Moody's Approach to Embedding Systemic Risk in the Rating Analysis and to Piercing the Local Currency Guideline in Structured Transactions

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SUMMARY OPINION

As a general rule, the global rating of a security denominated in foreign currency is capped by the local currency guideline of the country in which the issuer - or originator of assets, in structured transactions - is domiciled.

The intention of this report is to present Moody's approach to capture the systemic risk of a country where the assets are located and to pierce the local currency guideline (LCG) of a specific country.

By allowing the rating of a transaction to pierce the local currency guidelines — and by using the approach described herein — Moody's can deal more effectively with transactions with different or with the same assets, but with different bond structures and different levels of onshore subordination. This approach would permit deals to achieve the same ratings with differing levels of offshore enhancement.

When securitizations backed by domestic assets are affected by sudden systemic risk of the type captured by the LCG, Moody's assumes from that point forward that local currency cash flows drop to zero and the cash reserve offshore would be the only available source of enhancement. The support required can be extensive, especially if the jump in credit ratings is great. In the extreme, it may be possible that a jump to the **Aaa** level would require almost *100% coverage*. On the other hand, smaller jumps can require much more modest offshore enhancement levels.

SYSTEMIC RISK AND LOCAL CURRENCY GUIDELINES

Moody's local currency guidelines are intended to capture various elements of systemic risk (institutional, structural, legal, political, etc.) that could have a dramatic adverse impact on local-currency obligor performance in a specific country. Consequently, the local currency guideline will indicate the rating that might be assigned to the financially strongest possible transaction in a particular jurisdiction.

Although some of the variables used to determine the local currency guidelines are similar to the ones employed by Moody's to determine foreign-currency country ceilings, it should be noted that there is a fundamental difference between the two concepts. Foreign-currency country ceilings measure the likelihood that a government will impose restrictions to the repayment of foreign-currency obligations. On the other hand, local currency guidelines attempt to measure systemic default risks that could affect the operation of the payments system within the country and thwart the general ability to repay local or foreign-currency denominated obligations in a timely manner.

The analysis that is incorporated into the determination of local currency guidelines involves consideration of a wide variety of quantitative and qualitative factors, including:

- The risk that a change in the political regime could lead to a general repudiation of debts;
- The presence of an inadequate system of contract law that could prevent the successful collection of unpaid debts or the seizure of collateral;
- The existence of a weak regulatory/legal environment which could introduce elements of unpredictability to credit transactions;
- The possibility that, under a severe stress scenario, generalized macroeconomic instability could lead the government to impose controls on the domestic payments system (e.g., a deposit freeze) that would jeopardize the obligors' general ability to repay debts on a timely basis.

HOW TRANSACTIONS BACKED BY DOMESTIC ASSETS ARE AFFECTED BY LOCAL CURRENCY RISK

When securitizations backed by domestic assets are affected by a sudden systemic risk of the type captured by the LCG, Moody's assumes, from that point forward, that local currency cash flows drop to zero. Although systemic risks vary from country to country, in most Latin American countries the local currency guideline has been set at **A1**. At this rating level, the probability of any such systemic risk occurring in a period of ten years is relatively low — well less than 1% — according to Moody's idealized corporate default study, but the severity would be 100%.

When analyzing local currency risk in a securitization backed by domestic assets, Moody's goal is to capture the likelihood of such systemic risk, whether or not the transaction pierces the local currency guideline, and to incorporate this risk into our analysis.

MOODY'S INCLUSION OF MULTIPLE RISKS IN THE RATING ANALYSIS

Step 1: Creating A Preliminary Model

The preliminary model ignores the systemic risk imbedded in the LCG, and any possible offshore enhancements. It concentrates on deal-specific asset performance and cashflows. Moody's typical cash flow model assumes asset defaults and recoveries are determined by probability distributions.

Whether the assets are considered as a pool or a discrete set, in each time period a probability of default can be assigned to the assets. We find that this better addresses the uncertainties surrounding the precise value of defaults and recoveries, than choosing any fixed stressed values for defaults or recoveries. The greater the uncertainty, the greater the volatility of the default distribution. Often, this greater volatility is modeled by increasing the standard deviation

of the distribution. All else kept equal, the higher the standard deviation for a default distribution, the "fatter" the tail, and the higher the credit enhancement needed. The standard deviation can be adjusted for several variables including economic volatility, pool size, and concentration.

The Role of Pool Size: Smaller Adds Uncertainty to the Model

Pool size plays an important role when running a cash flow model. The smaller the pool, the less certain that the outcome will fall within our expected loss scenario (small pool size decreases our confidence about the mean). For smaller pools, we also become less certain as to how fixed expenses will be covered compared to those of a larger pool. If delinquencies are very high, there might not be enough cash to cover the fixed expenses.

Gross Recovery Reductions Affect Model Assumptions

The gross recovery will be reduced by accrued interest, foreclosure or repossession costs, refurbishing costs, fees and expenses. Moreover, the gross recovery will also decrease while waiting to foreclose or to repossess. We therefore ascertain all such fees, expenses and costs involved in advance. When we cannot get such information, we make conservative assumptions.

Nuances of Deal Structure are Key

To factor in the effect of any nuances particular to the structure, we do a detailed review of deal structure and cash flows. Moody's seeks to understand what happens in the event of an asset default or a delinquency, from where is cash being drawn to cover shortfalls and defaults, and what is considered first loss protection, second, third, etc. We also review the workings of the waterfall, determine who gets the benefit of recoveries, the deal's fees and expenses, and who is covering those expenses.

Step 2: Adding Systemic Risk

Up to this point the model is identical to a model unconcerned with a LCG or possessing any offshore additions.

To model the systemic risks related to the LCG, we first populate the preliminary model with only the most benign assumptions: no losses, minimal prepayments, and minimal delinquencies. The goal is to find the ideal deal model: the model that reveals the best the transaction can ever behave.

Next, a default distribution is determined, such that when this default distribution is superimposed on the ideal model with an assumption of no recoveries, the expected losses are consistent with the best possible **A1** rating (assuming the local currency is rated **A1**). In general, this is accomplished by choosing a multiple of a period-by-period default frequency curve drawn from an idealization of Moody's corporate bond default study by using repeated Monte Carlo simulations. For an LCG of **A1**, the **A1** curve is the usual choice; however, circumstances may dictate other choices.

Step 3: Including Macroeconomic Shocks

Moody's third step is to incorporate macroeconomic shocks into the model. We discuss these thoroughly with our sovereign analysts, incorporating transaction and country features either for cross-border deals or for national deals to determine which shocks are pertinent. In each case we address the following six questions:

1. How many macroeconomic shocks are likely to happen during the life of the transaction?
2. What is the probability for each shock happening?
3. How much time will likely lapse between one shock and the next?
4. What is the magnitude of each shock?
5. How long would each shock likely last?
6. How do those shocks affect the frequency of default?

Moody's then simulates the macroeconomic shocks and applies varying magnitudes and duration to each one, to increase the base default rate.

Step 4: Simulating Deal-Specific Performance

Concomitantly, Moody's analyzes the historical performance data of the pool to be securitized. Ideally, we would receive static performance data for the securitized pool, the performance of all the assets originated by the same originator, and finally, the performance of the assets on an industry-wide basis.

Unfortunately, in some countries, particularly in Latin America, levels of credit enhancement are difficult to determine because often, the only data available is limited to assets that were originated by one specific originator. Furthermore, most pools in the region are not highly diversified and do not have a substantial amount of historical data available. Data that is available must often be adjusted to reflect the drastic positive or negative economic changes that took place in recent years. Problems also occur if the underwriting guidelines were changed substantially or if the originator changed its core business focus. When the data are unreliable, we may be able to use the information available as a proxy for future trends.

Monte Carlo simulations can help us to estimate how the frequency and the severity of pool defaults will affect the performance of the rated securities. The model indicates the impact of these factors on the expected loss, which is a major factor in determining the appropriate rating.

Step 5: Calculation Of Expected Loss

Simulations incorporating macroeconomic shock effects, deal-specific defaults and recoveries and the LCG-driven defaults with no recoveries are driven through a model of the bond structure to estimate the expected loss[1] on each class of securities.

In employing these techniques a rating cannot be higher than the local currency guideline with exclusively onshore enhancement.

PIERCING THE LOCAL CURRENCY GUIDELINE: OVERCOMING SYSTEMIC RISK WITH OFFSHORE ENHANCEMENT

If offshore enhancement is available independent of any systemic or non systemic risk, then clearly it must affect any credit analysis. Sufficient enhancement must raise ratings, and for any desired rating there must be a sufficient level of enhancement. But the question is: "By how much?"

At this point, the answers are almost immediate (at least this is so, if the model, considering only onshore performance and credit enhancement, is accessible). The model can be extended to simulate the offshore additions, be they reserve accounts or insurance. Further simulations now reveal the new expected losses, and hence new rating, or by iterating the offshore support required for a desired rating.

The support required can be extensive, especially if the jump in credit ratings is great. When, for example, an **A1** systemic risk happens, the onshore collateral at that point would be worth zero and the cash reserve offshore would be *the only* available source of enhancement. In the extreme, to go the **Aaa** level, almost *100% coverage* might be required. On the other hand, smaller jumps can require much more modest offshore enhancement levels.

1 By dividing the dollar amount of expected total losses by the size of the senior class, for example, we can estimate of expected loss in percent terms. We compare this percentage to the weighted-average life of the security with Moody's expected loss table to determine the rating and to verify if the credit support is sufficient to support the desired rating. By knowing the desired rating, Moody's can change the credit support needed to achieve it.

APPENDIX: LOCAL CURRENCY GUIDELINE

Country Guidelines for Local Currency Obligations

Country	Domestic Currency Guideline
Argentina	**A1**
Belize	**A1**
Brazil	**A1**
Chile	**Aa1**
Colombia	**A1**
Costa Rica	**Aa2**
Dominican Republic	**A1**
Mexico	**Aa3**
Peru	**A3**
Uruguay	**A1**
Venezuela	**A1**

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