INTRODUCTION
Moody's has placed tranches within more than 30 cash-flow\(^1\) CBOs and CLOs (collectively, CDOs) on review for downgrade this year, and has actually downgraded tranches within 20 transactions. Two factors account for nearly all of these actions:

- Downgrades of (primarily Japanese) banks that have sponsored CLOs in which the senior tranche ratings are directly tied to those of the bank, and
- The deterioration in collateral pools associated with the Emerging Market crisis.

In light of the attention given to the problems of Japanese financial institutions, as well as to the Emerging Market situation, these rating reviews and downgrades should not be surprising.\(^2\)

Investors may, however, find it puzzling that Moody's has neither placed under review nor downgraded any of the market-value transactions that we have rated. Part of the answer is straightforward: the vast majority of CDOs have been of the cash-flow variety, and even within the market-value universe, Emerging Market credits have comprised only a small fraction of the collateral pools. Nonetheless, the second half of 1998 has been marked by exceptionally high volatility in the prices of many of the assets that do account for the bulk of the collateral held within market-value CBOs. Over the balance of this note, we will seek to explain the stability of our market-value CBO ratings in the face of such volatility.

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\(^1\) For those not familiar with this terminology, "cash-flow" transactions are structured in such a way that if certain triggers relating to par value or interest coverage are tripped, cash flows are diverted to the more senior classes. The analytical focus is thus on the ability of the collateral pool to meet payments on the liabilities, even in the face of defaults. By contrast, market-value transactions require the liquidation of collateral to pay down liabilities if the "haircut" value of the assets falls below the principal plus accrued interest arising from the liabilities. The haircuts depend on asset price volatility and the liquidity of the assets.

Ratings Are Based on a Long-Term View of Price Volatility, Correlation and Liquidity

Price Volatility
In developing the approach through which we determine transaction-specific advance rates for each of asset classes in a market-value CDO, Moody's relied on an extensive database of asset prices. For some instruments – e.g., high-yield bonds – the data stretched back as far as 15 years. For others – e.g., distressed debt – the available price history was much more limited. It is important to have a sufficient price history. By “sufficient,” we mean one that captures a full range of market scenarios – periods of secular growth, speculative bubbles, recessions, and outright panics. During the past 15 years, we have observed both the 1987 stock market crash (which spilled over into the high-yield bond market) and the sharp deterioration of the early 1990s. In this sense, our high-yield bond history appears to be sufficient.

In cases where the price history was, in our judgment, inadequate, we have applied stress factors to account for potential downturns that are not reflected in the historical data. Even in the case of high-yield bonds, we have assumed modest stresses (that rise with the rating of the liability tranche under consideration) in recognition of the fact that the future may hold surprises unlike those seen over the last 15 years. For other instruments, we have applied sharper stresses because we are fully aware that the historical data have not captured significantly sharp sell-offs.

Correlation
As in the case of price volatility, we have not simply adopted the correlations embedded in the historical data for the development of our advance rates. It is our belief that average correlations measured over a period of years have little relevance in a rapidly sinking market. Rather, correlations tend to rise sharply during market downturns. One need only look to the latest emerging market crisis to see how apparently unrelated markets can suddenly be caught up in a global panic.

In view of the instability of correlations in market returns, we have also applied significant stresses to the historical figures. We do so by incorporating into our analysis not the average correlation over the period for which we have data, but the correlations that prevailed during periods of significant market losses.

Liquidity Haircuts
The market-value advance rates reflect not only the volatility in returns for each asset class and the correlations in returns, but also a liquidity discount. This discount, or haircut, is consistent with our view that the forced sale of a portfolio of illiquid assets in a slumping market will almost certainly entail a discount from the fair market value of the assets. These discounts will vary with the illiquidity and, perhaps, price volatility of the assets.

Just as we assumed in formulating our ratings approach, illiquidity has played an important role during the events of the past few months. The ability to dispose of not only emerging market bonds, but also domestic high-yield bonds and loans – or, for that matter, anything that isn't a U.S. Treasury obligation – has been hampered by a general sense of crisis. But there is no reason to believe that our assumed liquidity discounts, which range from 5% for high-yield bonds to 20% for distressed instruments, are overly optimistic. Of course, it may have been very difficult to dispose of particular instruments at certain times, but at least to the extent that liquidity losses are not perfectly correlated across all assets, the impact of such losses will be muted within the diversified portfolios that underlie market-value CDOs.

3 See “Moody's Approach to Rating Market-Value CDOs,” Moody's Special Report, April 1998. The approach relies primarily on historical simulation, but allows judgmental adjustments to volatility and correlation parameters to address inadequacies in the price data.
4 There are statistical techniques, including the “GARCH” and “stochastic volatility” methodologies, that can be applied to forecasting volatility. In theory, such tools could be used to develop a set of dynamic advance rates that change each time the overcollateralization test is run. However, in practice, it is not clear that such dynamic rates would be particularly effective. Though volatility can, to a limited extent, be forecast, true market crashes remain nearly unforecastable.
5 To the extent that a market is in turmoil, it is very difficult to determine the fair market value. The more volatile the price of the asset, the greater this uncertainty. Potential buyers of an asset may require a premium as compensation for this uncertainty.
Closely related to the liquidity issue is the quality of the marks that are used to determine compliance with a transaction's overcollateralization tests. The less liquid the asset, the more difficult it is to get a “true” market quotation. This problem is mitigated in market-value CDOs by the practice of soliciting two quotes from independent market sources. However, there is usually a small basket for “illiquid” investments that are more difficult to mark. We believe that our liquidity haircuts are sufficiently large to account for the difficulty in determining the fair market value of the collateral. These haircuts are larger, and therefore the advance rates more onerous, for such illiquid assets. Where assets have been sold from market-value CDOs, we have compared the sale prices to the marks just prior to sale and have not found evidence of a meaningful, systematic bias toward inflated prices.

When Would the Ratings Change?
We have suggested that despite the dislocations in the financial markets since August, the events have been consistent with the assumptions that we made in developing our market-value ratings approach. Certainly, the period has been exceptionally volatile and has provided a real test of market-value structures. But there is no evidence that the volatility is symptomatic of a sea-change in the workings of the financial markets. Moreover, all of the market value structures that we have rated held up well during the critical period. Not only were there no defaults, but at no point was an overcollateralization test breached so that even a partial portfolio liquidation was required.

What would cause us to downgrade the structures that we have rated (or to associate lower advance rates with a given set of ratings)? If we believed that the economic environment had changed in such a way that the assumptions behind our advance rates became either overly optimistic or overly conservative, then the advance rate/ratings relationships would necessarily change. We do not believe that this has occurred. Certainly, we have had a bad roll of the dice, but the game itself hasn’t changed.

Of course, it’s extraordinarily difficult to judge when a change in the environment has occurred. Examples of such changes include the Fed’s move to targeting money supply growth in late 1979, or the Fed’s more gradual shift to targeting interest rates over the late 1980’s and early 1990s. Similarly, the advent of the Euro promises a true change in the European economic environment. But unlike the carefully planned introduction of the Euro, many important shifts in the financial landscape can only be appreciated after they have occurred. It is normally difficult to distinguish between an “outlier” within the old regime and an event that is symptomatic of a long-term shift in financial relationships. Ultimately, it is a matter of judgment, and the judgment must be made quickly.

How Suddenly Could the Ratings Change?
When Moody’s has upgraded or downgraded the ratings of cash-flow transactions, the changes have not been dramatic. The ratings of senior tranches are particularly stable, while the ratings of the highly leveraged junior tranches may change more sharply. Though there has never been a default on a Moody’s-rated CDO tranche, there is a statistical likelihood that a few of the tranches in the more than 200 transactions we have rated will ultimately suffer defaults. Should that occur, tranches that were initially rated below investment grade are the likely victims, but even a tranche initially rated in the Baa range could eventually suffer losses. We do not, however, anticipate that a tranche will move directly from an investment-grade rating to default. Rather, there would be a gradual slide as credits in the underlying collateral pool are downgraded and ultimately default.

It is less clear that the ratings of tranches in market-value transactions will see such incremental changes. Certainly, it is equally true in the market-value context that we never expect a default on an investment-grade tranche. In a gradually deteriorating market environment, the schedule of advance rates will force the collateral manager to reallocate funds toward less volatile asset classes, or to pay down the senior tranches in an orderly and timely fashion. Thus, it is very unlikely that the senior tranches would suffer any losses.
But because financial markets incorporate perceived changes in the economic environment almost instantaneously, and because there is also a potential for contagion effects or an outright panic, it may be difficult to foresee a sudden collapse in the prices of the collateral instruments held by a particular CDO. At such times, a collateral manager's trading skills will become critical. To the extent that a manager is attuned to increased market volatility, the maintenance of an extra cushion of collateral value, beyond that provided by the CDO's advance rates and liability structure, would be appropriate.

**CONCLUSION**

In our view, Moody's current methodology for determining a set of advance rates consistent with the composition of a CDO portfolio and the ratings of the liability tranches remains appropriate. This view rests on our belief that despite the recent turmoil in the emerging markets and the impact on the prices of a range of financial instruments, the financial environment has not shifted in any fundamental way. We do not pretend to have been able to foresee these events, but they are within the range of behavior that we considered in developing the methodology. Moreover, the fact that the market-value CDOs that we have rated have stayed comfortably in compliance with their overcollateralization tests gives comfort that these structures can withstand the shock of a genuine financial crisis.