MOODY'S
INVESTORS SERVICE

RATING METHODOLOGY

Market Value Collateralized Loan Obligations Methodology

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This rating methodology replaces *Moody's Approach to Rating Market Value Collateralized Loan Obligations (MV CLOs)* published in March 2017. The methodology's title and table of contents have been revised. We have also made limited editorial updates to improve readability, and we have added a footnote for further transparency on our approach to monitoring transactions. The updates do not change the substantive approach of the methodology.

Scope

In this methodology, we explain our approach to assessing credit risks for market value collateralized loan obligations (MV CLOs), including the factors that are likely to affect rating outcomes in this sector.

We discuss the asset and liability analysis, including associated modeling, as well as other considerations. We also describe our monitoring approach.

Rating Approach

Market Value Structure

MV CLOs are structured finance transactions backed mostly by a pool of corporate assets, primarily loans. They operate by maintaining over-collateralization (OC) levels based on the market value of the underlying collateral relative to the par value of (and accrued interest due on) the MV CLO's liabilities. MV CLOs look to the liquidation value of the assets to pay off principal and accrued interest on the transaction's liabilities.

The primary factor that drives the rating of MV CLOs is the minimum contractually required OC levels determined by the market value of the transaction's assets over the transaction's liabilities. These OC levels are expressed in terms of haircuts to market value driven by price volatility and liquidity, referred to as "advance rates" (AR) for different types of assets. Advance rates for each transaction are set at the transaction's closing and included in the transaction's documentation.

MV CLO Protection Mechanism

The market value-based OC provides the protection to the MV CLO notes and the OC test is performed frequently, typically on a weekly basis (the mark-to-market period). If the test is breached on the test date, the issuer has several options to bring the test back into compliance within a defined period, typically 5 to 10 business days (the cure period). A failure to remedy the out-of-compliance test by the end of the cure period leads to an event of default (EOD). Upon triggering an EOD, the controlling class (senior noteholders) takes control rights to the portfolio and may decide to liquidate the assets, instructing the collateral manager to liquidate the collateral within a given period, typically assumed to be 5 to 10 business days (the liquidation period). The time period that includes the mark-to-market period, the cure period and the liquidation period measures the window in which underlying assets are subject to market value risk (the exposure period).

Our MV CLO rating methodology assesses the sufficiency of the OC requirements/ARs during the period in which the transaction breaches and fails to cure the OC requirements and the controlling class subsequently liquidates the collateral. The adequacy of these protections can, in part, be modeled. i.e., the rated notes are analyzed based on a set of ARs that define the market value coverage for the liabilities. The ARs are used to haircut the values of the assets that are determined by frequent marking to market. These haircut values are compared to the outstanding liabilities of the MV CLO to assess compliance with OC requirements. Each type of asset (as described in the "MV CLO Assets" section below) is assigned an AR that reflects our view of the asset's price volatility and liquidity, based on the structure of the MV CLO.

MV CLO Assets

The bulk of assets held by a typical MV CLO consists of broadly syndicated senior secured loans and high-yield bonds as well as some liquid government and corporate obligations including US Treasuries, and US agency debentures. MV CLOs typically classify categories for assets, such as (1) bank loans based on the rating and price and (2) high-yield bonds based on the rating and maturity (see Appendix D for indicative ARs). Across all asset types, ARs vary depending on the asset type, its maturity and characteristics as well as on the availability of reliable pricing sources for the instruments.

Our Framework

Our analysis takes careful account of transaction structure and governance and the roles of the parties to the MV CLO. When applying this methodology, a rating committee will consider these and additional qualitative and quantitative factors that they deem relevant when assigning MV CLO ratings, taking into account the unique circumstances and/or characteristics associated with each transaction. As such, the assigned rating may differ from the model output.

Asset-level Analysis and Related Modeling

Quantitative Approach

We apply two methods to model potential fluctuations in market prices of the underlying assets, including a parametric approach and historical simulation. The parametric approach utilizes certain assumptions used in the Black-Scholes framework for valuing derivatives.[1] In the historical simulation approach, market-observed changes in prices are randomly sampled to derive a distribution of potential future asset price changes. The advantages of the parametric approach are that it can capture price movements that have not been observed in the dataset, and it can be applied quickly when assessing alternative structures and/or portfolio compositions. The advantage of the historical simulation approach is that it is based on observed price movements and it does not rely on certain Black-Scholes assumptions. It can also ensure that the parameters and results of the parametric approach are representative of the historical dataset. Thus, the historical simulation approach works as both a tool to calibrate these parameters and an alternative method to generate ARs that properly reflect historical price behavior.

Parameter Estimation

The volatility and liquidity haircut assumptions have significant impact on the calculated expected loss (EL) and affect the ARs that correspond to particular target ratings. In estimating these parameters for corporate loans and high-yield bonds, we examined daily returns and bid-ask spreads of 10-asset portfolios over a period that included past crises. Once we obtain estimates for volatility and liquidity haircut (LHC) for each asset type, we calculate portfolio ARs for each asset type using the parametric model (see Appendix C and D).[2]

VOLATILITIES

By randomly sampling 10 assets from the historical dataset of daily returns, we generated a distribution of observed three-month volatilities.[3] From this distribution, we benchmarked the 95th percentile as the 10-asset volatility for the asset type.[4]

We then infer an equivalent single-asset volatility using an estimate of correlation (δ) between any pair of assets. Since the variance of returns on a portfolio of n assets - each with a weight (w_i) and a correlation (δ_{ij}) between any pair of assets i and j, can be expressed as:

FORMULA 1

$$V_n{}^2 = \sum_{i=1}^{n}(w_i * V_i)^2 + 2 * \sum_{i=1}^{n}\sum_{j=i+1}^{n} \delta_{ij} * (w_i * V_i) * (w_j * V_j)$$

Source: Moody's Investors Service

We express the variance of returns on a portfolio of N assets that are of the same size (1/N) with constant volatility (V_1) and correlation (δ) as the following equation:

1 Black, Fischer; Myron Scholes (1973), "The Pricing of Options and Corporate Liabilities," *Journal of Political Economy* 81 (3): 637–654.

2 For any new asset type, we may perform similar analysis to estimate these parameters.

3 Note that this is more conservative than the roughly 20-day period over which the MV CLO is intended to be liquidated.

4 Volatilities from Appendix C are 10-asset volatilities.

FORMULA 2

$$V_N = V_1 \sqrt{\frac{1 + \delta(N-1)}{N}}$$

Where:

» δ = the pairwise correlation assumption for 10 assets,[5]

» V_N= volatility of a portfolio of N assets, and

» V_1 = single asset volatility.

Source: Moody's Investors Service

Thus, we can infer single-asset volatility (V_1) from Formula 2.

Once we have an estimate of the volatility for a single asset, as well as assumptions for the correlations between assets,[6] we can calculate volatility for a portfolio of N assets via Formula 1 above. As long as the price changes in the assets are not perfectly correlated, there is some benefit from diversification.[7] A typical MV CLO limits concentrations to no more than 3% to 5% of portfolio market value for any single asset, and 8% to 10% for any industry, providing the diversification benefit.[8]

LIQUIDITY HAIRCUTS

The LHC represents the cost of liquidating an asset in an illiquid market and is therefore related to bid-ask spreads. In light of the extreme stresses we have observed during past crises, we use a highly stressed measure of the LHC. For each asset type, we assume an LHC equal to the widest observed bid-ask spread, plus the largest observed one-day price drop.

We estimate these two components of the LHC using the same sampling approach that we use to estimate volatility. That is, we randomly select sets of 10 assets within each category and calculate highly stressed bid-ask and one-day-price drop measures for each such mini-portfolio.

We report volatility estimates and LHCs for a number of common asset types in Appendix C.

Assets Requiring Special Treatment

Second Lien and Covenant-Lite Loans

Second lien and covenant-lite loans are either lower in seniority or carry less-restrictive covenants than typical senior secured corporate loans. Hence, the price volatilities and liquidity characteristics of such assets may substantially differ from those of the loans in our historical data set. Recognizing this, MV CLOs generally limit exposure to these assets. Additional haircuts may apply to these asset types.

Middle Market Loans

Middle market loans are made to small- and medium-sized companies (SME) through syndications that are typically no larger than $200 million. These loans tend to be less liquid and are more difficult to value. Again, MV CLOs generally limit exposure to such assets and may apply additional haircuts.

5 For corporate assets, we used 25% for δ. This correlation was derived from comparison of 10 asset ARs derived from Black-Scholes model to the ARs obtained from historical simulation.

6 Our current assumptions on inter- and intra-industry correlations are 15% and 30%.

7 However, given the tendency for asset prices to move together in a downturn, there is a limit to the value of diversification.

8 Asset type concentrations depend on the particular class. For example, par loans could comprise 100% of the portfolio. In contrast, equity holdings are typically limited to no more than 10% of the pool, by market value.

Bank Loan Participations

Bank loan participations do not transfer legal ownership of the loans to participants, but only provide an economic interest in the underlying loans. Consequently, there is credit exposure to the participating bank. In order to minimize this risk, MV CLOs normally require that any participating bank has our long-term rating of at least A2, and that participations be diversified so that no more than 5% of the portfolio be associated with any single participating bank. A further limit on the overall exposure to participations within the portfolio generally applies as well.

Funding Commitment Assets

Funding commitment assets are bank loans, participation or delayed-draw securities that entail a commitment to fund in the future. Because this is a future funding instrument, the MV CLO must have the capacity to meet such commitments. The MV CLO must either set aside cash or have available a line of credit from a highly rated source in order to satisfy any draws under the funding commitments.

Equity Securities

The MV CLO may acquire equity securities through distressed exchanges of debt instruments, as hedges against positions in loans or bonds, or as stand-alone investments. Additional analysis may be required for transaction-specific permitted equity securities in order to ensure that the assigned ARs are appropriate for the transactions. For example, a transaction that permits stocks belonging to the S&P 500 Index will have assigned ARs that are different from those in another transaction that permits stocks in the Russell 1000 Index.

Foreign Investments

Investing in foreign assets introduces foreign exchange (FX) currency risks and potentially counterparty risks. Additionally, ARs derived from the US dataset are not applicable to non-US assets as the volatility and liquidity profiles of foreign assets may differ substantially from those of US assets. We will consider foreign investments on a case-by-case basis. Any additional haircut may be a function of the liquidity and historical FX volatility of the currency.

Shorts and Derivatives

Some transactions are permitted to short assets and enter into derivative contracts such as interest rate swaps and credit default swaps (CDS) on a limited basis. Exposure to these positions are still subject to accurate valuation in the OC calculations. For example, if the MV CLO shorts an asset by writing a CDS with a counterparty, the initial mark-to-market of the swap is typically zero. When calculating the advance amount for this transaction, such mark-to-market has to be discounted by the appropriate haircut, i.e., the advance amount for the position needs to be a *negative* number, rather than zero, since we want to be certain in this case that the potential loss on this position is covered with other assets/cash in the portfolio. For example, the advance amount of the short CDS position may be calculated based on the following formula:

FORMULA 3

$$Advance\ Amount = (Notional + MTM) * AR - Notional + Cash\ Collateral$$

Where:

» $Notional$ = notional of the CDS contract;

» MTM = mark to market of the CDS contract;

» AR = advance rate applicable to the reference obligation with applicable haircut; and

» $Cash\ Collateral$ = cash collateral posted for the benefit of the transaction, if any.

Source: Moody's Investors Service

In order to assess the additional volatility inherent in the CDS market,[9] an incremental haircut is typically applied to CDS positions.

While CDS can be designed to replicate the returns of the physical assets, they often give rise to greater price volatility and lower liquidity than their physical counterparts.[10] To limit such risk, MV CLOs generally restrict CDS (Notional + MTM) to no more than 5% of the portfolio.

Entering into derivative contracts, whether for CDS or to hedge interest-rate or FX risk, also poses counterparty risk. MV CLOs typically require that counterparties be rated at least Aa3 upon initiation of the contract and maintain an A2 rating during the life of the contracts.

Structural Analysis and Liability Modeling

Parametric Modeling Framework

Loss in Terms of the Advance Rate

If we assume that there is no cushion beyond the excess market value implied by the AR, then the portfolio-wide AR determines the relationship between the initial market value (MV_0) of the portfolio and the debt (D), defined as principal plus accrued interest:[11]

FORMULA 4

$$AR * MV_0 = D$$

Source: Moody's Investors Service

A loss occurs whenever the portfolio return, x, is sufficiently negative such that the value of the assets falls below the value of the liabilities, or $(1 + x) * MV_0 < D$. The proportionate loss relationship is given by:

FORMULA 5

$$L = max\left\{0, D - \frac{D}{AR}(1 + x)\right\}/D \text{ , } or$$
$$L = max\left\{0, 1 - \frac{1}{AR}(1 + x)\right\}$$

Source: Moody's Investors Service

Expected Loss for a Senior Tranche

Exhibit 1 illustrates the EL calculation. For each possible value of the portfolio return (x-axis), we multiply the probability of that return (solid green curve) by the loss incurred by the senior tranche in that return scenario (dotted red line) and add up the results. We assume the AR in the figure to be equal to 0.75, so that a loss in portfolio asset value of more than 25% would cause a loss to the senior tranche.

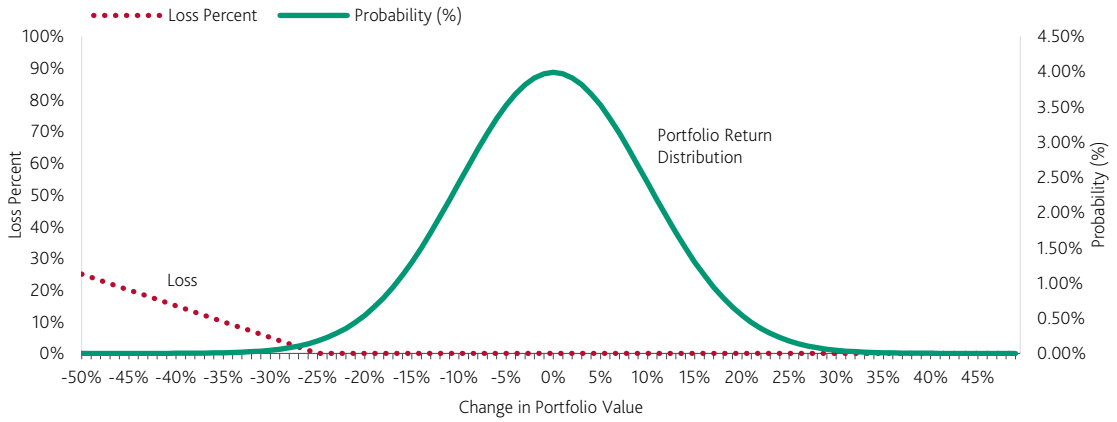
[9] We expect that CDS positions are likely to be more volatile and possibly less liquid than the corresponding cash instruments. The CDS market also has a very short history from which to infer price behavior.

[10] For example, the CDX and LCDX indices exhibited greater price volatilities than physical assets during the financial crisis, perhaps due to the impact of speculation.

[11] The single AR used here should be considered a portfolio-wide average, or the AR that would apply if all the assets were homogeneous.

EXHIBIT 1

Loss and Probability of Loss for a Senior MV CLO Tranche[12]



Source: Moody's Investors Service

Our parametric model for the portfolio return is based on some of the same assumptions that underlie the Black-Scholes framework for valuation of derivatives. Specifically, the framework assumes that the MV follows a "geometric Brownian motion," which means (among other things) that it is lognormally distributed[13] and its variance increases with time. The market exposure period is short enough that we may assume that the "drift" of the MV is zero – in other words, that its expected value at the end of the liquidation period equals its current value. Under these assumptions, the t-day expected loss (EL_t) for the senior tranche,[14] as a fraction of the value of the tranche, is given by:

FORMULA 6

$$EL_t = N[-d_2] - \left(\frac{1}{AR}\right) N[-d_1]$$

Where:

» AR = advance rate,

» V_t = the t-day volatility of the market value of the portfolio,

» $d_1 = \frac{1}{V_t} \ln\left(\frac{1}{AR}\right) + \frac{1}{2} V_t$,
$d_2 = d_1 - V_t$, and

» $N[\cdot]$ = the cumulative normal distribution function.

Source: Moody's Investors Service

This formula is in fact identical to the Black-Scholes formula for the value of a European put option on the portfolio whose strike price in dollars is MV * AR, if one assumes the risk-free rate is zero. We describe this further in Appendix A1.

[12] We have greatly exaggerated the price volatility in the figure in order to show a visibly positive loss probability.

[13] The lognormality assumption, coupled with an assumption of a constant volatility parameter, is highly restrictive. We relax these assumptions by taking our volatility estimates from the tails of the distributions, as described in the "Parameter Estimation" section.

[14] For subordinate tranches, we naturally need to take account of payouts to more senior classes before applying this formula. See the "Expected Loss Formula for a Subordinate Tranche" section and Appendix B for details.

Expected Loss Formula for a Subordinate Tranche

For a subordinate tranche, the EL is the difference between two quantities: (a) the EL of "tranche A," consisting of the subordinated tranche to be rated and all tranches senior to it, and (b) the EL of "tranche B," consisting of all tranches senior to the tranche to be rated:

FORMULA 7

$$EL = \frac{1}{M}[(S+M)EL(A) - (S)EL(B)],$$

Where:

» M = the notional of the subordinate tranche to be rated and

» S = the notional of tranche B.

Source: Moody's Investors Service

We describe this further in Appendix B, where the quantities $d_1,\ldots,d_4$ and AR' are defined and the EL of the subordinate tranche is shown to equal:

FORMULA 8

$$EL = \frac{1}{M} * \left\{(S+M)\left(N[-d_2] - \left(\frac{1}{AR}\right)N[-d_1]\right) - S\left(N[-d_4] - \left(\frac{1}{AR'}\right)N[-d_3]\right)\right\}.$$

Source: Moody's Investors Service

Liquidity Haircut

During stressful periods, financial assets not only experience sharp price declines, but also become less liquid. Such illiquidity can be observed in the form of wider bid-ask spreads.

To address this liquidity concern, we incorporate an LHC into our formula. The LHC represents an immediate cost to selling assets in an illiquid market. After modifying (3) above to include this effect, we have:

FORMULA 9

$$EL_t = N[-d_2] - \left(\frac{1-LHC}{AR}\right)N[-d_1]$$

Where:

» $d_1 = \frac{1}{V_t}LN\left(\frac{1-LHC}{AR}\right) + \frac{1}{2}V_t$ and

» $d_2 = d_1 - V_t$.

Source: Moody's Investors Service

We describe this further in Appendix A2.

Historical Simulation

Our parametric approach relies in part on the Black-Scholes assumption that prices follow a lognormal distribution. Though we use highly stressed volatilities and LHC to compensate for the restrictiveness of this assumption, it is possible that our adjustments fail to fully compensate. By supplementing our parametric approach with a historical (non-parametric) method, we avoid making assumptions about price behavior that may prove too limiting or too lenient.

The historical simulation approach is intuitive. For a t-day liquidation period, we randomly select M t-day price changes from our historical data set. Applying each of these, we measure the loss as in Formula 5 above. The average of these measured losses is the EL measure that we seek:

FORMULA 10

$$E(L) = \frac{\sum_{i=1}^{M} max\ (0, (1 - \frac{(1 + x_i)}{AR}))}{M}$$

Where:

» x_i = a value from a set of historical price returns.

Source: Moody's Investors Service

The set of historical returns that we select depends on the comprehensiveness and robustness of the historical data.

Additional Considerations

Aa1 Cap on MV CLO Tranche Ratings

When an MV CLO transaction requires a mandatory liquidation of assets within a short period, we do not expect that the rating on the debt of such MV CLO will be able to achieve the Aaa level. This consideration reflects the risk the debt of such MV CLO may not be paid on time due to a market shutdown, even if the possibility may be small.

Aaa Stresses

If an MV CLO does not impose a short, mandatory liquidation period, its senior debt may achieve a Aaa rating. However, even if the transaction permits a longer-term liquidation period, a Aaa rating may be achievable if there is a mechanism to assure adequate liquid resources to repay its senior debt at transaction maturity (see the "Redemption at Maturity" section below).

Where these concerns have been addressed, we will apply additional stresses to our assumptions. Specifically, in evaluating a tranche that is targeted to achieve a Aaa rating, we multiply both the volatility and LHC parameters by a factor of 2.0.[15]

Alternate Liquidation Scenarios

We have observed that in some cases, following an event of default, the controlling party (or parties) to the MV CLO prefers not to liquidate the collateral assets over the short period specified in the transaction documents. The decision to liquidate over a longer horizon reflects the view that better sale prices can be achieved by avoiding a "fire sale."

Within our historical simulation approach, we consider alternative liquidation scenarios that reflect the flexibility incorporated into documents to allow the controlling party to retain the assets rather than liquidating them. In these scenarios, we assume that the assets are sold over a longer period such as six months. Also, the assets are assumed to be sold at a price represented as the bid price in our historical series without any haircut. These scenarios are used to ensure the results are consistent with the assigned ratings.

Redemption at Maturity

Since MV CLOs actively trade during the life of the transaction without any restriction on acquiring long-dated assets (assets that mature past the transaction's legal final maturity date), there is a small risk that a

[15] The 2.0 factor does not apply to Treasuries and Agencies.

market shutdown will occur at the time of a transaction's final maturity, which could render the sales of the assets impossible. Although the advance rates described in this credit rating methodology allow for a significant stress on market prices, they may not cover a very short-term market shutdown on the maturity date when the liability tranches are due and payable. This exposes MV CLOs to liquidity risk at the tail end of the transaction if managers have not been selling assets in an orderly fashion well in advance of the final maturity date. We expect that this risk is inconsistent with our highest ratings. Structural features that ensure certainty of payment at maturity could, however, mitigate this risk.

Transaction Details

Marking to Market Frequency

In market value structures, the frequency of marking the assets and calculating the OC levels is one of the most crucial investor protections. Our analytical framework is based on the assumption that the transactions will mark to market as frequently as possible. In general, our expectation is that the OC calculations will be done at least bi-weekly.

Pricing Sources

The determination of market prices is a key procedure for MV CLOs as the prices directly impact the OC calculations. Each MV CLO provides guidance for marking the assets and the goal is to obtain objective and independent marks for each of the assets in the portfolio so that the aggregate of such values is a reliable measure of portfolio value.

Each MV CLO identifies a list of approved pricing services and dealers from which the manager can obtain the marks on the assets. In our analysis, we review the list to assess whether the designated pricing sources are capable of producing marks that are both independent and objective.

Other Considerations

Documentation and Legal Analysis

Our assessment of the MV CLO's legal structure typically includes a review of key characteristics of the issuer, including bankruptcy remoteness. We review numerous documents including, as applicable, the indenture, collateral valuation schedule, collateral management agreement, swap documents and other agreements, as well as a number of legal opinions that law firms provide to the issuer and the arranger.

Domicile of the Obligor

The domicile of the obligor associated with an asset may have an important impact on both the price volatility and liquidity of the assets. For corporate obligations, MV CLO documents typically refer to the country in which the obligor is organized or incorporated in determining how the assets should be treated for the purpose of determining appropriate ARs.

An exception may be appropriate for issuers that are operating companies and are organized in certain well-established low-tax jurisdictions. These assets are typically included and treated as if they were located in the jurisdiction where the principal portion of issuer revenue and income producing assets are located.

Governing Law

The legal opinions delivered on the closing date typically apply the law of the jurisdiction that has been chosen by the parties to the transaction as the governing law of the transaction documents.

Role of Collateral Manager and Other Parties in MV CLOs

The performance of an MV CLO depends not only on the current portfolio and transaction structure, but also on the roles played by various parties to the transaction, including, especially, the collateral manager (the "manager").

Collateral Manager

MANAGER REVIEW

Given the manager's important role and potential impact on MV CLO performance, we assess in our rating analysis the manager's ability to manage the transaction. We base our assessment on a number of factors in light of the specific terms and features of the MV CLO, as set forth in its governing documents. These factors include the performance of the manager's existing transactions and information we gather from our operations review of the manager. They also include any "key person" issues and whether the manager (if a US entity) is a registered investment adviser (RIA)[16] (and, if so, any questions posed by the manager's Form ADV[17]). This assessment is part of our qualitative analysis and sometimes leads us to adjust our quantitative analysis to appropriately capture our expectations for the manager's performance.

Regarding the performance of existing MV CLOs, we consider whether the various tests are in compliance, any positive or negative aspects to the manager's trading behavior, the manager's overall handling of conflicting interests between the debt and equity investors and its adherence to the spirit of the transactions' documents.

Our operations review of the manager includes a discussion about a range of topics, including:

» The amount of assets under management

» Overall credit strategy

» Credit decision process

» Performance relative to objective benchmarks

» Unusual transaction features

» Performance of the manager's existing MV CLO transactions

In addition, we discuss the manager's history, organization, staffing, policies and internal controls, systems, software, and business continuity plans. We also seek information related to any audits or regulatory investigations of the manager, such as whether any irregularities were discovered.

COLLATERAL MANAGEMENT AGREEMENT

The manner in which the manager will carry out its duties with respect to the transaction depend in part on the provisions of the collateral management agreement (CMA). We expect that the CMA should address, among other issues, three key elements:

» The standards of care and liability of the manager

» The conditions governing termination of the manager

» The provisions for dealing on an arms-length basis

[16] A registered investment adviser (RIA) is an entity that advises others with respect to the valuation of securities and advisability of investing in securities. RIAs receive management fees, rather than commissions on trades. In accordance with the Investment Advisors Act of 1940, RIAs must register with the SEC annually.

[17] Form ADV is the uniform form used by investment advisers to register with both the Securities and Exchange Commission (SEC) and state securities authorities that specifies the investment style, assets under management (AUM) and key officers of the firm.

A strong CMA typically includes the following provisions:

The manager agrees to exercise a degree of care that is no less than that which an institutional manager of international standing would exercise when managing comparable assets. Furthermore, the degree of care is no less than that which the manager itself exercises when managing comparable assets for itself, affiliates, and third parties.

The standard of liability provides that the manager incurs financial liability for losses suffered due to any of its actions that are typically "grossly negligent."[18]

The manager can be removed by investors for cause, including any willful violation or breach of the CMA (without a cure period or "material effect" carve-out), as well as misrepresentations and breaches of warranties (allowing for a cure period or "material effect" carve-out). The removal for cause can be prompted by the resolution of a single class of noteholders, rather than effected through the votes of several classes of noteholders, to avoid a delay in or blocking of such removal. In addition, under certain circumstances, the noteholders can remove the manager without showing cause, subject to a majority or super-majority vote. The manager (or any of its affiliates and any accounts for which the manager holds a discretionary mandate) cannot be allowed to vote on its termination for cause or, following such termination, on naming a replacement manager.

In any case, the process for replacing the manager is resolved with the prevailing decision of the controlling class or the trustee or, ultimately, a court.

The CMA typically provides that the manager deal with related parties on an arm's-length basis.

Trustee and Collateral Administrator

A fundamental question we consider in our analysis is whether the trustee/collateral administrator (the "trustee") is capable of carrying out its responsibilities with respect to the transaction. The answer will depend, in part, on the experience of the trustee in handling assets of the type to be held by the MV CLO as well as its experience in playing the same role in other transactions.

One of the most important responsibilities of the trustee is to report on compliance of the MV CLO with the requirements of the indenture. At a minimum, we expect to receive the following from the trustee every reporting period, all for the purpose of monitoring the assigned ratings:

- Measured levels vs. covenanted levels for all coverage tests, collateral quality tests and concentration limitations, along with a "pass/fail" indication and calculation details;
- Details of collateral pool, including trading history;[19]
- Details of any hedges or other derivative transactions;
- Account balances; and
- Note balances.

[18] "Gross negligence" is a US standard which is not strictly defined under English law (and the legal regimes of other European jurisdictions). European MV CLO transactions typically use "negligence" as a liability standard. Under the "gross negligence" standard, the manager is not liable for any failure to perform its obligation unless in cases of gross negligence, bad faith or willful misconduct. Although the "gross negligence" standard is definitely not higher than the plain "negligence" standard under English law, because there is no precedent under the latter, it is unclear whether the "gross negligence" standard is lower or comparable.

[19] Note that Moody's credit estimates should not be indicated in these reports.

For each payment date, we ask to receive the following:

» All items in the monthly report list above, plus

» Details of payments applied in accordance with the waterfall.

We ask to receive prompt written notices provided to any party pursuant to the underlying documentation. We also request prompt written notice of any redemptions so that we can withdraw our ratings on a timely basis. We review *pro forma* reports to assess if we expect that they are sufficient for our monitoring purposes.

Auditor

A typical MV CLO requires an auditor to certify compliance with MV CLO indenture covenants on the closing date, the effective date and any interim test dates where applicable. The auditor audits the accounts of the MV CLO issuer on at least an annual basis and provides the results to the trustee.

The auditor also performs certain agreed-upon-procedures (such as closing date/effective date confirmations).

Monitoring

Transaction Performance

We generally apply the key components of the approach described in this methodology when monitoring MV CLOs, except for those elements of the methodology that could be less relevant over time, such as the review of the legal structure. We also typically receive periodic data on transaction-specific performance, which we use to monitor these types of transactions.

We monitor performance data published by the trustees and provided by the manager to determine if transaction performance is in line with our expectations. Any negative developments detected through our periodic analysis will lead to a thorough review process. We use the parametric approach and, when appropriate, we run our simulation model or apply other analytical approaches to evaluate the expected loss on the bonds in a similar manner to the approach that we use to assign initial ratings.[20]

Consideration of Cushion

We typically assume that the transactions operate exactly at the point where the market value of the collateral, haircut by ARs, would be equal to the rated liabilities. However, in practice, the transactions are often managed with a cushion because:

» managers prefer not to risk liquidating a portfolio and defaulting on debt obligations, which would curtail management fees;

» equity holders, which often include the manager, may be willing to forego dividends if such payments put their investments at risk of liquidation by a third party; and

» when markets are turbulent, the maintenance of a large cash cushion may allow the manager to make opportunistic investments.

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

We may consider this cushion, up to 10 percentage points of over-collateralization level, in circumstances where a manager has historically maintained and is expected (although not committed) to maintain such a cushion. However, because the maintenance of a cushion is not covenanted, we restrict any ratings uplift from the presence of the cushion to no more than three rating notches.

For example, if the transaction ARs are consistent with an A2 rating for a particular security, and the transaction has 120% over-collateralization (OC), then we may evaluate the security as if the OC level was 110%. However, if the resulting expected loss rating is higher by more than three notches – higher than Aa2 in this case – then the rating will be capped at Aa2. Also, if the cushion is less than 110%, then we will model the transaction based on the actual cushion level, with the three-notch cap still in effect. We take account of the history of cushion fluctuations when determining what credit, if any, is appropriate.

In the absence of changes in our parameter values or other aspects of our rating approach, this implies that rating migration for an MV CLO will be generally contained within three notches. We will evaluate new transactions in the same way; if a cushion is present from the outset, then the transaction could have ratings that are three notches above the ratings implied by the ARs.

Appendix A1: Expected Loss for a Senior Tranche

As stated in the "Structural Analysis and Liability Modeling" section, our parametric model for the portfolio return is based on these assumptions:

1) The MV of the portfolio follows a geometric Brownian motion; and
2) The MV has a drift of zero.

Let $\mathbf{MV_0}$ denote the market value at the time of the OC calculation immediately preceding the OC breach, and let $\mathbf{v}$ denote the logarithm of $(\mathbf{MV/MV_0})$ at the end of the liquidation period. The value of the senior tranche equals the advance rate times the market value of underlying collateral at the beginning of the exposure period: $\mathbf{AR * MV_0}$. Therefore, the senior tranche only incurs a loss if $\mathbf{v < \ln(AR)}$, in which case the senior tranche loss, as a fraction of the value of the tranche, is given by:

FORMULA 11

$$L = max\ (0, 1 - \frac{e^v}{AR}).$$

Source: Moody's Investors Service

By assumption 1, v is normally distributed and its variance equals $\sigma^2 t$, where σ is the volatility parameter and t is the length of the market exposure period. By Ito's Lemma,[21] assumption 2 implies that the expected value of v is $-\sigma^2 t/2$. Thus, the EL is given by:

FORMULA 12

$$\text{EL} = \int_{-\infty}^{\infty} \varphi\left(v; -\frac{\sigma^2 t}{2}, \sigma^2 t\right) \max\left(0, \left(1 - \frac{e^v}{\text{AR}}\right)\right) dv$$

Source: Moody's Investors Service

Where:

FORMULA 13

$$\varphi\left(v; -\frac{\sigma^2 t}{2}, \sigma^2 t\right) = \frac{1}{\sigma\sqrt{2\pi t}} exp\left(\frac{-\left(v + \frac{\sigma^2 t}{2}\right)^2}{2\sigma^2 t}\right)$$

is the probability density function for a normally distributed variable v with mean $-\sigma^2 t/2$ and variance $\sigma^2 t$.

Source: Moody's Investors Service

[21] "On stochastic differential equations," Memoirs, American Mathematical Society, Kiyoshi Ito (1951), 1-51.

The methods of calculus can be used to show that the expression for EL equals:

FORMULA 14

$$EL = N[-d_2] - \left(\frac{1}{AR}\right) N[-d_1]$$

Where:

» Vt = the t-day volatility of the market value of the portfolio = $\sigma\sqrt{t}$,

» $d_1 = \frac{1}{V_t} \ln\left(\frac{1}{AR}\right) + \frac{1}{2} V_t$;

» $d_2 = d_1 - V_t$; and

» $N[\cdot]$ = the cumulative normal distribution function.

Source: Moody's Investors Service

Appendix A2: Expected Loss for a Senior Tranche incorporating a Liquidity Haircut

As before, let $\mathrm{MV_0}$ denote the asset value level as of the OC calculation immediately preceding the OC breach, i.e., $\mathrm{MV_0 = D/AR}$, where D is the value of the senior tranche. Assuming a liquidity haircut (LHC) represents an immediate cost of selling assets in an illiquid market, the effective market value at the time of sale is equal to $\mathrm{MV_0}$ *$(\mathrm{1\text{-}LHC})$.[22] Then, under the same assumptions as before, the logarithm of $\mathrm{MV/MV_0}$ at the end of the liquidation period is normally distributed with mean of $\ln(1 - LHC) - \frac{\sigma^2 t}{2}$ and volatility of $\sigma^2 t$. Thus, the EL is given by:

FORMULA 15

$$EL = \int_{-\infty}^{\infty} \varphi\left(v; ln\,(1 - LHC) - \frac{\sigma^2 t}{2}, \sigma^2 t\right) max\left(0, \left(1 - \frac{e^v}{AR}\right)\right) dv$$

Where:

$$\varphi\left(v; ln\,(1 - LHC) - \frac{\sigma^2 t}{2}, \sigma^2 t\right) = \frac{1}{\sigma\sqrt{2\pi t}}\, exp\left(\frac{-\left(v - ln\,(1-LHC) + \frac{\sigma^2 t}{2}\right)^2}{2\sigma^2 t}\right) and\, v = ln\,\left(\frac{MV}{MV_0}\right).$$

Source: Moody's Investors Service

The methods of calculus can be used to show that the expression for EL equals:

FORMULA 16

$$EL = N[-d_2] - \left(\frac{1 - LHC}{AR}\right) N[-d_1]$$

Where:

- $\mathrm{V_t}$ = the t-day volatility of the market value of the portfolio = $\sigma\sqrt{t}$;
- $d_1 = \frac{1}{V_t} \ln\left(\frac{1-LHC}{AR}\right) + \frac{1}{2} V_t$;
  $d_2 = d_1 - V_t$; and
- $N[\cdot\,]$ = the cumulative normal distribution function.

Source: Moody's Investors Service

[22] The impact of liquidity haircut assumption is effectively the same as assuming a negative drift on the MV.

Appendix B: Expected Loss for a Subordinate Tranche

Let:

» M = size in dollars of the subordinate tranche to be rated

» S = combined size in dollars of all tranches senior to the subordinate tranche to be rated

» AR = the advance rate for the subordinate tranche to be rated

Let A denote a hypothetical tranche whose attachment point is the same as that of the subordinate tranche to be rated and whose detachment point is 100%. Let B denote a hypothetical tranche whose attachment point is the same as the detachment point of the subordinate tranche to be rated and whose detachment point is 100%. In other words, A includes the tranche to be rated and all tranches senior to it, and B includes all tranches senior to the tranche to be rated. Then the EL of the tranche to be rated is given by:

FORMULA 17

$$EL = \frac{1}{M}[(S+M)EL(A) - (S)EL(B)]$$

Source: Moody's Investors Service

We know from Appendix A1 that

FORMULA 18

$$EL(A) = N[-d_2] - \left(\frac{1}{AR}\right)N[-d_1]$$

with all variables defined as in Appendix A1.

Source: Moody's Investors Service

EL(B) cannot be determined from Appendix A1, because EL(B) in this case is the expected loss to B as of the moment A's OC trigger is breached, not as of the moment B's OC trigger is breached. However, using logic similar to that used in Appendix A1, we can show that:

FORMULA 19

$$EL(B) = N[-d_4] - \left(\frac{1}{AR'}\right)N[-d_3]$$

Where:

» $AR' = AR * \left(\frac{S}{S+M}\right)$;

» $d_3 = \frac{1}{V_t}\ln\left(\frac{1}{AR'}\right) + \frac{1}{2}V_t$; *and*

» $d_4 = d_3 - V_t$.

Source: Moody's Investors Service

Combining the two Els yields the EL of the tranche to be rated as:

FORMULA 20

$$EL = \frac{1}{M} * \left\{(S+M)\left(N[-d_2] - \left(\frac{1}{AR}\right)N[-d_1]\right) - S\left(N[-d_4] - \left(\frac{1}{AR'}\right)N[-d_3]\right)\right\}$$

Source: Moody's Investors Service

Following similar steps as Appendix A2 and applying a liquidity haircut to Formula 19 will result:

FORMULA 21

$$EL = \frac{1}{M} * \left\{(S+M)\left(N[-d_2] - \left(\frac{1-LHC}{AR}\right)N[-d_1]\right) - S\left(N[-d_4] - \left(\frac{1-LHC}{AR'}\right)N[-d_3]\right)\right\}$$

with AR' defined as before, $\mathbf{d}_1$ and $\mathbf{d}_2$ defined as in Appendix A2 and

» $d_3 = \frac{1}{V_t}\ln\left(\frac{1-LHC}{AR'}\right) + \frac{1}{2}V_t$; and

» $d_4 = d_3 - V_t$.

Source: Moody's Investors Service

Under the non-parametric (simulation) approach, the loss can be expressed as:

FORMULA 22

$$L = min\left(1, max\left(0, \frac{S+M-\frac{S+M}{AR}(1+x)}{M}\right)\right)$$

Source: Moody's Investors Service

The expected loss is estimated as:

FORMULA 23

$$E(L) = \frac{1}{N}\sum_{i=1}^{N} min\left(1, max\left(0, \frac{S+M-\frac{S+M}{AR}(1+x_i)}{M}\right)\right)$$

Where:

» N= the number of t-day price changes from our historical data set used in the simulation.

Source: Moody's Investors Service

In practice, the resulting loss profiles for subordinate tranches are very different from those for senior tranches. They are hard to predict because the controlling class has the priority over the collateral and controls the liquidation process. A particular concern is the possibility that during the liquidation process, assets will be "cherry-picked" as the controlling class would most likely sell the "better" assets first. The impact is especially severe if much larger senior tranches have priority over the collateral. For this reason, the subordinate tranches ratings will be capped at below investment grade levels regardless of the calculated advance rates if a sizable senior tranche has liquidation preference over the assets.

Appendix C: Volatilities and Liquidity Haircuts for Common Asset Types

EXHIBIT 2

	US Treasuries		US Agency Debentures	
Maturity	Volatilities (annualized)	Liquidity Haircut	Volatilities (annualized)	Liquidity Haircu
<1Y	3.8%	5 bps	4.2%	10 bps
1Y-2Y	7.1%	6 bps	7.9%	12 bps
2Y-3Y	9.4%	7 bps	10.4%	14 bps
3Y-5Y	14.3%	10 bps	15.8%	20 bps
5Y-7Y	14.9%	12 bps	16.4%	24 bps
7Y-10Y	17.5%	15 bps	19.2%	30 bps
10Y-20Y	28.0%	24 bps	30.8%	48 bps
20Y-30Y	35.0%	30 bps	38.5%	60 bps

Source: Moody's Investors Service

EXHIBIT 3

US Senior Secured Loans	Volatility	Liquidity Haircut
Performing Priced ≥$.90	27.7%	800 bps
Performing Priced Between $.80 and $.90	34.7%	1,000 bps
Performing Priced <$.80	49.1%	1,600 bps
Caa/NR Priced ≥$.90	37.8%	1,300 bps
Caa/ NR Priced Between $.80 and $.90	66.2%	1,500 bps
Caa/ NR Priced <$.80	114.8%	2,600 bps

Source: Moody's Investors Service

EXHIBIT 4

US High-Yield Corp. Bonds

	Volatility (annualized)							
Rating\Maturity	0-1Y	1-2Y	2-3Y	3-5Y	5-7Y	7-10Y	10-20Y	20-30Y
Aaa	4.5%	8.7%	11.8%	18.3%	20.5%	26.7%	42.7%	53.4%
Aa	8.5%	16.4%	22.1%	33.3%	36.9%	47.5%	76.0%	95.1%
A	9.6%	18.3%	24.6%	36.0%	39.6%	50.2%	80.3%	100.4%
Baa	10.6%	20.2%	27.1%	38.6%	41.9%	52.1%	83.4%	104.3%
Ba	13.0%	24.6%	33.0%	45.5%	48.8%	59.6%	95.3%	119.1%
B	17.6%	33.1%	44.3%	58.5%	61.7%	73.2%	117.2%	146.5%
Caa	22.1%	41.6%	55.6%	71.6%	74.6%	86.9%	139.1%	173.8%

	Liquidity Haircuts (in basis points)							
Rating\Maturity	0-1Y	1-2Y	2-3Y	3-5Y	5-7Y	7-10Y	10-20Y	20-30Y
Aaa	30	30	30	60	75	150	150	150
Aa	30	38	38	75	120	165	165	165
A	60	90	90	180	300	390	390	390
Baa	60	120	120	210	390	480	480	480
Ba	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
B	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Caa	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

Source: Moody's Investors Service

Appendix D: Indicative Advance Rates (for 20 Day Exposure Period, 5% Issuer Concentration and 10% Industry Concentration)[23, 24]

EXHIBIT 5

	Rating Target					
Asset Type	**Aaa**	**Aa1**	**Aa2**	**Aa3**	**A2**	**Baa2**
UST-1Y	95.5%	96.3%	96.5%	96.7%	97.2%	98.1%
UST-2Y	91.6%	93.0%	93.3%	93.7%	94.6%	96.1%
UST-3Y	88.9%	90.7%	91.1%	91.6%	92.7%	94.7%
UST-5Y	83.3%	85.8%	86.5%	87.1%	88.8%	91.6%
UST-7Y	82.7%	85.2%	85.9%	86.5%	88.3%	91.3%
UST-10Y	79.8%	82.7%	83.5%	84.2%	86.2%	89.6%
UST-20Y	69.1%	73.2%	74.2%	75.3%	78.2%	83.0%
UST-30Y	62.7%	67.3%	68.5%	69.7%	73.1%	78.7%
Agencies-1Y	95.0%	95.9%	96.1%	96.3%	96.9%	97.8%
Agencies-2Y	90.6%	92.1%	92.5%	92.9%	93.9%	95.6%
Agencies-3Y	87.7%	89.6%	90.1%	90.6%	91.9%	94.0%
Agencies-5Y	81.6%	84.3%	85.0%	85.7%	87.5%	90.6%
Agencies-7Y	80.9%	83.7%	84.4%	85.1%	87.0%	90.2%
Agencies-10Y	77.9%	81.0%	81.8%	82.6%	84.8%	88.4%
Agencies-20Y	66.4%	70.6%	71.8%	72.8%	75.9%	81.1%
Agencies-30Y	59.6%	64.4%	65.6%	66.9%	70.5%	76.4%
Bank Loans-FL-B-90 +	48.9%	74.0%	74.8%	75.6%	77.9%	81.7%
Bank Loans-FL-B-80 – 90	40.3%	68.2%	69.2%	70.1%	72.8%	77.2%
Bank Loans-FL-B-< 80	25.7%	56.6%	57.7%	58.8%	62.0%	67.3%
Bank Loans-FL-Caa / NR-90 +	35.4%	64.6%	65.6%	66.6%	69.3%	73.9%
Bank Loans-FL-Caa / NR-80 - 90	17.7%	48.6%	49.9%	51.1%	54.9%	61.2%
Bank Loans-FL-Caa / NR-< 80	4.1%	27.1%	28.4%	29.6%	33.5%	40.3%
Corp Bonds-FX-Aaa-1Y	88.9%	95.4%	95.6%	95.8%	96.4%	97.5%
Corp Bonds-FX-Aaa-2Y	79.6%	91.1%	91.6%	92.0%	93.1%	94.9%
Corp Bonds-FX-Aaa-3Y	73.2%	88.1%	88.6%	89.2%	90.6%	93.0%
Corp Bonds-FX-Aaa-5Y	60.8%	81.6%	82.4%	83.1%	85.2%	88.7%
Corp Bonds-FX-Aaa-7Y	57.0%	79.4%	80.3%	81.1%	83.4%	87.2%
Corp Bonds-FX-Aaa-10Y	47.1%	73.4%	74.4%	75.4%	78.1%	82.7%
Corp Bonds-FX-Aaa-20Y	29.6%	60.7%	62.0%	63.3%	67.0%	73.3%
Corp Bonds-FX-Aaa-30Y	21.5%	53.3%	54.7%	56.1%	60.3%	67.4%
Corp Bonds-FX-Aa-1Y	80.0%	91.3%	91.8%	92.2%	93.2%	95.1%
Corp Bonds-FX-Aa-2Y	64.4%	83.6%	84.3%	85.0%	86.9%	90.1%
Corp Bonds-FX-Aa-3Y	54.9%	78.3%	79.2%	80.1%	82.5%	86.5%
Corp Bonds-FX-Aa-5Y	39.6%	68.4%	69.6%	70.7%	74.0%	79.4%
Corp Bonds-FX-Aa-7Y	35.3%	65.2%	66.5%	67.7%	71.1%	76.9%
Corp Bonds-FX-Aa-10Y	25.6%	57.1%	58.5%	59.9%	63.8%	70.5%
Corp Bonds-FX-Aa-20Y	10.8%	40.2%	41.7%	43.2%	47.9%	56.0%
Corp Bonds-FX-Aa-30Y	5.9%	31.5%	33.0%	34.5%	39.3%	47.7%

[23] Bank Loan advance rates in the table reflect full diversification benefits. Corporate bond advance rates in the table, however, are composed of 10 asset advance rates.

[24] For bonds and loans, the volatilities are multiplied by the volatility factors appropriate for each rating target. Those factors are: 95% for Aa1-Aa3, 90% for A1-A3, 87% for Baa1-Baa3, 85% for Ba1-Ba3, and 70% for B1 and below rating targets. Also, for bonds and loans, we would not assume the exposure period to be less than twenty days.

EXHIBIT 5

	Rating Target					
Asset Type	**Aaa**	**Aa1**	**Aa2**	**Aa3**	**A2**	**Baa2**
Corp Bonds-FX-A-1Y	77.2%	90.0%	90.4%	90.9%	92.1%	94.1%
Corp Bonds-FX-A-2Y	60.4%	81.3%	82.1%	82.9%	85.0%	88.4%
Corp Bonds-FX-A-3Y	50.6%	75.6%	76.6%	77.5%	80.2%	84.5%
Corp Bonds-FX-A-5Y	35.8%	65.5%	66.7%	67.9%	71.3%	76.9%
Corp Bonds-FX-A-7Y	31.4%	62.0%	63.3%	64.5%	68.0%	73.9%
Corp Bonds-FX-A-10Y	22.5%	54.0%	55.4%	56.8%	60.7%	67.5%
Corp Bonds-FX-A-20Y	9.0%	37.2%	38.7%	40.2%	44.8%	52.8%
Corp Bonds-FX-A-30Y	4.8%	28.8%	30.2%	31.7%	36.3%	44.6%
Corp Bonds-FX-Baa-1Y	75.1%	89.0%	89.5%	90.0%	91.3%	93.5%
Corp Bonds-FX-Baa-2Y	56.9%	79.4%	80.2%	81.0%	83.2%	87.0%
Corp Bonds-FX-Baa-3Y	46.8%	73.2%	74.3%	75.3%	78.1%	82.7%
Corp Bonds-FX-Baa-5Y	33.0%	63.3%	64.6%	65.8%	69.3%	75.2%
Corp Bonds-FX-Baa-7Y	28.8%	59.8%	61.0%	62.3%	65.9%	72.0%
Corp Bonds-FX-Baa-10Y	20.9%	52.3%	53.7%	55.0%	59.1%	65.8%
Corp Bonds-FX-Baa-20Y	8.0%	35.4%	36.9%	38.4%	43.0%	51.0%
Corp Bonds-FX-Baa-30Y	4.1%	27.1%	28.5%	29.9%	34.5%	42.7%
Corp Bonds-FX-Ba-1Y	52.7%	75.8%	76.4%	76.9%	78.2%	80.5%
Corp Bonds-FX-Ba-2Y	38.1%	66.4%	67.3%	68.1%	70.4%	74.2%
Corp Bonds-FX-Ba-3Y	30.0%	60.2%	61.2%	62.2%	65.0%	69.7%
Corp Bonds-FX-Ba-5Y	20.8%	51.8%	53.0%	54.2%	57.6%	63.4%
Corp Bonds-FX-Ba-7Y	18.9%	49.8%	51.0%	52.2%	55.8%	61.7%
Corp Bonds-FX-Ba-10Y	13.6%	43.6%	44.9%	46.2%	50.1%	56.7%
Corp Bonds-FX-Ba-20Y	4.5%	27.8%	29.1%	30.5%	34.7%	42.1%
Corp Bonds-FX-Ba-30Y	2.1%	20.4%	21.6%	22.9%	26.9%	34.3%
Corp Bonds-FX-B-1Y	46.4%	72.0%	72.7%	73.3%	75.1%	78.0%
Corp Bonds-FX-B-2Y	29.9%	60.1%	61.1%	62.1%	64.9%	69.7%
Corp Bonds-FX-B-3Y	21.5%	52.6%	53.7%	54.9%	58.3%	64.0%
Corp Bonds-FX-B-5Y	14.1%	44.2%	45.5%	46.8%	50.6%	57.2%
Corp Bonds-FX-B-7Y	12.8%	42.5%	43.8%	45.1%	49.0%	55.7%
Corp Bonds-FX-B-10Y	9.0%	36.8%	38.2%	39.5%	43.6%	50.7%
Corp Bonds-FX-B-20Y	2.2%	20.9%	22.2%	23.4%	27.5%	34.9%
Corp Bonds-FX-B-30Y	0.8%	14.2%	15.3%	16.3%	20.0%	26.9%
Corp Bonds-FX-Caa / NR-1Y	33.2%	62.9%	63.6%	64.3%	66.2%	69.5%
Corp Bonds-FX-Caa / NR-2Y	18.9%	49.9%	51.0%	52.0%	55.0%	60.1%
Corp Bonds-FX-Caa / NR-3Y	12.5%	42.1%	43.3%	44.5%	47.9%	53.8%
Corp Bonds-FX-Caa / NR-5Y	7.7%	34.5%	35.8%	37.0%	40.8%	47.3%
Corp Bonds-FX-Caa / NR-7Y	7.0%	33.3%	34.5%	35.7%	39.5%	46.1%
Corp Bonds-FX-Caa / NR-10Y	4.8%	28.5%	29.7%	30.9%	34.8%	41.6%
Corp Bonds-FX-Caa / NR-20Y	0.9%	14.4%	15.4%	16.4%	19.9%	26.4%
Corp Bonds-FX-Caa / NR-30Y	0.3%	9.0%	9.8%	10.6%	13.5%	19.2%

Source: Moody's Investors Service

Moody's Related Publications

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

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

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

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