Moody's Investors Service
Global Credit Research

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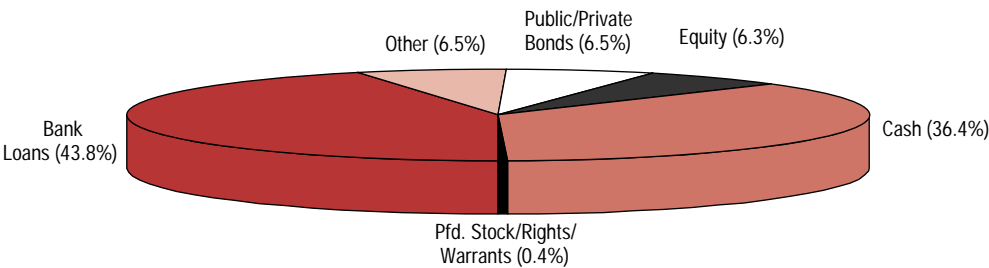| Contact	Phone
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Bankrupt Bank Loan Recoveries

Summary

In more than 50% of all cases, Moody's rates companies' bank loans higher than the bonds it rates for the same issuer. This "rating spread" indicates, in part, our opinion that the loans will be worth more in the event of a default, than the bonds. In our earlier study of bank loan recoveries (Defaulted Bank Loan Recoveries, Moody's Special Report, Nov. 1996), we measured the dispersion of recovery estimates for defaulted bank loans by looking at both secondary market pricing and actual cash flows to the defaulted debts. This study extends and updates our previous research by considering the nature, timing, and value of actual payouts to a sample of 200 bankrupt bank loan claims. The results obtained from this new dataset are then compared with recovery estimates based on market pricing. Briefly, the study finds that:

- 80.2% of the total value recovered from 200 bankrupt bank loans derives from additional bank loans or cash. Another 19.4% is divided amongst bond debt, equity, and other payments. Just 0.4% takes the form of preferred stock, rights, or warrants.

- The average length of time to bankruptcy resolution is 1 year and 3 months. This varies considerably with the type of filing. Prepackaged Chapter 11's average just 3 months, while regular Chapter 11's take 18 months on average to complete.

- Senior secured bank loans eventually recover 87% of their value on average after bankruptcy. This number falls to 79% for senior unsecured loans. However, the dispersion in recovery rates is high, generating significant uncertainty of the value of any particular loan.

- Average recovery rates vary by bankruptcy and collateral type with prepackaged Chapter 11s and accounts receivable/cash/inventory collateral being associated with greater recovery. Regular Chapter 11s and collateral in the form of subsidiaries' stock are associated with lower recovery.

- An update to Moody's previous research on recoveries for defaulted bank loans based on market pricing indicates an average post-default loan price of $70 per $100 defaulted par amount.

- There is a significant difference between the recovery rates estimated on the basis of actual bankruptcy resolution payouts and those implied by market pricing. The difference between these two is largely attributable to the high risk premium demanded by the bankrupt debt market in response to uncertainty over the payment prospects of these instruments.

Instrument Use in Bankrupt Bank Loan Resolution
($1,873 Billion=100%)

Other (6.5%) · Public/Private Bonds (6.5%) · Equity (6.3%) · Cash (36.4%) · Pfd. Stock/Rights/Warrants (0.4%) · Bank Loans (43.8%)

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Introduction

Moody's began rating bank credit facilities in 1995, when several years of rapid development in the syndicated bank loan market generated a critical mass of interest in the credit characteristics of these instruments. Moody's rating coverage has continued to grow along with origination volumes. Since 1995, when Moody's rated US$86.3 billion par amount of loans from 322 facilities, our annual new rating activity expanded to US$313 billion par amount and 770 facilities in 1997 (see **Exhibit 1**).

Banks' desires to manage their loan portfolios more actively has, in part, spurred the market's growth and secondary market trading volumes, which are up from under $10 billion in 1991 to over $60 billion in 1997, according to Garman and Fridson (1998). Additionally, investors have come to recognize bank loans as a separate asset class with their own set of return correlations and their own place within many asset diversification schemes.[1]

Exhibit 1

Number & Par Value of Moody's-Rated Bank Credit Ratings

*Through March 1998

Moody's ratings incorporate assessments of both the likelihood and the severity of default. While the likelihood of a default is roughly the same[2] for various debt obligations of the same obligor, these obligations are readily differentiated by the severity of the loss from a default. For this reason, when rating bank credit facilities, Moody's pays close attention to the collateral and seniority of the instrument. These are two of the most important determinants of the post-default recovery that bank loan investors may realize.

Collateral and seniority can also make the ultimate recovery for bank loan investors significantly different from the recovery bondholders would realize. Where Moody's believes that the seniority and security of a loan is enough for a significantly greater recovery than bondholders would realize, the reduced credit risk of the bank loan is reflected in a higher rating.

Exhibit 2 displays the frequency of ratings spreads - measured in alpha-numeric rating notches - between 1,341 bank loan tranches and senior unsecured bonds of the same obligor as of the bank loans' initial rating dates. In just over half of the cases, the bank credit facility rating is one or more notches higher than the senior unsecured bond rating, indicating Moody's opinion that the loan's seniority and collateral afford superior protection. However, in nearly half of the cases, the bank loan carries the same Moody's rating as the firm's senior

Exhibit 2

Bank Loan Senior Unsecured Bond Rating Spreads
(As of initial bank loan rating date)

*A negative integer indicates a higher bank loan rating

unsecured debt. In these situations, Moody's believes that any post-default advantage that the loan may enjoy would be of so little economic consequence as to be essentially indistinguishable from senior unsecured debt in terms of credit risk.

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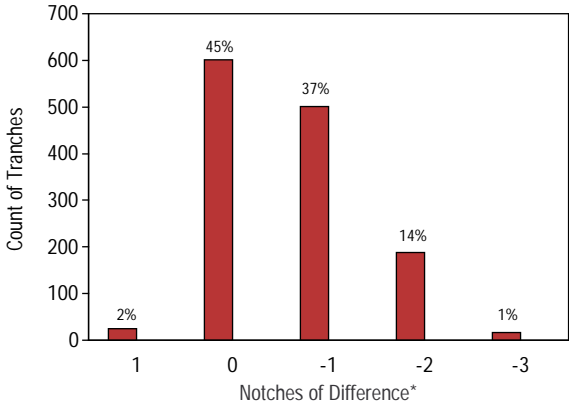
[1] The research of Marker and Rapoport (1996) and Asarnow (1996) for examples, finds a favorable historical risk/reward characteristic for corporate loans and a distinct return correlation profiel with several other major US asset classes. Furthermore, Garman and fridson (1998) documents the uniqueness of the leveraged loan asset class in terms of its return with other major indices.

[2] The nature of the debt obligation may affect the likelihood of default. For example, a bank loan may have a more restrictive set of covenants that allows the lending bank to intervene in the company's affairs at an earlier stage of developing credit risk than the indenture of a public bond issue would allow. The early warning may grant the banks flexibility enough to take default risk mitigating actions such as shoring up its collateral position or reducing exposure. Furthermore, because of collective action problems, restructurings of this sort may be more easily accomplished with a small grou of bank lenders than with a large and fractious group of public bondholders.

The dispersion among the ratings differences reflects Moody's opinion on the incremental protections the various bank loans provide against credit loss; bank loans can not all be expected to experience the same loss in the event of default. This report, and other research (e.g., Asarnow and Edwards, 1995, Carty and Leiberman, 1996, Eales and Bosworth, 1998), documents a dispersion in the actual values and types of payouts that investors in defaulted and bankrupt bank loans have received, lending empirical support to this rating pattern.

Since Moody's began rating bank credit facilities in 1995, we have been accruing a history of rated bank loan defaults that will eventually allow us to calculate meaningful default and loss rates for the syndicated loan market. To date, nine companies had Moody's-rated bank loans outstanding when they defaulted on bonds. All had speculative-grade ratings when they were first rated and when they defaulted. **Exhibit 3** details the defaults and the bank loans involved.

Exhibit 3
Moody's-Rated Bank Loans Involved in Bond Defaults Since 1995

Defaulter	Bond Default Date	Bank Loan	Amount ($Mil)	Initial Rating	Rating @ Default
A.P.S., Inc.	01/13/1998	Gtd. Sr. Sec. Revolving Credit Facility	$235.00	NR*	B2
	01/13/1998	Gtd. Sr. Sec. Term Loan Facility	$65.00	NR*	B2
Alliance Entertainment Corp.	07/14/1997	Gtd. Sr. Secured Term Loan	$27.50	Ba3	Caa
	07/14/1997	Gtd. Sr. Secured Term Loan	$22.50	Ba3	Caa
Bruno's, Inc.	02/02/1998	Tranche B Term Loans	$200.00	B1	B3
	02/02/1998	Revolving Credit Facility	$200.00	B1	B3
	02/02/1998	Tranche A Term Loans	$150.00	B1	B3
County Seat Stores Inc.	10/01/1996	Gtd. Sr. Sec. Revolving Credit Facility	$135.00	B1	Caa
Harvard Industries, Inc.	05/08/1997	Gtd. Sr. Sec. Term Loan	$30.00	B3	B3
	05/08/1997	Gtd. Sr. Sec. Revolving Credit Facility	$90.00	B3	B3
Levitz Furniture Corp.	09/05/1997	Gtd. Sr. Sec. Senior Note Repurchase Facility	$45.00	NR*	B3
	09/05/1997	Gtd. Sr. Sec. Term Loan	$75.00	NR*	B3
	09/05/1997	Gtd. Sr. Sec. Revolving Credit Facility	$40.00	NR*	B3
Marvel Entertainment Group, Inc.	12/27/1996	Senior Secured Revolving Credit Facility	$145.00	Caa	Caa
	12/27/1996	Senior Secured Term Loan	$350.00	Caa	Caa
MobileMedia Communications, Inc.	11/01/1996	Sr. Sec. Tranche B Term Loans	$200.00	B1	Caa
	11/01/1996	Sr. Sec. Tranche D Term Loans	$300.00	B1	Caa
	11/01/1996	Sr. Sec. Revolving Credit Facility	$200.00	B1	Caa
	11/01/1996	Sr. Sec. Term Loan A	$600.00	B1	Caa
Payless Cashways, Inc.	07/21/1997	Senior Secured Term Loan B	$100.00	B1	B2
	07/21/1997	Senior Secured Revolving Credit Facility A	$60.00	Ba3	B1
	07/21/1997	Senior Secured Revolving Credit Facility B	$135.00	B1	B2
	07/21/1997	Senior Secured Term Loan A	$173.00	B1	B2

*NR = Not Rated

Moody's published its first analysis of defaulted bank loan recoveries in November, 1996 (Carty and Lieberman, 1996) in the belief that analysis and information relating to the credit aspects of bank loans would be critical to the development of the secondary loan market. This update refers to new and unique data on the nature, value, and timing of actual payouts to bank credit facility claimants in resolutions to a sample of Chapter 11s. The results should be of interest to market participants interested in pricing the credit risk in bank loans, managing the credit risks of bond loan portfolios, and understanding the timing, nature and value of bankrupt bank loan workouts.

The next section of this report describes the methodology, data, and results Moody's used to estimate recovery rates for the original loan contracts. It also explores those recovery rates as they vary across bankruptcy and collateral types. The section after that relates these results to the results obtained in previous Moody's research (Carty and Lieberman 1996), which explored recovery rates on the basis of market pricing. The final section concludes this report.

Recovery Rates

METHODOLOGY

Moody's past studies of defaulted loan, bond and preferred stock recoveries have considered market valuations for these instruments as recovery proxies (Carty 1994, Carty and Lieberman 1996, Keenan, Carty, and Shtogrin 1998, and Keenan, Carty, Shtogrin, and Fons 1998). The recovery rates calculated in those reports are the ratios of the post-default instrument values to their par amounts.

Using market valuations in this way has several benefits. First, this use captures realized recoveries in cases where debtholders sold immediately after the default. Second, it permits market participants to estimate recovery rates particular to their own circumstances. As an example of this second point, consider the following. Moody's has published recovery rates as the ratio of an instrument's post-default market value to its par value. This calculation would likely underestimate recoveries likely to be realized for investors purchasing distressed debt at a discount. The recovery rate these investors need might then be calculated – based on the price-based recovery data – as the ratio of the defaulted instrument's expected market price and its purchase price. Finally, the use of market pricing to estimate recoveries has the advantage of being practically implementable.

However, relying on market valuations as recovery indicators does not allow us to describe the timing, value, and nature of debtholders' actual recoveries. Furthermore, our confidence in these prices as indicators of the eventual recovery relies on the efficiency of the market in which they are traded. Several researchers (Eberhart and Sweeney (1992), Altman and Eberhart (1994), Warner (1977)) have found general, although sometimes qualified, support for the hypothesis that the bond market prices defaulted bonds efficiently. To our knowledge, there is no similar research on the market for bankrupt loans, and the question of its efficiency is still unexplored. This research complements Moody's prior research on defaulted bank loan recoveries by examining in detail the actual payouts to a sample of bankrupt loans.

The difficulties associated with this approach are significant. Bankruptcy resolutions often satisfy creditor claims with a variety of debt, equity, and derivative instruments, many of which have no active secondary market in which the payments' true values can be determined. Because the payment amount, type, and maturity of bankruptcy claims is uncertain, accurate modeling of the instruments' value is also difficult. Additionally, many bankruptcies require a significant amount of time to resolve. Consequently, the time value of money can enter as a significant determinant of economic recoveries. However, these difficulties do not neutralize the value of research, and the need persists for a more complete understanding of the bankruptcy resolution process and its effects on corporate debt instruments.

The first section of this report concerns the estimation of the rate of recovery actually experienced by a sample of credit agreements. It analyzes the present value (as of the date of bankruptcy) of actual payouts associated with the bankruptcy's resolution. The recovery rate in this section is defined as the present value of payouts presented as a fraction of the principal and interest due as of the date of filing. The three primary components required to calculate these recovery rates are: 1) prepetition par value and accrued interest, 2) the value, nature and timing of any distribution returned to the creditor, and 3) the discount rate to apply to each distribution.

Prepetition par value and accrued interest. In researching the first component, we consulted a number of sources. These include reorganization plan summaries, Moody's proprietary documents taken from our library of financial reports, press releases, press clippings, internal memoranda and our proprietary database of defaults and bankruptcies. We also examined Securities and Exchange Commission documents.

Value, nature and timing of distributions. The second component can be obtained only more subjectively because actual prices for many resolution payments are not available. Payments awarded to each creditor class varied widely across reorganizations and included such financial instruments as cash, debt, equity, derivatives, and enhancements to the terms of any surviving liability. Moody's was able to document the nature and timing of a majority of these instruments, but valuing them required additional subjective analysis. Moody's used a number of approaches to value these items as consistently as possible across each bankruptcy resolution in our sample.

Moody's preferred approach to valuing resolution distributions was to rely on market pricing after the bankruptcy's resolution. Our primary sources for obtaining equity, preferred, warrant, and debt prices were Bloomberg, IDC, Citibank, Goldman Sachs, BDS Securities, Lehman Brothers, Merrill Lynch, Loan Pricing Corporation, the borrower's financial statements, and the libraries of certain domestic stock exchanges. When possible, Moody's took prices as of the borrower's exit date from bankruptcy. However, when a quote was not available immediately after the borrower had exited bankruptcy, Moody's discounted the price of the new security by the total return of an applicable market benchmark.

In cases where reliable pricing was not available, Moody's used a discounted cash flow approach to value certain distributions. Moody's recognizes the limitations of this approach and used it only to value new or amended debt instruments. To derive the discount rate, we used an historical Moody's rating or an estimated rating (based on a Moody's analyst's opinion of the reorganized borrower's credit quality) on the new or amended security. The discount rate was the median yield for similarly rated debt instruments in the market at the time.

In certain cases, Moody's valued some payments based on appraisals by Moody's analysts and independent, qualified agents. Moody's acknowledges the subjectivity and limitations of this technique and the potential effects on the study. However, we believe that our expertise in securities analysis and the bankruptcy process limits any distortions introduced and enables us to conduct a meaningful study of loan recoveries.

Discount rate. The third component, the discount rate, is defined in relation to the terms of the original credit agreement. Hence, the discount rate applied to any loan workout is the contractual lending rate. In many cases, we were able to determine this rate precisely. In others, we used estimates drawn from analyses of the credit environment and similarly structured instruments.[3]

DATA

This report is based on a dataset of 200 bank loans involved with the bankruptcies of 119 large, public borrowers. Most of these borrowers filed for regular Chapter 11 protection, and a significant portion of those (29%) filed prepackaged Chapter 11s. The earliest bankruptcy in this sample is LTV Corporation's July 17, 1986 Chapter 11 filing. The most recent is Payless Cashways, Inc.'s July 21, 1997 Chapter 11. The bankruptcies analyzed in this report cover the second half of the 1980s, the recession of the early 1990s (and the coincident junk bond market crash) as well as the boom years since. Exhibit 4 shows that bankruptcies were most frequent in the early 1990s.

Exhibit 4
Bankruptcies by Year, 1996-1997
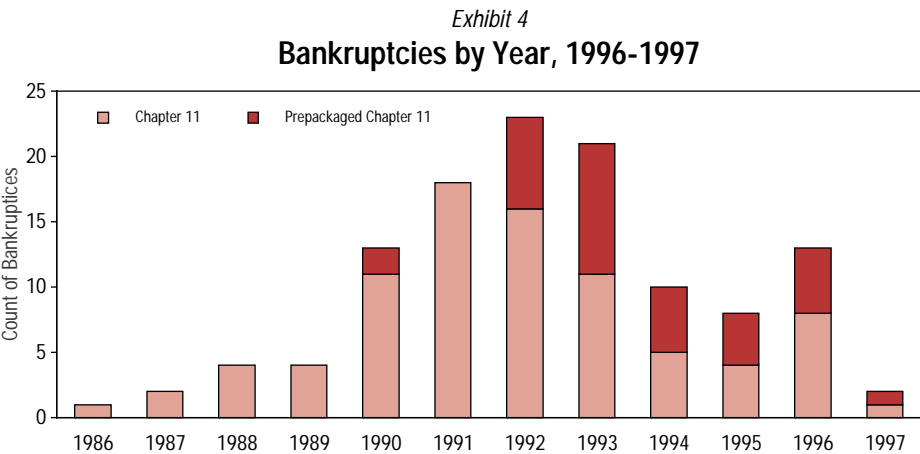
Exhibit 4 also highlights the increased relative popularity of prepackaged Chapter 11s since the early 1990s. This pattern is consistent with the observations of Chatterjee, Dhillon, and Ramirez (1995 & 1996), who wrote that in the early 1990s, prepackaged bankruptcies solved the problem of choosing between a formal Chapter 11 proceeding and an informal workout. Chapter 11 has the benefits of

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[3] The sensitivity of our results to the discount rates applied is small. For example, grossing them up by 10% leads to 0.1% and 0.8% changes in our average recovery rates estimates for senior secured and senior unsecured loans respectively. While using discount rate estimates introduces some error, we believe it to be small relative to the overall dispersion in the distribution of recovery rates.

protecting debtors from creditors but is expensive. Informal workouts, while less costly, are marred by collective action problems.[4] The 1990 Revenue Reconciliation Act made them even less attractive by making income realized from debt forgiveness taxable. Prepackaged bankruptcies take advantage of the Chapter 11 process to mitigate the holdout problem and of pre-filing negotiations to speed the process to completion, thus limiting costs.

Exhibit 5 details the industrial cross-section of the firms in the sample. Industrials, retailers and consumer products companies accounted for 58%. No other single industry accounted for more than 7% of the sample. This pattern is roughly consistent with Moody's database of bond defaults in the same period.

Exhibit 5
Bankruptices by Industry
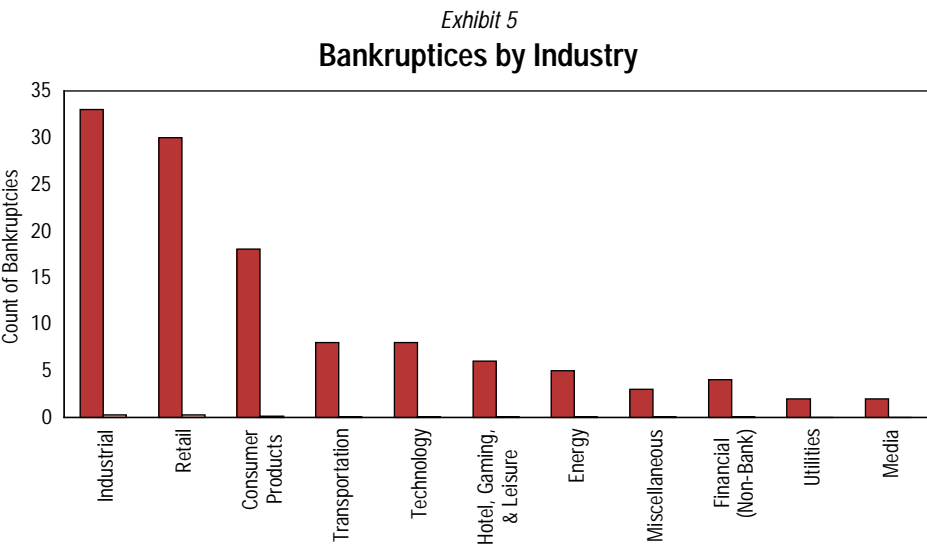
THE LENGTH OF TIME SPENT IN BANKRUPTCY

The length of time that a bankruptcy takes to resolve is a critical aspect of recovery. The longer the recovery, the greater the cost to unsecured debtholders whose claims to interest do not typically accrue during the course of a workout. Even secured debtholders are not always paid interest, although it may accrue during the course of the bankruptcy's resolution. Hence, even if the debtholders are confident that their claim will be satisfied, the uncertain timing of settlement may limit the appeal of bankrupt debt to many investors - especially those seeking current income. Consequently, investors require a compensatory liquidity premium.

Exhibit 6 describes the overall distribution of the lengths of time spent in bankruptcy and breaks them out by bankruptcy type. Overall, the shortest time to resolution of the bankruptcies in the sample is a little over one month for the prepackaged Chapter 11 of Memorex Telex Corporation. The maximum is almost 7 years for LTV Corporation and the average is about one year and 3 months. The distribution of time to recovery, however, varies in the expected way with the bankruptcy type. Prepackaged bankruptcies require less time on average to resolve, about 2.2 months, compared to 1.6 years on average for regular Chapter 11 filings - almost 8 times longer. Furthermore, the distribution of times to resolution varies more widely for Chapter 11 filings than for Prepackaged Chapter 11s. The longest time any of the borrowers that filed for a prepackaged Chapter 11 spent in bankruptcy is six months, compared to almost seven years for Chapter 11 filers. Furthermore, the dispersion of the distribution as measured by the standard deviation is much greater for Chapter 11s.

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[4] For example, in a workout involving a tender, tendering bondholders bear the cost of selling their bonds at a discount while non-tendering bondholders, enjoy the benefits of the restructuring through higher prices for their bonds.

Exhibit 6 Descriptive Statistics for the Length of Time Spent in Bankruptcy						
Bankruptcy Type	**Count**	**Average (yrs.)**	**Median (yrs.)**	**Minimum (yrs.)**	**Maximum (yrs.)**	**Standard Deviation (yrs.)**
Chapter 11	85	1.62	1.43	0.15	6.95	1.13
Prepackaged Chapter 11	34	0.21	0.17	0.10	0.49	0.10
All	119	1.22	0.94	0.10	6.95	1.15

The average of the lengths of times to resolution may overstate the amount of time one can expect a typical filing to take to resolve. This is because the distribution of times to resolution is necessarily truncated at zero. The median is a more reliable measure of the center of similarly skewed distributions' centers. In each case shown in **Exhibit 6**, the median length of time to resolution is less than the average reflecting this fact.

THE NATURE OF TYPICAL BANKRUPTCY RESOLUTIONS

Almost by definition, a bankruptcy resolution requires the relaxation of the current financial commitments of the firm.[5] The financial reorganization typically requires extending debt maturity, eliminating, diminishing, deferring, or otherwise modifying interest payable (e.g., making pay-in-kind); and diminishing the principal or replacing the claim with contracts that place less strain on the firm's short-term contractual cash flow (e.g., preferred stock, equity, warrants, right, options, or other derivative instruments).

The pie chart on the front page of this report summarizes how often the claims of bankrupt bank loans are satisfied with various types of financial instruments. To make the pie chart, we sorted by instrument type all of the recoveries earned on each of the 200 bank loans in this study by instrument type. For example, 43.8% of the recovery on all 200 loans took the form of bank loans. New loans typically have terms that reduce the strain on the current cash flow of the borrowing firm (such as extended maturities or reduced interest rates), but new loans may also enjoy an enhanced collateral position. Bank loans and cash together account for 80.2% of the total recovery analyzed in this report. Long-term public and private debt account for another 6.5%. "Other" also accounts for 6.5% and is composed of various types of assets, including collateral or income generated by legal settlements. Equity makes up another 6.3%, leaving preferred stock, rights, and warrants to make up the remaining 0.4%.

BANKRUPT BANK LOAN RECOVERY RATE DISTRIBUTION

Exhibits 7 and **8** display the average estimated recovery rates for senior secured and senior unsecured bankrupt bank loans. **Exhibit 9** provides more detail on the distribution of the recovery rates. The additional protection afforded by security shows up here as a higher average recovery—87%—for 178 senior secured bank loans. For senior unsecured bank loans, the average recovery falls to 79%.

However, the average recovery is only one measure of what could be considered the most "typical value" that would be realized for a bankrupt bank loan. The distributions of recoveries are skewed towards the high end of the scale. This indicates that while the average recovery of senior secured bank loans is 87%, more than half are greater. The median recovery rate, 100%, is a more robust measure of the center of an asymmetric distribution. It indicates that a loan drawn at random from this sample would yield a recovery of at least 100% half of the time.

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[5] Exceptions could occur in cases where firms strategically file for court protection though financially solvent (e.g. Johns Manville).

Exhibit 7
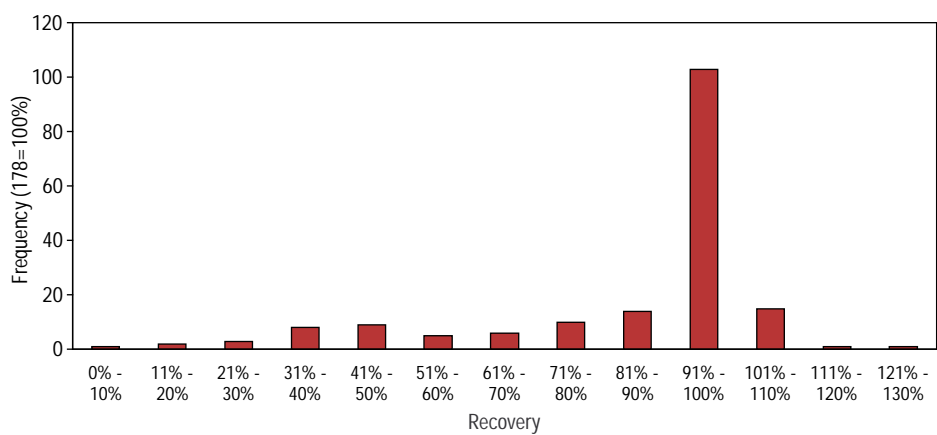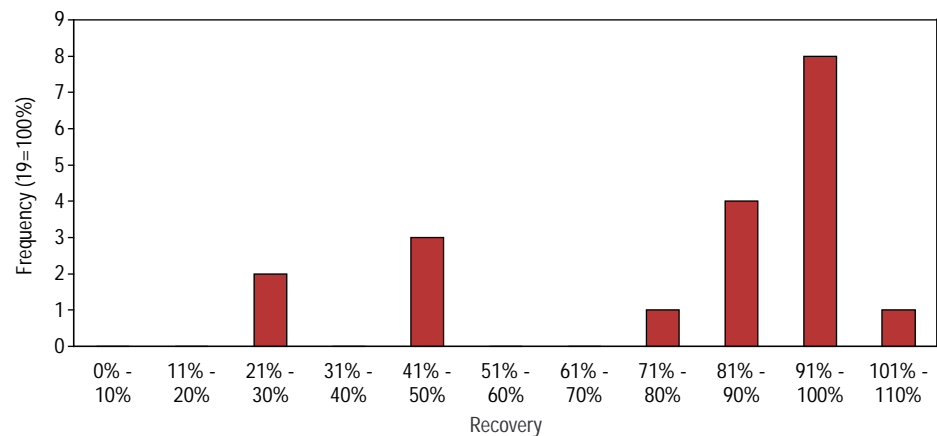**Bank Loan Recovery Rate Distribution—Senior Secured Bank Loans**

Exhibit 8
**Bank Loan Recovery Rate Distribution—
Senior Unsecured Bank Loans**

The tremendous dispersions of the recovery rate distributions are an important characteristic. Lenders to the supermarket Almac's, which filed for creditor protection in August 1993, recovered 7.4%, the lowest recovery calculated for senior claims. The greatest is well over 100%. One of the most common measures of dispersion is standard deviation, which is 23% for senior secured loans and 27% for senior unsecured loans. The size of these standard deviations means that a loan may well see a recovery rate much greater or much lower than the average.

While somewhat useful, confidence intervals derived from averages and standard deviations can be misleading when they're applied to small samples from skewed distributions. An alternative is to consider a band into which approximately 90% of the observations actually fall. In Moody's sample of 178 senior secured recovery rates, 160 (90%) fell between the tenth lowest recovery rate, 36%, and the tenth highest recovery rate, 100%. This distribution-free methodology shows that recovery rates of less than 36% and greater than 100% are relatively rare. While actual recoveries on senior secured bank debt are high, both on average and relative to public bonds, uncertainty over actual value is tremendous. Even though the median recovery value is 100% of principal and interest due on senior secured bank loans, recoveries as low as 36% are not uncommon.

Exhibit 9
Senior Bank Loan Recovery Rates

Bank Loan Type	Count	Average	Median	Minimum	Maximum	Std. Dev.
Secured:						
Chapter 11	131	84.5%	100.0%	7.4%	128.7%	24.5%
Prepackaged Ch 11	47	92.9%	100.0%	16.4%	103.5%	15.7%
All Secured	178	86.7%	100.0%	7.4%	128.7%	22.8%
Unsecured:						
Chapter 11	18	78.2%	89.2%	23.6%	100.4%	26.9%
Prepackaged Ch 11	1	100.0%	100.0%	100.0%	100.0%	NA
All Unsecured	19	79.4%	90.0%	23.6%	100.4%	26.6%

Exhibit 9 breaks out recoveries more descriptively by Chapter 11 and prepackaged Chapter 11. For both the senior secured and senior unsecured bank loans, the average recovery rate is higher for prepackaged Chapter 11s than for Chapter 11s, and the median recovery rate is at least as large. Moreover, the sample of prepackaged Chapter 11s for the senior secured bank loans is big enough for Moody's to calculate the sample standard deviation: 16%. This is lower than for senior secured Chapter 11s, and it indicates that senior secured bank loan holders face less risk if a prepackaged Chapter 11 is filed. This pattern is apparent in part because the senior and secured position of these lenders protects them relatively more in the event of a Chapter 11 filing. If creditors were faced with a prepackaged Chapter 11 that did hurt senior secured bank lenders more than a regular Chapter 11 could be expected to, the bank creditors would opt for a regular Chapter 11 filing over the prepack. Hence, there is a bias towards prepacks that benefit senior secured bank lenders.

THE VALUE OF COLLATERAL

A previous Moody's Special Report (Stumpp, Marshella, Mulvaney, and Hilderman, 1997) addressed Moody's general approach to assessing various types of collateral securing bank credit facilities. The report stressed Moody's belief that not all collateral gives equal security. Our new data supports that conclusion. We determined and broadly classified the supporting collateral for 136 of our bankrupt senior secured bank loans, which in turn permitted us to estimate average recovery rates segmented by collateral type. **Exhibit 10** presents those results.

Exhibit 10
Average Senior Secured Bank Credit Facility Recovery Rates by Collateral Type

Security Type	Sample Size	Average Recovery Rate	Recovery Rate Standard Deviation
Stock of Subs.	31	73.55%	30.95%
Prop., Plant, & Equip	36	85.43%	23.44%
Substantially. All Assets	45	88.78%	18.19%
Accounts Rec./Cash/Inventory	24	89.77%	20.67%

The results are consistent with intuition and Moody's opinion that not all collateral gives equal security. The most liquid collateral – accounts receivable, cash and inventory – produces the highest average recovery rate. The stock of subsidiaries is the collateral associated with the lowest average recovery rate.

Stock pledges offer limited benefits because pledged stock is illiquid and often adversely affected by the bankruptcy filing. Furthermore, the lender's claim is secured only to the extent of the equity value of the entity that has pledged its stock. The subsidiaries of a parent filing for bankruptcy are likely to be insolvent or underperforming. It may surprise some readers that the stock of subsidiaries generate an average recovery rate as high as 74%. Keep in mind two factors when interpreting these statistics: 1) Most of this sample was formed during a bull market in equities, and the stock of subsidiaries may have been more valuable then than it would be under more typical equity market scenarios. 2) There is tremendous uncertainty surrounding the average value as measured by the sample standard deviation.

Interestingly, the dispersion of the recovery rates – measured here by their standard deviation – tends to fall as average recovery rates rise. This pattern suggests that as the expected recovery rate of a loan falls, the loan's risk increases. Conversely, to the extent that all loans will behave like those in this sample, loans backed by accounts receivable, cash or inventory will have a greater recovery rate than loans backed by the stock of subsidiaries, and recovery will be more certain.

RECOVERY RATE ESTIMATES BASED ON SECONDARY MARKET PRICING

To estimate recovery rates on bank loans involved in bond defaults and bankruptcies, Moody's 1996 study of bank loan recovery rates (Carty & Lieberman, 1996) focused on secondary market pricing. We used the trading price of the defaulted instrument as a proxy for the present value of the ultimate recovery. We collected from several sources prices for 58 of the senior secured loans that were involved in bankruptcies between 1989 and 1996 or were outstanding when a bond by the same obligor defaulted. We considered the price of each defaulted issue approximately one month after default.

The average and median defaulted bank loan prices from that sample were $71 and $77 respectively. Since 1996, we collected additional price and default data and conducted a similar analysis on a larger dataset of 98 loan prices. The distribution of these prices is presented in **Exhibit 11**.

Exhibit 11
Defaulted Senior Secured Bank Loan Price Distribution
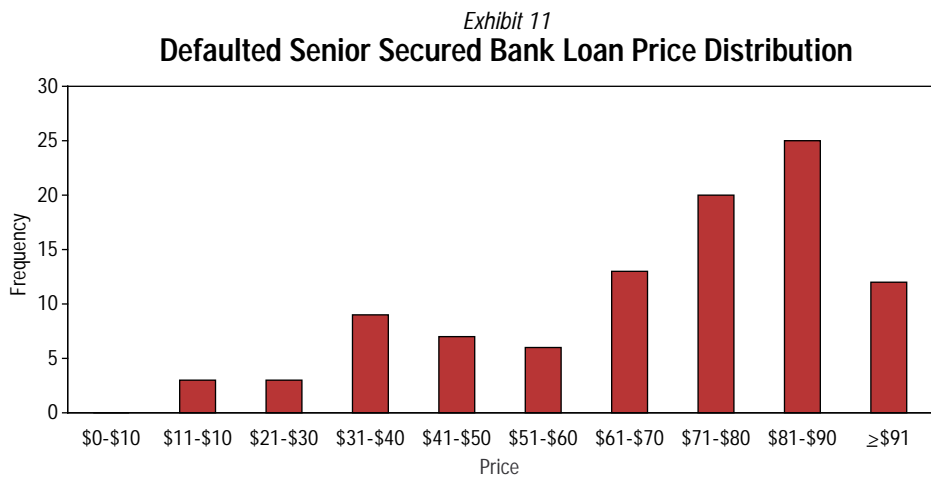
The increase in sample size did not significantly change the shape of the distribution. The average value fells slightly, from $71 in the 1996 report to $70. However, given the tremendous dispersion in this distribution (the standard deviation remains at $21) this difference cannot be considered statistically meaningful. The median also dropped from $77 to $75.

The broad dispersion of recovery rates indicates that bankrupt bank loans are quite risky. While the average recovery rates for bank loans (both senior secured and senior unsecured) will probably be higher than for senior secured or unsecured bonds, that recovery may well deviate from the mean recovery rate. This risk is likely priced into the market for bankrupt bank loans, and while the median recovery rate for bankrupt bank loans is 100%, market pricing will likely value the loans at less.

RECOVERY RATES RELATIVE TO ORIGINAL CONTRACT TERMS AND POST-BANKRUPTCY LOAN PRICING

This section concerns the relationship between the average recovery rate associated with credit agreements as measured by discounting actual recoveries by the interest rate specified in the original contract and the market's valuation of the bankrupt loan claim as explored in previous Moody's research (Carty & Lieberman, 1996). The recovery rate based on actual payouts discussed above is defined in relation to the original credit agreement terms and the interest rate associated with that contract. It is influenced by, among other things, the market's perception of the credit risk associated with that contract at the time it is formed. Once a bankruptcy has occurred, however, the nature of the instrument changes fundamentally. The risk, as measured by the dispersion in value and timing of recovery, is significant. Consequently, the risk premium commanded by the market may also change.

To understand the relationship between the recovery rates described earlier in this study and those obtained by considering market valuations, we must first construct comparable samples. If we consider only post-bankruptcy loan pricing on senior secured loans the pricing sample examined immediately above falls to 72 loans. Even though non-bankruptcy defaults are excluded, neither the average nor the standard deviation of the prices changes significantly. Descriptive statistics for this sample are listed in **Exhibit 12**.

Exhibit 12					
Bankrupt Senior Secured Bank Loan Price Descriptive Statistics					
Count	Average	Median	Minimum	Maximum	Standard Deviation
72	$72.80	$79.75	$15.00	$98.00	$20.97

The average bankrupt loan price, 73% of par, falls short of the average recovery rate of 87% calculated above. The difference is largely attributable to the considerable risk premium the market demands for bankrupt debt. Bankrupt bank loan prices reflect supply and demand conditions, which in turn vary with expectations of timing and value of future cash flows. Market participants take into account risk factors, such as poor liquidity, regulation-induced price distortions, uncertain payouts in timing and value, and many others.

Previous Moody's research has documented that bankrupt bonds have generated relatively high average returns (Hamilton & Carty, 1998). Since January 1991, average monthly returns for bankrupt bonds have been 1.6%—greater than the 1.5% associated with the S&P 500 stock index. However, high volatility of returns is associated with this high average return. Over the same time period, the standard deviation of monthly returns to bankrupt bonds has been 3.6%, compared to 3.2% for the S&P 500 stock index. **Exhibit 13** illustrates the risk/reward tradeoff for various asset classes. Among other things, this chart shows the bankrupt bonds' greater risk relative to performing corporate bonds (represented by Merrill Lynch's High Yield Master II and Corporate Master indexes).

Exhibit 13
Historical Risk/Return Relationships[6]
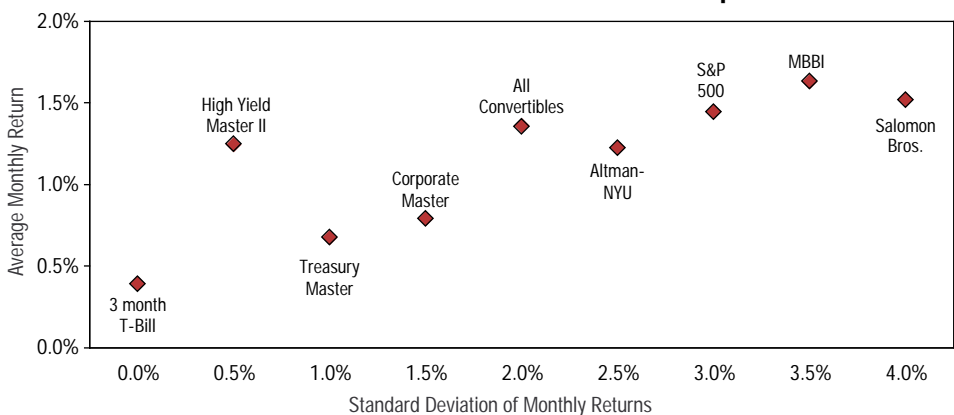
There are some data on the returns associated with defaulted bank loans. In addition to Moody's defaulted public bond index, Professor Altman, in conjunction with New York University's Salomon Center, has compiled an index of returns to defaulted bank loans since 1996. From January 1996 through March 1998, defaulted bank loans have returned an average of 1.4% per month to investors. There was considerable volatility in their performance as measured by the return standard deviation, 1.5%. This compares to the Altman-NYU defaulted bond return index figures of 0.8% and 0.7% respectively.

The discussion above highlights the high risk associated with defaulted public debt and loan instruments. It is reasonable then to expect that these instruments command significant risk premia over and above those priced into the originally performing loans.

In this section, assume that the return distribution of bankrupt loans is similar to that of defaulted public debt. Further, assume that long-run return expectations are matched by long-run returns. Then apply the same discount rate of 17.4%, which is equal to the long-run average return to defaulted public bonds, to all of the bankrupt bank loans in the sample and re-estimate average recovery rates. This approach has

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[6] "High Yield Master II" is Merrill Lynch's index of total returns to a broad selection of high of high yield bonds. "Corporate Master" is Merrill Lunch's index of total returns for a broad selection of corporate investment grade bonds. "treasury Master" is Merrill Lynch's index of total returns for a broad selection of treasury bonds. "Altman-NYU" represents the returns associated with the Altman-NYU return index for defaulted bonds. "Salomon Bros." represents the returns associated with the Solomon Brother return index for defaulted bonds.

limitations but still can yield valuable insights. In any case, although the assumption of one interest rate will produce errors, they are probably small compared to errors that an attempt to derive discount factors from more sophisticated market models would produce, given the limited data available.

This approach produces average recovery rates of about 79% for senior secured bankrupt bank loans, higher than the average bankrupt senior secured loan price of $73. While the difference between these two measures of recovery—about 8% of the average recovery rate estimate – is economically important, the difference may not be statistically significant. Given the large dispersion in both of the underlying distributions, as indicated by their respective standard deviations, the difference between these two values must be considered small in a statistical sense.

Conclusion

Since Moody's began rating bank credit facilities, it has made sharp rating distinctions – in the form of rating notch differentials with public bond debt - on the basis of the additional protections that bank credit facility structure, seniority and collateral afford investors. This research supports Moody's practice of making rating distinctions. Moody's analyzed a sample of 200 bankrupt bank loans for the timing, value, and nature of their payouts in bankruptcy resolution. The sample includes Chapter 11 and prepackaged Chapter 11s for large public companies from the late 1980s through the present.

The recovery rate for senior secured bank loans estimated here is significantly higher—87%—than recovery rates estimated previously for loans or bonds. The higher recovery rate reflects the risk-mitigating features of many bank credit facilities: collateral, seniority and structure. Further, the recovery rate was found to vary with both types of bankruptcy (Chapter 11 and prepackaged Chapter 11) and the type and presence of collateral.

The overall average recovery estimate differs from previous recovery estimates largely because of different methodologies. Previous Moody's research concentrated on market pricing. That methodology has certain advantages (practicality, portability and it measures recoveries precisely for investors liquidating a position shortly after bankruptcy). However, because the risk of bankrupt loan claims is fundamentally different from – and probably higher than – performing loans, market valuations reflect substantial risk premia. When similar risk premia are used in this analysis, average recovery calculations are much closer to observed market pricing.

Bibliography

Altman, Edward I. and Eberhart, Allan C. (1994), "Do Seniority Provisions Protect Bondholders' Investments?," *A New York University Salomon Center Working Paper*, Series S-94-12.

Altman, Edward I. and Kishore, Vellore (1996), "Recoveries on Defaulted Bonds: by Industry and Debt Seniority," *A New York University Salomon Center Working Paper*, Series S-96-6.

Asarnow, Elliot (1996), "Corporate Loans as an Asset Class," *The Journal of Portfolio Management*, Summer 1996.

Asarnow, E. and Edwards, D. (1995), "Measuring Loss on Defaulted Bank Loans: A 24-Year Study," *The Journal of Commercial Lending*, Vol. 77, No. 7, March 1995, p.11-23.

Carty, Lea V. (1994), "Preferred Stock Dividend and Credit Risk," A *Moody's Special Report*, December 1994.

Carty, Lea V. and Lieberman, Dana (1996), "Defaulted Bank Loan Recoveries," A *Moody's Special Report*, November 1996.

Chatterjee, Sris, Dhillon, Upinder S., and Ramirez, Gabriel G. (1996), "Resolution of Financial Distress: Debt Restructurings via Chapter 11, Prepackaged Bankruptcies, and Workouts," *Financial Management*, Vol. 25, No. 1, Spring 1996, p. 5-18.

Chatterjee, Sris, Dhillon, Upinder S., and Ramirez, Gabriel G. (1995), "Coercive Tender and Exchange Offers in High Yield Debt Restructurings: An Empirical Analysis," *Journal of Financial Economics*, July 1995.

Eberhart, Allan C. and Sweeney, Richard J. (1992), "Does the Bond Market Predict Bankruptcy Settlements?," *The Journal of Finance*, Vol. XLVII, No. 3, July 1992.

Eales, Robert and Bosworth, Edmund (1998), "Severity of Loss in the Event of Default in Small Business and Larger Consumer Loans," *Journal of Commercial Lending*, May 1998.

Garman, M. Christopher, and Fridson, Martin S. (1998), "Highlights of Loan Trading: 1997 Review," Merrill Lynch's Global Securities Research & Economics Group, April 13, 1998.

Hamilton, David T., and Carty, Lea V. (1998), "Moody's Bankrupt Bond Index," A *Moody's Special Report*, April 1998.

Keenan, Sean C., Carty, Lea V., Shtogrin, Igor (1998), "Historical Default Rates of Corporate Bond Issuers, 1920 - 1997," A *Moody's Special Report*, March, 1998. Also, yearly updates from 1994 through 1997.

Keenan, Sean C., Carty, Lea V., Shtogrin, Igor, and Fons, Jerome S. (1998), "Preferred Stock Ratings and Credit Risk," A *Moody's Special Report*, March 1998.

Marker, Jim, and Rapoport Michael R. (1996), "Historical Performance of Corporate Loans: An Update," Citibank's *Corporate Loan Market Review and Outlook* - 1st Quarter 1996.

Stumpp, Pamela, Marshella, Tom, Mulvaney, Michael, and Hilderman Mara (1997), "A Sense of Security: Moody's Approach to Evaluating Bank Loan Structure and Collateral," A *Moody's Special Report*, October 1997.

Warner, Jerold B., 1977, "Bankruptcy, Absolute Priority, and the Pricing of Risky Debt Claims," *Journal of Financial Economics*, 1977, Vol. 4, No. 3, 239-276.