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## Defaulted Bank Loan Recoveries

### Summary

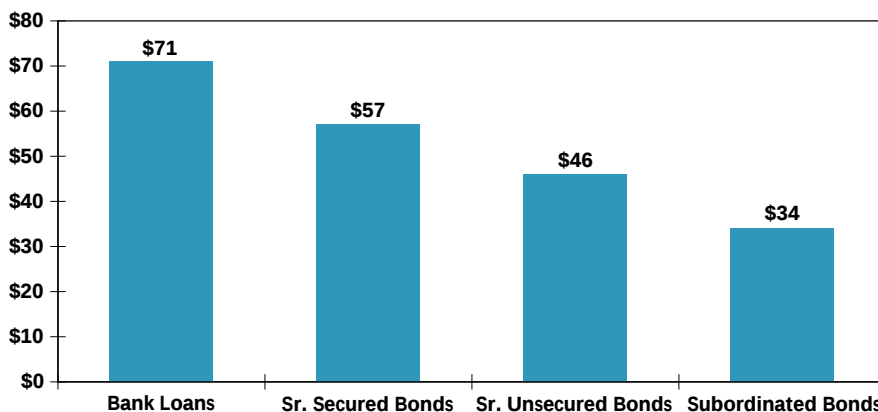
In 1995, Moody's began assigning credit ratings to bank loans in the belief that access to analysis and information relating to the credit aspects of bank loans is critical to the continued development of the secondary market for those instruments. For a firm with both rated bank debt and bonds, Moody's typically rates the bank debt at least as high as the bonds. Variation in the ratings "spread" between bank loans and bonds of the same company are, in part, attributable to Moody's opinion of the relative value of these instruments in default.

This research examines both secondary market loan pricing and actual payments to defaulted loan holders to arrive at estimates of the value and recovery rate of defaulted bank loans. Briefly, the study finds that:

- Secondary market pricing for defaulted U.S. senior secured syndicated bank loans indicates an average recovery rate of 71% and a median recovery rate of 77%. The standard deviation of these recovery rate estimates is 21%, and they range from a low of 15% to a high of 98% of par. The tremendous dispersion indicates that the likelihood that an individual loan's recovery rate will be much more or much less than average is high.
- A second set of recovery estimates was derived using a distinct methodology and a dataset consisting of the post-default cash flows to a sample of senior secured loans to mostly small and mid-size U.S. firms. The average of these recovery rate estimates is 79% and the median is 92%. The standard deviation of these recovery rate estimates is also large, 29%, and loan holders within the sample recovered from as little as 1% to as much as 110% of par.
- Bank loans are typically worth more upon default than unsecured bonds, a fact that is reflected in Moody's bank loan ratings. Defaulted bank loans tend to be priced 13% of par higher than the defaulted senior unsecured bonds and 37% of par higher than the defaulted subordinated bonds of the same company.

### Average Defaulted Bank Loan and Bond Prices One Month After Default

(from September 1989 to September 1996)



*continued on page 3*

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## Introduction

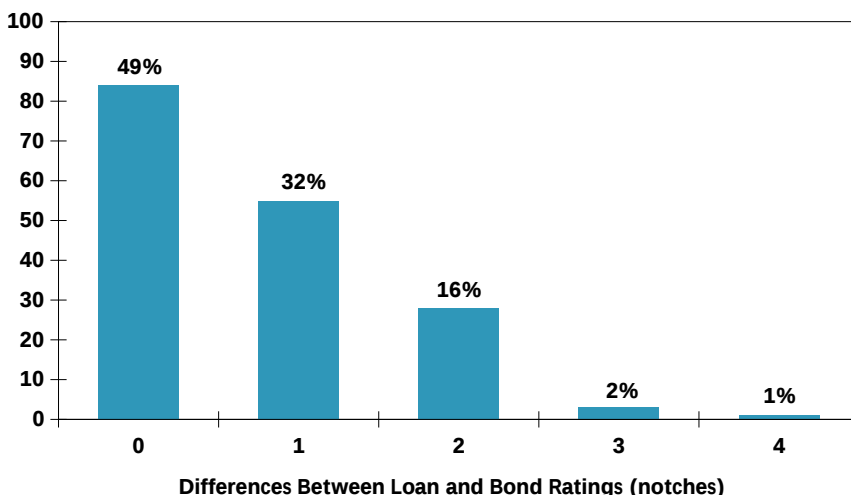
In the 1990s, the secondary market for bank loans has grown dramatically in size and scope as a result of both increased supply and stronger demand. On the supply side, banks' interests in minimizing reserves held against loans and in the active management of their loan portfolios has induced them to structure a greater volume of loans in ways that make them easier to trade. On the demand side, investors have recognized loans as a distinct asset class with their own set of return correlations and their own place within many asset diversification schemes.

Moody's believes that access to analysis and information relating to the credit aspects of bank loans is critical to the continued development of the secondary market for loans. As bank loans have historically been private lending instruments, detailed public information on the past performance of loans under various business conditions remains obscured. Consequently, many investors are at an informational disadvantage relative to banks and have come to rely on a simple rule of thumb for measuring the credit risks associated with loans not rated by Moody's: "A loan's credit rating is one notch higher than the firm's senior unsecured bond rating." While this rule of thumb may not be grossly mistaken, for any particular loan it can be. Moody's began rating bank loans publicly according to the traditional Aaa to C rating scale in 1995 in order to help investors overcome this difficulty. As of October 24, 1996, we had assigned 663 ratings to over \$150 billion of bank debt.

Moody's focuses a great deal of attention on an analysis of the collateral and seniority of a bank loan in assigning a credit rating. While an obligor is roughly just as likely to commit a payment default on its bank loans as on its long-term bonds, the post-default recovery that bank loan investors realize can be very different from that realized by bondholders. In cases in which Moody's believes that the seniority and security of a loan will be sufficient to generate a significantly greater recovery than would be experienced by bondholders, the reduced credit risk of the bank loan is reflected in a higher rating.

Chart 1 shows the differences between Moody's bank loan and senior unsecured debt ratings for the 171 firms for which both ratings were available as of August 15, 1996. In about half of the cases, the bank facility rating is one or more notches higher than the senior unsecured bond rating of the firm, reflecting Moody's opinion of the superior value of the loan's collateral position. However, in many cases the bank loan carries the same Moody's rating as the firm's senior unsecured debt. In such situations, it is Moody's opinion that any post-default advantage that the loan may enjoy would be of so little economic consequence that the loan would be essentially indistinguishable from the senior unsecured debt in terms of credit risk. The dispersion among the rating differences between zero and four reflects differences in Moody's opinions of the incremental protections the various bank loans provide against credit loss.

**Chart 1: Senior Unsecured Ratings vs. Bank Loan Ratings of the Same Company**  
(as of August 15, 1996, 171 bank loans = 100%)



This report estimates average and median recovery rates for defaulted bank loans using two distinct methodologies and datasets and examines the similarities and differences between the recoveries on public debt and on private debt in default. The first section of the report analyzes secondary market defaulted loan pricing to derive estimates of defaulted loan recovery rates. Because this sample necessarily consists of traded loans, the results of this analysis are more representative of the recovery characteristics of syndicated loans. The second section examines actual post-default payments made on a sample of defaulted bank loans from Loan Pricing Corporation's Loan Loss Database to generate recovery rate estimates. The chosen sample consists of loans largely made to small and mid-size commercial and industrial firms and the results of this section are more representative of the recovery characteristics of non-traded loans. The third section compares and contrasts Moody's results from the first two sections with those of Edwards and Asarnow's 1995 research on the topic.<sup>1</sup>

## Recovery Rate Estimates Based on Secondary Market Prices

Just as in any market for performing assets, the prices of distressed and defaulted bank loans reflect the expectations of market participants as to the present value of the security's future cash flows, adjusted for its risk characteristics. Many investors feel that because of poor liquidity, the use of pricing grids, and regulation-induced pricing distortions, secondary market pricing does not accurately reflect the intrinsic value of bank loans in default. Despite these market characteristics, in this section we consider defaulted loan prices as proxies for loan recovery rates. While the trading price is only an estimate of recovery and can be expected to be lower than any actual payout by the amount of the market's risk premium, it has the distinct advantage of being the definitive measure of recovery for those investors who liquidate positions after default.

### Methodology and Data

Credit agreements tend to be more easily and privately renegotiated. Credit agreement amendments that would classify as defaults in Moody's corporate bond default research, such as maturity extensions and reduced interest rates, are difficult to discover and document for unrated facilities. Consequently, reliable information on the incidence of a wide range of bank loan defaults is not available. For this part of our research, we have chosen a practical definition of default: a default on publicly held bonds as recorded in Moody's corporate bond default database or a filing for bankruptcy protection.<sup>2</sup> While this definition fails to include many credit agreement modifications, it has the advantages of being more easily understandable, verifiable and comparable to our public bond default research.

Actual transaction prices are not available for most of the defaulted bank loans in our database. Instead, we rely on bid prices as reflected on loan dealers' quote sheets. Additionally, defaulted bank loan price quotes tend to remain nearly constant for extended periods of time reflecting the pace of the default's resolution and the corresponding information flow, the relatively high transaction costs associated with a loan sale and the market's illiquidity. In order to mitigate the effects of using bid quotes on illiquid securities, we collected these prices from several different sources.<sup>3</sup> We take the average of these dealers' bid quotes as our price for the defaulted loan.

The date of the price is also important. We choose to let some time pass after the default date so that investors have time to assess accurately, and therefore to price, the severity of the default. On the other hand, as time passes, the time value of money generates an upward bias in the price as an indicator of the loan's eventual recovery. As a compromise, for each dealer and loan we take one price which is the earliest price recorded between two and eight weeks after the default.

Our sample consists of 58 U.S. borrowers with one loan per borrower.<sup>4</sup> The earliest default for which we have full information occurred in September of 1989 (the mortgage financier Lomas Financial Corporation) while the most recent occurred in July of 1996 (the construction company Morrison Knudsen Corporation). In terms of industry affiliations, the majority (52) of the defaulting borrowers were industrial firms, with the balance spread amongst the financial, transportation and utilities industries. Within the group of defaulting industrial firms, a noteworthy 17 borrowers were retailers.

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<sup>1</sup> Edwards, David and Asarnow, Elliot, "Measuring Loss on Defaulted Bank Loans — A Twenty Four Year Study," *Journal of Commercial Lending*, Vol. 77, No. 7, March 1995, p.11-23.

<sup>2</sup> Moody's defines default as any missed or delayed disbursement of interest and/or principal. We include as defaults distressed exchanges where (i) the issuer offered bondholders a new security or package of securities that amount to a diminished financial obligation (such as preferred or common stock, or debt with a lower coupon or par amount) and (ii) the exchange had the apparent purpose of helping the borrower avoid default.

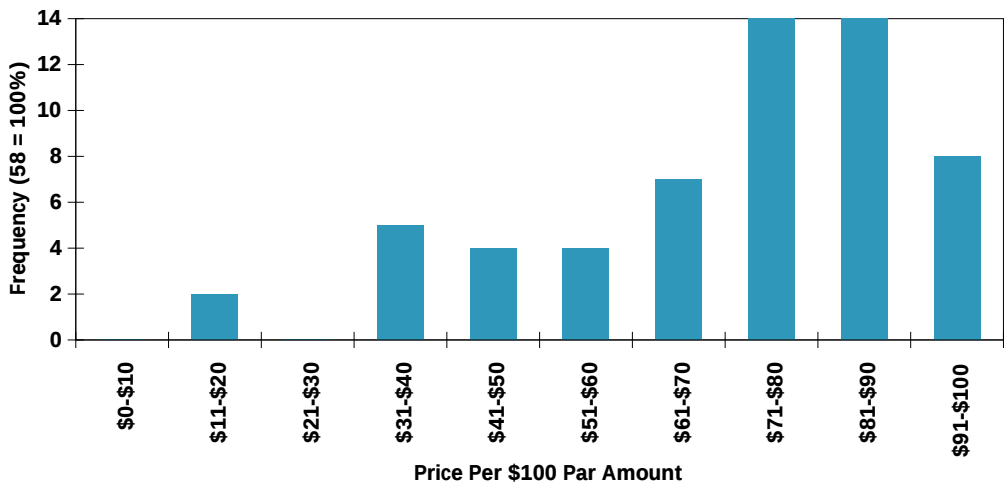
<sup>3</sup> Among the contributors were BDS Securities, Goldman Sachs, Merrill Lynch, Lehman Brothers and Citibank.

<sup>4</sup> Including prices for different loans involved in the same default would have the effect of biasing our results towards the characteristics of borrowers with multiple loans outstanding and artificially lowering our estimates of the standard deviation of the defaulted loan prices.

Defaulted Loan Price Distribution

The average of these 58 defaulted bank loan prices comes to \$71 per \$100 par amount of the defaulted loan. However, the average price is only one measure of what could be considered the most typical value that would be realized for a defaulted bank loan. As Chart 2 portrays, the distribution of prices is skewed towards the high end of the price scale. This indicates that while the average of these prices is \$71, more than half are greater than that value. The median price, \$77, is a more robust measure of the center of an asymmetric distribution such as Chart 2 portrays. It indicates that a loan drawn at random from this sample would yield a price of at least \$77 half of the time.

Chart 2: Defaulted Bank Loan Price Distribution



Another characteristic of the price distribution above is its tremendous dispersion. The lowest price observed is \$15 while the greatest is \$98. One of the most common measures of dispersion is the standard deviation, \$21. A 95% confidence interval for the mean defaulted loan price based on this standard deviation extends from \$29 dollars on the low side to \$112 on the high side.<sup>5</sup> The size of the confidence interval conveys that the likelihood that an individual loan will be worth much more or much less than the average is high.

While useful to some extent, confidence intervals derived from averages and standard deviations can generate misperceptions when applied to small samples from skewed distributions. The large upper bound, \$112, seems unlikely ever to be reached as bank loans are overwhelmingly floating rate instruments resetting interest rates each quarter making prices over \$100 rare. An alternative approach is to consider a band into which 95% of the observations actually fell. Of the 58 prices, 56 (97%) fell between the second lowest price, \$15, and the second highest price, \$97. Using this “distribution-free” methodology one can see that prices greater than \$97 are rare.

Comparison with Price-Based Defaulted Bond Recovery Estimates

Moody’s also maintains a database of prices for defaulted bonds from which we derive estimates of bond recoveries. The defaulted bond prices are highly variable (as are default resolutions), and so we typically calculate averages over as long a time horizon as possible in order to increase the sample size and our confidence in the results. However, in this case, we intend to compare our average defaulted bond prices with those for defaulted bank loans. Because the defaulted loan price sample includes only U.S. loans that have defaulted since 1991, we limit our sample of defaulted bond prices to include only bonds issued by U.S. companies that defaulted during these years. The cover chart presents the averages of these prices segmented by seniority of claim.

The average defaulted senior secured bank loan price is, \$71, \$14 higher than the average price for senior secured bonds that defaulted in the same time period, \$57. Defaulting senior unsecured bonds

<sup>5</sup> The 95% confidence interval is calculated as the average  $\pm$  1.96 \* standard deviation. Conceptually, one can be 95% confident that the true mean of defaulted loan prices lies between the upper and lower confidence limits.

were worth, on average, even less, \$46 and defaulted subordinated bonds were worth only \$34 on average. The average price for defaulted bank loans' is higher than for senior unsecured bonds or subordinated bonds because of the loans security and, in the case of subordinated bonds, seniority. It is noteworthy that the average price of defaulted bank loans is much higher than that of senior secured bonds of similar seniority. A statistical test reveals that this difference is significant at the 3% level of confidence. Hence, the data indicate that, on average, bank loan recoveries tend to be both economically and statistically significantly higher than senior secured bond recoveries.

While the cover chart provides a useful summary of the relative effects of seniority and security on recovery, a more precise calculation is the average difference in prices for various defaulted debt instruments of the same obligor. This controls for the particular circumstances of each default and focuses more narrowly on the role seniority plays in determining recovery. There are twelve instances for which we have post-default pricing for both the bank debt and senior unsecured bond debt of the same defaulter. The average difference between the loan and bond prices comes to \$13. There are another 47 instances for which we have post-default pricing for both the bank debt and subordinated bond debt of the same defaulter. The average difference between the senior secured bank loan and subordinated bond prices in these cases comes to \$37. This indicates that by controlling for the specifics of each default, we can see that senior bank loans may be expected to be worth 37% of par more than subordinated bonds upon default.

**Recovery Rate Estimates Based on Post-Default Payment Data**

Another approach to determining the value of defaulted bank loans is to consider the actual payments that defaulted loan holders ultimately received in the default's resolution. Conceptually, the proportion of the par amount of the defaulting loan represented by the discounted value of the post-default payments is the recovery earned on the defaulted loan. This methodology requires detailed information on the timing, size of defaults and on the payments loan holders actually received, as well as determination of the discount rate to apply to post-default payments.

**Data and Methodology**

Loan Pricing Corporation (LPC) maintains a proprietary database designed to track and measure the credit performance of bank loans. The database details loan and borrower characteristics and payment histories including payments made on loans subsequent to default. With the stated goal of contributing to the further development of the secondary market for loans, LPC agreed to allow Moody's to explore certain aspects of this database in order to ascertain reliable recovery rate estimates.<sup>6</sup> The data Moody's analyzed derived from the U.S. loan portfolios of 24 U.S. and non-U.S. banks and contains payment information on a sample of defaulted bank loans that comprises over 70% of the par amount of these banks' distressed loan portfolios.

We limited our sample to include only senior secured loans that the contributing banks had placed on "Non-Accrual" and that had completed their workouts. This limited the number of post-default payment streams considered to those of 229 bank loans. Not surprisingly the sample is predominantly comprised of small to mid-sized borrowers since they form the bulk of borrowings in the overall commercial loan market. The borrowers represent a geographically and industrially diversified cross-section of United States borrowers. All but one had defaulted since 1990.

In examining this data, Moody's considered as defaulted any loan that a contributing bank placed on non-accrual. For each defaulted loan, Moody's examined three payment streams in estimating ultimate recovery: interest payments, principal payments, and post-default draw-downs on the loan. The recovery rate estimate for a particular loan is then the sum of present values of each of these cash flows as of the time of default divided by the outstanding par amount of the loan at the time of default. Symbolically,

$$Recovery = \frac{PV(I) + PV(P) + PV(D)}{Par\ Amount\ as\ of\ Default\ Date}$$

<sup>6</sup>Loan Pricing Corporation did not provide Moody's with access to any information that would allow Moody's to identify lender or borrower names. LPC also requires Moody's to adhere to their strict security and confidentiality policies.

where  $I$ ,  $P$ , and  $D$  represent the post-default streams of interest payments, principal payments, and draw-downs, respectively, and  $PV(.)$  represents the present value of the stream of payments. The present value calculation for the stream of interest payments, for example, takes the form,

$$PV(I) = \sum_{k=1}^n \frac{I_k}{\left(1 + \frac{r}{4}\right)^{4T_k/365}}$$

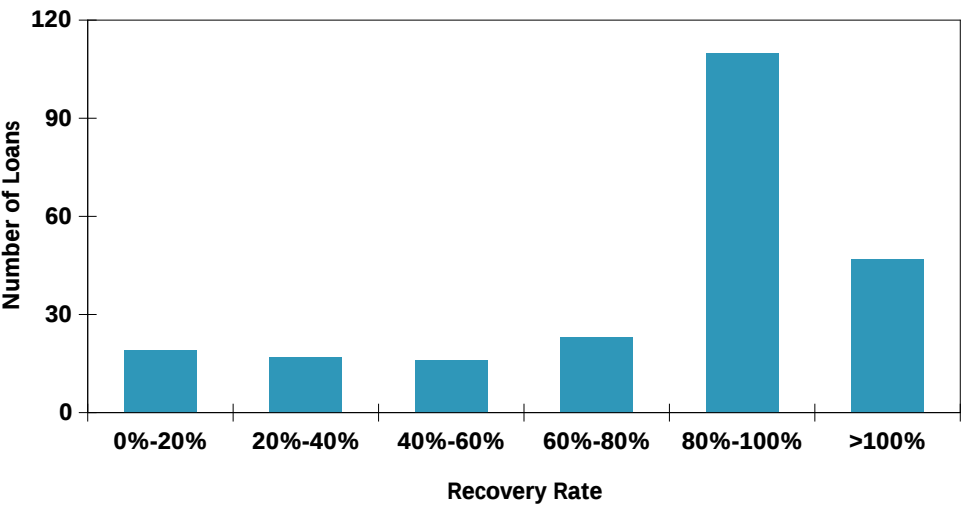
where  $n$  is the number of interest payments made between the date of default and the date of resolution,  $r$  is the discount rate, and  $T_k$  is the number of days from the date of default that the borrower made the payment. The factor of “4” in the denominator reflects the fact that this loan was to pay interest on a quarterly basis.

The estimated recovery rate calculation above relies also upon the discount rate. While the contractual lending rate is the most appropriate discount rate to apply for the sake of calculating present values, it is unavailable for these loans. To proceed we rely on estimates of what the contractual lending rates for these loans were. Our estimates are based on LPC’s market-based model of the spread over LIBOR paid by borrowers. The model incorporates a wealth of borrower- and loan-specific information into a flexible estimation structure to explain approximately 70% of the variation in loan spreads over LIBOR. Moody’s believes this model presents reasonably accurate estimates of the loans’ contractual lending rates.

**Recovery Rate Estimate Distribution**

The recovery estimates for senior secured bank loans derived from the post-default payment data in Loan Pricing Corporation’s database generate a distribution that is significantly more skewed towards the high end of the recovery scale than the distribution of defaulted bond prices. The average recovery estimate is 79%; however, the median value is much higher at 92%.

**Chart 3: Recovery Rate Estimates for Senior Secured Bank Loans**  
(Drawn from LPC’s Loan Loss Database)



As noted previously, the average and the median, while estimates of the center of the distribution of recoveries, are not particularly indicative of what any particular realization from this distribution would be. The concentration at the high end of the recovery scale generates both a high average recovery and a high standard deviation of recoveries, 29%. A distribution-free 95% confidence interval extends from 6% on the low side to 107% on the high side.

Additional results derived from the LPC database confirm intuitive notions about the value of a loan’s collateral in bankruptcy. For example, there is a clear increase in recovery rates for loans secured with current assets over loans collateralized by property plant and equipment. An additional, but perhaps unintuitive result is the virtual invariance of average recovery rates with the asset size of the borrower. The average given above, 79%, is based on all 229 defaulted loans. However, limiting the sample to borrowers with total assets exceeding \$25 million lowers the average recovery estimate to 78% (see Table 1). Considering just borrowers with total assets exceeding \$100 million generates an average recovery rate of 77%. However, given the distribution’s high standard deviation, the difference between the 79% average recovery rate for all firms and the 77% average recovery rate for firms with total assets exceeding \$100 million can not be considered meaningful in a statistical sense.

**Table 1 - Recovery Rate Estimates by Size of Borrower**

| Total Assets<br>Greater than: | Number<br>of Loans | Average<br>Recovery<br>Estimate | Median<br>Recovery<br>Estimate | Standard<br>Deviation |
|-------------------------------|--------------------|---------------------------------|--------------------------------|-----------------------|
| \$0                           | 229                | 79%                             | 92%                            | 29%                   |
| \$25 million                  | 39                 | 78%                             | 86%                            | 27%                   |
| \$50 million                  | 30                 | 77%                             | 84%                            | 28%                   |
| \$100 million                 | 25                 | 77%                             | 85%                            | 30%                   |

**Comparisons with the Edwards and Asarnow Loan Loss Study**

Edwards and Asarnow (E&A) conducted one of the most complete publicly available studies on the value of bank loans in default. The study examines a set of 831 commercial and industrial loans that Citibank had classified as either “Doubtful” or had placed on non-accrual over the period extending from 1970 to 1993. Citibank has detailed accounting and payment information on each of these loans and on the expenses incurred in recovery. These values are discounted to the date of default using Citibank’s yearly average interest rate on domestic commercial and industrial loans. Their present value, as a percentage of the par amount of the loan at the time of default, represents E&A’s estimate of the recovery earned on each loan. The average of these recoveries is \$65. The distribution of E&A’s recoveries is also skewed towards the high end, with a median of \$79.

The variation of E&A’s recovery estimates from the average value is also significant. While the authors did not calculate the standard deviation of their recoveries directly from the data, a reasonable approximation may be derived from the published results. Moody’s estimates the standard deviation to be \$32. Similarly, one can infer that about 95% of the recoveries fall between 1% and 99%. The high variability of the data implies that while the mean recovery is \$65 per \$100 par amount, that value is not very informative about the most likely experience of any one loan that defaults.

**Secondary Market Price-Based Recovery Rate Estimates versus E&A’s Results**

Given the significant differences between the methodologies employed, it is surprising that their averages, \$71 and \$65, and medians, \$76 and \$77, for Moody’s and E&A respectively, are so similar. However, the distributions of the two sets of recovery estimates are dissimilar. The E&A recovery distribution is bi-modal, with significantly more recoveries at the high end of the scale and a larger incidence of near-zero recoveries. This generates the higher estimated standard deviation for their sample vis-à-vis the sample of secondary market prices — \$32 versus \$21.

At least part of the reason for the higher dispersion of recovery rates exhibited by the E&A data is that the data set includes loans positioned at different levels within firms’ capital structures and of differing security. The greater frequency of loans with near-zero recoveries in the E&A data could be attributable to the inclusion of subordinated and unsecured loans in the sample.

Also, the greater frequency of loans experiencing nearly complete recoveries in the E&A recovery data could be due to differences between the definitions of default employed. E&A’s definition of default — any loan considered doubtful or placed on non-accrual, may include a greater proportion of loans that experienced mild defaults relative to those experienced by the loans for which we have secondary market pricing. The sample of loans considered doubtful may include a considerable number

of loans that never actually missed a payment or altered, in any economically important way, the terms of the credit agreement. On the other hand, those loans for which we have secondary market pricing are considered as defaulted only if they have filed for Chapter 11 protection or if they have defaulted on long-term public bonds according to Moody's definition of default in that sector. In these cases, the default would typically involve a realized economic loss to investors. It seems likely that private workouts involving only a small group of private lenders entail defaults of lesser average severity than public defaults involving a large and fractious group of creditors.

### **Recovery Rate Estimates Based on LPC's Database versus E&A's Results**

One major difference between these two studies lies again in the default definitions used. In contrast to E&A's methodology, the estimates derived from LPC's database do not include, as defaults, loans considered "doubtful." Because "doubtful" loans have not necessarily committed actual payment defaults, they may be expected to be less severe and therefore to enjoy greater recoveries on average. Additionally, our selection criteria assured that the recoveries we estimated from the LPC database are based only upon the experience of senior secured loans while E&A's data may include senior secured, subordinated and unsecured loans. This is consistent with the fact that the distribution of our recovery estimates derived from the LPC data does not include the large mass of near-zero recovery loans that E&A's dataset does, but does share the large mass of nearly zero losses. Finally, the E&A data is conditioned upon Citibank's lending culture and covers a 23-year period. LPC's data is drawn from a large and more diverse sample of lending institutions and is drawn primarily from the post-1990 period.

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## **Conclusion**

Moody's believes that access to analysis and information relating to the credit aspects of bank loans is critical to the continued growth of the secondary market for such loans. This study begins to address loan investors' needs for more complete understanding of the recovery characteristics of defaulted bank loans.

Moody's results of the first two sections were derived from two distinct datasets; one consisting of secondary market prices and the other based on post-default loan cash flows. The empirical recovery rate data generated by the secondary market prices are more representative of the recovery characteristics of syndicated loans. These data generate an average recovery rate estimate of 71% and a median estimate of 77%. The recovery rate estimates generated by the sample taken from Loan Pricing Corporation's post-default payment data, the majority of which are non-syndicated loans, generate an average recovery rate estimate of 79% and a median estimate of 92%. Differences between these estimates and those of the previous section are attributable to differing methodologies and samples.

The recovery rate for defaulted bank loans can be expected to be higher than for defaulted unsecured long-term public debt issues. After controlling for the individual circumstances of default, the seniority and security of bank loans generates an average recovery rate that is 13% of par greater than the recovery rate for senior unsecured bonds and 37% of par greater than the recovery rate for subordinated bonds. The higher recovery rates of loans relative to senior unsecured and subordinated debt obligations are on average captured in higher credit ratings.

Both datasets reveal a high degree of dispersion in the recovery rate estimates. Such dispersion is attributable in great part to variations in the quality of the security behind these loans. It demonstrates the inappropriateness of simple rules for analyzing the credit risks associated with any particular loan (e.g., that a loan's credit risk is accurately reflected by the Moody's credit rating that is one notch higher than the rating on the firms senior unsecured debt). Because of the significant variation in the quality of the security behind loans, Moody's concentrates a great deal of attention to the security behind a bank credit facility in assigning a credit rating.





