MOODY'S
INVESTORS SERVICE

CROSS-SECTOR RATING METHODOLOGY

Loss Given Default for Speculative-Grade Companies

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Introduction

This rating methodology explains how our Loss Given Default (LGD) framework is used in making rating distinctions across the liability structure within a speculative-grade corporate family. This document provides general guidance that helps companies, investors, and other interested market participants understand the application of the LGD framework, including assumptions for the LGD model that is part of the total framework, and general reasons why rating committees may assign ratings that differ from the outcomes suggested by the model.

This rating methodology can be used for any speculative-grade corporate globally whose operations are predominantly subject to legal jurisdictions where we believe that broad defaults by an issuer family will generally result in recoveries for liabilities that closely align with the stated differences in their legal priority. This geographic scope includes the US, Canada and Europe.

The LGD model that is a core part of this methodology provides a systematic framework for making rating decisions that reflect the estimated allocation of firm-wide creditor losses to a corporate family's various classes of debt and non-debt obligations. The output of the LGD model is used as an informational input to help rating committees determine how ratings on debt instruments are notched up or down relative to the Corporate Family Rating (CFR). The relevant sector rating methodology helps to determine the CFR that is assigned to a particular corporate family. The CFR reflects our opinion of the relative likelihood of default on the corporate family's debt and debt-like obligations combined with the expected financial loss (loss given default or LGD) in the event of default. In most cases, a Probability of Default Rating (PDR) is also assigned to the issuer family. The PDR reflects our opinion of the relative likelihood that there will be a default on one or more debt obligations within the corporate family[1].

THIS RATING METHODOLOGY WAS UPDATED ON DECEMBER 12, 2019. WE HAVE UPDATED SOME OUTDATED REFERENCES AND ALSO MADE SOME MINOR FORMATTING CHANGES.

[1] For the definitions of CFR and PDR, please refer to *Rating Symbols and Definitions*. A link to *Rating Symbols and Definitions* can be found in the "Moody's Related Publications" section.

It is difficult to anticipate what a defaulting corporate family's capital structure will look like if and when the issuer defaults at some future time. Furthermore, recoveries have not been found to correlate with industrial sector or other fundamental variables. Given these uncertainties, for most issuer families the average assumption of 50% firm-wide LGD is used[2] as an input for the LGD model. A different firm-wide LGD assumption is used when a rating committee believes that there is sufficient reason to expect LGD that is higher or lower than this usual assumption. For example, rating committees are more likely to take an issuer-specific view on family-wide recovery when companies migrate close to default and the capital structure is less likely to change in a material way prior to default. Different firm-wide recovery is also likely to be used when there is a strong expectation for higher average recovery for a class of issuers (e.g. 35% LGD for most regulated utilities or infrastructure companies) or based upon an all first lien bank debt structure with strong covenants (often 35% LGD) or an all unsecured bond debt structure without strong covenants (often 65% LGD).

In most cases, rating committees agree with the notching that is indicated by the LGD model. However, rating committees assign the rating that is viewed as most appropriately representing the risk of default and loss regardless of the LGD model output. There are many circumstances in which this will be the case. Some of the most likely include the following: the rating committee expects the future capital structure to be significantly different from the current capital structure; there is significant variability in liabilities due to seasonality; the family's corporate structure is complex with different instruments supported by different assets or security pools such that expected recoveries may not reliably mirror legal priority of claim; or there is a view that underlying assumptions of the model do not fit the circumstances.

LGD assessments and PDRs are assigned only to the obligations of speculative-grade companies because a default event is more remote for investment-grade issuers and, consequently, there is even greater uncertainty about a firm's expected liability structure at default.[3] For speculative-grade companies, however, there is already relatively high default risk (by definition), and the approximate liability structure at default can often be extrapolated from existing liability structures. Analysis of the terms and conditions underlying bank credit agreements and bond indentures — including an analysis of the adequacy of any underlying collateral — informs the estimated rank ordering of these obligations in the event of bankruptcy proceedings or restructuring negotiations. Moreover, for companies facing a high probability of default, fundamental cash flow or liquidation analyses can sometimes be useful in estimating the expected value of firm assets available for distribution to creditors in bankruptcy or as part of the ultimate default resolution.

Ratings assigned to securities and loans using this methodology reflect estimated differences in the relative expected loss (EL) across the capital structure. Expected loss can be represented by the product of the probability of default (PD) and loss given default (LGD), or EL = PD x LGD.

Relationship between CFR, PDR, and LGD[4]

Corporate Family Ratings (CFRs) are long-term ratings that reflect the relative likelihood of a default on a corporate family's debt and debt-like obligations and the expected financial loss suffered in the event of default. A CFR is assigned to a family as if it had a single class of debt and a single consolidated legal entity structure. In other words, the CFR is assigned as though the corporate family has a single probability of

[2] We believe this assumption is reasonable based upon long run average firm level recoveries. Actual recoveries vary substantially for any given issuer and average recoveries for corporates vary substantially over periods of time. For example, average recoveries are generally higher in periods of low default rates and lower in periods of high default rates.

[3] Expected LGDs for securities issued by investment-grade firms are likely best estimated by historical averages for bonds of each security class, and thus would be the same across all firms.

[4] For more information on CFRs, PDRs and LGD, please see *Rating Symbols and Definitions*. A link to *Rating Symbols and Definitions* can be found in the "Moody's Related Publications" section.

default and a LGD across the entire family. Once the CFR has been assigned, we may assign ratings to specific issuers and debt and preferred stock obligations. These ratings typically reflect a liability-weighted average of underlying EL and LGD rates for all obligations of a firm that is generally in line with that associated with the CFR.

A probability of default rating (PDR) is a corporate family-level opinion of the relative likelihood that any entity within a corporate family will default on one or more of its long-term debt obligations.[5]

The rating scale for probability of default ratings (PDRs) ranges from Aaa-PD to C-PD (although the use of this scale is typically limited to speculative-grade) for companies that are not in default. When a company is in default, D-PD indicates that the company is in default on all rated obligations, while a rating such as Caa1-PD/LD would signal a limited default on one or more (but not all) securities within a corporate family. In this example, the "Caa1" portion of Caa1-PD/LD reflects the perceived default risk of the rated obligations that have not yet defaulted and hence are not subject to the limited default. The meaning of PDRs is not comparable to the meaning of EL-based instrument and corporate family ratings because the former ranks credits with respect to expected default risk only and the latter ranks them with respect to expected credit losses inclusive of both default risk and severity.[6]

Since two companies with the same CFR should have comparable firm-wide expected credit loss rates, it is necessarily the case that firms with above-average firm-wide expected LGDs have below-average default probabilities relative to other firms with the same CFR. The inverse is also true, in that firms with below-average firm-wide expected LGDs have above-average default probabilities relative to other firms with the same CFR. Based on this reasoning, given a CFR and an expected firm-wide LGD rate, PDRs may be readily inferred and are generally assigned in a fairly straightforward manner in the LGD modeling template via reference to Moody's idealized loss and default tables (see Appendix B).

Firm-wide expected LGD rates for most firms can be characterized as falling into one of three categories — high, medium, and low — with the majority of firms being in the middle. Firms with "medium" expected LGD rates have PDRs and CFRs at the same level (although these are on different scales) since idealized expected loss and idealized default rates reflect this "medium" LGD rate. Firms with "high" expected LGD rates, however, have PDRs that are usually one notch higher than the CFR (i.e., a lower probability of default, and hence a higher probability of default rating). Firms with "low" expected LGD rates have PDRs that are usually one notch lower than the CFR (i.e., a higher probability of default, and hence a lower probability of default rating).

[5] Moody's definition of default includes four types of credit events:

- A missed or delayed disbursement of interest and/or principal;
- Bankruptcy, administration, or legal receivership;
- A distressed exchange whereby 1) an obligor offers creditors a new or restructured debt, or a new package of securities, cash or assets that amount to a diminished financial obligation relative to the original obligation and 2) the exchange has the effect of allowing the obligor to avoid a bankruptcy or payment default in the future.
- a change in the payment terms of a credit agreement or indenture imposed by the sovereign that results in a diminished financial obligation.

A link to *Rating Symbols and Definitions* can be found in the "Moody's Related Publications" section.

Companies usually, but not always, default on all their obligations when they default on one. Moreover, corporate families usually, but not always, default across all their affiliates when any one of their legal entities defaults. The LGD methodology recognizes the possibility that, in a default situation, some "senior" corporate obligations (or some affiliates in their entirety) may avoid default altogether by modeling those situations as defaults with zero loss severity.

[6] Both the PD and EL corporate rating scales express opinions on ordinal credit risk and are not designed to indicate a specific level of cardinal credit risk. That is, they do not indicate specific target default or loss rates. However, the likely expected future default and loss rates associated with a specific rating category over long periods of time is generally expected to be similar to that observed historically and summarized in our annual historical corporate bond default and loss studies. Actual default and loss rates by rating category can and do vary meaningfully due to their inherent cyclicality.

LGD Assessments

LGD assessments reflect our opinion about expected loss given default on debt instruments, expressed as an estimated percentage of the amount owed (principal and accrued interest) that will be a loss at the resolution of default.[7] LGD assessments are assigned to individual loan, bond, and preferred stock issues. The expected firm-wide LGD rate is mathematically equivalent to the weighted average of the expected LGD rates for the firm's liabilities, weighted for each obligation's expected share of the total liabilities at default.

LGD assessments are expressed through a six-point scale (LGD1 through LGD6) that orders expected loss severity from lowest to highest.

LGD Assessment	Loss Range
LGD1	0% and < 10%
LGD2	10% and < 30%
LGD3	30% and < 50%
LGD4	50% and < 70%
LGD5	70% and < 90%
LGD6	90% and 100%

As indicated in the table above, the expected loss severity for an LGD1 obligation is assessed at less than 10%, which means we estimate investors would recover more than 90% of principal and accrued interest at the resolution of default. At the other end of the scale, an LGD6 indicates a loss expectation of at least 90%, or a recovery of no more than 10%.

Framework for Deriving Expected LGD Assessments

A firm's obligation-specific expected LGD rates are derived from a probability distribution of its firm-wide recovery rates at default resolution and the expected liability structure at time of default.

The LGD model that is part of this methodology is used to derive expected LGD rates for individual debt and preferred stock instruments based upon a probability distribution of many different potential outcomes for the company's firm-wide recovery rates at default. The probability distribution of firm-wide recovery rates at default resolution produces a specific probability for each possible firm-wide recovery rate scenario. That is, it specifies the likelihood that the company's firm-wide recovery rate will be 0% or 1% or 2%, etc., all the way to 100% (representing full recovery for all debts) and then, additionally, up to 120% in recognition that firm value will in some scenarios be large enough at resolution that preferred and even common shareholders may receive some proceeds.

The expected liability structure at default includes both debt and non-debt obligations and assesses the quality of security for secured obligations with less than an "all assets" pledge. Expected priority of claim is generally determined by the prevailing bankruptcy regime.

[7] Expected LGD is the difference between value received at default resolution (either through bankruptcy resolution, distressed exchange, or outright cure) and principal outstanding and accrued interest due at resolution. The expected LGD rate is expected LGD divided by the expected amount of principal and interest due at resolution.

Together, the probability distribution for firm-wide recovery rates along with a specified expected liability structure at default, is sufficient to calculate each obligation's likely expected LGD rate. For each possible firm-wide recovery rate at resolution, the payouts for each obligation are determined by the priority of claim "waterfall." Each obligation's expected LGD rate is then calculated as the probability-weighted average of its LGD rates across these scenarios.[8]

Probability Distribution of Recovery at Default

For firms that are not close to default, our rating committees usually choose one of three beta probability distributions of firm-wide recovery rates at default that are specified on the basis of historical recovery data included in Moody's Ultimate Recovery Database (URD). The three distributions have mean firm-wide recovery rates of 50% (baseline or medium assumption), 65% (high-recovery assumption) and 35% (low recovery assumption). As discussed in more detail below, which of the three distributions is chosen by a rating committee typically depends on the firm's industry and its capital structure characteristics.

In some cases, particularly when firms are nearer to default or already in default, our rating committees estimate an expected enterprise value at default (i.e., firm-wide recovery rate) using a "bottoms-up," distressed-firm analysis. A band of uncertainty based on historical experience –expressed as a standard deviation around that assessment – may still be employed in such situations given the high-level uncertainty and unpredictability that may exist even for near-default (and in-default) companies. The distressed-firm analysis (discussed in Appendix C) determines which of the two methods — "going concern" or "liquidation" — produces the higher valuation for each particular firm. The higher of the two valuation methods is usually used in our analysis. In certain situations, particularly when a company is in or near default and uncertainty regarding recovery is considered low, rating committees may estimate recovery prospects without utilizing the LGD modeling template (e.g., based on the terms of a prepackaged bankruptcy plan).

The use of the LGD framework entails considerable rating committee discretion in determining the estimated liability structure, especially if the issuer is a complex organization. Analysts and rating committees may revise general LGD framework assumptions, including guidelines with respect to the inclusion or exclusion and sizing of different liabilities that comprise the LGD waterfall, as needed to reflect our view of the relative credit risks of the company's obligations. For example, a company may have a litigation judgment against it but be far removed from default (i.e., Ba CFR). If the rating committee deems it likely that the judgment will be paid prior to a default event (which it almost certainly would with a Ba CFR), then the claim is unlikely to be modeled into the LGD waterfall of liabilities. Such is often the case with other non-debt liabilities, many of which are excluded from the LGD waterfall unless ratings are very low and proximity to default is thereby very high.

In cases where a rating committee assigns a CFR of B2 or below, the rating committee may choose to apply a traditional valuation approach for estimating LGD, rather than using the mean LGD estimates in the framework, which represent averages derived from empirical data in Moody's Ultimate Loss Given Default Database. The application of rating committee judgment that differs from empirically suggested averages considers the potential for knowledge and insights that may justify a different view for a specific firm. Here again, however, closer proximity to default often correlates with greater certainty and visibility of the

[8] When rating committees assign a rating that differs from the LGD model output , LGD rates for the affected instruments are adjusted within the modeling template framework to yield EL rates that are consistent with the assigned rating. It should also be noted that rating committees may establish LGD and EL rates that reflect a specific view on loss rates. For example, this is likely to occur in the case of a limited default or a distressed exchange when loss rates for specific instruments can generally be estimated with a higher level of certainty. When rating committees determine EL and LGD that differ from what is suggested by the model output, the LGD and EL rates for all other unaffected instruments remain unchanged, and hence the firm-wide loss rate will not then match exactly the sum of all instrument-level loss rates.

default event, and thereby the liability structure at default, as well as the likely LGD outcome for the corporate enterprise. All of these factors support our incorporation of more qualitative analytic judgment into the rating process for near-term defaulters (i.e.; lower-rated companies) relative to the more generic approach typically employed for higher-rated firms that are further removed from default.

By using a distribution of firm-wide outcomes, rather than a single point estimate, the LGD model incorporates uncertainty surrounding the firm-wide LGD rate. Modeling this uncertainty is critical to obtaining security-level expected LGD rates that are consistent with actual losses typically observed for these instruments. If one ignores uncertainty and assumes that the precise firm-wide LGD rate is known, then the application of strict priority of claim analysis inevitably implies exaggerated "bar-bell" results — with senior-most debt claims often experiencing no loss and junior-most claims often experiencing 100% loss. In general, the introduction of uncertainty into the analysis reduces the difference in expected recovery rates between the most senior and the most junior debt classes.[9]

Our baseline assumption, based on US bankruptcies and distressed exchanges, is a 50% recovery rate with a 26% standard deviation. While observations for non US bankruptcies and distressed exchanges are more limited in number, there is no evidence in Moody's view that the model would not fit well in other geographies. Rating committees have the flexibility to vary from the baseline distribution assumption. We recognize that firms with a very low proportion of bank debt in their capital structure have historically experienced higher-than-average LGD rates (about 65%), whereas firms with only first lien bank debt (with customary loan market protective covenant structures) in their capital structures have experienced lower-than-average LGD rates (about 35%). These findings can be rationalized by the greater degree of control provided by the protective covenants typically embedded in bank credit agreements relative to bond indentures, where most meaningful controls tend not to become exercisable until considerably later in the life cycle, when asset values have eroded further. Bank groups also no doubt exercise more caution when no junior capital is present to absorb first loss positions in a default scenario. In addition, regulated or network utilities have historically experienced below-average enterprise LGD rates (about 35%), partly because of the more reliable asset base where value is slower to erode, even in a distress scenario, and partly because default has sometimes been used by firm managers strategically and in advance of severe financial distress to obtain more supportive regulatory treatment from rate-setting authorities. Future research could provide additional basis for distinctions in expected enterprise-wide LGD rates.

Hence, in the case of regulated or network utility and infrastructure companies and also "all loan" structures (assuming customary covenants to protect creditors), the mean family LGD estimate utilized is typically 35% (65% recovery) with a 26% standard deviation. “All loan” structures include debt capitalizations that are predominantly first lien though if there is an immaterial amount of non-first lien debt (generally less than 5%) in the corporate structure, the family would still qualify for this lower LGD rate. Covenant-lite all first lien structures will usually carry a 50% family LGD assumption. If the capital structure is comprised of both first lien and second lien bank debt, a 50% LGD rate is generally used. If non-debt represents a large portion of total liabilities modeled, however, we may revert to the 50% mean family recovery level - even if the only debt in the capital structure is comprised of first lien loans. The presumption in this latter situation is that the existence of a meaningful layer of junior-ranking (albeit non-debt) capital would presumably put bank lenders somewhat more at ease about the risk of meaningful loss absorption, thereby delaying what might otherwise be an earlier default acceleration trigger point - at least until a later point in the life cycle of

[9] Potential violation of absolute priority of claim is another reason why senior debt can trade at prices less than 100 while junior debt trades at positive prices. The empirical evidence on the historical magnitude of such violations, however, suggests that expected violations alone are much too small to explain the relative pricing we observe for senior and junior debt. Since, however, uncertainty about the total amount to be distributed to different claimants has similar effects on relative expected LGD rates as violations of absolute priority of claims, modeling uncertainty can also serve as a proxy for violations of priority of claims.

that company when asset values have started to dip below the level of liabilities represented by that junior capital.

Finally, we would select a higher family LGD rate of 65% (35% recovery) with a 26% standard deviation for a company with no bank debt (i.e., debt capitalization is an "all unsecured bond" structure) and comparatively few or no protective covenants (such as those typically present in bond indenture agreements) that might trigger an earlier default prior to above-average erosion of asset value. Where the debt structure consists of secured bonds with comparatively few or no protective covenants, we generally select a 50% family recovery rate.

To date, our analysis has been unable to identify industry-specific or firm-specific variables that can reliably be used to help predict family recovery rates far in advance of default, other than the prevalence of loans in the liability structure or the firm's status as a regulated utility, as already mentioned.

Some Reasons Why Rating Committees May Sometimes Assign Ratings that Differ from What Is Suggested by the LGD Model Output

Rating committees use judgment in assigning ratings that are believed to most appropriately represent the risk of default and loss, regardless of the notching that is suggested from the use of the LGD model. In most cases, the difference between the rating assigned and the LGD model output is no more than one notch. However, multiple notch differences are possible.

The following provides some examples of circumstances that make it more likely that a rating committee will choose ratings that differ from the LGD model output. This list is illustrative and does not include all circumstances that will result in a difference between the rating and the model outcome.

» We believe that future capital structure changes are likely and that the model output resulting from populating the liability waterfall from the historical capital structure would not suggest the most appropriate forward-looking ratings. For example, we may think that it is likely that the proportionate mix of senior secured and unsecured liability claims will change in a particular direction and consider this sufficient reason to assign a rating that is higher or lower than the notching suggested by the model, without necessarily having a view of the precise amount for these liabilities at particular future dates. Rating committees may also take a forward view in modeling certain obligations (level of trade payables or revolver borrowings) to account for temporary factors such as commodity price volatility and working capital movements, that may reverse over time.

» Liabilities (debt or non-debt) are expected to fluctuate substantially due to seasonality, or the unusual nature of these liabilities leads us to believe that the amount of the liability will be substantially different at the time of default. For example, we may consider trade payables at a seasonal peak or trough to be unrepresentative of the average level, or may consider an exceptionally high level of trade payables resulting from unusual relationships with suppliers to be substantially different than the level likely to exist at default. Again in these cases, while there may be a view on general magnitude and direction, we are unlikely to estimate a precise amount for the level of the liabilities at time of default.

» The company is near default or in default and we believe that there is less uncertainty around expected recoveries.

» Structural complexities of a borrowing arrangement do not align with the assumptions underlying the LGD model. Examples include partial guarantees from subsidiaries (this may occur due to tax

considerations or other reasons) and partial asset pledges, which pose complexities for rank-ordering claims.

» Well-structured asset-based loan facilities (ABLs) have typically been rated one notch above the ratings otherwise suggested by our LGD model. We believe that a well-structured and closely monitored ABL will experience lower losses in default or bankruptcy than other types of senior secured first-lien loans.

» The rating committee chooses to undertake a fundamental analysis of expected loss prospects for the company and its rated instruments. This is more likely for companies rated in deep speculative-grade, where there is often very little flexibility to make changes in the capital structure and a better ability to form a forward-looking view on how default will occur.

» Rating committees may be cautious about rating an instrument more than one notch above the CFR if upward pressure is only due to non-debt liabilities ranking below it in the waterfall. For instance, pension liabilities may be unsecured and stand lower in the waterfall but may be treated more favorably in a bankruptcy than their legal status would normally warrant.

» Where the model output suggests an instrument rating that is multiple notches above the CFR, rating committees may choose to limit up notching at CFRs of Ba2 and higher since these companies are generally far from default with capital structures that are likely to change substantially as they move closer to a default event.

Impact of Legal Organization on the Claim Structure

The fact that corporate families possess different legal organizational structures introduces an element of complexity in estimating a firm's expected liabilities at default resolution. We do not typically assume a simple consolidation of all companies under the corporate family umbrella, but rather analyze a firm's obligations by legal entity, subject to having sufficient information. Our analysis also takes into consideration the flow of inter-company guarantees into the liability structure and distinguishes whether such guarantees have been issued on a senior versus subordinated, and secured versus unsecured basis. For example, an upstream guarantee issued on a senior secured basis by an operating company to cover the debt of its parent holding company would typically be viewed as being pari-passu with senior secured debt of the operating company.

Where appropriate, and in particular for situations in which default risk is not consistent across the consolidated enterprise and/or absolute priority of claim may not be adhered to - we may establish additional corporate family ratings and alter the structure of the "waterfall" accordingly, or we may simply conclude that the model will not reliably suggest appropriate notching across the family.

As a company approaches default, we may undertake more detailed analyses of LGD risk at the individual subsidiary level to ascertain whether assumed default correlation assumptions are still relevant. For example, in the utilities sector, a company may consist of a parent with interests in two subsidiaries, operating in two different states, each subject to different regulations. The default risk may not necessarily be identical for these two essentially independent entities, notwithstanding their common ownership and the ability that typically exists to move monies between them. In such cases, it may be appropriate to construct separate "waterfalls" for different parts of the consolidated company when implementing LGD.

Appendix A: Details on the Use of the LGD Model

Priority of Claim across Expected Liabilities at Default

Using the Current Liability Structure as a Proxy

Given a CFR and an enterprise-wide LGD distribution assumption, LGD analysis centers on construction of the liabilities "waterfall". Time to default is a key component of this analysis. Similar to our approach to thinking about enterprise value, and specifically incorporating the high degree of uncertainty that typically exists, the approach to constructing the liabilities "waterfall" also notably incorporates the likelihood that significant changes may occur to a company's liability structure between the time it is healthy and when it defaults. Bank loans, for example, may become fully utilized, or in some cases they may be partially or even fully repaid. Additional liabilities may be taken on and existing liabilities may grow, decrease, or be repaid entirely.

To estimate a company's liability structure at the time of default, we start with the current liability structure of the issuer. Our objective is to ascertain the extent of claims that would be allowable under the relevant insolvency laws and practices of the relevant jurisdiction and that might have a bearing on the ultimate recovery value of the company, thus minimizing the level of speculation in this assessment. We consider the current mix of debt and other liabilities in the capital structure, subject to certain adjustments described below, a reasonable proxy for the issuer's capital structure at default. The fact that absolute claim levels are likely to change as default approaches is not as significant as the mix of capital because the LGD methodology is grounded in an analysis of the relative shares of capital that each creditor class maintains in the context of the consolidated family.

Liabilities derived from the company's financial statements may be substantially inconsistent with our expectations for their impact on recovery. In unusual instances, we may enter values in the LGD template that substantially differ from the amounts that might otherwise be derived or estimated from financial statements. However, entering a specific adjusted amount can imply greater precision than we intend for a number used in estimating future recovery. In most cases, we have a strong view that the amount that might be derived or estimated from financial statements seems too high or too low for estimating future events but do not perceive any exact amount as being the single most appropriate value. Therefore, in most cases we enter values that would be typically derived or estimated from financial statements and qualitatively consider our view of these values as part of the rating committee judgment that determines the rating believed to be the most appropriate. Where we perceive a meaningful difference but do not make an adjustment for this in the LGD template, rating committees are significantly more likely to choose ratings that differ from those suggested by the LGD template.

The same broad considerations apply when expectations for a particular issuer strongly differ from the usual approach for ranking the seniority of non-debt liabilities, such as pensions and trade payables. Our expectations for the recovery impact of these liabilities can meaningfully differ with regard to the portion that is typically classified as secured or unsecured in the LGD template, as well as with regard to the total amount of the liability. Our usual approach is to classify liabilities wholly within a single seniority class. While this aligns with our expectation for average outcomes, rating committee decisions consider that actual outcomes will differ from the typical seniority ranking in many cases. In unusual instances, we may enter a non-debt liability with a highly specific allocation mix (for example partially as senior unsecured and partially as secured). However, entering a specific allocation across multiple debt classes can imply greater precision than we intend for a number used in estimating future recovery. Therefore, in most cases we enter values as derived or estimated from the issuer's financial statements and qualitatively consider our view of the values and seniority ranking as part of the rating committee judgment that determines the rating

believed to be most appropriate, without adjusting values in the LGD template. Where we perceive a meaningful difference but do not make an adjustment for this in the LGD template, rating committees are significantly more likely to choose ratings that differ from the LGD model output.

In many cases, we estimate the inputs to the LGD model rather than derive them from financial statements. Such cases include but are not limited to instances in which the issuer is undertaking a debt financing, is undergoing an event or transaction that we expect will change its financial profile, pending mergers, acquisitions and spin-off transactions.

Determining And Sizing The "Waterfall" Claims

We generally size obligations in the capital structure based on current levels of borrowings but may make adjustments to reflect significant events that are highly likely to occur in the next year. These can include:

» Mandatory term loan amortization

» Payment-in-kind interest accretion

» Pending refinancings (including unrestricted cash on the balance sheet from a pre-funding activity, to be used to retire other debt near-term)

» Expected repayments triggered by asset sales

Absolute Priority of Claim

We assess the expected ranking of each potential claim relative to all others in a manner consistent with priority of claim as reflected in the insolvency laws and practices of the relevant jurisdiction. Importantly, our analysis incorporates both structural and contractual considerations.

Structural considerations are evaluated based on a legal entity analysis and a determination of relative priority of claim from a corporate organizational structure perspective. Understanding how a company is organized -- be it with (often multiple) holding companies and/or solely operating companies, and specifically where its assets are held and its liabilities reside, is critical to properly rank-order its obligations. This review assesses potential complexities arising from multiple holding and operating companies, jurisdictional issues stemming from domestic and foreign operations, and guarantor relationships, among others. Our assumptions generally hold that closer proximity to assets (and ultimately the cash flow that is generated from these assets) is favorable from a priority of claim perspective. As such, operating companies which either directly hold or maintain closer proximity to the company's assets are generally ranked senior to "true" holding companies that do not directly hold assets of their own and are further removed from the company's assets.

We note that guarantees can have a meaningful effect on the analysis. Subsidiary guarantees (if granted on a full and unconditional and equivalently ranked basis -- e.g., secured guaranty for secured debt), in particular, may mitigate what would otherwise be structural subordination in their absence if the claim is a holding company obligation, thereby causing such obligations to be treated on a pari-passu basis with similar-ranking operating company obligations.

Contractual considerations are incorporated via careful review of the terms and conditions embedded in the bank credit (and inter-creditor) agreements and bond indentures governing the individually rated instruments. This review assesses the relative contractual ranking (e.g., secured vs. unsecured, senior vs. subordinated) of different instruments within the corporate family, in particular including a critical review of security provisions and potential cross-collateralization and deficiency claim issues, among others.

When assessing a possible default scenario we generally assume a reorganization or restructuring of the company's operations, as is typically the case, rather than a liquidation of assets (which usually would yield lower recovery values for creditors). We would alter this assumption only when our analysis concludes that liquidation would result in higher value for creditors. This would apply, in particular, in cases when the sum of the parts is greater than the whole (i.e., when the value of discrete assets to be sold is greater than the value of the entity as a going concern).

Sizing and Assessing Specific Types of Liabilities

If secured claims carry an "all-assets" pledge, then they can simply be treated as the most senior claim (subject only to administrative/priority claims and lien prioritization; i.e., 1st lien, 2nd lien, 3rd lien, etc.). Certain secured credit facilities have equivalent lien structures (e.g. all first lien) but the underlying documentation specifies a payment waterfall at default and upon other events such as sale of assets (e.g. a first-out revolver and a last-out term loan). Rating committees may treat these structures as similar to first lien/second lien arrangements if the expectation is that these claims will recover in a similar manner in a default scenario.

If secured claims have less than an "all assets" pledge, then it becomes important to determine the relative collateral value supporting each secured claim and the extent to which each secured claim is effectively unsecured. When there is a discrete asset pledge (i.e. less than all assets) and the stressed collateral value is deemed insufficient to cover the debt, rating committees can model in a deficiency claim that treats a portion of the claim as an unsecured claim. Alternatively, the rating committee can take into account the deficiency through the rank ordering of liabilities or through use of an override to the output of the LGD model.

For example, US secured bank credit facilities typically include a 100% pledge of domestic assets and two-thirds pledge of foreign stock for tax reasons. In situations in which foreign debt or non-debt obligations are material and a material portion of earnings are generated outside the US, rating committees may assess the relative asset coverage of the foreign obligations relative to the asset coverage of the US obligations. If for example, the asset coverage of foreign trade payables is considered substantially higher than the asset coverage supporting a US secured credit facility (for example, because foreign earnings comprise 50% of consolidated earnings and there is no debt outside the US), the foreign trade payables could be ranked ahead of a secured domestic credit facility and unsecured domestic obligations. Alternatively, in different scenarios based on asset coverage, the foreign obligations could be ranked pari passu or beneath domestic secured obligations.

In a structure in which collateral is effectively shared (i.e., first lien on current assets and second lien on remaining assets for one creditor group, and the inverse lien ordering for another), the first lien claims on the most liquid assets are often ranked ahead of the first lien claims on the long-term assets if rating committees estimate that the first lien claim on the liquid assets will generate substantially higher recovery in a default scenario.

Debt obligations of holding companies secured only by stock pledges (without operating company guarantees) are generally prioritized below operating company obligations. If a holding company has two series of unsecured notes, one secured by a stock pledge of the operating subsidiary and the other unsecured, the notes secured by the stock pledge will generally be prioritized ahead of the unsecured notes in the waterfall.

Revolving Credit Facilities and Asset-Based Lending Facilities

The structures of these financings are highly diverse and tend to vary considerably by industry, so the analytical treatment involves substantial judgment.

With revolvers and ABLs, we first determine our view of the "baseline" level of borrowings related to the committed line of credit. The baseline is essentially the normalized level of borrowings likely to be funded under such facilities. While current borrowings may often be an appropriate "baseline" level, adjustments may be made to reflect longer term average borrowings levels or peak borrowing levels in certain industries. Adjustments may also be made to reflect known extraordinary events (i.e., M&A transaction(s), permanent shift(s) in capital mix, etc.). Incremental drawings under uncommitted lines of credit will generally not be assumed, as the lines would likely be extinguished prior to default. However, borrowings under uncommitted lines of credit will generally be input to the liabilities "waterfall" (often as an additional borrowing under a committed credit facility) to the extent that they are expected to remain drawn and will be similarly adjusted for normalization.

Our goal is for our ratings not to change unnecessarily in response to the normal rise and fall of borrowing levels. Thus, when assessing cyclical, commodity-based industries in particular, the analysis to inform the "baseline" borrowing level will typically look back over an appropriate timeframe. We may average the peak quarterly cyclical borrowings to smooth the extreme volatility common in these sectors.

Once the baseline level has been established, we assume a specified level of incremental borrowings based on a percentage of remaining undrawn committed lines of credit, tiered by rating category to reflect the company's distance from default.

For Ba-rated (CFR) issuers that still maintain relatively low default risk, the bulk of committed facilities often remains undrawn. We assume a normal level of incremental borrowing equivalent to 50% of the difference between the baseline amount and the remaining undrawn committed amount (irrespective of covenants, under the assumption that financial maintenance covenants would probably readily be waived, if not permanently amended, at this rating level).

For B-rated (CFR) issuers with greater but not necessarily imminent default risk, the incremental amount assumed is 75% (again, irrespective of covenants, as even single-B rated issuers tend to get covenant relief most of the time, albeit at an arguably higher cost).

For Caa- and lower-rated (CFR) issuers much closer to default, we typically assume up to 100% utilization of remaining undrawn availability, subject to the most restrictive financial covenants of the issuer.

This assumption is consistent with both empirical and anecdotal evidence suggesting that relatively non-creditworthy firms in default tend to have maximized available sources of liquidity, while capturing the potential for outstanding and/or line of credit reductions as may be (and often are) effected by lenders as a company approaches default.

For traditional asset-based lending facilities supported by a borrowing base with customary advance rates and monitoring provisions, incremental borrowing assumptions are calculated based on the undrawn or expected availability per the borrowing calculation. These facilities will generally be assumed to have no deficiency claim, as they typically self-liquidate either leading up to or immediately following default.

Accounts receivable securitization and factoring facilities (which also typically self-liquidate leading up to a default) are typically excluded from the liability waterfall. However, if these facilities are secured by assets

that represent a significant portion of a company's assets pool, other secured obligations in the capital structure will have a diminished collateral pool. Consequently, we will consider whether to apply a deficiency claim to these other secured obligations or use an override to the output of the LGD model.

Term Loans

To size and assess term loans, we record the current balance outstanding and consider adjustments for material amortization requirements scheduled and likely to be paid over the next year. If a delayed-draw term loan facility is in place and is likely to be drawn within one year, we would typically include it in the waterfall.

Letters of Credit

We generally exclude letters of credit (L/Cs) from the waterfall unless exposure is both substantial and their use is highly probable. This applies to standby L/Cs supporting debt guarantees or L/Cs supporting performance obligations, insurance programs and the like. It is generally assumed that "normal course" exposure from such L/Cs will effectively be captured in the incremental draw-down assumption contemplated for all committed revolving credit facilities. However, if the L/C facility is secured and supports an obligation that would otherwise be modeled in the waterfall as an unsecured claim (e.g., an environmental reclamation claim), the portion of the unsecured claim supported by the L/C as a secured claim should be included as a secured claim, with a corresponding reduction in the amount of the related unsecured claim.

Other Debt Instruments

All other debt obligations are typically modeled at current outstanding amounts (or with one year of prospective interest accretion for PIK instruments). Senior unsecured instruments may be "senior" in name but junior in relative rank within the consolidated corporate family due to a HoldCo-OpCo structure (e.g., wherein the senior debt is a claim of the HoldCo). Hence, if senior unsecured debt is issued from a holding company without the benefit of upstream subsidiary guarantees, it will generally be prioritized below all operating company obligations.

Subordinated Notes

An additional step in estimating and prioritizing the corporate family's expected liabilities at default is to analyze the depth and breadth of the subordination clauses contained in the indentures covering subordinated debt. This is accomplished through a review of the terms of the indenture to identify those obligations to which the subordinated debt is contractually subordinated. While subordinated debt is typically subordinated to "senior debt" as defined in the indenture, it is important to determine whether or not the subordinated debt is subordinated to other obligations including trade claims of the issuer. It is likely that the subordinated note indenture will contain a fairly narrow provision limiting subordination only to other debt, but terms vary among indentures.

In the US and Canada, we generally consider subordinated debt to be on parity with trade debt and other obligations to the extent not otherwise specified in the indenture. However LGD and EL rates will generally be higher due to their subordination effects to senior unsecured debt (which the non-debt liabilities would not suffer from). See below "Non-Debt Liabilities in the LGD Waterfall" for a discussion of treatment of trade payables in EMEA.

PIK and Discount Instruments

Pay-in-kind and discount debt instruments are generally modeled at current accreted values plus one year of interest accretion, rather than at their full face amounts. While this may understate the size of these

liabilities in default, particularly for high coupon/dividend instruments, it is entirely consistent with our desire to minimize the amount of unnecessary speculation necessary in trying to predict the ultimate default scenario and default date. Utilization of the face amount of the liability, or the amount due at maturity, would also often be overly punitive, depending on the coupon rate and particularly for long-dated maturities. We acknowledge that this approach may result in more volatility when sizing these obligations, which grow through accretion with the passage of time.

Intercompany Notes

Intercompany notes will generally not impact the waterfall, with a couple of exceptions. If the notes are pledged as collateral for a credit facility, the entity holding the receivable may be prioritized higher in the waterfall than otherwise because of the claim on another entity's assets. As a pledge of intercompany notes is fairly atypical in practice, however, senior unsecured notes of a holding company generally receive no benefit in the waterfall from having down-streamed funds to an operating company and taking an intercompany note back in return. The other potential exception, while expected to be rare and subject to rating committee discretion, would be if the intercompany notes are supported by a note agreement that is deemed to be tantamount to the aforementioned more formal pledge and the entities are deemed to be critical to each other's operations (i.e., an intercompany note between two operating subsidiaries with roughly equal division of assets). Our ultimate recovery database supports the above approach, including limited use of exceptions, as intercompany claims are generally seen to be eliminated on consolidation and/or they enjoy very little incremental enhancement of value upon ultimate recovery.

Hybrid Securities and Preferred Stock

Preferred stock and other similar equity instruments with no debt claim are not considered debt in the LGD model waterfall. Instruments that are called preferred but have a debt claim are included in the LGD model waterfall. Preferred stock instruments may be included in the LGD model template for purposes of generating a model output for the preferred stock instrument but this inclusion has no impact on model outcomes for other instruments.

The only exception for debt claims is for certain deeply subordinated debt instruments held by the owners of the common stock, often referred to as shareholder loans, which meet specific criteria effectively making them function equivalent to equity from a credit standpoint; that is, with no ability to influence the probability of default and loss given default on the more senior debt of a company. If these instruments meet all of the criteria, we treat them as similar to equity from a credit perspective. That is, such shareholder loans receive 100% equity treatment for the purposes of calculating a company's adjusted financial metrics and are excluded from the LGD model debt waterfall. Otherwise, if all of the required criteria are not met, we treat them as 100% debt and they are included in the LGD model debt waterfall.

Debt Obligations of Joint Ventures and Unrestricted Subsidiaries

For debt obligations of joint ventures and unrestricted subsidiaries, the rating committee will elect whether to include or exclude debt from the parent waterfall based on the nature of the underlying debt instrument and the parent's perceived willingness and ability to support the entity in a default scenario. Project finance debt and debt of special-purpose bankruptcy-remote entities will generally be excluded from the parent waterfall.

Non-Debt Liabilities in the LGD Waterfall

Whereas most non-debt obligations are treated as unsecured claims in the US, under a strict observance of the EMEA and Canadian insolvency regimes reviewed by us, non-financial debt claims such as trade creditors, pension obligations and contract rejection claims — the principal non-debt claims considered under the LGD methodology — may be treated as secured or unsecured claims in an administrative receivership or insolvency. This may occur even in the absence of corporate legal structure considerations that could otherwise result in them having non-priority or priority status in the waterfall by being further away from or closer to the operating company assets and firm value, respectively, than other creditors not benefiting from upstream guarantees or other structural provisions. In the waterfall, however, we generally treat these obligations according to the rating committee's assessment of their likely status in a default resolution given the following observations discussed below.

Trade Claims and Underfunded Pension Plans

Almost every company will have some amount of trade claims. In most instances, our approach is to look for a baseline, normalized level of trade payables rather than simply take the current outstanding balance - similar to the approach taken for revolving lines of credit. Whether this will be an average over the latest 12 months or reflect a longer cycle to normalize more wide-ranging peak-trough borrowing swings remains within the analyst's and/or rating committee's discretion. It may be that trade claims are more likely to be at relatively low levels in default for some industries, but at high levels for others. In situations where little volatility is expected, current levels can serve as a reasonable proxy of potential trade claims in default.

For under-funded pension obligations, we generally use an approximation of the under-funded status of the plan based on Moody's standard analytic adjustment for obligations of this type.

United States-based Companies:

Changes to the US Bankruptcy Code that went into effect on October 17, 2005 improved a trade creditor's position in bankruptcy, likely to the detriment of banks and bondholders. In particular, the Bankruptcy Abuse and Consumer Protection Act of 2005 provides that any claim for goods received by a debtor in the ordinary course of business within 20 days before the bankruptcy filing will be entitled to administrative expense priority status for the value of the goods rather than just general unsecured status. Additionally, a seller that has sold goods that the debtor receives within 45 days before bankruptcy may give a written reclamation demand to the debtor within 45 days after the debtor receives the goods or within 20 days after bankruptcy, whichever is later. To reflect these factors, we assume that in most cases trade payables equal to 20 accounts payable days (for material goods but not for services) will be treated as administrative priority claims, and the balance will be considered to be a general senior unsecured claim (note that this applies to material goods sold to US entities, to the best of our ability to distinguish).

In the US, underfunded pension obligations are usually treated as general unsecured claims.

Canadian-based Companies:

Although the general operating guidelines embedded in the Canadian Bankruptcy and Insolvency Act tend to be closely aligned with those of the US Bankruptcy Code, like other jurisdictions there exist some subtle distinctions wherein our approach to prioritizing claims may vary as deemed appropriate by rating committee. For Canadian-based companies in particular, wherein merchandise suppliers have the right to repossess 30 days of identifiable merchandise (vs. the typical 20-day provision under Chapter 11 of the US Bankruptcy Code), anecdotal evidence suggests such treatment is exceptional in practice. Rather, trade creditors tend to be awarded general unsecured status for the entirety of their claims in the Canadian court system. As such, trade claims for speculative-grade rated companies subject to the LGD methodology that have the preponderance of their debt and payables issued in the Canadian financial markets (and in our

estimation therefore maintain a higher perceived likelihood of restructuring activities occurring in the Canadian bankruptcy court system) will often be prioritized entirely as general unsecured claims (vs. the more typical practice of prioritizing 20 days' worth of payables as administrative/priority claims for companies deemed to be prospective defaulters under the US Bankruptcy Code).

Similar to the US, underfunded pension obligations are usually treated as general unsecured claims.

EMEA-based Companies:

Trade Creditors: Although they are generally defined as unsecured creditors in liquidation under insolvency regimes, in practice, where consensual restructurings are pursued, financial creditors often exclude trade creditors from the negotiations — both because of the objective of maintaining the issuer as a going concern in order to maximize future enterprise value where the trade suppliers remain a critical component and in order not to complicate the broader restructuring by having to accommodate the demands of the trade creditors who could hold up an ultimate resolution.

UK Under-funded Pension Obligations: While under-funded pension exposures would also generally be afforded unsecured status in a liquidation unless in a preferential position due to their location in the corporate legal structure, in practice, with the passage of the UK Pensions Act in 2004 and the creation of a new UK pensions regulatory authority in April 2005, the possibility exists in going-concern restructurings that the pension exposures will receive preferential treatment.

As a result, in situations where a rating committee believes that a consensual restructuring is the more likely outcome of a default for EMEA-based companies, the methodology guidelines generally suggest modeling trade creditors and under-funded UK pension obligations as having a pari-passu status with other secured creditors, even though under a strict reading of the various insolvency laws they would be treated as unsecured creditors. This reflects the practice in Europe associated with consensual debt restructurings where often some non-financial debtors are excluded from the negotiations by other financial creditors to accelerate resolutions in going-concern restructurings and are not expected to assume the same losses in the restructuring as other unsecured financial creditors. Otherwise, if a consensual restructuring is not deemed to be the likely outcome, and instead an in-court restructuring process is expected to transpire, then non-financial debts of EMEA-based companies are generally modeled as unsecured claims (particularly if no secured claims exist). Where there is less certainty about which ranking is most appropriate for non-debt liabilities, it may be appropriate for rating committees to consider the outcomes under the two alternative treatments and choose the rating that best reflects the balance of possible outcomes.

Trade payables would still be modeled at a higher (better) level in the LGD waterfall of liabilities in any event if they maintain a priority position within the corporate legal structure (such as if they were obligations of the operating subsidiaries).

Contract Rejection Claims

For contract rejection claims we use as a proxy the amount of lease commitments for the upcoming year, which captures obligations for both capital leases and operating leases. In addition to the consistency afforded by this common approach, the amount is deemed to be a reasonably conservative estimate of potential contract rejection claims of the lessor. These obligations are usually treated as general unsecured claims.

Other obligations

There are many other obligations that a company may face. We generally consider these "other obligations" after they are material and expected to continue to exist in a default scenario. But as many other claims may arise as a company defaults, we use our best judgment to make estimations and normally only look at them when a company approaches default and we are using a fundamental analysis approach. With the exception of certain tax obligations that might be considered as an administrative priority claim, the bulk of these obligations are usually considered to be general unsecured claims. Some other examples are:

- Litigation/judgments
- Tort claims
- Tax obligations
- Environmental obligations
- Reclamation claims
- Reimbursement obligations under letters of credit that are drawn and not self-liquidating

Appendix B

An Illustration of the Use of the LGD Model

The following example illustrates how the LGD methodology (including derivation of the LGD assessment and the PDR) is typically applied in practice. Exhibit 1 presents the basic inputs panel of the framework. In this example, the rating committee assigned a B1 rating to the corporate family. This CFR represents the committee's expectation of total credit losses for the corporate family as a whole. The other key inputs in Exhibit 1 are the expected firm-wide LGD rate and total liabilities at default, which in this example the committee estimates to be 50% and $400 million, respectively.[10] The final input in Exhibit 1 is the standard deviation of the firm-wide LGD rate, which will normally be set at 26%, although the committee may vary this assumption when they believe the uncertainty around the expected enterprise value at default is unusually large or small.

EXHIBIT: 1

Analyst Inputs ($M)		
A	Corporate Family Rating	B1
B	Expected Firm-Wide LGD Rate	50%
C	Expected Total Liabilities at Default	$400
D	Standard Deviation in Enterprise LGD Rate	26%[11]
Implied Values		
E	Expected Enterprise Value at Default (=B*C)	$200
F	Implied 4-Year Cumulative Default Rate	15.2%

Two important statistics can be inferred from the inputs in Exhibit 1. First, the implied expected enterprise value at default, in this case $200, is calculated by multiplying the expected firm-wide LGD rate by the expected liabilities at default, or in this case 50%*400. Second, by using information that maps expected credit loss rates to different corporate family ratings over different investment horizons, corporate family default rates can be inferred from the corporate family rating and the expected firm-wide LGD rate (50% in this case). For example, using the information in Exhibit 2 which reflects 4-year idealized expected loss rates that are generally used in the LGD model, it can be inferred that the four-year default probability for this B1-rated issuer is 15.2% (=7.6%/50%).[12]

Under the assumptions that the enterprise value at default is described by a beta distribution bounded between 0% and 120% of liabilities, the mean firm-wide LGD rate of 50% and its standard deviation of 26% imply the distribution of potential firm-wide recovery rates shown in Exhibit 3.[13] The distribution indicates that though the expected enterprise LGD rate is 50%, the actual realization at default resolution

[10] As discussed in the body of the text, we expect that for issuers rated above B2, analysts will usually assume that the expected firm-wide recovery rate is 50%. However, for lower-rated issuers, they may use one of a number of common valuation methods to forecast expected enterprise value at default.

[11] The Standard Deviation of the Enterprise LGD Rate is automatically populated in the LGD modeling template based on the Expected Firm-Wide LGD Rate and empirical data underlying Moody's Ultimate LGD Database, with the uncertainty factor notably lessening somewhat for lower-frequency outcomes (i.e.; firm-wide LGD <35% or >65%).

[12] An expected loss table is necessary to implement the methodology; however, only relative expected loss rates – not their absolute values – matter to the analysis. For example, the critical feature of this table is that issuers rated Caa1 are expected to experience about 35% more in credit losses than those rated B3, and not that the respective expected loss rates shown are 17.86% and 13.22%.

[13] A beta distribution for asset values bounded between 0% and 120% of liabilities with a mean of 50.21% and a standard deviation of 26.46% is consistent with a 50% expected firm-wide LGD rate and a 26% standard deviation of firm-wide LGD. That is, if one calculates the expected value and standard deviation of the assets just over the range of this beta distribution from 0% to 100%, one obtains a mean of 50% and a standard deviation of 26%. The range of the distribution of assets in excess of 100% of liabilities is only relevant for calculating expected recoveries on preferred and common stock.

may vary widely from that value. Many empirical studies show that market measures provide only weak guidance to ultimate recoveries even during the bankruptcy process. It is extremely difficult to predict firm-wide LGD rates well in advance of default.

EXHIBIT: 2

4-Year Idealized Expected Loss

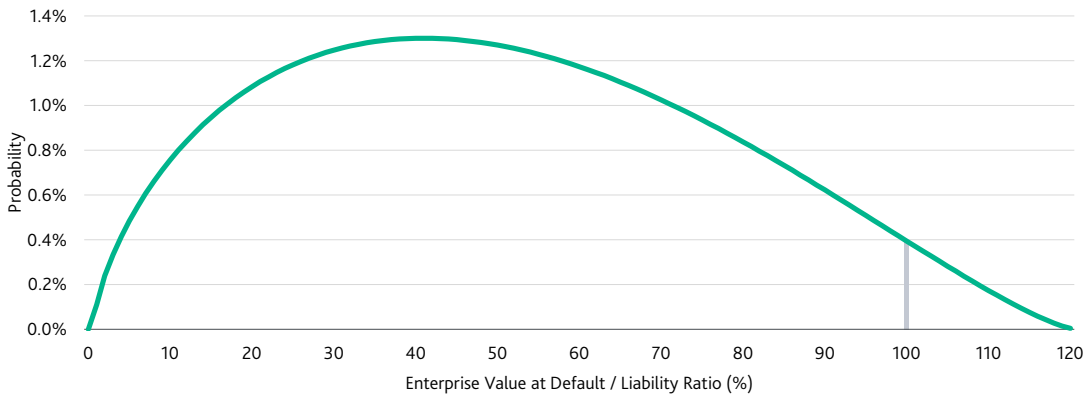
(EL = PD x LGD) Rates by Rating Category

Aaa	0.00%	Ba1	2.31%
Aa1	0.01%	Ba2	3.74%
Aa2	0.03%	Ba3	5.38%
Aa3	0.06%	B1	7.62%
A1	0.10%	B2	9.97%
A2	0.19%	B3	13.22%
A3	0.30%	Caa1	17.86%
Baa1	0.46%	Caa2	24.13%
Baa2	0.66%	Caa3	36.43%
Baa3	1.31%	Ca	50.00%
		C	100.00%

EXHIBIT 3

Beta Distribution

50% Mean Firm-Wide LGD Rate and 26% Standard Deviation



Source: Moody's

Exhibit 4 below presents a liability structure at default that would be developed by the analyst. In this case, we have assumed a very simple structure, with no non-debt liabilities and no second-lien loans or preferred stock; however, adding these instruments to the analysis is very straightforward. We have also assumed that the bank loans benefit from an all-assets pledge and that the bank line is fully drawn at default.

The outputs of the analysis are LGD rates for each security class. These LGD rates are used to assign LGD assessments. The same output panel shown in Exhibit 5 also shows credit loss rates by security class (calculated by multiplying the family's probability of default by the security class's LGD or severity rate) and issue ratings (assigned using a lookup table as defined in Exhibit 2).

In our example, the simulated absolute-priority analysis results in expected severity rates of 22%, 73%, and 94% for the bank loan facilities, senior unsecured bonds, and subordinated bonds, respectively. These LGD rates imply loss-given-default assessments of LGD2, LGD5, and LGD6 and issue ratings of Ba2, B2, and B3 for these debt classes, respectively.

EXHIBIT: 4

Expected Liability Structure at Default	Amount ($M)
Secured Debt	
1st Lien Sr. Sec. Bank Loan	$200
2nd Lien Sr. Sec. Bank Loan	----
Total Secured Debt	$200
Trade Credit & Other Liabilities	-
Sr. Unsecured Bonds	$150
Subordinated Bonds	$50
Other Debt	$200
Total Liabilities	$400

EXHIBT: 5

Estimated Severity (LGD)/Recovery Rates, Credit (Expected) Loss (EL = PD x LGD) Rates, LGD Assessments, Issue Ratings*

Expected Liability Structure at Default	Amount ($M)	Probability of Default Rate*	Expected LGD Rate	Expected Recovery Rate	Expected Loss Rate (EL = PD x LGD)*	LGD Assessment	Issue Rating
Total Secured Debt	$200						
1st Lien Sr. Sec. Bank Loan	$200	15%	22%	78%	3%	LGD2	Ba2
2nd Lien Sr. Sec. Bank Loan	--		--	--	--	--	--
Total Unsecured Debt	**$200**						
Trade Credit & Other Liabilities	--	--	--	--	--	--	--
Sr. Unsecured Bonds	$150	15%	73%	27%	11%	LGD5	B2
Subordinated Bonds	$50	15%	94%	6%	14%	LGD6	B3
Total Liabilities	**$400**	**15%**	**50%**	**50%**	**8%**	**--**	**B1***

*Corporate Family Rating = B1 (correlates to a 15.235% four-year idealized default rate, which is applied to all securities of the corporate enterprise such that this PD Rate times the Expected LGD Rates equal the Expected Loss Rates shown above)

Maximum Gaps between CFR and Instrument Ratings

Because of the logic of the absolute priority waterfall, a strict application of the LGD approach could suggest a very high instrument rating on a senior-most obligation if the size of that obligation were very small relative to the firm's overall capital structure. We believe, however, that extremely low expected LGD rates are unrealistic because of potential violations of absolute priority of claim and uncertainty about how the courts will treat accrued interest during the bankruptcy period. In addition, though we use the existing capital structure as a starting point for the analysis, we cannot be sure that the relative size of the different security classes (and, therefore, their expected LGDs) will not change prior to default. This and other potential sources of "model risk" are specifically incorporated into the framework by adopting a guideline currently limiting debt instrument ratings to no more than four rating notches above a CFR of Caa2 or lower, and three notches above a CFR of Caa1 or higher. For example, an issuer with a Ba1 CFR would have at best a Baa1 rating[14] on its senior-most rated instrument (the rated instrument with the lowest LGD rate and highest LGD assessment). As indicated earlier, ratings may be different from this guideline in cases where rating committees believe that a different rating outcome is more appropriate.

Inferring the PDR from the CFR and Expected Firm-wide LGD Rate

The following steps can be taken to derive the PDR from the CFR and expected firm-wide LGD rate. First, we identify the firm's hypothetical expected loss rate from its CFR using the idealized loss table referenced below.[15] Second, we divide the expected loss rate by the firm-wide expected LGD rate to obtain the firm's hypothetical probability of default. Then, we look up the associated PDR. The idealized default probabilities are equal to the idealized expected loss rates divided by 50% (which is roughly the historical average loss severity rate across the liabilities of corporate issuers). For example, if the issuer carries a B1 CFR and its expected family-level LGD is 35%, its four-year idealized loss rate is 7.6% and its four-year idealized default probability is 21.8% (=7.6%/35%), resulting in a B2-PD PDR. This firm's PDR is lower than its CFR because its expected LGD rate is considerably lower than the empirical mean for most firms (and in particular those firms that are also rated B1 on a CFR basis) — and, therefore, its expected default rate must be higher — than that of the typical issuer with the same CFR.

[14] The most likely rating in this example is no higher than Baa2. When the CFR is Ba2 or Ba1, the highest rated debt instrument is likely to be no more than 2 notches above the CFR. This reflects rating committee awareness that the CFR is approaching investment grade where notching differences between debt instruments of the same issuer are typically narrower than in speculative-grade.

[15] It should be noted that we present cardinal expected loss and default probability tables to implement the methodology; however, only the relative default probabilities and relative expected loss rates – not their absolute values – matter to the analysis. In particular, the critical feature of the table above is that issuers rated B2 are assumed to default at nearly twice the rate of those rated Ba3, and not that the respective expected default rates are 19.9% and 10.8%, per se. This particular table represents four-year idealized expected loss rates which are generally employed in the LGD modeling template for companies subject to our LGD methodology (note that for companies that are near or actually in default – whether on a "limited" basis for only certain instruments or for the entire company as a whole, as denoted by a "/LD" or "D-PD" PDR, respectively -- one-year idealized expected loss rates may be employed by analysts and rating committees and are often used in the LGD modeling template for such companies that are subject to our LGD methodology).

Idealized Loss (EL = PD x LGD) & Default (PD) Rates

Corporate Family Rating	Four-Year Idealized Expected Loss Rate	Probability of Default Rating	Four-Year Idealized Default Probability (Assumes 50% Average Expected LGD)
Ba1	2.3100%	Ba1-PD	4.6200%
Ba2	3.7400%	Ba2-PD	7.4800%
Ba3	5.3845%	Ba3-PD	10.7690%
B1	7.6175%	B1-PD	15.2350%
B2	9.9715%	B2-PD	19.9430%
B3	13.2220%	B3-PD	26.4440%
Caa1	17.8634%	Caa1-PD	35.7268%
Caa2	24.1340%	Caa2-PD	48.2680%
Caa3	36.4331%	Caa3-PD	72.8662%
Ca	50.0000%	Ca-PD	100.0000%
C	100.0000%	C-PD	100.0000%

Appendix C

Estimating expected Enterprise Value for Firms in or Near Default

The starting point for estimating enterprise value for issuers in default or facing a significant probability of default (generally with CFRs of B2 and below, with negative or stable outlooks) is to assess the potential of a company reorganizing rather than liquidating. This requires an explicit expected default scenario and that an enterprise be valued both as a going concern and in liquidation, with the liquidation value typically serving as a valuation floor. For the majority of issuers, the valuation methodology is based on the assumption that the existing enterprise is maintained as a going concern and is reorganized through the bankruptcy process. Though we recognize many corporate defaults are resolved through debt restructurings outside the bankruptcy process, our approach should be relevant for such issuers if outcomes under restructuring are driven, as we suspect, in large part by the expectations of the loss severity that would result from bankruptcy.

Analysts use their judgment and industry knowledge in determining the appropriate valuation technique. Valuation is determined either by discounting expected cash flows, using a multiple of adjusted EBITDA, deriving values based on revenues (more relevant when historical cash flow is not indicative of a firm's potential) or assets (more relevant for resource-intensive industries), or inferring a value based on current market prices for similar assets at other companies. For some issuers, the specific valuation methodology may reflect liquidation of either part or whole of the enterprise.

Liquidation valuations are particularly relevant for enterprises that are not viable as going concerns or where a specific creditor class would receive less value in reorganization than under liquidation. Analysts typically use a liquidation approach if the firm is incapable of generating positive EBITDA on a sustained basis due to technological obsolescence, competitive circumstance, inadequacy of physical plant, or a failed business concept. The liquidation approach considers the selling price of the firm's assets under duress, recognizing that portions might be saleable as business units with going-concern valuations.

Analysts typically use a "distressed" EBITDA multiple when a firm is expected to reorganize and remain a going concern and other techniques are not more appropriate. The distressed EBITDA multiple varies by industry, is based on expected EBITDA growth and required investor returns, and will typically be in the 4 to 6 times range (although analysts have the discretion to go outside of this range) given the inherent risk of investing in distressed situations and low growth rates of companies in distress. The distressed multiple also incorporates certain costs associated with the reorganization or bankruptcy.

For valuations using a distressed EBITDA multiple we typically first derive core EBITDA by eliminating one-time expenses and unusual charges, severance, closing costs, restructuring reserves, losses of businesses to be written off, and uneconomic leases that can be rejected in bankruptcy. We typically then consider possible enhancements to cash flow through remedial efforts that the company may undertake in the foreseeable future. This might incorporate the benefits of plant closings, contract renegotiation or other value-enhancing steps that have been identified and which have reasonable prospects of being implemented.

Appendix D

Discrete Indicators Can Provide Additional Information

As credits approach default and move further down the rating scale, we can use the CFR, PDR and LGD Assessments to better communicate distinct aspects of loss and default. Two distressed firms can have the same CFR, reflecting identical enterprise-wide expected credit loss rates, but differ markedly in the components of expected probability of default and loss given default.

For instance, given two firms with the same CFR (or underlying expected loss assumption), if we expect above-average LGD (below-average recovery) for one and average or below-average LGD (average or above-average recovery) for the other, then the one with higher LGD (lower recovery) must also have a lower probability of default than the one with lower LGD (higher recovery). This is because expected loss equals the probability of default times loss given default (EL = PD x LGD).

In the example, if the CFRs are both B2, then the underlying idealized expected loss approximates 10% in both cases; so, if the family LGD assessment for one is below average (say 35%), then default risk (PD) must be above average for the equivalent B2 (CFR) risk (or roughly 29% in this case, vs. roughly 20% for an "average" B2 company based on Moody's four-year idealized default and loss rates). Note the explicit reflection of this point of differentiation as evidenced by the (lower) B3-PD probability of default rating (PDR), signaling higher default risk, for the corporate family subjected to an assumed "below average" LGD assessment. Such might be the case for an "all first-lien" bank debt capital structure, as banks tend to protect their downside a bit earlier in the life cycle of a company on the way to default to mitigate eroding enterprise value and preserve above average recoveries -- which they tend to realize in such situations. The inverse is true for the "all bond" debt structure, with the above average LGD (65%) guideline in that instance translating into a below average probability of default rate (roughly 15%) at the equivalent B2 CFR (still 10% expected loss) level.

Intuitively, this makes sense as the relative lack of covenant protection and/or default triggers in the all bond structure are likely to contribute to a lower PD rate, and enterprise value can subsequently be expected to fall relatively further when such protections are absent for a firm by the time it ultimately defaults.

Corporate Family Assumptions	PD	LGD	EL	CFR	PDR
Low PD, High LGD	15%	65%	10%	B2	B1-PD
Avg. PD, Avg. LGD	20%	50%	10%	B2	B2-PD
High PD, Low LGD	29%	35%	10%	B2	B3-PD

Investors can thus compare the CFR and PDR to gain insight into assumed recovery prospects. With a 50% loss assumption, the PDR and CFR will be at a comparable level (although on different rating scales) because Moody's idealized loss and default rates that underlie ratings are based on a 55% average LGD rate.[16] At CFRs of B2 and below, and particularly Caa1 and below, it is more likely that rating committees will choose an issuer specific mean family LGD assumption rather than the usual broad assumption. Within the 35% to 65% loss range, the CFR and PDR will vary by no more than one notch. When loss assumptions fall outside

[16] Our idealized loss rates are effectively *defined* around this 55% family LGD assumption, which remains constant irrespective of the company-specific assumptions utilized in rating committee. Hence, even if an analyst and a rating committee conclude that something other than a mean 50% LGD expectation is appropriate for a *given* company, the relationship between Moody's idealized probability of default and expected loss (PD x LGD) for the purpose of *defining* ratings will always be essentially 2-to-1 (as idealized PDRs are based on a mean 55% LGD assumption, consistent with the empirical data underlying Moody's Ultimate LGD Database). Moody's ratings are ordinal indicators of relative expected loss, and even though we use such quantitative methods and absolute values to inform the rating process, we do not propose that ratings are cardinal indicators at any time.

of the 35% to 65% range, however, the gap or notching between the CFR and PDR can be wider, or notching may be eliminated entirely at extreme loss ranges. A divergence between the ratings indicates a strong opinion on the relative composition of credit risk. A high Corporate Family Rating (i.e.; lower underlying EL assumption) and low Probability of Default Rating (high PD rate), for example, suggests we consider default risk to be high but recovery prospects to be fairly strong.

Notching Relationships Can Change as Default Nears

As a company moves closer to default, the more granular rating adjustments afforded by the LGD methodology can result in a widening or narrowing of the spread of ratings from the top (safest) to the bottom (riskiest) liabilities within a given company's capital structure.

Raising the family recovery rate would tend to widen this notching, particularly if default risk is also rising, which is often the case. The higher recovery would lower loss rates at all levels of the capital structure, but it would tend to provide greater benefit to secured creditors at the top of the structure because they have first-priority claims on company assets. Thought of another way, the greater "certainty" associated with the analysis underlying higher recovery for the corporate enterprise disproportionately enhances recoveries for the highest-ranking securities by reducing the "uncertainty" factor associated with the wide standard deviation assumption embedded in our LGD methodology.

Conversely, lowering the family recovery rate would tend to compress notching. In that case, while a higher expected loss would not have much effect on already disadvantaged creditors at the bottom of the structure, it would have a disproportionately negative effect on those at the top who would have realized value first. And if the CFR (and the underlying expected loss assumption) did not change, this would imply a lower PD rate or higher PD rating (PDR), as EL must still = PD x LGD.

Hence, with a lower default rate and a higher severity assumption for the combined enterprise, notching between the highest- and lowest-ranking (rated) instruments is compressed in an "all bond" financing structure. This is because the implied differential in expected loss rates is no longer that significant, at least not on a relative basis. Losses will be greater for *all* creditors under this scenario, with the difference between any distinct tranches (i.e., senior unsecured vs. subordinated bonds) being less meaningful and more similar to the loss experience for the enterprise as a whole, which was specifically assessed as carrying above average loss severity in this scenario to begin with. This again serves to underscore the ordinal nature of our ratings. Finally, it is noteworthy that changes in the *absolute* LGD point estimates for individually rated instruments will be evidenced directionally in a manner consistent with changes in assumed family-level LGD rates. Hence, if the mean estimated family LGD rate changes from "average" (i.e. 50%) to "above average" (65%), LGD rates ascribed to individual debt claims will also rise, all else being equal. This holds true even though instrument ratings may themselves not always change. This last point is again entirely due to the ordinal vs. absolute nature of our ratings, and the fact that the change in LGD rate may not yield a sufficiently large change in underlying EL for the instrument to warrant another rating notch on Moody's scale, as opposed to the purely absolute nature of LGD point estimates).

Appendix E

Stability Bands Mitigate Rating Volatility in Monitoring

Analytical teams have a degree of flexibility in monitoring credits to determine whether or not a change in the LGD model output for an instrument necessitates review by a rating committee. Typically, LGD assessments are reevaluated at least once each calendar year given the importance that they hold in terms of informing ultimate instrument ratings. In making the assessment of whether a rating committee should be convened to reassess the instrument rating, analysts employ the concept of "stability bands" around idealized expected loss rates. This is consistent with our desire to limit unnecessary ratings volatility and accommodate a modest drift in expected loss rates for an instrument that may be the result of a short-term shift in a company's capital structure. In essence, when an LGD point estimate moves more than 25% into the next higher or lower range of idealized EL rates, suggesting the rating may need to be raised or lowered to the next higher or lower rating level, a rating committee would normally be convened to reconsider the instrument rating. When the change is less than this 25% threshold, however, the analyst generally has discretion to hold off on calling a rating committee if he or she believes that the change may be temporary and, therefore, may reverse within the next 12-to-18 months, for example. We call this 25% zone above and below the relevant LGD range a "stability band."

EXHIBIT 6

Idealized Loss Rates with Stability Bands

Rating	EL Range (Original)	EL Range (Stability Bands)
Baa1	0.368% - 0.549%	0.331% - 0.602%
Baa2	0.549% - 0.929%	0.501% - 1.103%
Baa3	0.929% - 1.739%	0.783% - 2.004%
Ba1	1.739% - 2.939%	1.509% - 3.316%
Ba2	2.939% - 4.488%	2.606% - 4.916%
Ba3	4.488% - 6.404%	4.097% - 6.985%
B1	6.404% - 8.715%	5.872% - 9.322%
B2	8.715% - 11.482%	8.148% - 12.321%
B3	11.482% - 15.368%	10.700% - 16.569%
Caa1	15.368% - 20.763%	14.255% - 22.385%
Caa2	20.763% - 29.653%	19.259% - 32.868%
Caa3	29.653% - 42.681%	26.751% - 46.196%
Ca	42.681% - 70.711%	39.433% - 84.090%
C	70.711% - 99.500%	59.460% - 100.000%

Source: Moody's

The stability band portion of the range effectively reflects a 25% migration into the expected loss range for the next lower and next higher rating levels. Hence, a Ba3 rating could be one suggested outcome of the LGD modeling template if the expected loss rate for the reference instrument fell between a range of 4.1% and 7.0% (rounding errors not considered for illustrative purposes), incorporating the "extra" range of the stability band on either side of the original range (4.5% to 6.4%) of idealized loss rates for Ba3 instruments and/or companies. Debt instruments that move within this range of expected loss under the LGD modeling template may retain their rating without a reassessment by rating committee. Alternatively, analytical teams may determine that a rating committee should be convened to reassess an instrument rating whose modeling template-indicated outcome has moved within this band, particularly when the view is that the movement is not likely to be temporary or reversed. Two different instruments with an equivalent given modeling template-indicated EL outcome and instrument rating may therefore have actual Moody's EL rates and instrument ratings that differ by one notch. For example, with an expected loss rate of 6.8% an instrument could be rated B1, as suggested by the LGD modeling template, consistent with the original EL

range for deemed B1 risk, or Ba3, as the EL rate falls within the expanded range of the deemed Ba3 risk level incorporating the 25% stability band factor. While all rating assignments and changes require a rating committee, the decision to continue to maintain an existing rating does not typically require a rating committee when the EL rates are within the "stability band" range. A larger difference between the modeling template-indicated EL outcome and the existing instrument rating may precede a rating committee review of the circumstances.

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 is available here.

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