

Defaulted Bond Returns by Seniority Class

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Cyclical escalation in default rates on high-yield bonds since the late 1990s has vastly increased the supply of bankrupt securities. At the end of 2001, Moody's Bankrupt Bond Index consisted of \$65.5 billion par amount of debt. This compares with \$24.4 billion in 2000 and only \$5.6 billion as recently as 1998.

The general class of defaulted bonds is subdivided according to seniority within the capital structure, which determines liquidation preference, or priority of claim in bankruptcy.¹ To value individual issues, investors must take into account the ordinary expectation that the percentage of claim recovered will decline with each step down the priority scale. Furthermore, financial theory suggests that returns will rise with risk; that is, they will vary inversely with seniority. These expectations may or may not reflect actual experience. The degree to which observed returns fail to correspond inversely with seniority, analyzed across time, may provide evidence regarding investors' propensity to learn from past errors.

I. RETURNS FROM 1980 THROUGH JULY 1992

Exhibit 1 shows the rise in high-yield default rates since 1994. Exhibit 2 sheds light on the success that defaulted bond investors have had in valuing seniority classes. The sample was reported by Altman and Eberhart [1994]. It consists of 202 bonds that defaulted,

entered Chapter 11 bankruptcy reorganization, and emerged from bankruptcy between January 1980 and July 1992.

Altman and Eberhart do not calculate rates of return, focusing instead on recoveries by priority level. Estimated returns can be teased out of their findings, however.

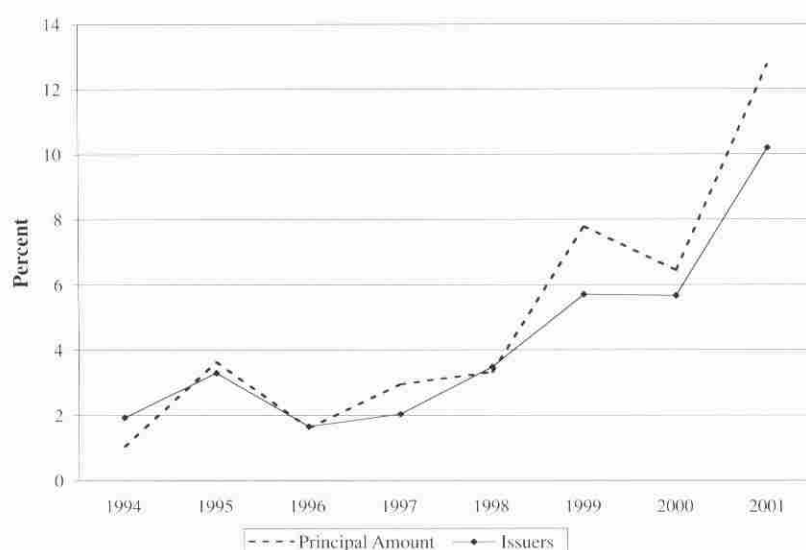
We base our calculation of return by seniority levels on class mean prices at default and mean payoffs on emergence. The Altman-Eberhart mean time in bankruptcy (1.97 years) is our assumed interval for computing discounted returns for all seniority classes. We weight class returns by number of issues, effectively assuming that the face amount of defaulting debt was similarly distributed.

Under these assumptions, we calculate that investors earned a weighted-average return of 28.31% on senior bonds (the senior secured plus the senior unsecured subclasses). Subordinated bonds, including the senior subordinated, subordinated (cash-pay), and subordinated (non-cash-pay) subclasses, returned only 0.20%. Contrary to the predictions of financial theory, the riskier assets (those with lower priority) generated a lower return than the less risky assets.²

Although our calculations reveal relative mispricing among classes of defaulted debt, we do not find systematic mispricing for the class as a whole. The weighted-average return for all defaulted bonds, 12.87%, is close to the 13.16% annualized return of the Altman-New York University Index of Defaulted Bonds from inception (December 31, 1986) through

EXHIBIT 1

Default Rate on Speculative-Grade Bonds (1994–2001 Annually)



Source: Moody's Investors Service.

EXHIBIT 2

Internal Rates of Return on Defaulted Bonds by Seniority Class (January 1980–July 1992)

Seniority Class	Observations	Mean Price at Default	Mean Payoff on Emergence	Internal Rate of Return ^a
Senior Secured	23	69.39	102.24	21.77%
Senior Unsecured	68	46.02	77.78	30.53%
Total Senior	91	51.93	83.96	28.31%^b
Senior Subordinated	32	25.69	21.32	−9.03%
Subordinated (Cash-Pay)	74	29.80	30.71	1.54%
Subordinated (Non-Cash-Pay)	5	2.48	4.78	39.53%
Total Subordinated	111	28.56^c	27.88^c	0.20%^b
Grand Total	202	39.35^c	53.78^c	12.87%^b

^aAssumed interval between default and emergence: 1.97 years.

^bWeighted by number of issues.

^cExcludes non-cash-pay issues.

Sources: Altman and Eberhart [1994], Merrill Lynch High Yield Strategy computations.

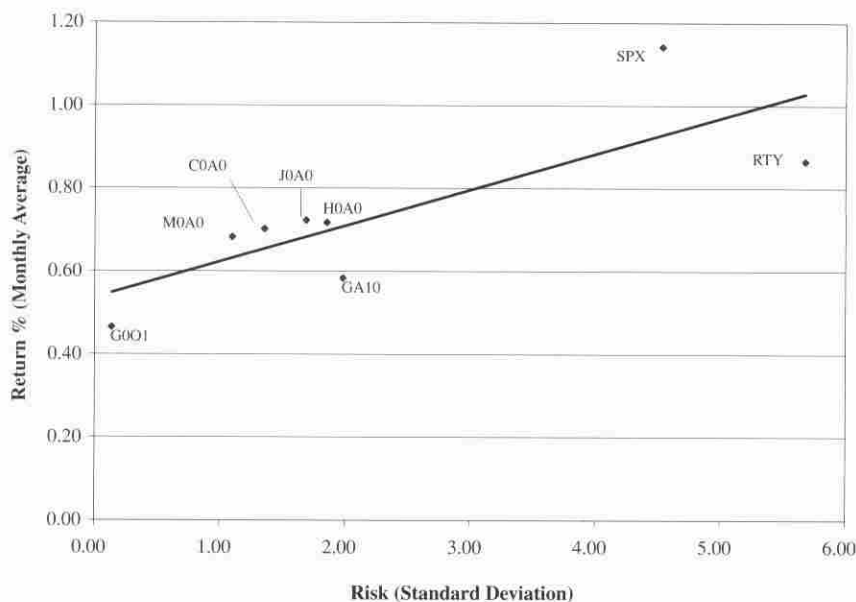
the end of 1994, the year that Altman and Eberhart published their findings. The same period mean monthly returns and standard deviations for the Altman–New York University Index are 1.04% and 3.80%, respectively. These figures place the defaulted bond sector roughly in line with other asset classes, i.e., inside the same band around the longer-run securities market line (see Exhibit 3).

II. WHAT EXPLAINS THE ANOMALY?

Exhibit 2 shows that the subordinated bonds' 0.20% annual return between January 1980 and July 1992 was lower than the risk-free (Treasury bill) rate. The senior bonds, although less risky than the subordinated issues, returned more than equities. What accounts for such extreme risk/reward anomalies?

EXHIBIT 3

Securities Market Line (September 1986-2001)



RTY = Russell 2000 Index.
 SPX = S&P 500 Index.
 H0A0 = Merrill Lynch High Yield Master II Index.
 J0A0 = Merrill Lynch High Yield Master Index.
 C0A0 = Corporate Index.
 M0A0 = Mortgage Index.
 GA10 = 10-yr. Treasury Note.
 G0O1 = 3-mo. Treasury Bill.

Sources: Standard & Poor's, Russell Indexes, Merrill Lynch & Co.

We surmise that unsophisticated investors bid up the prices of subordinated issues to uneconomic levels. Previous research has documented a similar overvaluation of distressed (but not bankrupt) companies' stocks.³ Evidently, unsophisticated investors drive up troubled company shares that they mistakenly believe to represent bargains, simply on the grounds that prices are quoted far below their peak levels.

A second possible source of systematic mispricing during Altman and Eberhart's observation period is failed "holdouts" by certain defaulted bond specialists or "vulture capitalists." (For details of a holdout strategy, see the appendix.) Or proactive vultures whose ultimate goal was to gain equity control may have overpaid for the subordinated debt, countenancing the excess price as a control premium.

Some mix of errors by unsophisticated investors and aggressiveness on the part of professionals, in our judgment, produced the mispricing of defaulted subordinated bonds observed between January 1980 and July 1992. As time went on, presumably, the highly unsatisfactory returns made the subordinated buyers aware of their systematic error.

Therefore, a natural follow-up to Altman and Eberhart's findings is to investigate whether investors learned from their errors and consequently improved their performance in the succeeding period.

III. RETURNS FROM AUGUST 1992 THROUGH MARCH 2000

To test for a possible learning effect in the pricing of bankrupt companies' debt, we gather prices of defaulted bonds for the period August 1992 through March 2000, replicating as faithfully as possible the methodology described in Altman and Eberhart [1994]. In the new observation period, we identify 215 defaulting bonds (see Exhibit 4). This is comparable to Altman and Eberhart's total of 202 observations, although we find prices and payoffs for only 115 bonds.⁴

Returns by seniority class during the more recent period appear to uphold the notion that learning occurred. As in the January 1980 through July 1992 interval, to be sure, the riskier subordinated issues produced an anomalously lower return than the less risky senior bonds. The disparity in the

EXHIBIT 4

Bonds Defaulted Between August 1992 and March 2000—Characteristics of the Sample

Seniority/Security	Number of Observations		Subtotal
	Priced	Not Priced	
Senior Secured	7	16	23
Senior Unsecured	44	46	90
Senior Subordinated	38	14	52
Subordinated (Cash)	26	22	48
Subordinated (Non-Cash)	0	2	2
Total	115	100	215

Sources: Moody's Investors Service, Standard & Poor's, Bloomberg, Income Securities Advisors.

EXHIBIT 5

Internal Rates of Return on Defaulted Bonds by Seniority Class— Bonds Defaulted Between August 1992 and March 2000

Seniority Class	Observations	Mean Price at Default	Mean Payoff on Emergence	Internal Rate of Return ^a
Senior Secured	7	78.46	87.41	11.91%
Senior Unsecured	44	64.03	70.93	11.24%
Total Senior	51	66.01	73.19	11.33%^b
Senior Subordinated	38	52.82	61.78	17.73%
Subordinated (Cash-Pay)	26	51.10	48.43	-5.44%
Total Subordinated	64	52.12	56.35	8.32%^c
Grand Total	115	58.28	63.82	9.66%^b

^a Average interval between default and emergence: 350 days (0.96 of a year).

^b Weighted by number of issues.

^c Subordinated (non-cash-pay) class did not yield any priced observations in our sample.

Source: Merrill Lynch & Co.

August 1992 through March 2000 span is far less pronounced (11.33% versus 8.32%) than calculated for Altman and Eberhart's observation period (28.31% versus 0.20%) (see Exhibit 5). The more contemporary defaulted-bond investors, it would seem, avoided many of the pitfalls that led to gross relative overpricing of subordinated issues in earlier years.⁵

Uncovering evidence of learning is surprising in an asset class that was by no means new before the errors that supposedly led to the learning. Keenan, Hamilton, and Berthault [2000] report an extensive record of corporate bond defaults stretching back to 1920. According to their data, defaults surged in the 1920s and again during the Great Depression of the 1930s. If investors were still systematically mispricing subordinated issues as late as the 1980s, it seems improbable to us that in the 1990s they suddenly caught on and corrected their errors. We suspected that a closer examination of the data might reveal changes in conditions that merely created the appearance

of learning during the most recent period.

Analysis of the Reduced Disparity in Returns by Class

As we studied Exhibits 2 and 5, we found that a salient contrast was the swifter resolution of bankruptcy in the more recent period. Recall that Altman and Eberhart reported a mean interval between default and emergence of 1.97 years. For the August 1992 through March 2000 period, we find a mean interval of only 0.96 years.

Shorter average bankruptcy resolution periods, we hypothesized, could have produced an increase in average payoffs on emergence. At least in some cases, bankrupt companies' asset values are likely to diminish during longer reorganization proceedings. Even though the Chapter 11 process is designed to foster business-as-usual (aside from the suspension of debt service), a bankrupt company's oper-

ations may suffer from neglect when senior management's attention is diverted to resolution of the bankruptcy.

We also take into account that many companies entering Chapter 11 are in long-run decline, rather than suffering from temporary business slumps. This is evidenced by a high incidence of Chapter 22 filings (companies emerging from bankruptcy only to file again).⁶ For a company in the course of protracted deterioration, the shorter the time in bankruptcy, the less the decline in earning power (and associated loss of asset value).

Consistent with our conjecture, the estimated mean payoff on emergence, across all seniority classes, rose from 53.78 in Altman and Eberhart's observation period to 63.82 in the August 1992 through March 2000 period.⁷ In the latter period, that is, there was on average more asset value available to creditors (in percentage of claims terms, before considering how the pie was divided among seniority classes).

According to market participants we talked to, the swifter resolution of bankruptcies in the post-July 1992 period is attributable to several factors:

Increased prevalence of prepackaged bankruptcies.

The prepackaged bankruptcy technique for expediting reorganization under Chapter 11 consists of obtaining consents to a plan of reorganization prior to the filing. Roe [2000] reports that the popularity of prepackaged bankruptcies has risen since the 1980s. Citing an unpublished paper by Elizabeth Tashjian, Ronald C. Lease, and John J. McConnell, Roe says:

In the first half of 1993, prepackaged bankruptcies made up just under half of the bankruptcy filings of publicly traded firms having assets of more than \$100 million. They took an average of three months to complete after filing (but needed 18 months to negotiate before the filing) (pp. 430-431).

Increased prevalence of prearranged (or prenegotiated) bankruptcies. Like the prepackaged variety, prenegotiated transactions involve the resolution of many of the key distributional and operational issues prior to the bankruptcy filing. The difference is that not all the consents to the reorganization plan are obtained before the company enters Chapter 11.

Increased reliance on merger and acquisition solutions. The sale of the bankrupt company's assets lays to rest time-consuming contention over the value of the estate. Once the valuation issues are resolved, application of the absolute priority rule leads to a comparatively speedy settlement of claims.

Certainly, it may be merely coincidental that mean

payoffs on emergence rose as the interval between default and emergence shortened. To test this proposition, we conduct a regression analysis on the August 1992-March 2000 sample. For the 51 senior debt issues, we find that the time elapsed between default and emergence has a meaningful correlation (R) of -0.42 with the payoff on emergence. A p -value of 0.002 indicates a negligible probability that the sign of the correlation (indicating that a shorter reorganization period is associated with a higher payoff) is wrong.

We conclude that even though statistical noise buries the effect in the subordinated subsample ($R = -0.07$, $P = 0.578$), a company's payoff on emergence is to a considerable extent a function of the length of time that it spends in bankruptcy. This finding supports our hypothesis that, at least in part, payoffs rose after July 1992 because reorganization periods shortened.

By inference, we have reconstructed the post-July 1992 sequence of events that created the appearance of learning, as follows.

- Prepackaged, prearranged, and merger and acquisition-based bankruptcy solutions gained in popularity.
- The average interval between default and emergence from bankruptcy shortened.
- As a percentage of total claims, the average asset value available to creditors increased.
- Both the amount available for satisfaction of senior claims and the amount available after satisfaction of senior claims increased.⁸
- For both senior and subordinated claims, the mean price at default rose, reflecting reduced time value discounts on expected payoffs on emergence.
- With the mean price at default for subordinated (excluding non-cash-pay) issues substantially higher than in the January 1980-July 1992 period, there was less of an ultra-low-dollar-price lure for unsophisticated investors and practitioners of the holdout strategy.
- In the absence of incentives to drive the prices of subordinated issues to excessively high levels following default, returns on that class more closely approximated the levels appropriate for their risk than was the case in the January 1980-July 1992 period.

Why Did Returns on Senior Defaulted Bonds Fall?

The subordinated class's improvement in both absolute and relative returns occurred while we were seeing depressed returns for defaulted bonds. For the period August 1992–March 2000, the Altman–New York University Index of Defaulted Bonds produced a mean monthly return of only 0.4%. Taking into account the period's standard deviation of returns, 3.9%, the asset class's return was substantially below the securities market line in Exhibit 3.

This performance of defaulted bonds in general partially explains the sharp reduction in defaulted senior bonds' internal rate of return from 28.31% (January 1980–July 1992) to 11.33% (August 1992–March 2000). Also contributing to the reduced performance of senior defaulted bonds, though, was a decline in mean payoffs on emergence from 83.96 to 73.19. This decline may reflect concessions from senior to subordinated holders, made in the context of prepackaged and prenegotiated bankruptcies, with an eye toward speeding up the reorganization process.

IV. CONCLUSION

Within the general class of defaulted corporate bonds, senior issues produced anomalously high returns between January 1980 and July 1992. Over the same period, subordinated issues produced anomalously low returns. The systematic misvaluation that distorted the risk-reward relationship between the two subclasses was greatly reduced in the subsequent period, August 1992 through March 2000. Did investors learn from errors they committed in the earlier period?

Not likely. Investors made their relative pricing errors in the 1980s and early 1990s despite several decades of experience with defaulted bonds.⁹ What appears to be learning may actually be a result of the more recent period's higher payoffs at the conclusion of bankruptcy.

In a finding not previously reported to our knowledge, we demonstrate a correlation between the length of time from default to emergence and the payoff on emergence. According to this construing of the data, prices at default were higher in the August 1992–March 2000 period as a function of reduced time value discounts on expected proceeds from the reorganization process. Unsophisticated investors and aggressive vulture capitalists were therefore less tempted by ultra-low dollar prices

to overpay for subordinated issues than they were in the January 1980–July 1992 period.

APPENDIX The Holdout Strategy

According to the United States Bankruptcy Code, approval of a plan of reorganization requires the agreement of two-thirds of each class of creditors. In response to this requirement, some vulture funds attempt to acquire more than one-third of a company's outstanding subordinated debt, with the object of blocking approval of the plan. By delaying the disbursement of funds to creditors, the holdouts exert pressure on senior unsecured holders to strike a deal rather than suffer further loss of time value of money.¹⁰ As a quid pro quo for their consent to the plan, the holders of a blocking position in the subordinated paper demand more of a percentage recovery than they would be entitled to under absolute priority.¹¹

If successful, the holdout strategy can be quite lucrative. Exhibit 2 shows that in the 1980s subordinated cash-pay bonds were typically available at prices of just 25 or 30 at the time of default. This means that by extracting a concession from senior unsecured holders equivalent to only five points per bond, the subordinated holders could achieve a capital gain of up to 20%. (The gain would be on top of the return earned as a matter of course by holding the unsecured claim through the company's emergence from bankruptcy.)

For the time value-sensitive senior secured holders, on the other hand, the five-point concession represents, on average, a sacrifice only about half as great ($5 \div 46 = 11\%$). The incentive for senior unsecured holders to make concessions is even greater when, as is typically the case, the subordinated class represents a decided minority of the capital structure.

For instance, suppose there are three senior unsecured debentures outstanding for every subordinated debenture. A concession of 1.7 points on each senior unsecured debenture produces the same gain of up to 20% per subordinated debenture as in the example, but at a sacrifice of only $1.7 \div 46 = 4\%$ per senior unsecured debenture. In light of these relative costs and benefits, both the probability of success and the potential rewards of the holdout strategy look compelling.

The risk and the downside, however, are also substantial. To begin with, the speculator attempting to execute a holdout strategy must pay a control premium to accumulate one-third or more of the subordinated class. This increases the required capital investment and reduces the potential return on investment. In addition, the speculator may fail to amass a blocking position, resulting in a loss on the premium prices paid in pursuit of control. Yet another risk is that the bankruptcy judge may "cram down" the proposed debtor's reorganization plan, thereby foiling

the subordinated holders' attempt to reap more than they would be entitled to under absolute priority.¹²

Finally, the profit captured by a successful holdout is likely to be diluted by a free-rider effect. That is, the speculator who extracts a concession on the strength of controlling more than one-third but less than 100% of the subordinated class provides a windfall to other subordinated holders who bear none of the associated costs (legal expenses as well as control premium).

To some extent, the defaulted subordinated issues' remarkably low returns from January 1980 through July 1992 may reflect failed holdout attempts. Vulture managers' persistence in pursuing a largely unsuccessful tactic could be explained by the performance incentives of the limited partnerships through which they largely operate. The typical compensation formula provides the manager an annual fee equivalent to 1% of assets under management plus a 20% share of the profits. Under these terms, the manager shares more than proportionately in the portfolio's gains, but not in its losses. Speculation involving both large upside and large downside is therefore attractive to the manager.

ENDNOTES

Special thanks to Richard Lehmann of Income Securities Advisors and to Oleg Melentyev for research assistance.

¹For more discussion, see Roe [2000].

²Non-cash-pay issues are bonds that do not pay interest through traditional cash coupons. Instead, they provide returns to investors either through accretion of principal from an original issue discount to par (zero-coupon bonds) or through issuance of new, small-denomination bonds to holders (payment-in-kind bonds).

³See Fridson [2000].

⁴Unavailability of prices is a common problem in research on corporate bonds. These securities trade primarily in the over-the-counter market, rather than on centralized exchanges. Many issues trade very infrequently.

⁵As in our analysis of Altman and Eberhart's sample, we treat senior secured and senior unsecured bonds as a single senior class and regard senior subordinated and subordinated bonds as a single subordinated class. Analysis of the emergence prices for the subdivisions of the August 1992 to March 2000 sample provides only weak statistical evidence that the subgroups were genuinely different (79% confidence for the senior class and 85% confidence for the subordinated class). Similar analysis of mean payoffs on convergence confirms, with 99% confidence, that the total senior class is genuinely different from the total subordinated class.

Aside from the statistical evidence, our consolidated approach is supported by the fact that company capital structures do not invariably include all four seniority subclasses. In some instances, the subordinated (cash-pay) debt may stand next in priority behind the senior unsecured class, with no intervening senior subordinated class.

⁶Taking into account only cases in which the second bankruptcy filing occurred in 2000 or 2001, McHugh [2001] reports 13 examples of Chapter 22s. Over a longer period, the same source reports six cases of three-time filers (Chapter 33s).

⁷Lacking Altman and Eberhart's underlying data, we estimate the mean payoff across all classes by multiplying each class's observations by the corresponding mean payoff on emergence. For the senior secured class, by way of illustration, the calculation is $23 \times 102.24 = 2,351.52$. We sum the products for all classes and divide by 197 issues to derive the mean payoff across all classes of 53.78. (We exclude the five subordinated non-cash-pay issues from the calculation on the grounds of non-comparability with the other classes. The non-cash-pay holder's claim is not par, or \$1,000 per bond, but a lesser amount representing the bond's accreted value at the time of default.) An analogous calculation on the August 1992-March 2000 sample produces a mean payoff across all classes of 63.82. The latter computation is equivalent to calculating the mean in the more conventional manner of dividing the sum of all values by the number of observations.

⁸Notwithstanding the absolute priority rule, assets may be available to subordinated holders even if the *economic value* of assets awarded to senior holders is less than 100% of senior claims. The court may assign those assets a nominal value greater than their economic value and declare the senior claims fully satisfied. Assets will then be available to satisfy subordinated debt. On the other hand, the issuance of bonds originally rated below investment-grade, and especially subordinated speculative-grade bonds, escalated sharply after 1976. Perhaps the post-default behavior of these issues was sufficiently different from that of "fallen angels" (one-time investment-grade bonds that deteriorated substantially in credit quality) to have necessitated a new round of investor education.

⁹See Fridson [2001].

¹⁰In general, senior secured holders feel less pressured by loss of time value than unsecured holders do. The Bankruptcy Code permits secured claims to rise during reorganization proceedings by an amount representing accrued interest. Incidentally, this provision also explains why the average emergence payoff for senior secured holders shown in Exhibit 2 exceeds 100%.

¹¹The doctrine of absolute priority "stipulates that creditors should be compensated for their claims in a certain hierarchical order and that the most senior claims must be paid in full before a less senior claim can receive anything" (Altman [1993, p. 47]).

¹²"If the requisite majorities in an impaired class do not vote for a plan, the plan may still be confirmed over the objection of the class as long as one impaired class has accepted the plan and the plan is 'fair and equitable' with respect to each dissenting class" (Mayer [1991], pp. 278-279).

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