Recovering Your Money: Insights Into Losses From Defaults

Recovery data has always been a weak link of quantitative credit loss models and has long lagged research done on default and migration. Modeling, whether it be to estimate return on capital, return on risk-adjusted capital, value at risk, or pricing, utilizes increasingly sophisticated methods of predicting default based on credit rating equity, price volatility and financial statistics. This default analysis has tended to be paired with static loss assumptions with, at best, a single average used for all secured loans and another single average used for all unsecured loans. Unsurprisingly, the result has been loss given default assumptions marred by high standard deviations and fat tails (excess data points at both ends of the distribution). An unfortunate result of this high standard deviation is an inability to fine-tune spreads, capital allocation and ratings based on historical loss experience.

Portfolio Management Data LLC (PMD), working with Standard & Poor's, has assembled an empirical credit loss database that will enhance loss assumptions and tighten standard deviations. This permits improved capital allocation, more precise pricing and better portfolio management.

In order to achieve this goal, the new database focuses not only on tranche of debt (e.g., bank loans, senior secured debt, senior subordinated debt, etc.) and collateral type, but also on capital structure—how much debt is above or below a particular instrument in the balance sheet. By analyzing loss data by the amount of debt subordinated to the loans, we have been able to significantly tighten the distribution around the mean in compiling loss statistics. When this subordination data is combined with a specific type of collateral, the standard deviation is further reduced.

METHODOLOGY

This article analyzes the recoveries of 829 debt instruments from over 210 of the biggest defaults in the database. All types of defaults (such as bankruptcy, restructuring, distressed exchange, and default and cure) were included. Recoveries were calculated using three separate methods that are more fully explained in table 1.

All recoveries are given in present-value terms discounted from the date of emergence or liquidation to the last date that interest was paid on each instrument at that instrument's predefault con-

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Table 1

Recovery Rates

	Recovery (%)	Standard deviation (%)	95% confidence* (%)	Count
Bank	84.5	24.9	43.4	258
Senior secured	65.7	28.4	18.8	97
Senior unsecured	49.3	35.8	0.0	127
Senior subordinated	36.8	31.0	0.0	144
Subordinated	26.1	30.3	0.0	179
Junior subordinated	13.6	24.4	0.0	24

*This is a one-tailed test demonstrating the percentage we can be confident of recovering 95% of the time.

Table 2

Value of Collateral

Collateral types	Recovery (%)	Standard deviation (%)	95% confidence (%)	Count
All assets or current assets; most assets; noncurrent or unclassified; capital stock; second liens	79.6	26.7	35.5	327
All assets or current assets; most assets; noncurrent or unclassified; capital stock	80.6	25.9	37.8	312
All assets or current assets; most assets; noncurrent or unclassified	82.9	25.3	41.2	254
All assets or current assets; most assets	86.3	23.7	47.2	174
All assets or current assets	89.8	19.8	57.2	157

Table 3

Value of Subordination

	Recovery (%)	Standard deviation (%)	95% confidence (%)	Count
No debt cushion/sole debt	34.3	33.3	0.0	323
Any debt cushion	66.5	35.3	8.3	504
33.33% or greater debt cushion	82.3	26.1	39.2	307
66.66% or greater debt cushion	89.3	24.9	48.2	104

tractual rate. While the database allows for collateral to be segmented in over a dozen ways, for purposes of this article, collateral was divided into five main groups:

- All assets and current assets;
- Most assets;
- Noncurrent assets such as real estate and plant, property, and equipment (PP&E), and other, unspecified assets;
- Capital stock; and
- Second lien.

If the debt was listed as "unimpaired," or was reinstated with all due interest and with no subsequent defaults, then discounted recoveries are assumed to be 100 cents on the dollar because all interest and

principal payments were ultimately made on a contractual basis and because, from a capital perspective, no loss occurred.

OBSERVATIONS

From a bird's-eye view, as shown in table 1, recovery rates and respective standard deviations corroborate the results from prior studies. As in prior studies, however, these averages are not the product of a bell-shaped curve. Bank loans are a good example. While the average recovery of the loans in this analysis is 84.5%, just 7% of all defaulted loan recoveries are in the 80%-90% range *(see chart 1)*.

This skewed distribution accounts for the wide standard deviation and explains why the median recovery (100%) and the average recovery are so different.

Taking the analysis a step further, we segmented the loans by the debt cushion—the proportion of debt in the capital structure that ranks below the loans including inferior security, second lien, unsecured, and subordinated instruments. The conclusion is intuitive yet powerful: For the 58 loans with a debt cushion of 75% or more, 89% had recoveries of 90% or more *(see chart 2)*.

For the 43 loans with an unsecured debt cushion of less than 20%, just 28% had recoveries of 90% or more *(see chart 3)*.

The corresponding mean recovery rates and standard deviations of the recoveries were 96.5% and 13.2%, respectively, for the loans with a debt cushion of 75% or greater, and 63.4% and 32.9% for the loans with a less-than-20% debt cushion.

This last observation echoed a finding throughout the analysis, namely that the use of increasing subordination or improved collateral (i.e., from unsecured to all assets) leads to both higher recoveries and lower corresponding standard deviations. This "virtuous circle" is illustrated in table 2, which shows the effect of improved collateral on average recovery of all debt types and its corresponding standard deviation while table 3 looks at the effect of subordination on all types of debt.

The use of both together reduces the standard deviation further, as evidenced in table 4.

Or, stated in terms of confidence intervals, when the debt cushion is at least 50% and there is collateral present, recovery will be 64.5% given a 95% confidence interval. These charts illustrate results for all debt tranches, the results are even more striking with bank loans alone. Put another way, the results from our analysis empirically demonstrate the significance that structure has on recovery experience.

ABOUT THE DATABASE

The Credit Loss Database captures information on more than 1,200 bank loan, high-yield bond, and other debt instruments gleaned from 300 nonfinancial, public and private, U.S. companies that defaulted since 1987. Chart 4 and chart 5 provide a breakdown of the obligors in the database by industry and by year of initial default.

Chart 1

Distribution of Present Value of Recoveries Of Defaulted Leveraged Loans

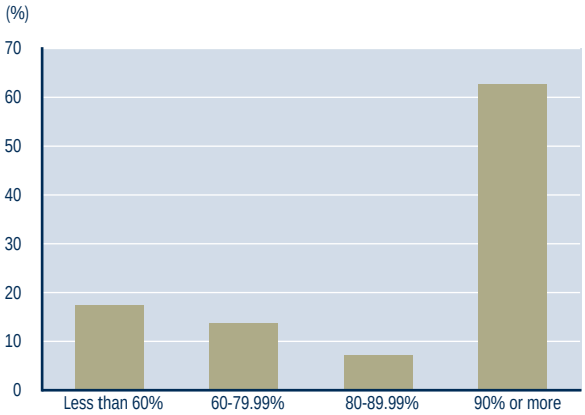


Chart 2

Distribution of Present Value of Recoveries Of Defaulted Leveraged Loans That Had Debt Cushion of 75% or More

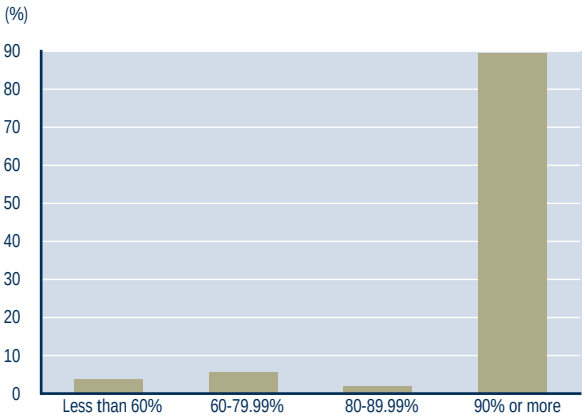


Table 4

Value of Structuring

	Recovery (%)	Standard deviation (%)	95% confidence (%)	Count
All	54.0	37.9	0.0	829
50% or greater debt cushion	86.9	24.8	45.9	188
50% or greater debt cushion and any collateral	91.9	16.6	64.5	136

Table 5

Multiple Regression Model

Regression Statistics			
Multiple R	0.68		
R-squared	0.46		
Adjusted R-squared	0.45		
Standard error	279.96		
Observations	829		
	Degrees of freedom	**f-statistic**	
Regression	3.00	231.33	
Residual	825.00		
Total	828.00		
	Coefficients	**Standard error**	**t-statistic**
Intercept	195.67	20.99	9.32
Instrument code	61.79	8.63	7.16
% of debt below tranche	363.19	44.85	8.10
Collateral code	33.94	7.27	4.67

Source data were obtained from bankruptcy documents (reorganization and disclosure statements), SEC filings, press articles, and press releases, as well as Standard & Poor's default studies.

RECOVERY METHODOLOGIES

Recoveries are calculated using three separate methods:

- Trading prices of prepetition instruments at the time of emergence;
- Earliest available trading prices of the instruments received in settlement; and
- Value for illiquid settlement instruments at the time of a "liquidity event"—the first date that a price can be determined, such as the subsequent acquisition of the company, significant ratings upgrade, refinancing or subsequent bankruptcy or distressed exchange. All three methods were discounted back from either the date of emergence or the "liquidity event" date to the last date that interest was paid on each instrument at that instrument's predefault contractual rate. For purposes of this article, preference was accorded to the trading price at emergence, then to the settlement instrument methodology, and then to the "liquidity event," if no other method was available.

PMD excluded debt specifically tied to an asset from the analysis, including industrial revenue bonds, mortgages and purchase money debt. The recovery rate of such debt is highly dependent on the value of the underlying asset. As a result, the amount of subordination does not influence recoveries.

STATISTICAL TESTING OF THE DATABASE

Several multiple regression models have been employed to gain a better understanding of the factors that might explain recovery experience for defaulted debt. The recovery value was the dependent variable in all of these models. This dependent variable was regressed against three independent variables: collateral type, instrument type, and subordinated debt cushion—measured by the percent of debt below the subject tranche.

The results of these models are quite robust. Here is why:

- In every model, each of the independent variables has a t-statistic exceeding two, which indicates a strong statistical relationship.
- The adjusted R-squared for these models exceeded 40% in all cases. This means that more than 40% of the recovery values can be explained by a combination of collateral, instrument type and subordinated debt cushion.

Because of its statistical significance, this data is rich with implications. At first blush, several multiple regression analyses were performed in an effort to explain recovery for defaulted debt. This initial article only scratches the surface; we expect the data to generate many insights into loss given default. Of various models that PMD and Standard & Poor's created, we believe that the following one provides the most telling results:

Discounted Recovery = 195.67
+ 61.79 Instrument Type
+ 363.19 Percent of Debt Below Tranche
+ 33.94 Collateral Code.

The independent variables are:

- Instrument Type. Instruments were ranked in the following manner: revolving credit = 6; term loan = 5; senior secured bonds = 4; senior notes = 3; senior subordinated bonds = 2; subordinated bonds = 1; junior subordinated bonds = 0.
- Subordinated Debt Cushion. This measures the percent of debt subordinate to the subject tranche at date of default.
- Collateral. Collateral was ranked in the following manner: all assets and current assets = 5; most assets = 4; secured transactions, real estate, PP&E, oil and gas reserves and equipment = 3; capital stock of operating units, intellectual property and intercompany debt = 2; second lien = 1; and unsecured = 0.

Observations below are based on this model and the regression statistics for this model are summarized in table 5.

OBSERVATIONS

Even without the empirical evidence this data provides, the instrument type and collateral have long been noted as important indicators of recovery. It's no surprise then that recovery rates for secured bank debt

Chart 3

Distribution of Present Value of Recoveries Of Defaulted Leveraged Loans That Had Less Than 20% Debt Cushion

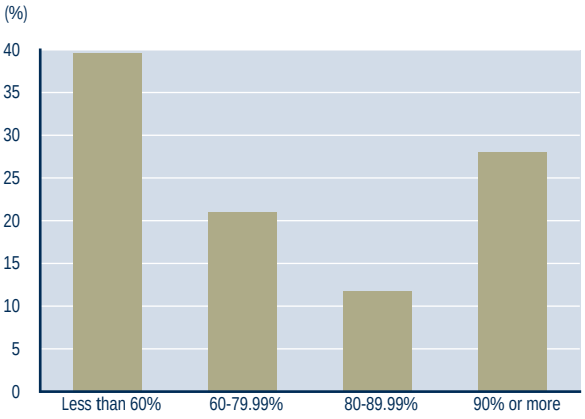
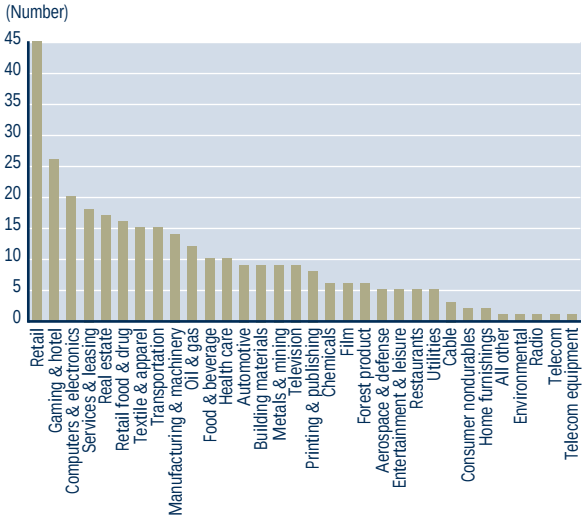


Chart 4

Industry by Industry Breakdown Of Defaulted Transactions



Source: Portfolio Management Data.

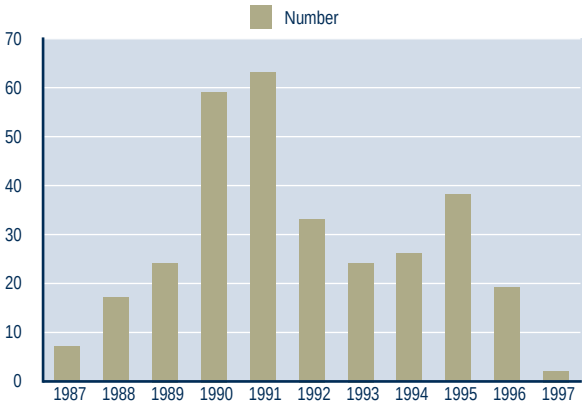
Table 6

Multiple Regression Model

Regression Statistics			
Multiple R	0.65		
R-squared	0.42		
Adjusted R-squared	0.42		
Standard error	288.35		
Observations	829.00		
	Degrees of freedom	**f-statistic**	
Regression	2.00	302.91	
Residual	826.00		
Total	828.00		
	Coefficients	**Standard error**	**t-statistic**
Intercept	311.85	13.71	22.74
% of debt below tranche	509.42	41.13	12.39
Collateral code	65.37	5.97	10.96

Chart 5

Initial Defaults by Year 1987-1997



Source: Portfolio Management Data.

typically exceed those of unsecured and subordinated debt. However, subordinated debt cushion—even without incorporating whether an instrument is secured—proves to be the most important explanatory variable of loan recovery, having a higher t-statistic than instrument type or collateral. In other words, subordinated debt cushion is an even more statistically significant indicator of recovery than instrument type or collateral. This variable is of particular value when two distinct instruments are compared—each referred to, for example, as senior subordinated bonds—which have completely different positions in their respective balance sheets.

MULTICOLLINEARITY

To test potential multicollinearity of the independent variables, instrument type was removed from the equation. The reason is simple. Instrument type is nomenclature that indicates whether an instrument is backed by collateral (e.g., senior secured, unsecured) and, more vaguely, right of payment (for example, senior, subordinated, or junior). Therefore, this variable is highly correlated with collateral and, to a lesser extent, subordinated debt cushion.

Regressing recovery values against just collateral and subordinated debt cushion yields an adjusted R-squared of 42%. Though this is slightly less than in the previously mentioned model, it gives us comfort that balance-sheet position is a most relevant determinant of potential for recovery. Statistics for this regression model are in table 6. CW