Moody's Approach to Jointly Supported Obligations

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OVERVIEW

This report provides an overall framework for assigning ratings to jointly supported obligations, also referred to as two-party pay (TPP). In applying this framework, rating assessments are made on a case-by-case basis and incorporate differences in structure, types of support instruments, varying correlation between supporting and supported entities, and other circumstances particular to the obligation being rated. These factors cannot be completely reduced to a matrix or mathematical formula and thus our methods require additional refinements to take into account the variations in structure and legal issues applicable to certain transactions. Application of the approach to specific instruments and sectors will be addressed in follow-up reports.

Early approaches to TPP analysis were based almost entirely on Moody's default study and provided a suggested rating based on the ratings of both supporters of the debt. Douglass Lucas, one of the original authors of Moody's Corporate Bond Default Study, prepared the first proposal for handling TPP risk. In a 1995 article, Lucas addressed the special issues surrounding TPP. He showed how ratings could be implied from the joint default probabilities between firms of different rating categories by assuming a moderate correlation between the two entities. And he included matrices that presented the rating refinements that could potentially be achieved through TPP.[1] In this paper, we use the Lucas framework to derive a range of ratings likely to be applied to a jointly-supported transaction. Our results depend on the initial ratings and assumed correlation between the two parties. In every case, the matrices are intended to be a reference tool, providing general guidance only.

APPLYING TWO-PARTY PAY

All third party-supported securities, whether backed by a letter of credit, a guarantee, or some form of swap agreement, are characterized by the existence of an underlying obligor and a separate guarantor or counterparty, such as a highly rated financial institution. Although the specific form of support may vary broadly, all such support instruments enhance a separate, independent payment obligation.

TPP highlights the importance of the dual-party characteristics of supported obligations, as well as the resulting distinction between the payment likelihood of the supported security and a stand-alone obligation of either the underlying obligor or of the support provider.

1 See "Default Correlation and Credit Analysis," by Douglass Lucas in *The Journal of Fixed Income*, March 1995.

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Critical to the application of TPP is the measure of both economic and legal correlations between a support provider and an underlying obligor: the lower the correlation, the higher the likelihood that no single event, or series of events, would simultaneously force both parties to default on a rated security. The greater the correlation between the two entities, however, the more likely it becomes that specific events or economic cycles would have an almost identical impact on both, thus causing the security to behave more as if it only had the backing of the higher of the two credits.

TPP can apply to at least two broad types of supported transactions: (i) those with dual protections, and (ii) those with dual risks. In dual protection deals, before there is a loss to investors, there must be a failure to make payment by both entities. In dual risk deals, failure by either party can result in a loss to investors. In either case, TPP can offer a refinement of the credit rating analysis of the relative risks for a transaction. Generally, the credit quality of securities that feature dual sources of protection (joint probability of default) will benefit from upward pressure under a TPP analysis. Conversely, securities in which two parties must both perform (several probability of default) in order for investors to realize a full return will experience downward pressure.

Dual-Protection or Joint Probability-of-Default Structures

Supported securities that warrant joint probability-of-default analysis include traditional third-party-supported obligations, including LOC-backed and guaranteed commercial paper programs, a variety of bank-guaranteed bonds sold into the Euromarket, guaranteed note programs, industrial development revenue bonds, and general obligation bonds. Roughly speaking, the support provider for these issues simply enhances the credit of the underlying obligor with either a primary, direct-pay, or a standby instrument should the obligor fail. Single-party analysis focuses simply on the support provider and, assuming a properly structured security and 100% support, the credit rating would correspond directly to the credit rating of the supporting entity. Under TPP, however, the rating warranted on the security may be higher than that of either the support provider or the underlying obligor, depending on the correlation between the two entities.

Dual Risk or Several Probability of Default

In dual-risk securities, two parties must each independently perform so that investors will receive their promised return. The most prevalent example of this kind of security is the repackaged bonds sold in the Euromarkets. Unlike traditional third-party supported securities, these repackaged bonds require timely payment, first of the obligor of the underlying bonds, and then of the swap counterparty, if investors are to realize their expected return. A default by the obligor terminates the swap counterparty's obligation to make payment and automatically leads to a loss to investors. A default by the swap counterparty may also create a shortfall.

Just as in a two-party analysis for dual protection transactions, the risk of the security is distinct from the individual credit risks of the parties. The difference now, however, is that the risk is greater: the additive possibility of default, as well as the severity of loss resulting from a default, defines the credit quality of the securities. Actual ratings would depend on a detailed evaluation of several factors, including the potential severity of loss and, again, the measure of correlation between the parties. However, lower correlation increases the risk of default, while greater correlation accomplishes the opposite. The higher the correlation between parties, the more likely they are to either jointly perform, or to jointly default, under similar economic circumstances. Therefore, an analysis closer to that of single party risk is required.

FOUNDATION OF TWO-PARTY PAY

The critical issue when considering joint credit support, or two-party pay, is the likelihood that both obligors will default within the remaining life of the supported instrument. In order to ensure that the rating assigned to a jointly supported transaction is consistent with the risk implied by a stand-alone rating, we incorporate the results of Moody's corporate bond-default studies.

Historical default rates provide estimates of the default probability for each rating category. An examination of the correlation between the two parties completes the picture.[2]

Correlation

Correlation is a deceptively simple concept to grasp. Nevertheless, it is a true challenge to measure correlation precisely. Yet, an estimate of the correlation, or the degree of independence, between a support provider and an underlying obligor is critical to TPP analysis. If the credit-risk profiles of two entities tend to move in tandem, we would say that their default risks are positively correlated. If factors that reduce the credit profile of one issuer have a beneficial effect on another, however, we would say that their default risks are negatively correlated. Zero correlation would imply that there is no relationship between the credit profiles of the two parties. The correlation between two variables can range from +1 (perfectly correlated) to -1 (perfectly negatively correlated).

Default-risk correlation between two parties can be affected by several specific factors, including the presence of a formal relationship between the parties, a similarity of production inputs or sales markets, geographic location, or material exposure to similar event risks. Because of the inter-relationship between agents in today's economy, one rarely encounters pairs of issuers with a strong negative default correlation.

Correlation is further constrained across rating categories. Moody's default studies show, for example, that at the ten-year horizon, the probability of default for a B-rated issuer is nearly 60 times higher than that of a **Aaa**-rated party. For their default risks to be perfectly correlated would imply that, when one issuer defaults, the other defaults. However, this would mean that the Aaa-rated issuer has the same default risk as the B-rated issuer – a situation inconsistent with historical evidence.

The Model

We appeal to the binomial default model proposed by Lucas (1995) to determine: a) the range of permissible correlation values across rating combinations; and b) the joint probability of default – and in turn, an equivalent rating – for a given estimate of correlation.[3] We use Lucas' joint default model, in conjunction with default probabilities estimated from historical default rates, to solve for both the maximum and minimum correlation values for each rating combination.

With stand-alone default probabilities for each party in hand, along with a correlation estimate, we can estimate the joint default probability for the supported transaction. This joint default probability is then compared with historical default rates to determine a rating for the supported transaction.

At the maximum theoretical correlation level, the two rated issuers present a joint default likelihood that is identical to the higher rated party (on a stand-alone rating basis). In this situation, the risk collapses to that of the single party with the higher rating – and no benefit results from joint support.

Moody's default probabilities can also be used to derive a minimum theoretical correlation value for each rating combination. At theoretical minimum correlations, the credit risks of the two parties perfectly offset one another: the result is a joint rating of **Aaa**.

2 Ratings are sometimes interpreted as indicators of expected loss, defined as the product of the probability of default and the severity of loss (in the event of default). The expected loss on a jointly supported transaction also includes an estimate of the probability of default, as addressed in this report, and an estimate of the severity of loss.

3 Lucas (1995) notes that, in a binomial default setting, the probability of A and B defaulting is given by:
P(A and B) = P(A) ¥ P(B) + Corr (A,B) ¥ [P(A) ¥ (1-P(A))]1/2 ¥ [P(B) ¥ (1-P(B))]1/2 ,where P(∑) is the probability of an event occurring and Corr(∑) is the correlation between two outcomes.

Correlations Somewhere In Between

All real-world applications of TPP involve combinations of firms with credit-risk correlations lying somewhere between these two extreme cases. Under ideal circumstances, the precise correlation between two issuers could be measured, and the joint default risk could be calculated directly. In practice, the most an analyst is usually able to determine is that the credit risk of two issuers has a high, medium, or low level of correlation.

We offer below three matrices, each of which was derived by setting the correlation between each rating combination near the maximum (for "high"), upper middle (for "medium") and lower middle (for "low") theoretical levels. These matrices give some indication of the range of ratings likely to be assigned when two rated issuers support a transaction. Because of special features, results for a particular transaction may vary substantially from those indicated here. Moreover, the cases shown were derived from historical credit events. Our view of the future linkages between firms may deviate from measured historical patterns. Thus, the ratings shown here serve only as the starting point for critical analysis.

The analyst, in consultation with the rating committee, determines the appropriate correlation between two parties on a case-by-case basis. The rating committee must weigh a number of factors in deciding the strength of correlation between the two entities. In arriving at a correlation factor, the facts and circumstances of the given issue/issuer are considered most important.

Implied Joint Support Rating for High Correlation Case

Rating of the Higher-Rated Party:

	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa
Aaa	Aaa																
Aa1	Aaa	Aaa															
Aa2	Aaa	Aaa	Aa1														
Aa3	Aaa	Aaa	Aa1	Aa2													
A1	Aaa	Aaa	Aa1	Aa2	Aa3												
A2	Aaa	Aaa	Aa1	Aa2	Aa3	A1											
A3	Aaa	Aaa	Aa1	Aa2	Aa3	A1	A2										
Baa1	Aaa	Aaa	Aa1	Aa2	Aa3	A1	A2	A3									
Baa2	Aaa	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1								
Baa3	Aaa	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2							
Ba1	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1						
Ba2	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2					
Ba3	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3				
B1	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1			
B2	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2		
B3	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	
Caa	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa

Implied Joint Support Rating for Medium Correlation Case

Rating of the Higher-Rated Party:

	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa
Aaa	Aaa																
Aa1	Aaa	Aaa															
Aa2	Aaa	Aaa	Aa1														
Aa3	Aaa	Aaa	Aa1	Aa1													
A1	Aaa	Aaa	Aa1	Aa1	Aa1												
A2	Aaa	Aaa	Aa1	Aa1	Aa2	Aa2											
A3	Aaa	Aaa	Aa1	Aa1	Aa2	Aa2	Aa3										
Baa1	Aaa	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A2									
Baa2	Aaa	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A2	A3								
Baa3	Aaa	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A2	A3	Baa2							
Ba1	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3						
Ba2	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Ba1	Ba1					
Ba3	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa3	Ba1	Ba1	Ba2				
B1	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1			
B2	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2		
B3	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	
Caa	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa

Implied Joint Support Rating for Low Correlation Case

Rating of the Higher-Rated Party:

	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa
Aaa	Aaa																
Aa1	Aaa	Aaa															
Aa2	Aaa	Aaa	Aaa														
Aa3	Aaa	Aaa	Aaa	Aaa													
A1	Aaa	Aaa	Aaa	Aaa	Aaa												
A2	Aaa	Aaa	Aaa	Aaa	Aaa	Aa1											
A3	Aaa	Aaa	Aaa	Aaa	Aaa	Aa1	Aa2										
Baa1	Aaa	Aaa	Aaa	Aaa	Aaa	Aa1	Aa3	Aa3									
Baa2	Aaa	Aaa	Aaa	Aaa	Aaa	Aa1	Aa3	A1	A1								
Baa3	Aaa	Aaa	Aaa	Aaa	Aa1	Aa1	Aa3	A1	A1	Baa1							
Ba1	Aaa	Aaa	Aaa	Aa1	Aa1	Aa2	A1	A1	A2	Baa1	Baa3						
Ba2	Aaa	Aaa	Aa1	Aa1	Aa1	Aa2	A1	A1	A2	Baa2	Baa3	Ba1					
Ba3	Aaa	Aaa	Aa1	Aa1	Aa2	Aa3	A1	A2	A3	Baa2	Baa3	Ba1	Ba2				
B1	Aaa	Aa1	Aa1	Aa2	Aa3	Aa3	A1	A3	Baa1	Baa2	Ba1	Ba1	Ba2	Ba3			
B2	Aaa	Aa1	Aa2	Aa2	Aa3	A1	A2	A3	Baa1	Baa3	Ba1	Ba1	Ba3	Ba3	B1		
B3	Aaa	Aa1	Aa2	Aa3	A1	A1	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B1	B3	
Caa	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa