EL Model typically sets the minimum average life of refinancing risk at 5 years at the time of Issuer Default. The reason for this is to ensure that a reasonable discount for refinancing is built into programmes that have Cover Pools with short average lives.

Appendix D4: Example: Calculating Refinancing Risk

This appendix presents a few simplified examples to show how the three main risk drivers can be combined to show the impact of refinancing risk. A simplified illustration of how Moody's 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 assumptions 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).

TABLE 1

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%

Appendix E1: Impact of Mismatches in Moody's EL Model

Interest rate and currency mismatches between covered bonds and the Cover Pool may arise from the different payment promises and durations made on the Cover Pool and 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 Moody's EL Model, analysis of interest rate and currency mismatches following Issuer Default is undertaken in respect of two time periods as follows:

» Those mismatches that arise after Issuer Default 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 Issuer Default and prior to any refinancing of the Cover Pool

During the period prior to the refinancing of the Cover Pool, Moody's EL Model will assess whether interest rate and currency mismatches materialising may lead to an acceleration of the covered bonds. This may arise as follows:

» Cash flow deficiencies may result from mismatches materialising. For example, interest rate or currency movements might lead to collections being below that required to pay interest (in the case of interest rate and currency differences) and principal (in the case of currency differences) 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.

» Mismatches materialising may affect matching test compliance under the covered bonds, failure of which may lead to acceleration of payment obligations under the covered bonds. The applicable approach to calculating any matching tests will be set out in the relevant legislation or contractual arrangements for the covered bonds. Methods of calculation may include:

  - Notional value matching, which will not be affected by any changes in interest rates (but may be affected by changes in currency exchange rates).
  - Net present value matching, which may be affected by both interest rate and currency exchange rate changes.

Where net present value matching is applicable, Moody's EL Model will 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 and currency mismatches arising on refinancing of the Cover Pool

Under Moody's 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.

Moody's 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 refinance will depend on the mismatch that exists between the covered bonds and the Cover Pool. Situations in which material levels of exposure to interest rate movements arise include the following:

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

» Due to reinvestment risk, where interest rates applicable to (i) the collateral in the Cover Pool are either based on a short maturity or are floating, and (ii) 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 above, the loss to the Cover Pool may arise in respect of a falling interest rate environment. Moody's 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 Moody's EL Model as well as setting out the relevant workings of Moody's EL Model for exposure to interest rate risks. *Appendix E4* provides an example of the impact of interest rate mismatches.

Currency risks

Currency risk at the time of refinance 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 Moody's EL Model as well as setting out the relevant workings of Moody's EL Model. *Appendix E4* provides an example of the impact of currency mismatches.

Appendix E2: Hedging Arrangements

Moody's EL Model will analyse the interest rate and currency mismatches that may arise between the covered bonds and the Cover Pool following Issuer Default. Consideration will be given under Moody's EL Model to which of the following market risk-related scenarios may arise after Issuer Default:

» Strong arrangements in place to hedge mismatches, in which case a lower level of risk will be modelled

» Weak arrangements in place to hedge mismatches in which case a higher level of risk will be modelled.

» No hedge in place, in which case the unhedged mismatches will be modelled.

In no case has Moody's assumed that swaps used to hedge interest rate and currency risk completely remove these risks from a covered bond. However, the level of their effectiveness varies markedly depending on, first, the form of the swap documentation, and, second, the Issuer rating and whether the swap counterparty is part of the Issuer group. In particular, the answers to the two following questions have an important impact on Moody's modelling for assessing the effectiveness of swaps: [32]

» What is the probability of swap termination following Issuer Default?

» What is the probability of the swaps terminating at covered bond default?

Probability of swap termination at Issuer Default

*Where Issuer is rated **A2** or above*

For the majority of covered bond transactions for which Moody's gives value to such swaps, we model a 10% probability of swap termination following Issuer Default. The reason for this is that, based on the drafting of many swaps, we believe there is some probability that timely payments on covered bonds will not continue after Issuer Default.

*Where Issuer is rated **A3** or below*

Where the Issuer is rated **A3** or below, the probability of swap termination following Issuer Default may be increased. Unless specific provision is made for swaps to survive Issuer Default, the probability of this swap termination may be determined by the TPI for a covered bond – the higher/lower the TPI, the lower/higher the probability of the swap defaulting at Issuer Default. Finally, where the swap counterparty is also part of the Issuer group, if the Issuer is rated below **A3** the value of the swap may be limited to the value given by the collateral posting arrangements.

Exceptions to above

Regardless of the rating of the Issuer, Moody's may assume that the probability of swap termination following Issuer Default is lower where:

» The swap counterparty is not part of the Issuer group;

» A comprehensive set of the mitigants are in place for such swaps; and

» The swap counterparty is rated **A2** or above.

Probability of swap termination at covered bond default

Most covered bonds are modelled on the basis that there is a 100% probability of swaps terminating at covered bond default. However, for a few covered bonds, and where:

» Relevant protections have been put in place; and

» Swap counterparties are not part of the Issuer group

Moody's has used a percentage much lower than this.

Appendix E3: Interest Rate and Currency Stresses

Interest rate stresses

Moody's EL Model uses different interest rate stresses based on the projection of possible interest rate movements covering changes to what may be considered a confidence level of 95%. Different interest rate stresses are applied for every month of what is defined below as the Interest Rate Exposure Period. The "Interest Rate Exposure Period" can be defined as the period of time during which it is assumed that covered bonds will be exposed to changes in interest rates (see footnote 33 for more complete definition).

Accordingly, to illustrate the base interest rate stresses used in Moody's EL Model, Moody's has calculated the following "average" interest rate movements during different Interest Rate Exposure Periods:

TABLE 1

INTEREST RATE EXPOSURE PERIOD (IN YEARS)	CUMULATIVE INTEREST RATE INCREASE/DECREASE
1	1.65%
2	2.25%
3	2.75%
4 and above	3.00%

To understand two particular results from the table:

» Moody's EL Model may increase and decrease interest rates by an "average" of around 3% when the Interest Rate Exposure Period is five years.

» Moody's EL Model may increase and decrease interest rates by an "average" of around 2.25% when the Interest Rate Exposure Period is two years.

Moody's EL Model looks separately at the impact 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 on the covered bonds. This is because different covered bonds will be impacted differently by different interest rate environments, dependent on whether the Cover Pool and/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 impact of the interest rate changes in the table above on Moody's EL Model, *Appendix E4* provides a simple 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 Moody's EL Model to interest rate and currency mismatches will depend on the length of time assumed for the "Interest Rate Exposure Period" (see definition above, and footnote 30), except that for the purpose of currency risks this should be the period between Issuer Default until the time of refinance of the Cover Pool (if a matching test is in place to ensure currency rate risks are hedged up to Issuer Default). Examples of base stresses that may be applied are as follows:

TABLE 2

"INTEREST RATE EXPOSURE PERIOD" (IN YEARS)	CUMULATIVE ADVERSE CURRENCY EXCHANGE RATE MOVEMENTS
1	15%
2	25%
3 and above	30%

As for interest rate movements, Moody's EL Model assumes that currency movements do not increase linearly over time. Given this tendency, Moody's EL Model caps exposure to currency risk at the three-year stress.

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 be combined to show the impact of interest rate and currency risk. A simplified illustration of how Moody's 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 assumptions below in various combinations:

» **Interest Rate Movement** of 1.65% and 3% (see *Appendix E3* for more information).

» **Currency Movements** of 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

For interest risk:

TABLE 1

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%

For currency risk:

TABLE 2

CURRENCY MOVEMENT		LEVEL OF MISMATCH		CURRENCY RISK
5%	*	10%	=	0.5%
30%	*	10%	=	3.0%
5%	*	100%	=	5.0%
30%	*	100%	=	30.0%

Appendix F1: Moody's Idealised Probability of Default and Expected Loss tables

TABLE 1

Moody's Idealised Cumulative Probability of Default

RATING	1 YR	2 YRS	3 YRS	4 YRS	5 YRS	6 YRS	7 YRS	8 YRS	9 YRS	10 YRS
Aaa	0.00005%	0.00020%	0.00070%	0.00180%	0.00290%	0.00400%	0.00520%	0.00660%	0.00820%	0.01000%
Aa1	0.00057%	0.00300%	0.01000%	0.02100%	0.03100%	0.04200%	0.05400%	0.06700%	0.08200%	0.10000%
Aa2	0.00136%	0.00800%	0.02600%	0.04700%	0.06800%	0.08900%	0.11100%	0.13500%	0.16400%	0.20000%
Aa3	0.00302%	0.01900%	0.05900%	0.10100%	0.14200%	0.18300%	0.22700%	0.27200%	0.32700%	0.40000%
A1	0.00581%	0.03700%	0.11700%	0.18900%	0.26100%	0.33000%	0.40600%	0.48000%	0.57300%	0.70000%
A2	0.01087%	0.07000%	0.22200%	0.34500%	0.46700%	0.58300%	0.71000%	0.82900%	0.98200%	1.20000%
A3	0.03885%	0.15000%	0.36000%	0.54000%	0.73000%	0.91000%	1.11000%	1.30000%	1.52000%	1.80000%
Baa1	0.09000%	0.28000%	0.56000%	0.83000%	1.10000%	1.37000%	1.67000%	1.97000%	2.27000%	2.60000%
Baa2	0.17000%	0.47000%	0.83000%	1.20000%	1.58000%	1.97000%	2.41000%	2.85000%	3.24000%	3.60000%
Baa3	0.42000%	1.05000%	1.71000%	2.38000%	3.05000%	3.70000%	4.33000%	4.97000%	5.57000%	6.10000%
Ba1	0.87000%	2.02000%	3.13000%	4.20000%	5.28000%	6.25000%	7.06000%	7.89000%	8.69000%	9.40000%
Ba2	1.56000%	3.47000%	5.18000%	6.80000%	8.41000%	9.77000%	10.70000%	11.66000%	12.65000%	13.50000%
Ba3	2.81000%	5.51000%	7.87000%	9.79000%	11.86000%	13.49000%	14.62000%	15.71000%	16.71000%	17.66000%
B1	4.68000%	8.38000%	11.58000%	13.85000%	16.12000%	17.89000%	19.13000%	20.23000%	21.24000%	22.20000%
B2	7.16000%	11.67000%	15.55000%	18.13000%	20.71000%	22.65000%	24.01000%	25.15000%	26.22000%	27.20000%
B3	11.62000%	16.61000%	21.03000%	24.04000%	27.05000%	29.20000%	31.00000%	32.58000%	33.78000%	34.90000%
Caa1	17.38160%	23.23416%	28.63861%	32.47884%	36.31374%	38.96665%	41.38538%	43.65696%	45.67182%	47.70000%
Caa2	26.00000%	32.50000%	39.00000%	43.88000%	48.75000%	52.00000%	55.25000%	58.50000%	61.75000%	65.00000%
Caa3	50.99020%	57.00877%	62.44998%	66.24198%	69.82120%	72.11103%	74.33034%	76.48529%	78.58117%	80.70000%

TABLE 2

Moody's Idealised Cumulative Expected Loss

RATING	1 YR	2 YRS	3 YRS	4 YRS	5 YRS	6 YRS	7 YRS	8 YRS	9 YRS	10 YRS
Aaa	0.00003%	0.00011%	0.00039%	0.00099%	0.00160%	0.00220%	0.00286%	0.00363%	0.00451%	0.00550%
Aa1	0.00031%	0.00165%	0.00550%	0.01155%	0.01705%	0.02310%	0.02970%	0.03685%	0.04510%	0.05500%
Aa2	0.00075%	0.00440%	0.01430%	0.02585%	0.03740%	0.04895%	0.06105%	0.07425%	0.09020%	0.11000%
Aa3	0.00166%	0.01045%	0.03245%	0.05555%	0.07810%	0.10065%	0.12485%	0.14960%	0.17985%	0.22000%
A1	0.00320%	0.02035%	0.06435%	0.10395%	0.14355%	0.18150%	0.22330%	0.26400%	0.31515%	0.38500%
A2	0.00598%	0.03850%	0.12210%	0.18975%	0.25685%	0.32065%	0.39050%	0.45595%	0.54010%	0.66000%
A3	0.02137%	0.08250%	0.19800%	0.29700%	0.40150%	0.50050%	0.61050%	0.71500%	0.83600%	0.99000%
Baa1	0.04950%	0.15400%	0.30800%	0.45650%	0.60500%	0.75350%	0.91850%	1.08350%	1.24850%	1.43000%
Baa2	0.09350%	0.25850%	0.45650%	0.66000%	0.86900%	1.08350%	1.32550%	1.56750%	1.78200%	1.98000%
Baa3	0.23100%	0.57750%	0.94050%	1.30900%	1.67750%	2.03500%	2.38150%	2.73350%	3.06350%	3.35500%
Ba1	0.47850%	1.11100%	1.72150%	2.31000%	2.90400%	3.43750%	3.88300%	4.33950%	4.77950%	5.17000%
Ba2	0.85800%	1.90850%	2.84900%	3.74000%	4.62550%	5.37350%	5.88500%	6.41300%	6.95750%	7.42500%
Ba3	1.54550%	3.03050%	4.32850%	5.38450%	6.52300%	7.41950%	8.04100%	8.64050%	9.19050%	9.71300%
B1	2.57400%	4.60900%	6.36900%	7.61750%	8.86600%	9.83950%	10.52150%	11.12650%	11.68200%	12.21000%
B2	3.93800%	6.41850%	8.55250%	9.97150%	11.39050%	12.45750%	13.20550%	13.83250%	14.42100%	14.96000%
B3	6.39100%	9.13550%	11.56650%	13.22200%	14.87750%	16.06000%	17.05000%	17.91900%	18.57900%	19.19500%
Caa1	9.55988%	12.77879%	15.75124%	17.86336%	19.97256%	21.43166%	22.76196%	24.01133%	25.11950%	26.23500%
Caa2	14.30000%	17.87500%	21.45000%	24.13400%	26.81250%	28.60000%	30.38750%	32.17500%	33.96250%	35.75000%
Caa3	28.04461%	31.35482%	34.34749%	36.43309%	38.40166%	39.66107%	40.88169%	42.06691%	43.21964%	44.38500%

Appendix F2: Other Adjustments to Moodys EL Model

There are a number of ways in which Moody's EL Model may be adjusted to either allow for flexibility in programmes or recognise particular risks. Examples include the following:

» Moody's EL Model is set up so that the Issuer has a certain amount of leeway when issuing covered bonds of different maturities. We assume, unless we are advised otherwise, that the Issuer will require flexibility to issue covered bonds of different maturities over time.

» The Collateral Score may be adjusted to assume a certain limited deterioration in Cover Pool quality. This may, for example, be the case when we have reason to expect that lower-quality collateral may be included in the Cover Pool in the future.

» Moody's EL Model may limit the benefit from the gross margin generated by the Cover Pool to Moody's current view on the long-term sustainable margin.

» Several risks are modelled in Moody's EL Model in a way which assumes that only the pro-rata share of any covered bond's over-collateralisation is available to it. Following Issuer Default, an administrator of the Cover Pool might have the power to use all programme-wide over-collateralisation to pay down a single covered bond, even though there may be later-maturing covered bonds.

» When assessing market risk, Moody's 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 Moody's EL Model is a function of this base interest rate. The reason why Moody's has set this base interest rate as a constant, as opposed to using the current interest rate, is to prevent covered bond ratings being overly sensitive to interest rate changes.

Appendix F3: Over-collateralisation Committed and Uncommitted

Moody's distinguishes between over-collateralisation in the Cover Pool which is (i) committed and (ii) uncommitted.

Committed Over-Collateralisation

Moody's regards over-collateralisation as committed if the Issuer has an obligation to provide it. This obligation may be created under applicable legislation or the terms of the programme and Moody's may take account of different types of obligation in assessing committed over-collateralisation. However, the nature of the commitment should be one which cannot be reversed or reduced at the discretion of the Issuer without the Issuer (or its directors) facing the risk of litigation or a materially equivalent sanction.

Uncommitted Over-Collateralisation

Uncommitted over-collateralisation is over-collateralisation which may be removed at the Issuer's discretion or as a result of the Issuer (or another third party) making decisions about allocation of these resources. Such decisions will be subject to few, if any, constraints and may be driven by conflicts of interest between stakeholders and general business concerns.

Moody's believes that over-collateralisation that is uncommitted may not be available to the covered bonds at the time of Issuer Default. This is because:

» such over-collateralisation may be removed due to a legal claim from other creditors; and/or

» the directors of the Issuer may decide to remove such over-collateralisation voluntarily or in order to meet their duties as directors;

Accordingly, when assigning covered bond ratings which are significantly higher than the Issuer's rating Moody's EL Model may only give value to uncommitted over-collateralisation where both: (i) the Issuer is suitably rated; and (ii) the covered bond is issued under a specific covered bond law. Considerations that Moody's rating committee will consider when deciding whether to give value to voluntary over-collateralisation include:

» the amount of voluntary over-collateralisation being relied on relative to the size of the Cover Pool;

» the amount of voluntary over-collateralisation relative to the total amount of over-collateralisation available;

» the support of the covered bond framework; and

» the rating gap between the Issuer rating and the covered bond rating

When relying on voluntary over-collateralisation Moody's would typically expect the Issuer to hold at least a **Prime-1** rating when Moody's highest ratings are targeted. However exceptions to this exist; for example, in Germany and Spain Moody's typically gives value to voluntary over-collateralisation for **A3/Prime-2** rated Issuers when **Aaa** ratings are targeted.

For Issuers without the benefit of a specific covered bond law, Moody's will not give value to voluntary over-collateralisation.

Covered bonds that could exist on a stand-alone basis but are registered under a specific covered bond law may be a special case. Under these covered bonds, the mechanisms for segregation of the Cover Pool and treatment of cashflows on Issuer Default are established primarily by contractual documents and Moody's normally expects over-collateralisation to be in committed form because all key terms are set out in the transaction documents. Nevertheless, where these covered bonds are issued or registered under a covered bond law and we have reviewed the law and consider that it entails significant regulatory oversight, we may give value to voluntary incremental increases in over-collateralisation over and above the initial amount committed. This will be subject to the Issuer's rating and the other considerations referred to above.

Appendix F4: Timely Payment Indicators

Timely Payment Indicators ("TPIs") are Moody's assessment of the likelihood that a timely payment would be made to covered bondholders following Issuer Default. The TPI determines the maximum rating (TPI Cap) that a covered bond programme can achieve with its current structure while allowing for the addition of a reasonable amount of over-collateralisation.

A number of the primary determinants of the TPIs are discussed below.

The Determinants of the Timely Payment Indicators

TPIs vary from programme to programme. The main drivers behind the TPIs include:

» Strength of legislation and/or contract;

» Hedging;

» Type of assets;

» Type of liabilities; and

» Other factors.

We consider these below in turn.

Factor 1: Strength of Legislation/Contract

This will usually determine the base for the TPI. The TPI will then normally be adjusted by the further factors discussed below in turn. The strength of the legislation and/or contract is determined by the legal environment, as assessed by a combination of the covered bond law and specific contract.

The primary factors considered by Moody's are:

» General timely payment (which can cover both interest and/or principal payments);

» Timely payment specific for principal amounts; and

» The role of the administrator: additional provisions.

These are considered in turn:

General Timely Payment (which can cover interest and/or principal)

The law or contracts supporting a programme contain a number of arrangements which Moody's believes can ease the process of making payments to bondholders on a timely basis. These include:

» Coverage of commingling: this risk is considered to be substantially addressed if the administrator can easily identify and access all cash flows that can be used to pay the covered bondholders.

» NPV test: up until Issuer Default 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 potential support of timeliness.

» 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 reserve (for at least 30 days' interest): this protection improves short-term liquidity and may be in the form of either a segregated reserve or a mechanism to build up such a reserve.

Timely Payment Specific for Principal Amounts

Most covered bonds are bullet bonds and timely payment on these bullet bonds may rely on raising finance against the Cover Pool. A major issue for covered bonds is, in the event of an Issuer Default, how this finance can be raised in a timely manner. Relevant features found in transactions that attempt to address this risk include:

» Mainly "pass-through" bonds: if so, there is no or limited refinancing risk and thus limited reliance required on the timely raising of finance against the Cover Pool.

» Minimum refinance period (of at least six months): such a refinance period would give an administrator at least six months 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 pool: this ability should give the administrator the possibility of selling the entire Cover Pool in order to make a principal payment.
  - Sell part of pool: this ability should give the administrator the possibility of selling part of the Cover Pool in order to make a principal payment.
  - Borrow against the pool: this ability should give the administrator the possibility of borrowing funds against the Cover Pool in order to make a principal payment.

» Borrowing against pool ranks senior: If the administrator can borrow against the pool, and the additional borrowing ranks senior to the covered bonds, it should make borrowing easier to arrange as the lender should benefit from stronger security.

The Role of the Administrator: Additional Provisions

The extent to which the administrator may be able to take advantage of the timely payment arrangements that have been established may depend on a number of additional provisions. These include:

» Covered bond law specifies the ability to appoint the administrator pre-Issuer Default: this ability may allow an administrator additional time in which to organise payments to covered bondholders when they fall due post Issuer Default.

» Dedicated administrator to service covered bondholders: this ability may reduce the conflicts of duty an administrator could suffer.

» Specific protection from legal action by creditors: this protection may reduce the probability of legal actions or other claims delaying payments. This specifically refers to limited recourse and/or non-petition language.

» Government-related body acts as servicer of last resort: this provision 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 are included in the documentation (where permitted, most commonly in more "structured" transactions) which provide for appointment of back-up administrator, servicer and/or cash manager upon certain trigger events. Similar triggers may also be used to prompt re-direction of cashflows to segregated accounts or creation of reserves for liquidity or set-off risk. Such clauses may vary but Moody's has recognised such provisions as benefiting the TPI when based on triggers around the **Baa** level with respect to service providers or the **A2/P-1** level for other risks[34].

Table 1 below gives Moody's current views on many of these questions for covered bond laws in a number of jurisdictions. When reading Table 1, a "+" means that the relevant feature enhances the TPI (or if expressed as a risk, that the risk is relatively limited) and a "-" means that the relevant feature is negative for the TPI (or the relevant risk is relatively significant). A "+" does not mean that the relevant feature is fully covered or relevant risk is non-existent and a "-" does not necessarily mean that the relevant feature or risk is not mitigated in any way.

There are a number of caveats to this table. In general, answers are based on the covered bond law in a jurisdiction, and this may not be a good representation of how a deal operates in a country. In France, for example, many programmes enjoy strong timely payment features. However, in many cases, this comes from programme-specific contractual provisions entered into with a view to implementing the provisions set out in the French Monetary Code and applying directly or indirectly to the Société de Crédit Foncier. Where such programme-specific contractual provisions are important in the context of a programme (e.g. in France), the answers in Table 1 may provide limited guidance in respect of the actual programme-specific timely payment support.

While the answers in Table 1 are targeted at the covered bond law, the answers for certain questions have been amended in a couple of instances where a market seems to have established a common precedent. This is notably the case under the questions: "extended refinance period or pre-maturity test of at least 6 months" for Norway, Portugal and some of the programmes in France, Ireland and Finland.

Countries that have no specific covered bond law have also been included in Table 1, largely as a point of comparison. For these countries, answers are provided based on what may be described as a market "standard". However, in practice all deals can be expected to differ from one another.

TABLE 1:

Timely Payment Strengths and Weaknesses across Jurisdictions

	AUSTRIA	CANADA	DENMARK*	FINLAND	FRANCE	GERMANY	HUNGARY	IRELAND	ITALY	LUXEMBOURG	NETHERLANDS	NORWAY	POLAND	PORTUGAL	SPAIN	SWEDEN	UK	US
GENERAL TIMELY PAYMENTS (WHICH CAN COVER INTEREST AND/OR PRINCIPAL)																		
Coverage of commingling	-	+	+	-	-	-	+	-	-	-	+	-	-	-	-	-	+	+
NPV test	+ / -	-[1]	+	+	-	+	+	+	+	+	-[1]	+	-	+	-	+	-[1]	-
Periodic matching test	-	-[1]	+	+	-	-	-	+	-	-	-[1]	-[1]	-	+	-	-	-[1]	-
Dedicated reserve	-	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-	+	-
TIMELY PAYMENT SPECIFIC FOR PRINCIPAL AMOUNTS																		
Mainly pass-through bonds	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Minimum refinance period	-	+	n/a[5]	+ / -[2]	+ / -[2]	+	-	+ / -[2]	-	-	+	+	-	+	-	-	+	-[3]
Ability of administrator to….																		
…sell whole pool	+	+	n/a[5]	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+[6]
…sell part of pool	+	+	n/a[5]	+	-	+	+	+	+	+	+	+	-	+	+	+	+	-[6]
…borrow against the pool (senior or pari passu)	+	-	n/a[5]	-	-	+	-	+	+	-	-	+	-	-	+	-	-	-[6]
Borrowing against pool ranks senior	+	n/a	n/a	-	-	-	n/a	-	-	n/a	n/a	-	n/a	-	-	n/a	n/a	-
THE ROLE OF THE ADMINISTRATOR: ADDITIONAL PROVISIONS																		
CB law specifies the ability to appoint an administrator pre Issuer Default	-	n/a	-	-	+	+	-	+	-	-	n/a[4]	-	-	-	-	-	n/a[4]	n/a
Dedicated administrator to service CBholders	+	+	+	-	-	+	+	+	-	+	+	-	-	+	-	-	+	-
Specific protection from legal action by creditors	-	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	+	+
State-related body acts as servicer of last resort	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-

* For mortgage lenders with the specific balance principle

1 For some deals in this jurisdiction this may be indirectly covered through hedge arrangements

2 Some bonds benefit from these provisions, others do not

3 There is a 120-day refinance period, which may be reduced by a FDIC stay to as little as 30 days.

4 Trustee appointed when programme first established

5 Given the mainly pass-through nature of the Notes, principal payment risk is relatively well addressed

6 Following an Issuer Default, the Federal Deposit Insurance Corporation (FDIC) would have three options with respect to the covered bond program: (1) transfer the entire program to a solvent bank, (2) exercise its repudiation powers, which allow it to retain the Cover Pool assets in the estate of the failed Issuer and pay damages to the covered bond trustee in cash equal to the lesser of (a) par amount of the covered bonds and (b) the market value of the Cover Pool assets (with any shortfall being an unsecured claim against the Issuer's estate), and (3) allow a liquidation of the Cover Pool within 30-120 days.

Factor 2: Hedging

The base TPI may be positively or negatively affected by the nature of hedging arrangements. While the presence of swaps is usually credit positive for a programme, from a timely payment perspective, swaps may have a negative impact. The reasons for this include that swaps may not survive Issuer Default, and even if swaps do survive Issuer Default, they may hinder the sale of the assets and/or liabilities where such 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 both material interest and currency risks.

In addition, where a swap is provided by the Issuer or an entity in the Issuer group, Moody's may consider this as negative for TPI purposes.

A well-structured swap can be positive from a timely payment perspective. This may be the case, for example, where a macro-level swap has an extended grace period built into it which effectively acts as a timely payment buffer for the covered bond programme.

Factor 3: Type of Assets

The base TPI will also be affected by the type of collateral backing a transaction. This is because certain assets are expected to be more straightforward to sell following an Issuer Default. In particular, this will be the case where assets comprise traded bonds and where these bonds are backed by highly rated government (or similar) guarantees.

In extreme cases, the type of collateral could be the sole driver of the TPI. For example, where material refinancing risk exists and Moody's believes that it is highly unlikely that the assets in the Cover Pool could be sold in a timely manner, the TPI may be "Very Improbable" regardless of other mitigating features.

Factor 4: Nature of Liabilities

Most programmes issue bullet bonds, which face refinancing risk. However, certain programmes issue pass-through bonds instead of bullet bonds. In these cases, refinancing risk may be much more limited. This is discussed under Factor 1: Strength of legislation/contract above.

Factor 5: Other Factors

The above adjustments are some of the main considerations Moody's expects to take into account when assigning a TPI to a transaction. However, there are many other factors that may influence the TPI assessment and the application of TPIs. Examples of other factors include:

» The sovereign rating. Following a default of the Issuer supporting a covered bond with refinancing risk, an important source of liquidity for timely payments may derive from state support. This support may either be in the form of direct state support to the covered bond programme, or indirect via finance provided to support solvent banks in the affected jurisdiction which in turn use this finance to support the covered bond programme. Further, the strength of the banking system in general may be negatively impacted as the sovereign weakens, for example where issues of confidence arise market participants may be less able and willing to receive or extend credit.[35] Therefore as the credit strength of a sovereign changes, the TPIs of covered bonds issued in the affected jurisdiction may also be reassessed.

» 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 1: Strength of Legislation/Contract above). If this is not the case, Moody's 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, public-sector loans may be considered to be "suitably liquid assets". However, where these arrangements are not considered "committed", this benefit may be limited.

» Correlation between the performance of the Issuer and the Cover Pool. The less reliant the Issuer is on the performance of the assets in the Cover Pool, the lower should be the probability that an Issuer Default would be primarily caused by the performance of the Cover Pool.

» Additional over-collateralisation. As stated above, 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 over-collateralisation. However, large amounts of over-collateralisation may allow ratings to exceed these TPI constraints.

» In particular where the Issuer is rated sub-investment or low investment grade, case by case adjustments. Examples of other issues that may be considered when adjusting a TPI include time to the next principal payment, and the then cash position of the Issuer.

Related Research

Special Report: Covered Bond Specific

» EMEA Covered Bonds: 2010 Outlook & 2009 Review, February 2010 (SF192452)

» Assessing Swaps as Hedges in the Covered Bond Market, September 2008 (SF142765)

» European Covered Bond Legal Frameworks: Moody's Legal Checklist, December 2005 (SF66418)

Special Reports: Collateral Specific

General Methods

» Moody's Methodology for Rating RMBS in Europe, Middle East, and Africa, October 2008 (SF141262)

» Moody's European Country Tiering for CMBS Recovery Rate Assumptions: Focus on Key Jurisdictions, January 2005 (SF45047)

» Moody's Real Estate Analysis for CMBS in EMEA: Portfolio Analysis (MoRE Portfolio), April 2006 (SF71831)

» A Guide to Moody's Sovereign Ratings, December 2008 (98177)

» The Application of Joint Default Analysis to Government Related Issuers, October 2006 (99025)

» Local and Regional Governments Outside the US, May 2008 (107844)

Country Specific RMBS Methods

» Moody's Approach to Rating Dutch RMBS, June 2004 (SF37202)

» Moody's Approach to Rating UK RMBS, April 2005 (SF47735)

» Moody's Updated Methodology for Rating Spanish RMBS, July 2008 (SF133138)

» Moody's Approach to Rating US Residential Mortgage-backed Securities (SF152151)

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

[1] "Issuer Default" occurs when the rated entity (which is normally in the Issuer group) upon which Moody's relies ceases to provide support (whether administrative or financial) for the benefit of the covered bondholders. This broad definition is also intended to capture structures where this support comes from an entity that is not the Issuer itself but instead may be another entity typically within the Issuer group. It should be noted that an Issuer Default does not necessarily mean there has been a late or missed payment on the covered bonds. The likelihood of timely payment following Issuer Default is measured by Moody's TPI.

[2] It should not be assumed that this method paper will be applied rigidly by Moody's in all circumstances. Moody's shall, where appropriate, consider any other factors that it deems relevant to its analysis and this may lead to a different rating outcome. Further, Moody's may revise the rating methodology set out in this paper at any time as it sees fit.

[3] See footnote 1 above.

[4] In many jurisdictions, covered bonds are instruments defined by statute; in others, they are structured to resemble such instruments.

[5] This might not be the case where the collateral was of very low value or where the access to the collateral was in doubt.

[6] The term "underlying Issuer" may not always refer to the Issuer of the covered bonds itself. It also includes entities which have guaranteed, or otherwise directly supported, payment on the covered bonds. Such an entity would typically also be part of the Issuer group.

[7] See "Moody's increases refinancing margins for European covered bonds" (April 2009).

[8] Moody's calculates the monthly default rates by interpolating from our published idealised default tables, which are reproduced in Appendix F1.

[9] A company established solely for the purpose of the covered bond programme that holds the assets of the Cover Pool and does not carry out any other transactions; it is usually established to be insolvency-remote from the bank that supports it.

[10] In many cases, the Issuer will benefit from either direct or indirect support from the group of which it is a part. In addition to the credit strength derived from the group of which it is part, the Issuer may benefit from specific aspects of the legislation, which may, for example, limit the business activities of the Issuer and thus offer investors incremental protection from event risk.

[11] An Issuer Default will not normally lead to an acceleration of the Covered Bonds. In many cases, the Cover Pool is expected to survive an Issuer Default, which will typically trigger the appointment of an administrator to administer and service the Cover Pool. Following Issuer Default, 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 legal final 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).

[12] Note, however, that for these purposes credit estimates are not considered an appropriate alternative to public or private monitored ratings. This is in line with Moody's approach to the use of credit estimates as set out in "Updated Approach to the Usage of Credit Estimates in Rated Transactions" (October 2009).

[13] See also Moody's press release "Covered bond issuer ratings important for accuracy and stability of covered bond ratings" (30 April 2009) where we state that a key criterion in our ratings of covered bonds will be for the issuing financial institution to have obtained a monitored rating. While the role played by the credit strength of the Issuer in covered bond ratings was unchanged, the press release confirmed that stable and accurate assessments of Issuer credit strength are best maintained via full, monitored, Issuer ratings.

[14] Moodys is in the process of reviewing its methodology for analysing shipping assets. See press release "Moody's reviews its EMEA ABS Shipping Methodology" (May 2009)

[15] See Moody's presale and new issue reports – reports contain an appendix on income underwriting.

[16] See Moody's presale and new issue reports - reports contain an appendix on valuation methods.

[17] Moody's is in the process of fine-tuning its analysis of public sector loans. At this stage Moody's does not expect any rating actions as a result of this process. See methodology paper "Updated Approach to the Usage of Credit Estimates in Rated Transactions" (October 2009).

[18] Moody's may take into account any expected deterioration in the Cover Pool over time, and any leeway that an Issuer wished to build into the analysis of its Cover Pool.

[19] A further protection worth noting is that Moody's would look more critically at any Cover Pool where the assets, as a matter of general strategy, are originated outside the Issuer group. Moody's EL Method assumes that the Issuer adopts an *originate-and-hold* strategy.

[20] These numbers ignore any benefit given to any "haircuts" applied to the underlying collateral scores. See Appendices C2 and C3 for a further discussion on "haircuts".

[21] These numbers are estimates only. Also they generally exclude figures for transactions where refinancing risk is more limited. Examples of such transactions include the "pass-through" transactions found in Denmark and the UK.

[22] The numbers are based on a simple average based on covered bond transactions rated by Moody's. There are some differences in the numbers presented here. For example, the collateral score numbers post haircut include transactions that have limited levels of refinancing risk. However, these transactions are excluded from the refinancing risk and interest and currency mismatches numbers. See also footnote 21.

[23] This is the average collateral score post haircut, Pre-haircut this number is 12.3%.

[24] This is the average collateral score post haircut, Pre-haircut this number is 7.8%.

[25] "EMEA Covered Bonds: 2010 Outlook & 2009 Review" (February 2010).

[26] This is equivalent to the collateral score and for the purposes of this example ignores the haircut referred to in Appendix C2.

[27] These percentages are assumed to be the aggregate of the following categories of loss: (i) loss due to credit quality of the Cover Pool, (ii) loss as a result of refinancing risk, and (iii) loss arising from interest and currency mismatches.

[28] 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.

[29] These numbers mostly exclude transactions where refinancing risks are more limited. For example most transactions that issue "pass-through" bonds only are excluded. See also "Moody's increases refinancing margins for European covered bonds" (8 April 2009).

[30] Exceptions to this may be made where an ALM gap is unlikely to deteriorate markedly within a short timeframe.

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

[32] For a more detailed description of how Moody's assesses swaps as hedges see "Assessing Swaps as Hedges in the Covered Bond Market" (September 2008).

[33] The Interest Rate Exposure Period will usually be determined by the type of matching test that is being run by the Issuer. So, for example:
a) In those circumstances where the matching test that is applied prior to Issuer Default is based on net present values (or an equivalent approach), the Interest Rate Exposure Period will extend from Issuer Default until the time of refinance of the Cover Pool.
b) In those circumstances where the matching test that is applied prior to Issuer Default is not based on net present values (or an equivalent approach), the Interest Rate Exposure Period will extend from the time of issue of Covered Bonds until the time of refinance of the Cover Pool.

[34] See also "Operational Risks in securitisations to be Revisited" (November 2009).

[35] See Special Comment entitled "Financial Crisis More Closely Aligns Bank Credit Risk and Government Ratings in Non-Aaa Countries" (May 2009).

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