New York University
Salomon Center

Report on

Defaults & Returns on High Yield Bonds:
Analysis through 1999 and
Default Outlook for 2000-2002

By

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With
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Introduction and Overview

Full year 1999 was again a mixed performance year for the high yield bond market in the United States but for different reasons than the mixed 1998 performance. Once again, total returns were lackluster, registering just +1.73%. But, unlike last year's companion negative return spread vs. U.S. ten-year Treasuries, the return spread in 1999 was a positive 10.1%, as yield spreads increased significantly and Treasuries tumbled. And again, new issuance of high yield bonds was impressive, topping $100 billion for the third consecutive year, but aggregate defaults increased dramatically to an all-time record level of over $23 billion (face value).

The default rate registered a sizeable increase, topping 4% (4.15%) for the first time since 1991 and significantly above the 1.6% level of one year earlier. Combined with a relatively low recovery rate of below 30 cents on the dollar, the default loss rate was 3.2% in 1999, compared to a historical arithmetic annual average of 1.9%. Despite 1999's low absolute return, net returns (after deducting losses from defaults, rating migrations and interest rate changes) for the 1978-1999 period continued to show an attractive compounded return spread over U.S. Treasury bonds of close to 3.0% per year (2.96%).

This report documents the high yield bond market's risk and return performance by presenting traditional and mortality default rate statistics and providing a matrix of performance statistics over the relevant periods of the market's evolution. Our analysis covers the 1971-1999 period for defaults and the 1978-1999 period for returns. In addition, we present our annual forecast of expected defaults for the next three years (2000-2002). Our 1999 forecast was for substantially higher defaults than 1998, but we underestimated the record default levels. Default levels and rates were swelled in 1999 due to a number of factors, including the huge new issuance in the 1997-1999 period, a trend toward earlier defaults, deteriorating credit quality of new issues, pockets of industry fragility, and the continued vestige of 1998's flight to quality.

For 2000, we expect default levels to decline to about $17.5 billion and the default rate to regress to around three percent of the amount outstanding.

Default Rates

During 1999, a record $23.6 billion of developed country (U.S., Canada, Europe, Australia) high yield straight bonds defaulted or were exchanged under distressed conditions. This amount was comprised of 149 issues from 100 defaulting companies and resulted in a default rate of 4.15%. This compares to just 53 issues from 37 companies in 1998. A list of 1999 defaults appears in Appendix A.[1] The 1999 default rate is considerably higher than last year's rate (1.60%), above the historic weighted average annual rate from 1971-1999 of 3.22% per year (2.6% arithmetic average rate), and is also above the median annual rate (1.60%) over the same 29-year period - (Figures 1 & 2). The face value of defaults reached record levels, topping the old record from 1991 by almost $5 billion. Of course, the high yield market is now about three times larger than it was in 1991. The default rate calculation is based on a mid-year population of high yield bonds, estimated to be $567.4 billion. The default rate in 1999 breaks a six-year string of rates below 2.0% and was so great that it surprised even those observers, including the authors, who were expecting a return (or regression) to the mean default rate of about 3.0% per year. We will return shortly to a discussion of this sizeable increase.

[1] We do not include emerging market defaults in these calculations. All defaults were U.S., Canada or off-shore U.S. dollar denominated issues. While European defaults were not evident, we do expect this area's growing population of high yield bonds to "contribute," starting in 2000 (see D. Newman, T. Crawley and G. Peters, "Assessing Fair Value of European High Yield: Recovery or Wipeout," Salomon Smith Barney (London and New York), January 2000. In addition, consistent with our past approach, we do not include those issues that missed interest payments in 1999 but cured their delinquencies within the typical 30-day grace period or who missed an interest payment in December and still had a grace period remaining into 2000.

Default Rates and Aging Bias

The 4.15% 1999 default rate is based on a mid-year population estimate of $567.4 billion - an amount that does not include issues that had defaulted prior to 1999 but were still outstanding. This population total was swelled again by a continued surge in new issuance, which increased our base population by over $100 billion from a year earlier (Figure 1). Despite the considerably higher population denominator, the default rate increased dramatically.

When there is a relatively large increase in new issuance in the high yield market, you normally observe a downward bias in the default rate due to the "aging effect" of defaults. This can be clearly seen, at a later point, when we present our mortality statistics and observe that the marginal default/mortality rates in the first three years after issuance start out quite low, increase considerably to the third year and then, for the most part, level off thereafter. This new issuance aging effect is not possible to observe in the Moody's (dynamic cohort) or S&P's (static-pool) approaches[2] It has been introduced, however, in recent attempts to build default rate forecasting models (e.g., see Moody's, 1999).

Our mortality calculations take into account the aging bias, which can manifest during abnormally high new issuance periods. Despite all of this, we observe that this bias, while observable, was not very substantial in 1999, now that the high yield market is as large as it is. For example, if the population base had not grown at all from the mid-year 1998 figure ($465.5), the 1999 default rate would have been 5.06% -- an increase of

[2] For an in-depth discussion of the various default rate methodologies and results, see J. Caouette, E. Altman and P. Narayanan, "Managing Credit risk: The Next Great Financial Challenge," John Wiley & Sons, New York, 1998.

less than 1% over the actual calculation. Another reason for the lesser aging bias in 1999 defaults is the unusual observation that over 50% of the defaults in 1999 occurred within two years of issuance – a point that we will return to.

Quarterly Defaults

In Appendix B, we present default rates on a quarterly basis from 1990-1999. It can be observed that the quarterly rates in 1999 were consistently high, with the second quarter's level topping $8 billion (more than all of 1998) and 1.5%. As noted in our earlier reports, quarterly rates are usually not indicative of trends except possibly back in the 1990-1991 period when default rates skyrocketed to record levels over several consecutive quarters. Yet, in 1999, each quarter's default rate was greater than 0.8% and showed a consistently higher level than any quarter since early in 1992 and the years 1990 and 1991.

Our Default Rates vs. Moody's

There has been considerable discussion in recent years about how the Altman-NYU Salomon Center default rate calculations differ from those of Moody's (New York) results. Analysts point out that the Moody's rate, especially in recent years, is consistently higher. This can be seen in the last two columns of Appendix B. These results represent our 12-month moving average (or to be precise, last-four-quarter) default rates compared with Moody's 12-month moving average rate. One can observe that Moody's rate is consistently higher since, essentially, 1992. The main reason for this is that they include emerging market corporate and quasi-municipal bond defaults while we do not. Our calculation essentially has been a domestic default rate calculation.[3]

[3] There are other differences in the two calculations, e.g., we do not include cured defaults, but these are minor compared to the emerging market bias.

In order to analyze the differences in these two calculations, we constructed a moving four-quarter Altman/SC rate and compared it to Moody's 12-month moving averages, at the relevant quarterly dates. As noted above, Moody's rates are, for the most part, higher. But, when we ran a correlation of these absolute quarterly rates over the sample period (36 observations), we find that the correlation is 0.97 and the R-Square (proportion of one default rate "explained" by the other) is a huge 0.94 (Appendix B). Even when we ran the regression based on either first differences in the change in the quarterly default rates or the percentage change in the rates, the correlations were high (0.77 and 0.57 respectively). In other words, both measures are depicting very similar trends and directions of default rates.

Default Losses and Recovery at Default

Default losses also rose substantially in 1999 versus 1998 (3.21% vs. 1.10%) and were substantially above the average from 1978-1999 of 1.88% per year (2.24% weighted average annual rate). Figure 3 shows the 1999 loss rate, which includes the loss of one-half of the average annual coupon. Default losses for the last 22 years are shown in Figure 4.

The average recovery rate on the issues for which we had prices just after default was 27.9%, the lowest since 1990, far below the venerable 40%-42% historical average recovery rate (Figures 4 & 5) and considerably lower than last year's figure (35.9%). This was again somewhat surprising since the majority of 127 defaulting issues with prices were senior secured (17) or senior unsecured (58), and less than 40% of the issues were subordinated. Eleven were discounted bonds, where we use accreted values as the base to determine recovery rates and also in our default total and rate calculations. The

number of discounted defaulting issues was the highest ever and equal to the number in 1990.

About 70% of all new issuance in the high yield market since 1991 has been senior in priority. The much lower than average 1999 recovery rate is a caution to investors who cannot assume that senior bonds will always result in above average recovery rates. For example, the senior unsecured recovery rate in 1999 was only 39.5% versus an historical average of over 46.5%, and the senior secured average recovery rate slumped to just 28%, compared to a two-decade average of close to 60%. Figure 5 lists the recovery rates (prices just after default) by seniority for 1999 and for the past 22 years. All of the seniority levels recovered lower amounts in 1999 than the historical average. The overall arithmetic average 22-year recovery rate dipped below 40% (38.8%) and is based on 938 issues (41.9% average, weighted by the amount outstanding in each year and a median rate of 41.2%).

In Figure 6, we list the average recovery at default stratified by original bond rating for the period 1971-1999. The weighted recoveries for investment grade bonds definitely show higher rates than for non-investment grade debt, but the three non-investment grade bond classes continue to show very little differences. This is also true after adjusting for seniority bias.

Figure 7 lists the original Standard & Poor's ratings of defaulting issues, as well as the one year and six-months-prior to default ratings. Of the 903 issues tabulated, 78.4% were original issue high yield bonds, and 21.6% were originally rated as investment grade but eventually defaulted; 7.6% of the defaulted issues were still rated investment grade one year prior to default and 5.8% six months prior (multiple issues from a few

large high grade issuers, e.g., Columbia Gas System, however, accounted for a large proportion of the 12 and six-month-prior investment grade defaults) and most of these were BBB.

Figure 8 shows that the time it takes for an issue to default compared to its issuance date makes virtually no difference in the recovery rate. Most weighted recoveries by year are in the high $30s to low $40s range.

Deterioration in Original Issuance Credit Quality

One of the apparent reasons for the sizeable increase in defaults in 1999 is the seeming deterioration in credit quality of new issuance in recent years. This is demonstrated by the significant increase in the percentage of bonds that defaulted in the first and second year after issuance. From Figure 9, we observe that in 1999, 32 of the 125 issues (for which we had price and original ratings data) defaulted within 12 months (25.6%), and 69 (55.2%) defaulted within 24 months. This compares with just 7.7% and 24.3% for the 1971-1999 period (Figure 8) and about 4% and 20% for the 1991-1998 period.[4] If we exclude 1999 from the historic database, we observe that the one-year rate was just 4.9%, and the two-year rate was 20.1% (see our last year's report, Exhibit 8) for the background statistics). Hence, a sizeable increase in one and two year defaults is observed in the 1999 cohort. Apparently, this phenomenon is not just for 1999, since a recent study (Grossman and Verde, FITCH/IBCA, 1999) reached similar conclusions using data through 1998. Figure 9 shows that higher early defaults have been observed in some years (e.g., 1989, 1994 and 1997), but the default sample size was quite small in most years until 1999.

[4] R. Grossman and M. Verde, "High Yield Industry Default Risk," December 1999, FITCH/IBCA, New York.

We will be watching this phenomenon closely in 2000 to see if this indication of poorer credit quality persists. We do observe that the 1998 new issue cohort had 1.86% (BB) and 3.28% (B) default rates, which are considerably higher than the one-year rates from 1971-1999 (see our mortality rate data below in Figure 12). In order to better understand these statistics, however, we need to analyze the purpose of the financing (e.g., growth vs. refinancing vs. LBOs), to see if the one or two-year aging results are symptomatic of credit quality drift or for other reasons.

To pursue this recent shift in bond default mortality, we gathered data on original issuance by S&P bond rating over the last decade (1990-1999). From Figure 10, we can observe the sizeable increase in high yield bond new issuance since 1997—over $100 billion each year -- and the increase in dollar issuance in all three non-investment grade levels.[5] From Figure 11, we also observe that high yield new issuance as a percentage of all corporate bond issuance increased dramatically in the last three years, accounting for over 40% of all corporate bond new issuance and as much as 47% in 1999. And, within the high yield sector, the percentage of B and CCC rated issues also increased. In 1999, B rated bonds comprised 31.2% of all new corporate bond issuance and 66.2% of high yield issuance. The CCC cohort was particularly evident in 1998, with $9.3 billion (2.6% of all issuance and 10% of all high yield issuance). This was a distinct jump from previous years. Oddly enough, the 1998 CCC cohort did not contribute to the large increase in 1999 defaults. The CCC new issue cohort fell back in 1999 to 1.7% ($3.4 billion), but still was quite high relative to historic norms.

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[5] Note that we only use S&P rated criteria. If we had also included bonds rated non-investment grade by Moody's or other rating agencies, the amounts would be larger.

The high yield bond industry's exuberance for new issuance and the apparent deterioration in credit quality needs to be monitored closely. No doubt, this deterioration in credit quality contributed to recent default growth, but the added factor of earlier defaults exacerbated the 1999 numbers. Investors will need additional promised yields in order to expect to achieve return spreads comparable to the last two decades performance data (see our data at a later point involving return spreads, especially Figure 16).

Other Reasons for the Increase in Defaults

In addition to the deterioration in credit quality and the earlier occurrence of defaults, three factors contributed to the sizeable increase in 1999. These are (1) the increased dollar amount of recent new issuance, (2) the vestige of Russia's default in 1998, and (3) a number of "sick" industries despite the economy's overall strength.

We have already documented the huge new issuance years of 1997-1999 and the expected increase in dollar defaults as these new issues age. This simple mortality idea is the basis for our forecasted default numbers and percentages, which we will discuss at a later point. If nothing else, a regression to the mean would have caused the 1999 default amounts and default rate to increase vis-à-vis prior years.

The increase in the default rate to over 4%, however, was caused by additional factors. One intangible, but important factor, is the ability of distressed firms to refinance their indebtedness. Refinancing occurred with increasing difficulty in the aftermath of Russia's default and the flight-to-quality that ensued. Although this occurrence is mainly anecdotal, we are convinced that without the Russian contagion, the default rate would have been lower.

Industry Defaults

We continue to observe pockets of defaults in either chronically or newly ailing industrial sectors. Appendix C lists the 1999 defaults by major industrial sector, as well as the industry default data since 1970. In 1999, in addition to general manufacturing and miscellaneous industries (each with 14 defaulting issuers), such sectors as energy (12), retailing (12), communications (10), healthcare (8), and leisure/entertainment (8), and transportation (8-mainly shipping) lead the way. The energy sector's doldrums were mainly early in the year, while retailing and textiles continue to be a chronic problem. Industries such as communications and healthcare were new "leaders" in defaults, reflecting the frenetic new issuance in the former and the overcapacity and governmental regulatory fee related factors for the latter. Hence, despite an ebullient economy, driven by technology and productivity growth, a number of sectors have been ailing, and going forward some will continue to do so. Others, like energy and shipping, appear to have experienced the peak of defaults. As points of reference, Grossman and Verde concluded that retail, insurance, supermarkets, drug stores, and textiles/furniture had the highest default rates in the 1991-1998 period.

Appendix D lists the 1999 defaults by more precise industry classifications for the individual defaulting issuers, and Appendix E an update on the recovery rates by sector.

Mortality Rates and Losses

Updated mortality rates and losses for 1971-1999 are reported in Figures 12-15. Our total defaulted issue population that had a rating upon issuance and a price at default now numbers 802 issues. The methodology for these calculations comes from Altman

(1989)[6] and adjusts for calls, sinking funds, and other redemptions. It is interesting to note that bond calls in 1999 were extremely low ($5 billion overall and $2 billion in the high yield market) as interest rates increased throughout the year and the end of year promised yield to maturity on non-investment grade issues was 11.4%, compared to 10.0% one year earlier. Treasury bond yields increased even more over the same period (6.44% vs. 4.65%). Similar to actuarial insurance experience calculations, our mortality method measures default experience for major rating categories from the "birth" of the issue and is market value (not issuer) weighted. As such, it clearly adjusts for the aging bias, and marginal default rate experience can be analyzed.

As noted earlier, 1999 defaults were distinctive in their higher than average number and rate and also by their relatively early incidence. Indeed, from Figure 9 we observe that well over 50% (55% actually) of the defaults took place within two years of issuance. The early default phenomenon manifests clearly in our mortality rate compilations. We observe that the first and second year marginal rates of default for the period 1971-1999 are 1.58% and 3.92% respectively, compared with 1.14% and 3.00% for the period 1971-1998 (see Waldman & Altman, 1999).[7] The same trend is observed in Figure 12 for BB defaults (0.71%, one year and 0.81%, two years vs. 0.36% and 0.73%, measured at one year earlier) and for BBB defaults, as well. Interestingly, for the CCC rating category, for which had an unusual amount of new issuance in 1998 ($9.3 billion – 2.6% of all new issuance – as shown in Figures 10 and 11), the first year's

[6]E. Altman, "Measuring Corporate Bond Mortality and Performance," Journal of Finance, September 1989.

[7]R. Waldman and E. Altman, "Defaults and Returns on High Yield Bonds: Analysis Through 1998," Salomon Smith Barney Inc., January 1999.

marginal mortality rate decreased slightly (from 2.03% through 1998 to 1.63% through 1999).

One reason, perhaps, for the marked increase in earlier defaults in 1999 was the unusual amount of refinancing activity that took place in 1997 and 1998 as interest rates dropped noticeably from year-end 1996 (see Figure 16 below). Since refinancing does not provide the issuer with new capital and liquidity, the usual aging effect will not be as powerful. That is, while we still observe in Figures 12-15 that the marginal rates increase for the first three or four years after issuance and then level off or fall thereafter, this phenomena is less dramatic with our most recent update.

We also note that although there is a marked increase in the first two years' marginal and cumulative mortality rates and losses in this current report, the marginal rates fell somewhat in years three and four in some rating categories. Indeed, the five-year cumulative mortality rates for BB and B rated bonds are only very slightly higher for data through 1999 than they were one year ago.

The same observations can be made for our mortality loss compilations in Figures 13 and 15. Again, the higher early mortality loss rates are a function primarily of earlier defaults but are also caused by lower recovery rates. Figures 14 and 15 demonstrate very similar results for the more recent sample period 1983-1999, based on 679 defaulting observations. Despite the heavier new issuances in the last 15 years compared to the last 30 years, the mortality rates are virtually identical.

Returns and Return Spreads

Figures 16-19 document total returns and spreads on high yield bonds versus ten-year U.S. Treasuries for the period 1978-1999, inclusive. Figure16 shows each year's

absolute return and return spread as well as the promised yield to maturity and yield spread at year-end. The high yield bond market's return spread over U.S. Treasuries was a whopping 10.14% in 1999, bringing the arithmetic average annual spread for the last 22 years to 2.88%, versus 2.53% for data through 1998. The compound average annual spread, assuming reinvestment at the end of each year, is now 2.96% per year, versus 2.57% one year earlier. Despite the relatively low aggregate return performance in 1999 for high yield bonds (1.73%), investors have now experienced almost a 3% per year spread over default risk-free Treasuries for the entire modern history of high yield bond investing. Figures 17 and 18 show these absolute and relative returns and spreads for various starting and ending years over the 1978-1999 period. And, Figure 19 indicates that a $1,000 investment in high yield bonds would have aggregated to over $11,000 by 1999, compared to slightly over $6,000 for ten-year Treasuries.

To reflect on this almost 3% return spread advantage, one must assess if this result is sufficient to compensate for both the higher liquidity risk of high yield bonds versus Treasuries and the fact that one might not achieve the average absolute return each year (12.16%). Although we only observe three instances over the last 22 years of negative returns, it is clear that there is a possibility of unexpected losses, and investors must be compensated for this risk. Unexpected losses can occur in years of lackluster performance or when a portfolio is not well diversified, and results fall short of average market performance. Publicly regulated and insured financial institutions typically are required to allocate capital against these unexpected loss possibilities while prudence guidelines for unregulated investors, such as mutual and pension funds, suggest professional standards with respect to portfolio diversification and liquidity policies.

Optimum portfolio analysis has recently become an important effort for the world's commercial banks in their trading and bank lending books[8] but little work has been published and tested for other credit asset portfolios, such as corporate bonds. We expect that greater emphasis will be put on formal portfolio models for bond investors in the coming years.

Breakeven Analysis

From our prior analyses, we have shown that a relatively simple breakeven analysis can be constructed that shows the breakeven yield (BEY) that investors must be promised in order to compensate for actual or expected default rates and recovery rates.[9] The end result is a comparison between actual yields at a point in time and the breakeven yield. This shows the yield premium (if any), at any point in time (i.e., the amount to compensate investors for risks, other than expected default risk, involved, e.g., liquidity, unexpected losses, flights to quality, etc).

When we calculate Premium above the Breakeven Yield as of December 31, 1999, assuming a 3%, 4%, or 5% default rate and various recovery rates, the results are as follows (a risk free rate = 6.44% and a high yield-to-maturity rate of 11.41% (Figure 16), the results are:

	Recovery Rate		
Default Rate	30%	40%	50%
3%	2.43%	2.74%	3.05%
4%	1.55%	1.96%	2.38%
5%	0.65%	1.17%	1.79%

[8] See A. Saunders, Credit Risk Measurement, John Wiley & Sons, New York, 1999.

[9] This formula is as follows: $BEY = \frac{R_f + D_f(1 - \mathrm{Re}\,c) + (D_f \; x \, HYC/2)}{1 - D_f}$ See E. Altman & J. Bencivenga, "A Yield Premium Model for the High Yield Debt Market," Salomon Brothers, March 15, 1995 and the Financial Analysts Journal, September/October 1995.

We can observe that under all scenarios, the breakeven yield premium is positive but, except for the 3% default rate and 50% recovery rate assumptions, in all of the scenarios the premium is below the historical return spread (2.88%, as in Figure 16). If in the year 2000, we experience essentially the same default and recovery rates as 1999 (4.2% and about 30%), then the expected return spread will be about 1.55% -- considerably below the actual average return spread. If, on the other hand, default rates dip to about 3% and recovery rates are normal (40%) or above average (50%), then the resulting premium is near or above the historic average. As we will now demonstrate, a reasonable default rate forecast for 2000 is slightly below 3% of a market size of about $600-$650 billion. This forecast makes no specific forecast about the nation's economic growth, interest rates, or stock market levels. If one or more of these important exogenous factors collapses, default rates will probably increase from our forecasted level.

Default Forecast for 2000-2002

Forecasting defaults is always a tricky exercise, but one that is necessary in order to understand the dynamics of a risky security market, like high yield bonds. One might try to forecast micro and macro-economic variables, as well as the term structure of default rates, or simply examine the historical experience that we can observe and therefore feel more confident about. We embrace the latter methodology in our attempt to forecast default levels over the next three years (2000-2002).

We observe the amount of new issuance by initial S&P bond rating over the last ten-years (Figure 10), extrapolate the average historical issuance for the years 2000 and 2001, and apply these amounts to the marginal mortality rate results from Figure 12. The

end result is a dollar amount of public bond, and domestic default forecast of $17.5 billion, $20.54 billion, and $21.86 billion for the next three years (Figure 20). If we add in expected defaults from the newly emerging European market ($0.752 billion),[10] the aggregate total for 2000 is slightly above $18.0 billion – a default rate of slightly below 3% on a $650 billion combined market – a reasonable expected size of the U.S. and European markets for next year. For domestic markets alone, the $17.5 billion results in a 2.82% default rate for 2000, on a $620 billion base.

If we assume a 2.4 to 1 ratio of private debt (mainly bank and private placement debt) to public debt (bonds), the anticipated amount of private debt defaults in 2000 is about $42 billion and over $140 billion in the next three years.[11] We will continue to investigate the 2.4 to 1.0 private/public debt ratio as 1999 balance sheets become available. In terms of market values, Figure 21 assumes a 40% of face value price at default for public debt and 70% for private debt. The aggregate supply of new public high yield bond defaults, measured in anticipated market values, is therefore $7 billion for 2000 and $24 billion for the next three years combined. Private debt defaults could contribute an additional $100 billion.

[10] See D. Newman, T. Crawley and G. Peters, "Assessing Fair Value of European High Yield: Recovery or WipeOut," Salomon Smith Barney, London and New York, January 2000. They predict 2.05% European default rate in 2000.

[11] See our companion report E. Altman and P. Masset, "Market Size, Investment Performance and Expected Supply of Defaulted Bonds and Bank Loans: 1987-1999," January 2000.

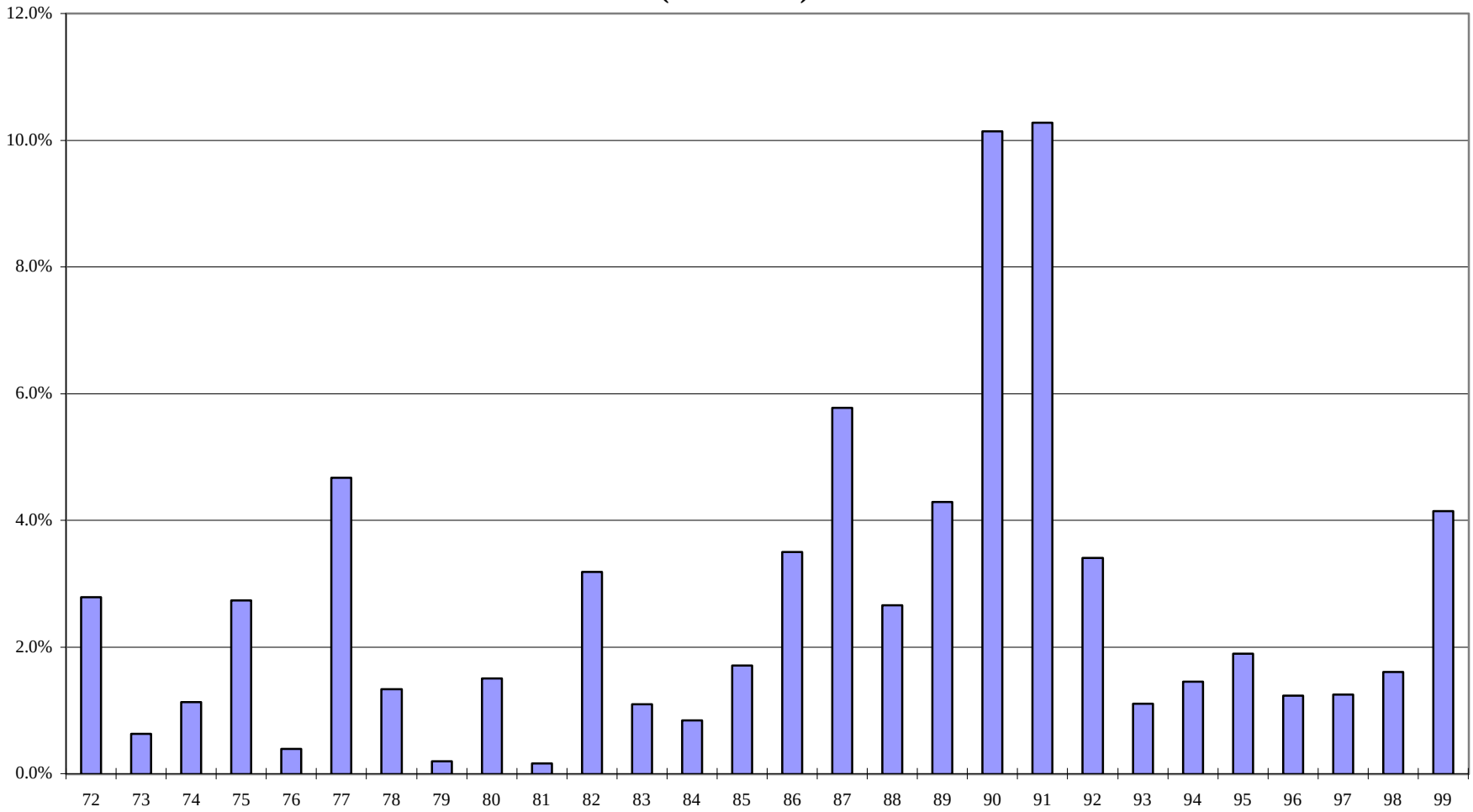
FIGURE 1
HISTORICAL DEFAULT RATES - STRAIGHT BONDS ONLY
EXCLUDING DEFAULTED ISSUES FROM PAR VALUE OUTSTANDING
1971 - 1999 ($ MILLIONS)

YEAR	PAR VALUE OUTSTANDING (a)	PAR VALUE DEFAULTS	DEFAULT RATES	
1999	$567,400	$23,532	4.147%	
1998	$465,500	$7,464	1.603%	
1997	$335,400	$4,200	1.252%	
1996	$271,000	$3,336	1.231%	
1995	$240,000	$4,551	1.896%	
1994	$235,000	$3,418	1.454%	
1993	$206,907	$2,287	1.105%	
1992	$163,000	$5,545	3.402%	
1991	$183,600	$18,862	10.273%	
1990	$181,000	$18,354	10.140%	
1989	$189,258	$8,110	4.285%	
1988	$148,187	$3,944	2.662%	
1987	$129,557	$7,486	5.778%	
1986	$90,243	$3,156	3.497%	
1985	$58,088	$992	1.708%	
1984	$40,939	$344	0.840%	
1983	$27,492	$301	1.095%	
1982	$18,109	$577	3.186%	
1981	$17,115	$27	0.158%	
1980	$14,935	$224	1.500%	
1979	$10,356	$20	0.193%	
1978	$8,946	$119	1.330%	
1977	$8,157	$381	4.671%	
1976	$7,735	$30	0.388%	
1975	$7,471	$204	2.731%	
1974	$10,894	$123	1.129%	
1973	$7,824	$49	0.626%	
1972	$6,928	$193	2.786%	
1971	$6,602	$82	1.242%	Standard Deviation
ARITHMETIC AVERAGE DEFAULT RATE		1971 TO 1999	2.631%	2.487%
		1978 TO 1999	2.852%	2.705%
		1985 TO 1999	3.629%	2.900%
WEIGHTED AVERAGE DEFAULT RATE (b)		1971 TO 1999	3.224%	2.902%
		1978 TO 1999	3.244%	2.681%
		1985 TO 1999	3.327%	2.696%
MEDIAN ANNUAL DEFAULT RATE		1971 TO 1999	1.603%	

Notes
(a) As of mid-year.
(b) Weighted by par value of amount outstanding for each year.

Source: Authors' Compilation and Salomon Smith Barney Estimates

FIGURE 2
HISTORICAL DEFAULT RATE, HIGH YIELD BOND MARKET
(1971 - 1999)



Source: Figure 1

FIGURE 3
1999 DEFAULT LOSS RATE

BACKGROUND DATA	
AVERAGE DEFAULT RATE 1999	4.147%
AVERAGE PRICE AT DEFAULT (a)	27.933%
AVERAGE LOSS OF PRINCIPAL	72.067%
AVERAGE COUPON PAYMENT	10.553%
DEFAULT LOSS COMPUTATION	
DEFAULT RATE	4.147%
X LOSS OF PRINCIPAL	72.067%
DEFAULT LOSS OF PRINCIPAL	2.989%
DEFAULT RATE	4.147%
X LOSS OF 1/2 COUPON	5.277%
DEFAULT LOSS OF COUPON	0.219%
DEFAULT LOSS OF PRINCIPAL AND COUPON	**3.208%**

(a) If default date price is not available, end-of-month price is used.

Source: Figure 1, authors' compilations, and various dealer price quotes.

FIGURE 4
DEFAULT RATES AND LOSSES (a)
(1978 - 1999)

YEAR	PAR VALUE OUTSTANDING (a) ($ MMs)	PAR VALUE OF DEFAULT ($ MMs)	DEFAULT RATE (%)	WEIGHTED PRICE AFTER DEFAULT	WEIGHTED COUPON (%)	DEFAULT LOSS (%)
1999	$567,400	$23,532	4.15%	$27.9	10.55%	3.21%
1998	$465,500	$7,464	1.60%	$35.9	9.46%	1.10%
1997	$335,400	$4,200	1.25%	$54.2	11.87%	0.65%
1996	$271,000	$3,336	1.23%	$51.9	8.92%	1.10%
1995	$240,000	$4,551	1.90%	$40.6	11.83%	1.24%
1994	$235,000	$3,418	1.45%	$39.4	10.25%	0.96%
1993	$206,907	$2,287	1.11%	$56.6	12.98%	0.56%
1992	$163,000	$5,545	3.40%	$50.1	12.32%	1.91%
1991	$183,600	$18,862	10.27%	$36.0	11.59%	7.16%
1990	$181,000	$18,354	10.14%	$23.4	12.94%	8.42%
1989	$189,258	$8,110	4.29%	$38.3	13.40%	2.93%
1988	$148,187	$3,944	2.66%	$43.6	11.91%	1.66%
1987	$129,557	$7,486	5.78%	$75.9	12.07%	1.74%
1986	$90,243	$3,156	3.50%	$34.5	10.61%	2.48%
1985	$58,088	$992	1.71%	$45.9	13.69%	1.04%
1984	$40,939	$344	0.84%	$48.6	12.23%	0.48%
1983	$27,492	$301	1.09%	$55.7	10.11%	0.54%
1982	$18,109	$577	3.19%	$38.6	9.61%	2.11%
1981	$17,115	$27	0.16%	$12.0	15.75%	0.15%
1980	$14,935	$224	1.50%	$21.1	8.43%	1.25%
1979	$10,356	$20	0.19%	$31.0	10.63%	0.14%
1978	$8,946	$119	1.33%	$60.0	8.38%	0.59%
ARITHMETIC AVERAGE 1978-1999:			2.85%	$41.9	11.34%	1.88%
WEIGHTED AVERAGE 1978-1999:			3.24%			2.24%

Notes
(a) Excludes defaulted issues.

Source: Figures 1 and 3.

FIGURE 5
WEIGHTED AVERAGE RECOVERY RATES ON DEFAULTED DEBT
BY SENIORITY PER $100 FACE AMOUNT (1978 - 1999)

Default Year	Senior Secured		Senior Unsecured		Senior Subordinated		Subordinated		Discount and Zero Coupon		All Seniorities	
	No.	$	No.	$	No.	$	No.	$	No.	$	No.	$
1999	1	$28.06	1	$39.54	1	$22.86	2	$13.88	11	$6.26	16	$28.66
1998	6	$70.38	21	$39.57	6	$17.54	0	0	1	$17.00	34	$37.27
1997	4	$74.90	12	$70.94	6	$31.89	1	$60.00	2	$19.00	25	$53.89
1996	4	$59.08	4	$50.11	9	$48.99	4	$44.23	3	$11.99	24	$51.91
1995	5	$44.64	9	$50.50	17	$39.01	1	$20.00	1	$17.50	33	$41.77
1994	5	$48.66	8	$51.14	5	$19.81	3	$37.04	1	$5.00	22	$39.44
1993	2	$55.75	7	$33.38	10	$51.50	9	$28.38	4	$31.75	32	$38.83
1992	15	$59.85	8	$35.61	17	$58.20	22	$49.13	5	$19.82	67	$50.03
1991	4	$44.12	69	$55.84	37	$31.91	38	$24.30	9	$27.89	157	$40.67
1990	12	$32.18	31	$29.02	38	$25.01	24	$18.83	11	$15.63	116	$24.66
1989	9	$82.69	16	$53.70	21	$19.60	30	$23.95			76	$35.97
1988	13	$67.96	19	$41.99	10	$30.70	20	$35.27			62	$43.45
1987	4	$90.68	17	$72.02	6	$56.24	4	$35.25			31	$66.63
1986	8	$48.32	11	$37.72	7	$35.20	30	$33.39			56	$36.60
1985	2	$74.25	3	$34.81	7	$36.18	15	$41.45			27	$41.78
1984	4	$53.42	1	$50.50	2	$65.88	7	$44.68			14	$50.62
1983	1	$71.00	3	$67.72			4	$41.79			8	$55.17
1982			16	$39.31			4	$32.91			20	$38.03
1981	1	$72.00									1	$72.00
1980			2	$26.71			2	$16.63			4	$21.67
1979							1	$31.00			1	$31.00
1978			1	$60.00							1	$60.00
Total/Average	100	$59.07	259	$48.08	199	$34.40	221	$31.55	48	$17.32	827	$40.19
Median		$59.47		$46.05		$33.56		$33.15		$17.25		$41.22

Source: Authors' compilation from various dealer quotes

Exhibit 6

AVERAGE PRICE AFTER DEFAULT BY ORIGINAL BOND RATING
(1971 - 1999)

Rating	No. of Observations	Average Price	Weighted Average Price	Median Price	Std. Dev.	Minimum Price	Maximum Price
AAA	7	$68.34	$76.99	$71.88	$20.82	$32.00	$97.00
AA	20	$59.59	$76.52	$54.25	$24.59	$17.80	$99.88
A	65	$62.07	$51.86	$62.00	$24.86	$10.50	$100.00
BBB	98	$45.59	$43.41	$46.00	$23.79	$2.00	$103.00
BB	91	$40.11	$40.25	$37.00	$22.05	$1.00	$98.75
B	495	$36.82	$34.67	$33.00	$24.66	$0.50	$112.00
CCC	127	$38.19	$35.49	$31.00	$27.18	$1.00	$103.25
Total	903	$40.86	$38.43	$36.50	$25.76	$0.50	$112.00

Source: Authors' Compilation

Figure 7

RATING DISTRIBUTION OF DEFAULTED ISSUES (a)
AT VARIOUS POINTS PRIOR TO DEFAULT
(1971-1999)

	ORIGINAL RATING		RATING ONE YEAR PRIOR TO DEFAULT		RATING ONE YEAR PRIOR TO DEFAULT	
	Number	Percentage	Number	Percentage	Number	Percentage
AAA	5	0.6%	0	0.0%	0	0.0%
AA	25	2.8%	0	0.0%	0	0.0%
A	69	7.6%	12	1.4%	2	0.2%
BBB	96	10.6%	52	6.2%	45	5.6%
Total Investment Grade	195	21.6%	64	7.6%	47	5.8%
BB	101	11.2%	85	10.1%	76	9.4%
B	475	52.6%	450	53.3%	409	50.8%
CCC	128	14.2%	224	26.5%	225	28.0%
CC	4	0.4%	15	1.8%	41	5.1%
C	0	0.0%	7	0.8%	7	0.9%
Total Noninvestment Grad	708	78.4%	781	92.4%	758	94.2%
TOTAL	903	100%	845	100%	805	100%

(a) Based on Standard & Poor's Bond Ratings

Source: Authors' Compilation

Figure 8

WEIGHTED AVERAGE PRICE AT DEFAULT BY NUMBER OF YEARS AFTER ISSUANCE (1971 - 1999)

Years To Default	No. of Observations	Average Price	Weighted Avg. Price	Median Price	Standard Deviation
1	62	$37.10	$38.85	$31.75	$24.45
2	135	$35.19	$32.02	$31.30	$22.30
3	144	$38.23	$35.59	$34.31	$25.83
4	136	$41.99	$41.90	$39.00	$24.90
5	112	$42.25	$40.65	$36.50	$27.30
6	88	$40.12	$53.38	$36.25	$26.33
7	52	$38.22	$41.66	$37.75	$24.16
8	35	$37.89	$36.42	$27.50	$27.07
9	19	$41.99	$50.22	$33.00	$27.34
10	27	$37.65	$41.29	$32.00	$22.78
All	810	$39.08	$37.81	$35.00	$25.15

Source: Authors' Compilation

Figure 9

Distribution of Years to Default From Original Issuance Date
(By Year of Default)
(1989 - 1999)

Years to Default	1989		1990		1991		1992		1993		1994		1995		1996		1997		1998		1999	
	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total	No. of Issues	% of Total
1	4	26%	3	3%	0	0%	0	0%	0	0%	3	20%	1	3%	2	8%	5	20%	2	6%	32	26%
2	12	30%	25	23%	18	13%	0	0%	1	5%	5	33%	9	28%	3	13%	4	16%	5	15%	37	30%
3	15	12%	23	21%	26	19%	7	13%	0	0%	5	33%	7	22%	3	13%	4	16%	10	30%	15	12%
4	13	11%	18	17%	29	21%	10	19%	2	9%	0	0%	3	9%	8	33%	9	36%	3	9%	14	11%
5	1	6%	23	21%	35	26%	8	15%	4	18%	0	0%	1	3%	1	4%	3	12%	10	30%	7	6%
6	7	6%	5	5%	10	7%	12	22%	6	27%	2	13%	2	6%	5	21%	0	0%	2	6%	8	6%
7	7	8%	5	5%	4	3%	5	9%	7	32%	0	0%	2	6%	0	0%	0	0%	1	3%	10	8%
8	2	2%	4	4%	10	7%	4	7%	0	0%	0	0%	2	6%	0	0%	0	0%	0	0%	2	2%
9	1	0%	1	1%	3	2%	0	0%	0	0%	0	0%	4	13%	0	0%	0	0%	0	0%	0	0%
10	3	0%	1	1%	2	1%	8	15%	2	9%	0	0%	1	3%	2	8%	0	0%	0	0%	0	0%
Total	125	100%	108	100%	137	100%	54	100%	22	100%	15	100%	32	100%	24	100%	25	100%	33	100%	125	100%

Source: Authors' Compilation

Figure 10

Original Issuance of Corporate Bonds by S&P Rating
($ Millions)
(1990 - 1999)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
AAA	$9,080	$24,135	$25,344	$25,257	$32,252	$23,606	$29,042	$3,471	$6,892	$35,173	$214,251
AA	$23,010	$32,506	$40,270	$56,440	$34,154	$38,559	$53,206	$20,247	$30,345	$9,812	$338,548
A	$31,138	$73,802	$89,096	$124,883	$102,833	$127,499	$159,112	$65,624	$101,612	$23,614	$899,212
BBB	$13,037	$22,541	$46,084	$60,068	$35,051	$43,669	$56,839	$57,659	$88,448	$35,640	$459,036
Total Inv	$76,264	$152,985	$200,794	$266,649	$204,290	$233,333	$298,198	$147,001	$227,296	$104,239	$1,911,047
BB	$913	$7,148	$12,085	$15,786	$10,999	$12,402	$17,135	$29,321	$42,671	$28,000	$176,459
B	$375	$2,183	$22,395	$28,694	$17,883	$11,026	$36,629	$73,361	$75,480	$61,500	$329,525
CCC	$446	$316	$575	$1,176	$2,265	$1,023	$1,475	$4,036	$9,326	$3,400	$24,036
Total Noı	$1,734	$9,646	$35,055	$45,656	$31,147	$24,451	$55,238	$106,718	$127,476	$92,900	$530,020
Total	**$77,998**	**$162,631**	**$235,849**	**$312,304**	**$235,437**	**$257,784**	**$353,436**	**$253,719**	**$354,772**	**$197,139**	**$2,441,067**

Source: Securities Data Corporation and Salomon Smith Barney

Figure 11

Original Issuance of Corporate Bonds by Rating, Percentage of Issuance

(1990 - 1999)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
AAA	11.6%	14.8%	10.7%	8.1%	13.7%	9.2%	8.2%	1.4%	1.9%	17.8%	8.8%
AA	29.5%	20.0%	17.1%	18.1%	14.5%	15.0%	15.1%	8.0%	8.6%	5.0%	13.9%
A	39.9%	45.4%	37.8%	40.0%	43.7%	49.5%	45.0%	25.9%	28.6%	12.0%	36.8%
BBB	16.7%	13.9%	19.5%	19.2%	14.9%	16.9%	16.1%	22.7%	24.9%	18.1%	18.8%
Total Inv	97.8%	94.1%	85.1%	85.4%	86.8%	90.5%	84.4%	57.9%	64.1%	52.9%	78.3%
BB	1.2%	4.4%	5.1%	5.1%	4.7%	4.8%	4.8%	11.6%	12.0%	14.2%	7.2%
B	0.5%	1.3%	9.5%	9.2%	7.6%	4.3%	10.4%	28.9%	21.3%	31.2%	13.5%
CCC	0.6%	0.2%	0.2%	0.4%	1.0%	0.4%	0.4%	1.6%	2.6%	1.7%	1.0%
Total Noı	2.2%	5.9%	14.9%	14.6%	13.2%	9.5%	15.6%	42.1%	35.9%	47.1%	21.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Securities Data Corporation and Salomon Smith Barney

Figure 12

MORTALITY RATES BY ORIGINAL RATING - ALL RATED CORPORATE BONDS*

(1971 - 1999)

Years after issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Yearly	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%
AA	Yearly	0.00%	0.00%	0.36%	0.20%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%
	Cumulative	0.00%	0.00%	0.36%	0.56%	0.56%	0.56%	0.57%	0.57%	0.60%	0.62%
A	Yearly	0.00%	0.00%	0.03%	0.08%	0.04%	0.08%	0.05%	0.09%	0.07%	0.00%
	Cumulative	0.00%	0.00%	0.03%	0.11%	0.15%	0.23%	0.29%	0.38%	0.45%	0.45%
BBB	Yearly	0.07%	0.25%	0.27%	0.53%	0.32%	0.32%	0.35%	0.06%	0.06%	0.24%
	Cumulative	0.07%	0.32%	0.58%	1.12%	1.43%	1.75%	2.09%	2.15%	2.20%	2.44%
BB	Yearly	0.71%	0.81%	2.65%	1.41%	2.35%	0.80%	1.71%	0.30%	1.45%	3.03%
	Cumulative	0.71%	1.51%	4.12%	5.47%	7.69%	8.44%	10.00%	10.27%	11.58%	14.25%
B	Yearly	1.58%	3.92%	4.88%	5.78%	4.62%	3.65%	2.38%	1.77%	1.54%	0.92%
	Cumulative	1.58%	5.43%	10.05%	15.25%	19.17%	22.12%	23.98%	25.33%	26.48%	27.15%
CCC	Yearly	1.63%	13.60%	15.16%	8.27%	3.05%	8.96%	4.02%	3.36%	0.00%	3.56%
	Cumulative	1.63%	15.01%	27.89%	33.86%	36.07%	42.21%	44.53%	46.39%	46.39%	48.38%

*** Rated by S & P at Issuance**
Based on 802 issues
Source: Standard & Poor's (New York) and Authors' Compilation

Figure13

MORTALITY LOSSES BY ORIGINAL RATING - ALL RATED CORPORATE BONDS*

(1971 - 1999)

Years after issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Yearly	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
AA	Yearly	0.00%	0.00%	0.07%	0.07%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%
	Cumulative	0.00%	0.00%	0.07%	0.15%	0.15%	0.15%	0.15%	0.15%	0.17%	0.18%
A	Yearly	0.00%	0.00%	0.01%	0.05%	0.03%	0.06%	0.02%	0.05%	0.04%	0.00%
	Cumulative	0.00%	0.00%	0.01%	0.06%	0.09%	0.15%	0.18%	0.23%	0.27%	0.27%
BBB	Yearly	0.07%	0.15%	0.15%	0.28%	0.16%	0.20%	0.28%	0.04%	0.04%	0.17%
	Cumulative	0.07%	0.22%	0.37%	0.65%	0.81%	1.00%	1.28%	1.32%	1.35%	1.52%
BB	Yearly	0.40%	0.55%	1.99%	1.00%	1.22%	0.65%	1.05%	0.14%	0.81%	1.64%
	Cumulative	0.40%	0.95%	2.92%	3.90%	5.07%	5.69%	6.68%	6.81%	7.56%	9.08%
B	Yearly	1.07%	2.89%	3.89%	3.92%	3.33%	2.12%	1.45%	1.31%	0.82%	0.63%
	Cumulative	1.07%	3.92%	7.66%	11.28%	14.23%	16.05%	17.27%	18.36%	19.02%	19.53%
CCC	Yearly	0.96%	10.94%	10.61%	4.99%	1.97%	6.17%	3.59%	2.67%	0.00%	2.96%
	Cumulative	0.96%	11.79%	21.15%	25.08%	26.56%	31.09%	33.57%	35.34%	35.34%	37.26%

*** Rated by S & P at Issuance**
Based on 681 issues
Source: Standard & Poor's (New York) and Authors' Compilation

Figure 14

MORTALITY RATES BY ORIGINAL RATING - ALL RATED CORPORATE BONDS*

(1983 - 1999)

Years after issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Yearly	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
AA	Yearly	0.00%	0.00%	0.44%	0.23%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.44%	0.67%	0.67%	0.67%	0.67%	0.67%	0.67%	0.67%
A	Yearly	0.00%	0.00%	0.03%	0.09%	0.05%	0.03%	0.04%	0.05%	0.04%	0.00%
	Cumulative	0.00%	0.00%	0.03%	0.12%	0.17%	0.21%	0.24%	0.29%	0.34%	0.34%
BBB	Yearly	0.08%	0.24%	0.26%	0.58%	0.30%	0.30%	0.33%	0.04%	0.00%	0.00%
	Cumulative	0.08%	0.32%	0.58%	1.16%	1.46%	1.75%	2.08%	2.12%	2.12%	2.12%
BB	Yearly	0.73%	0.83%	2.69%	1.32%	2.49%	0.66%	1.72%	0.33%	1.73%	0.84%
	Cumulative	0.73%	1.55%	4.20%	5.46%	7.81%	8.41%	9.99%	10.29%	11.84%	12.58%
B	Yearly	1.60%	3.96%	4.97%	5.69%	4.65%	3.35%	2.27%	1.11%	0.72%	0.52%
	Cumulative	1.60%	5.50%	10.19%	15.30%	19.24%	21.95%	23.72%	24.56%	25.10%	25.49%
CCC	Yearly	1.80%	13.60%	15.16%	8.27%	3.95%	12.83%	4.02%	4.80%	0.00%	0.00%
	Cumulative	1.80%	15.15%	28.02%	33.97%	36.07%	42.21%	44.53%	46.39%	46.39%	48.38%

*** Rated by S & P at Issuance**
Based on 679 issues
Source: Standard & Poor's (New York) and Authors' Compilation

Figure 15

MORTALITY LOSSES BY ORIGINAL RATING - ALL RATED CORPORATE BONDS*

(1983 - 1999)

Years after issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Yearly	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
AA	Yearly	0.00%	0.00%	0.09%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.09%	0.17%	0.17%	0.17%	0.17%	0.17%	0.17%	0.17%
A	Yearly	0.00%	0.00%	0.01%	0.06%	0.03%	0.02%	0.01%	0.03%	0.03%	0.00%
	Cumulative	0.00%	0.00%	0.01%	0.07%	0.11%	0.12%	0.14%	0.16%	0.19%	0.19%
BBB	Yearly	0.07%	0.15%	0.14%	0.31%	0.15%	0.17%	0.26%	0.03%	0.00%	0.00%
	Cumulative	0.07%	0.22%	0.36%	0.67%	0.82%	0.99%	1.25%	1.28%	1.28%	1.28%
BB	Yearly	0.41%	0.56%	2.01%	0.97%	1.30%	0.55%	1.03%	0.16%	0.96%	0.69%
	Cumulative	0.41%	0.97%	2.96%	3.91%	5.15%	5.67%	6.64%	6.79%	7.69%	8.32%
B	Yearly	1.08%	2.92%	3.96%	3.85%	3.35%	1.95%	1.36%	0.90%	0.26%	0.30%
	Cumulative	1.08%	3.97%	7.77%	11.31%	14.29%	15.96%	17.10%	17.85%	18.06%	18.31%
CCC	Yearly	1.06%	10.94%	10.61%	4.98%	2.55%	8.82%	3.60%	4.56%	0.00%	0.00%
	Cumulative	1.06%	11.88%	21.23%	25.15%	27.07%	33.50%	35.89%	38.81%	38.81%	38.81%

*** Rated by S & P at Issuance**
Based on 679 issues
Source: Standard & Poor's (New York) and Authors' Compilation

FIGURE 16
ANNUAL RETURNS, YIELDS AND SPREADS ON TEN-YEAR TREASURY (TREAS) AND HIGH YIELD (HY) BONDS (1978 - 1999)

	RETURN(%)			PROMISED YIELD(%)*		
YEAR	HY	TREAS	SPREAD	HY	TREAS	SPREAD
1999	1.73	(8.41)	10.14	11.41	6.44	4.97
1998	4.04	12.77	(8.73)	10.04	4.65	5.39
1997	14.27	11.16	3.11	9.20	5.75	3.45
1996	11.24	0.04	11.20	9.58	6.42	3.16
1995	22.40	23.58	(1.18)	9.76	5.58	4.18
1994	(2.55)	(8.29)	5.74	11.50	7.83	3.67
1993	18.33	12.08	6.25	9.08	5.80	3.28
1992	18.29	6.50	11.79	10.44	6.69	3.75
1991	43.23	17.18	26.05	12.56	6.70	5.86
1990	(8.46)	6.88	(15.34)	18.57	8.07	10.50
1989	1.98	16.72	(14.74)	15.17	7.93	7.24
1988	15.25	6.34	8.91	13.70	9.15	4.55
1987	4.57	(2.67)	7.24	13.89	8.83	5.06
1986	16.50	24.08	(7.58)	12.67	7.21	5.46
1985	26.08	31.54	(5.46)	13.50	8.99	4.51
1984	8.50	14.82	(6.32)	14.97	11.87	3.10
1983	21.80	2.23	19.57	15.74	10.70	5.04
1982	32.45	42.08	(9.63)	17.84	13.86	3.98
1981	7.56	0.48	7.08	15.97	12.08	3.89
1980	(1.00)	(2.96)	1.96	13.46	10.23	3.23
1979	3.69	(0.86)	4.55	12.07	9.13	2.94
1978	7.57	(1.11)	8.68	10.92	8.11	2.81
ARITHMETIC ANNUAL AVERAGE:						
1978-1999	12.16	9.28	2.88	12.82	8.27	4.55
COMPOUND ANNUAL AVERAGE:						
1978-1999	11.54	8.58	2.96			

* End of year yields.

Source: Salomon Smith Barney Inc.'s High Yield Market Index.

FIGURE 17
COMPOUND AVERAGE ANNUAL RETURNS OF HIGH YIELD BONDS (%)
1978-1999

BASE PERIOD (JAN 1)	TERMINAL PERIOD (DECEMBER 31)																					
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1978	7.57	5.61	3.36	4.39	9.48	11.45	11.02	12.80	13.21	12.31	12.58	11.65	9.96	12.05	12.46	12.82	11.85	12.41	12.35	12.45	12.03	11.54
1979		3.69	1.32	3.36	9.97	12.24	11.61	13.57	13.93	12.85	13.09	12.03	10.16	12.41	12.82	13.18	12.12	12.70	12.62	12.71	12.26	11.73
1980			(1.00)	3.19	12.14	14.48	13.26	15.30	15.47	14.05	14.18	12.90	10.77	13.17	13.55	13.89	12.71	13.29	13.17	13.23	12.73	12.15
1981				7.56	19.36	20.17	17.14	18.87	18.47	16.38	16.24	14.56	12.02	14.55	14.86	15.12	13.76	14.32	14.12	14.13	13.54	12.89
1982					32.45	27.01	20.52	21.88	20.79	17.92	17.53	15.47	12.53	15.27	15.54	15.77	14.25	14.81	14.57	14.55	13.91	13.19
1983						21.80	14.96	18.55	18.04	15.21	15.22	13.23	10.26	13.51	13.98	14.37	12.85	13.56	13.39	13.45	12.84	12.15
1984							8.50	16.96	16.81	13.62	13.94	11.86	8.70	12.51	13.14	13.65	12.07	12.90	12.77	12.88	12.26	11.57
1985								26.08	21.20	15.38	15.35	12.54	8.73	13.10	13.73	14.24	12.43	13.31	13.13	13.22	12.54	11.78
1986									16.50	10.37	11.98	9.39	5.56	11.07	12.07	12.84	11.01	12.10	12.02	12.21	11.56	10.83
1987										4.57	9.78	7.12	2.99	10.01	11.35	12.32	10.35	11.62	11.59	11.83	11.16	10.40
1988											15.25	8.41	2.47	11.42	12.76	13.67	11.20	12.54	12.39	12.58	11.78	10.90
1989												1.98	(3.38)	10.17	12.14	13.35	10.53	12.16	12.04	12.29	11.43	10.51
1990													(8.46)	14.50	15.75	16.39	12.33	13.95	13.56	13.65	12.54	11.41
1991														43.23	30.16	26.09	18.23	19.05	17.71	17.21	15.48	13.86
1992															18.29	18.31	10.90	13.67	13.18	13.36	11.98	10.64
1993																18.33	7.38	12.17	11.94	12.40	10.96	9.59
1994																	(2.55)	9.21	9.89	10.97	9.54	8.20
1995																		22.40	16.69	15.88	12.80	10.49
1996																			11.24	12.74	9.77	7.70
1997																				14.27	9.04	6.54
1998																					4.04	2.88
1999																						1.73

Source: Salomon Smith Barney Composite Index; Edward I. Altman, New York University Salomon Center

FIGURE 18
COMPOUND ANNUAL RETURN SPREADS BETWEEN HIGH YIELD AND LT GOVERNMENT BONDS (%)
1978-1999

BASE PERIOD (JAN 1)	TERMINAL PERIOD (DECEMBER 31)																					
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1978	8.68	6.60	5.01	5.51	3.17	5.82	4.13	3.10	1.99	2.57	3.15	1.64	0.19	1.77	2.43	2.66	2.88	2.68	3.15	3.14	2.57	2.96
1979		4.55	3.23	4.48	1.71	5.22	3.32	2.23	1.08	1.84	2.55	0.94	(0.57)	1.20	1.95	2.23	2.49	2.29	2.81	2.83	2.24	2.67
1980			1.96	4.45	0.67	5.39	3.05	1.79	0.51	1.46	2.30	0.54	(1.08)	0.88	1.73	2.04	2.34	2.14	2.70	2.72	2.10	2.56
1981				7.08	(0.13)	6.74	3.36	1.75	0.22	1.37	2.35	0.36	(1.43)	0.77	1.70	2.05	2.37	2.15	2.75	2.77	2.42	2.60
1982					(9.63)	6.49	1.93	0.18	(1.39)	0.29	1.59	(0.58)	(2.46)	0.07	1.16	1.58	1.97	1.76	2.44	2.48	1.79	2.33
1983						19.57	6.62	2.97	0.39	1.94	3.13	0.49	(1.73)	0.96	2.05	2.42	2.75	2.48	3.14	3.13	2.37	2.90
1984							(6.32)	(5.94)	(6.48)	(2.59)	(0.22)	(2.73)	(4.75)	(1.40)	0.08	0.68	1.23	1.04	1.87	1.96	1.23	1.86
1985								(5.46)	(6.56)	(1.30)	1.34	(2.00)	(4.50)	(0.69)	0.89	1.47	1.98	1.72	2.56	2.60	1.76	2.40
1986									(7.58)	0.48	3.28	(1.26)	(4.32)	0.00	1.67	2.23	2.68	2.33	3.18	3.17	2.24	2.88
1987										7.24	8.05	0.61	(3.61)	1.38	3.08	3.51	3.84	3.34	4.16	4.06	2.98	3.61
1988											8.91	(2.99)	(7.41)	(0.24)	2.15	2.82	3.31	2.80	3.78	3.71	2.56	3.28
1989												(14.74)	(15.07)	(3.32)	0.44	1.58	2.38	1.93	3.14	3.14	1.93	2.77
1990													(15.34)	2.59	5.68	5.82	5.82	4.76	5.73	5.41	3.80	4.52
1991														26.05	18.45	14.26	11.80	9.40	9.72	8.78	6.51	6.98
1992															11.79	9.06	7.84	5.83	6.94	6.32	4.14	4.98
1993																6.25	6.00	3.87	5.76	5.25	2.89	4.05
1994																	5.74	2.76	5.61	5.01	2.26	3.71
1995																		(1.18)	5.50	4.69	1.22	3.23
1996																			11.20	7.29	1.93	4.17
1997																				3.11	(2.93)	1.83
1998																					(8.73)	1.25
1999																						10.14

Source: Salomon Smith Barney Composite Index; Edward I. Altman, New York University Salomon Center

FIGURE 19
Cumulative Value of $1,000 Investment: 1978 - 1999
High Yield Bonds Vs. 10-Year U.S. T-Bonds

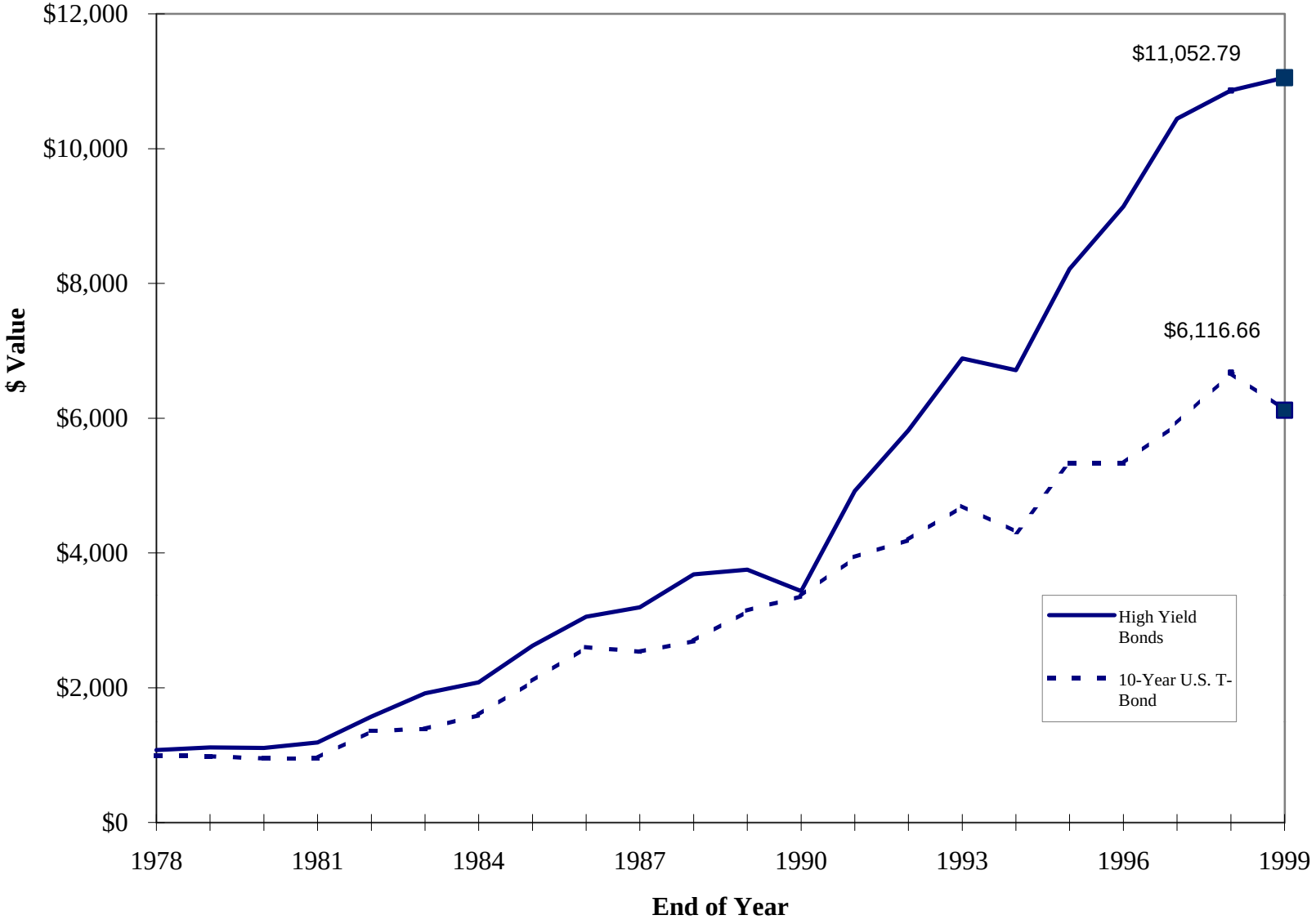


Figure 20
Expected Supply of New Defaulted Debt: US Only
(Face Value - Public and Private Markets: 2000 - 2002)
($ Billions)

	2000	2001	2002	Total
Public Defaulted Debt	**$17.51**	**$20.54**	**$21.86**	**$59.90**
Private Defaulted Debt*	**$42.02**	**$49.29**	**$52.46**	**$143.76**
Total Defaulted Debt	**$59.52**	**$69.83**	**$74.31**	**$203.67**

Estimates are based on marginal mortality rates, new corporate (Figure 9), actual and expected new corporate bond issues by bond rating (average of last 5 years.

*** Assumes Private/Public ratio of 2.4**

Source: New Issues by Bond Rating Compilation from Salomon Smith Barney Inc. and SDC Group

Figure 21
Expected Supply of New Defaulted Debt (U.S. Only, 2000-2002)
($ Billions)

Debt Type	Defaulted Debt Par Value	Defaulted Debt Market Value*
Public Straight Debt	$21.86	$8.74
Private Senior Debt**	$52.46	$36.72
Total Defaulted Debt	$74.31	$45.46

*** Assumes market value at default 40% of face value for Public debt and at 70% of face value for Private debt.**

**** Assumes a ratio of 2.4:1 of private to public debt.**

Source: New Issues by Bond Rating Compilation from Salomon Smith Barney Inc. and SDC Group

Appendix E

WEIGHTED AVERAGE RECOVERY RATES BY INDUSTRY

(1971 - 1999)

Industry	Sample	Weighted Avg. Price	Avg. Price	Price Range Low	Price Range High	Std.Dev.	Median
Mining	50	$28.60	$31.88	$9.50	$99.00	$17.81	$32.00
Food & Kindred Products, Tobacco	25	$37.17	$43.49	$14.50	$88.50	$19.28	$43.75
Textile Mill, Apparel & Related Products	42	$35.83	$34.85	$5.00	$89.30	$18.21	$32.88
Lumber, Wood Products, Furniture & Fixtures, Paper & Allied Products	13	$27.22	$32.50	$2.00	$75.00	$23.26	$43.50
Chemical, Petroleum & Energy, Rubber, Plastic & Leather Products	57	$57.93	$54.41	$12.00	$98.75	$27.27	$66.50
Stone, Clay, Glass, Concrete, Metals & Fabricated Products	84	$28.72	$37.54	$2.00	$101.50	$23.02	$33.75
Machinery, Electrical, Electronic & Transportation Equipment, Instruments & Related Products	60	$36.77	$51.39	$4.40	$86.00	$22.37	$41.25
Miscellaneous & Diversified Manufacturing	29	$28.76	$37.25	$1.00	$94.13	$26.40	$30.50
Transportation (Rail Road, Bus, Air, Water, Freight), Pipiline & Transportation Services	59	$39.05	$41.32	$5.00	$103.25	$28.44	$38.00
Printing & Publishing, Communication, and Movie Production	77	$30.76	$35.45	$3.75	$97.00	$21.26	$32.00
Utilities	57	$61.56	$70.01	$17.75	$99.88	$19.78	$79.00
Wholesale & Retail Trade	144	$33.01	$35.47	$0.50	$98.50	$22.82	$36.00
Finance, Insurance & Real Estate	120	$34.65	$35.29	$1.00	$103.00	$26.00	$31.40
Services	83	$38.25	$40.08	$2.00	$112.00	$28.30	$34.25
Total	927	$37.52	$40.36	$0.50	$112.00	$25.56	$35.88

Source: Appendices A and C and Exhibit 5