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DEFAULTS AND RETURNS IN THE HIGH YIELD BOND MARKET:  
THE YEAR 2003 IN REVIEW AND MARKET OUTLOOK

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The Year 2003 in Review and Market Outlook

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## **Defaults and Returns in the High Yield Market: The Year 2003 in Review and Market Outlook**

### **Abstract**

High yield bond defaults in 2003 declined significantly from record 2002 levels closing the year at \$38.5 billion for a default rate of 4.66%. The fourth quarter's rate of 0.36% was the lowest quarterly rate since the fourth quarter of 1997. The default loss rate for 2003 also declined to just 2.76% based on a weighted average recovery rate of about 45% -- a major improvement from the 25% levels of the prior several years. Fourteen of the 86 defaulting companies had issues that were investment grade sometime prior to default. These fallen angels accounted for 33% of defaulting issues and 46.3% of the defaulted volume in 2003.

The high-yield bond market returned an impressive 30.62% for the year, the third highest one-year return since 1978 (when we first began tracking returns). The return spread over ten-year US Treasuries was a record high 29.4%, bringing the historic average annual return spread to 2.22% per year. The concurrent yield spread at year-end fell to 3.74%, the lowest year-end figure since 1997 and 4.82% less than one year ago. New issues in 2003 recorded a near record level of \$137.4 billion; the vast majority was used for refinancing existing loan and bond issues.

Based on our mortality rate methodology and assuming different measures of credit risk of recent new issuance, we expect default rates to continue their decline in 2004 to between 3.2% - 3.8%, with rates increasing in 2005 to above 4.0%.

## **Defaults and Default Rates**

High-yield bond defaults continued to fall in the fourth quarter of 2003 to just \$3.04 billion, bringing the year's total to \$38.5 billion and an annual default rate of 4.66% (Figure 1). We use a population base of \$825 billion as of mid-year to calculate our dollar denominated default rate. During 2003, 203 issues from 86 companies defaulted (Appendices A and D). Amongst the largest defaulting issuers (each with over \$500 million outstanding) were AES Drax, Air Canada, Alamosa, Allegiance Telecom, AMERCO, American Cellular, Fleming, Healthsouth, Leap Wireless, Loral, Lumbermen's Mutual, Magellan, Marconi, Mirant, Northwestern, NRG, Petroleum Geo-Services, PG&E National Energy, Solutia, Southern Energy, and West Point Stevens. Only one, Solutia, defaulted in the fourth quarter.

The annual default rate of 4.66% was only about a third of the record 12.80% of 2002 and somewhat below the 1971-2003 historic weighted average rate of 5.35%. The decline in quarterly and annual rates is clearly shown in Figure 2. Note the similarity between the recent precipitous decline in the four-quarter moving average rate after the peak in the third quarter of 2002 and the drop in the early 1990s. As we will discuss at a later point, we expect the recent decline to continue, at least through 2004 and then begin to increase again. Moody's (5.4%) and S&P's (5.6%) 12-month issuer-based default rates also declined by year-end (Appendix B).

## **Default Rates and Economic Activity**

The decline in the four-quarter (annual) default rate in 2003 is consistent with an overall economic growth trend that expanded impressively in the past year. Note the peaking of our default rate in 2002, less than one year after the last recession in 2001 (Figure 3). Typically, default rates decline for about two years after the end of the prior recession. So, declining default rates in 2003 and 2004, as we expect, is consistent with prior economic time-series behavior.

## **Bankruptcies**

The number of Chapter 11 filings with liabilities greater than \$100 million was 95 in 2003 with total liabilities of about \$110 billion (Figure 4). This is down considerably from the record levels of 2002, especially with respect to the liability total. In the fourth quarter of 2003, the liability total climbed by only \$10 billion on 16 new filings. For the entire year of 2003, 25 companies with liabilities greater than \$1 billion filed, bringing the last three year total to 102 -- a staggering total. Only three of the 25 in 2003 occurred in the fourth quarter (Appendix C).

## **Industry Defaults**

Communication company defaults (21) continued to lead our industrial sector compilation (five in the last quarter). Other prominent industrial sectors were energy (9), financial services, leisure/entertainment and transportation (all with six) and retailing (5). See Figure 5 and Appendix D for details.

## **Age of Defaults**

Figure 6 shows the distribution of years to default from the original issuance date for defaults in 2003 and for the period 1989-2003. The first four-year proportion (48%) was considerably lower than the historic average (64%). Years 5-7 showed the opposite comparison, especially for five- and seven-year defaults. The first year default proportion (9%) in 2003 was about the same as the historic average as was the tenth-year or greater proportion. We are a bit surprised that the 10-year and greater proportion was not higher in 2003, because about a third of the defaulting issues were originally issued with an investment grade rating.

## **Fallen Angel Defaults**

As noted earlier, there were 14 companies that defaulted in 2003 that were rated as investment grade sometime prior to default. While only 16% of the 86 defaulting issuers in 2003, these firms had 33% of the total defaulting issues (Figure 7) and 46.3% of the dollar

volume of defaults (Figure 8). The 33% of defaulting issues that were investment grade at some point prior to default (usually at issuance) was somewhat above the historical average of 24%. It should be noted that, unlike 2002, when many of the fallen angel defaults were investment grade at the start of the year, none of the 2003 defaults were. Figure 8 lists the 14 fallen angel companies, only one of which (Solutia) occurred in the fourth quarter. Seven of these issuers had default amounts greater than \$1 billion. We will shortly explore the impact of these fallen angel defaults on our default loss and recovery rate results.

There were \$29.9 billion of downgrades to non-investment grade status, \$4.7 billion of which came in the fourth quarter. Upgrades to investment grade totaled \$6.7 billion in 2003. The net amount of \$23.2 billion helped to swell the size of the high yield bond market by year-end to \$886.5 billion.

The fallen angel default rate in 2003 registered 5.88%, based on 238 fallen angels issuers at the start of the year. Figure 9 shows the 2003 rate as well as the rates from 1985-2003. The original issuer high yield bond rate in 2003 was 5.46%. We do not have fallen angel dollar volumes to compare directly with our original issue high yield bond default rate (Figure 1 and last column of Figure 9). Therefore, our comparison between fallen angels and original issue high yield bonds are based on number of issuers, not dollars.

Note that the annual fallen angel issuer default rate is lower than the original issuer non-investment grade default rate in 14 of the 19 years in the time series, but not in 2003, and the annual averages (both arithmetic and weighted) are about one percent per year lower. The difference in averages is barely significant, however, and when we compare fallen angels with original issuance high yield bonds, controlling for the actual bond rating (e.g., BB vs. BB), the differences are not significant (see our analysis by bond rating in last year's Annual Report).

So, we can conclude that the default risk for fallen angel high yield bonds is essentially comparable to that of original issuance high yield bonds. Where the differences are significant, however, is in the average recovery rate. For high yield investors, the expected recovery rate on fallen angel defaults is considerably greater than on original issuance high yield bonds. This difference was never more striking than in 2003, when the weighted average recovery rate on fallen angel defaults was greater than 92%, compared to about 36% for original issue high yield bonds (see Figure 10). We will return to recovery rates and loss rates in 2003 (Figure 10), for our entire time series (Figure 11), and by seniority (Figure 12), shortly.

Figure 13 demonstrates that the median weighted average recovery rate on fallen angel defaulting issues is 70% (73.7% arithmetic average) for the period 1982-2003. This compares to about 42.4% for all high yield bond defaults (Figure 11) and about 29% for original issue high yield bond issues (slightly different time periods).

So, while we can conclude that investments in fallen angel high yield bonds is less risky from a default *loss* standpoint, we cannot conclude anything yet about the relative value of fallen angel bonds as an asset-class based on a risk-return standpoint. In order to complete the analysis, we need accurate, longtime-series data on returns on fallen angel investments and we are not there yet.

### **Default Losses and Recoveries**

The weighted average recovery (based on market prices just after defaults) on high yield bond defaults in 2003 increased substantially to 45.50% from the 25-28% range in the prior four years (see Figures 10 and 11). The 2003 annual loss rate, including the loss of 22 basis points from lost coupon payments, was 2.76%. This loss figure is unadjusted for fallen angel defaults. As noted above, fallen angels typically lose less than original issuance high yield bond defaults since the effective investment price is considerably discounted from par (61.8% of par in 2003)

and the price at default is higher than original issuance bonds (57% for fallen angels in 2003). The resulting effective recovery rate in 2003 for fallen angels was a much above average 92.4%. In Figure 13, we see that the weighted average annual recovery rate is about 70%.

Adjusting for fallen angel defaults, the loss rate in 2003 from defaults was 1.88%, compared to the 2.76% loss rate on an unadjusted basis. Both figures are much below historical averages. For example, Figure 11 shows that the historic weighted average default loss rate is 3.93% per year (unadjusted figure in last column of Figure 11). No doubt, lower-than-average, and lower-than-expected, loss rates in 2003 helped to fuel an impressive return performance for the high yield bond market. We will return to the comparison between three key variables in understanding the long-term dynamics of the high yield bond market at a later point -- namely the promised yield spread, the realized loss rate from defaults and the realized return spread.

Figure 12 lists the average recovery rates by seniority for defaults in 2003 and for the period 1985-2003. The recovery rate on senior secured bonds in 2003 (53.51%) was just about equal to the historic mean and median as was the average recovery rate on senior unsecured bonds (45.40% vs. 42.27% for the median). The senior subordinated bond recovery rate (35.98%) was also slightly higher than the historic median and discounted bonds showed a marked improvement over the historic averages. The sample sizes of subordinated and discounted bonds in 2003 were quite small.

Overall in 2003, an average recovery rate of about 45% is an immense increase over the previous several years. This result is totally consistent with our expectations based on our univariate and multivariate models discussed in “The Link Between Defaults and Recovery Rates,” NYU Salomon Center Working Paper #S-03-04, July 2003 (forthcoming in 2004 in the *Journal of Business* and available from <http://www.stern.nyu.edu/~ealtman>). For example, our log-linear univariate model regressing annual default rates and annual recovery rates (unadjusted



for fallen angels) would have predicted about a 35% recovery rate in 2003 and the linear model about 40.0%. Multivariate models would have been even more accurate.

### **Telecom Recovery Rates**

We typically break-out recovery rates for communication companies in our reports but we no longer believe it is important to present specific tables, by issuer. Table 14 presents the average recovery rates for telecom companies from 1998-2003. Note that in 2003, the telecom recovery rate (35.4%) was significantly greater than historic average recovery rates from prior years, which were in the 16%-26% range. Higher average recovery rates on 28 issues from 15 telecom issuers in 2003 are consistent with impressive average returns for telecom companies already in default and trading during their restructuring period. Indeed, our results that track all defaulted bond and bank loan returns during 2003 show that bond issues were up an incredible 85% (defaulted bonds) and about 27% (defaulted loans) in 2003 (see the “Market Size and Investment Performance of Defaulted Bonds and Bank Loans: 1987-2003” in our NYU Salomon Center Annual Reports, to be published shortly).

### **Related Recovery Rate Results**

Figure 15 shows the average recovery rate by original rating for almost 1,800 bond issues from 1971-2003. Consistent with our earlier discussion on fallen angel defaults, we see that the recovery rates on AAA, AA and A rated bonds were significantly higher than those rated BBB or below at issuance. There is a consistently decreasing relationship between original rating and average recovery rates for investment grade bonds from AAA to BBB but essentially no relationship from BB to CCC amongst original issuance high yield bonds (all in the high 20% to low 30% range).

Figure 16 shows that the number of years that it takes a bond to default from the original issuance date has essentially no impact on recovery rates. So, an early default is not only bad for

the investor in that interest coupons are foregone, but the expected recovery rate is no greater than on defaults that occur later.

### **Mortality Rates and Losses**

Updated mortality statistics for 1971-2003 are reported in Figures 17-19 with the former showing the total amount of defaulting dollars by original bond rating and Figures 18 and 19 showing the actual mortality rates and losses (see E. Altman, "Measuring Corporate Bond Mortality and Performance," the *Journal of Finance*, September 1989 or *Bankruptcy, Credit Risk and High Yield Bonds*, Blackwell, 2002 for the specific description of our mortality rate and loss models). This default analytical methodology includes the impact of bond aging and adjusts the base population in our marginal and cumulative mortality rates calculations for calls, sinking funds and other redemptions as well as defaults. Results are expressed based on the original rating at issuance. In this way, we can stipulate the expected mortality rate (default rate) for a specific credit quality at issuance as well as our previous default statistics for the high yield market as a whole. We will utilize this methodology in our predicted default statistics for 2004 and 2005 at a later point.

Figure 17 shows the dollar amount of defaults by original rating over the last 30 years for more than 2,000 issues. As expected the amounts increase as the original rating decreases until the BBB original rating. Interestingly, the BBB amount is greater than the BB amount (\$73 billion vs. \$33 billion) and then the amount increases again for B-rated issues (\$159 billion). The amount of new issuance for BBB rated bonds, however, was about three times that of BB and B rated bonds (each) but it is still revealing that the BBB rated amount is so great. The reason probably lies in the recent defaults that were fraud related (like WorldCom and Enron) which were huge and were originally issued as investment grade, BBB bonds. Despite a very

small amount of new issuance, CCC, CC and C rated bonds have a very high default incidence, which is reflected in our mortality statistics.

Figures 18 and 19 show that the mortality rates for data through 2003 are, in general, lower than the rates through 2002, as default rates moderated over the past year. The exception is the marginal and cumulative mortality rates for BBB originally rated securities, especially in the first six years after issuance. High yield investors are less concerned with original issue investment grade bonds and can take some comfort with the reduction in the BB and B rated classes (CCC rates, however, were considerably higher this year). For example, the BB marginal mortality rates in the first three years after issuance were 1.22%, 2.52%, and 4.44% respectively, compared to 1.23%, 2.62%, and 4.53% for data through 2002. The single B marginal rates were 3.06%, 6.92%, and 7.48% vs. 3.19%, 7.14% and 7.85% respectively for the first three years after issuance for data from 1971-2002 (see our Annual Report last year for complete 2002 results).

We continue to observe a profound aging effect, especially in the first three to four years after issuance for original issue high yield bonds. Again, the exception is with the BBB rated bonds due to several large defaults on bonds issued two years prior to default. Indeed, the two-year BBB marginal rate continues to be anomaly.

Mortality losses, presented in Figure 19, indicate a similar story to that of our mortality rate trend. Due to lower default rates and higher recovery rates in 2003, most mortality loss rates are lower than last year's aggregated statistics.

### **Returns and Spreads**

Figure 20 demonstrates the superb return performance in 2003 in absolute terms and relative to our traditional benchmark -- ten-year US Treasuries. Total returns on Citigroup's high yield bond index registered an impressive 30.6% in 2003, the third highest single year's return since 1978 (only 1982 and 1991 were better). And, the return spread over ten-year US

Treasuries was a record 29.4%, topping 1991's previous record of 26.05%. Our arithmetic annual average return spread for the period 1978-2003 increased dramatically in 2003 to 2.22% from just 1.14% one year earlier and the compound annual average from 1.09% to 2.17%. We, certainly felt that a return spread slightly over 1% was unusually low but we did not expect such a remarkable correction in just one year. Given the fact that high yield bonds are far less liquid than risk-free bonds and the unexpected loss is substantial, a more reasonable spread is certainly closer to two percent. We are still very impressed with the current level of historical performance of high yield bonds.

High yield bond yield-to-maturity levels fell dramatically in 2003 to 8.00% from 12.58% a year earlier and the yield spread fell by 482 basis points. One needs to go back to the 1990-1991 drop of 464 basis points to find a similar one-year fall in required yields for high yield investors. The historic average annual yield spread dropped slightly from 5.01% as of year-end 2002 to 4.96% at the end of 2003.

In terms of expected returns, one can observe that the arithmetic yield spread (4.96%) at year-end minus the actual annual average default loss rate (2.52% -- Figure 11) comes fairly close (2.44%) to our observed arithmetic average annual return spread (2.22%). So, 2003 was an exceptionally good year in terms of returns and spreads and the fundamental relationship between yields, default losses and returns remain intact.

### **Proportion and Size of the Distressed and Defaulted Public and Private Debt Markets**

The distressed and defaulted public debt proportion of the straight (non-convertible) high yield and defaulted corporate debt markets in the United States comprised about 23% of the total market, down considerably from the 40% figure at the end of 2002 (Figure 21). Our measure of the total market here is the aggregation of high yield bonds (\$886 billion at the end of the year) and the public defaulted bond issues that were still outstanding as of December 31, 2003

(estimated to be about \$193 billion) for a total of \$1,079 billion. Note the big drop in 2003 in the proportion of high yield bonds that were classified as distressed (trading at least 1,000 basis points over risk-free ten-year US Treasuries). This proportion dropped to about 5% as of year-end 2003 from 21% one year earlier. The proportion of distressed debt compared to just the high yield market was about 5.7%.

The defaulted debt proportion remained fairly steady at 18% compared to 19% one year earlier. This reflects the fact that new defaults in 2003 (\$38 billion) were fairly close to the amount of bonds that were involved with companies emerging from Chapter 11 bankruptcies in 2003 (about \$32 billion). We can expect that emergencies will vastly outpace new defaults in 2004, especially since several large bankruptcies are expected to be confirmed and completed (for example, WorldCom and Enron) and the expected default rate and amounts are expected to be lower in 2004.

### **Market Size**

From Figure 22, we estimate the size of the defaulted and distressed public and private debt markets as of year-end 2003. Total US distressed and defaulted debt fell dramatically in 2003 to about \$585 billion (face value) from the record level of \$942 billion one year earlier. The overwhelming reason for the precipitous drop is the amount of distressed debt. Recall, we saw that the proportion of distressed bonds fell from 21% to about 5% (Figure 21).

The breakdown of the total public defaulted and distressed bonds is \$193 billion of defaulted bonds and only \$51 billion of distressed bond issues. We again utilize a public to private debt ratio of 1.4:1 to estimate the size of the private debt market (primarily bank loans and private placements). Combining our estimates of the public and private debt results in the \$585 billion figure.

Our estimate for *market values*, combining the public and private debt market, was about \$369 billion, down from \$513 billion one year earlier. The drop would have been even greater if the average defaulted and distressed bond and bank loan had not dramatically increased in value during the year. Indeed, we increased our estimated average price of defaulted bonds to 45% of par based on levels from our Altman-NYU Salomon Center Defaulted Bond Index.

Commensurate increases in public distressed securities as well as private debt markets are indicated in Figure 22. We expect that these markets will continue to diminish in size in the next year or two as default rates are expected to continue to fall and the amount of bonds emerging from their reorganization status increases. We will discuss this forecast further in the next section.

Figure 23 shows our estimate of defaulted and distressed debt values for the period 1990 to 2003. Note that the level of public and private defaulted and distressed debt is now somewhat below the level in 2000 but still a very sizeable “vulture” investing market. Market values are fairly similar to the average in the 2000-2002 period, although clearly below the record level of 2002. Note that certain years during the sample period shown in Figure 22 are not included because we did not perform the required analysis for those years.

### **Forecasting Default Rates and Size of Distressed and Defaulted Market**

One of the more enduring aspects of the high yield bond market is the importance of default rates and the change in this risk parameter. We have observed that when markets expect a very high level of defaults and the actual default rate is far below expectations, the yield spread tends to fall dramatically and the market’s return is likely to soar. This certainly was the case in 1991 and again last year (2003). So, forecasting default rates is a useful exercise for high yield investors, not to mention those “vulture” investors whose market size depends on levels of

required returns and defaults. The following methodology was utilized to forecast default rates and the size of the market for distressed and defaulted securities in 2004 and 2005.

- (1) Observe the recent history of credit quality metrics on corporate bond new issuance.
- (2) Forecast the size of the high yield market over the forecasting period.
- (3) Apply the mortality rate methodology and its historical empirical results to historical credit quality, new issuance statistics and to forecasted new issuance (in 2004 only).
- (4) Aggregate defaults from each of the last ten years of new issuance by bond rating, adjusted for past defaults, calls, and other redemptions, to derive future defaults and then divide this total into the forecasted market size to ascertain future default rates.
- (5) Using forecasted future defaults and assuming a diminution in the current size of existing defaulted securities, we can derive defaulted bond levels in 2004 and 2005. By observing the trend in default levels, we can make some assumptions about distressed debt levels in 2004 and 2005 in order to forecast the market's total size in those years.

### **Credit Quality Levels of Past New Issuance**

The standard technique to assess the credit quality of new issuance in the corporate bond market is simply to observe the bond ratings from the rating agencies on new issuance for the period 1993-2003. We utilize the average quality over the past five years to derive estimates of new issuance and credit quality ratings in 2004 (necessary to forecast one year default levels in 2005). Past defaults and all redemptions for 1993-2003 and expected in 2004 are deducted from the historical new issuance totals to derive the appropriate cohort of bond levels, by rating, for our mortality rate forecast. We call this the aged-bond-rating technique (ABR).

A modification of the ABR is to rely on our own measure of credit quality instead of the rating agencies, wherever sufficient data exists. We utilized the more robust version of our Z-Score credit scoring model, called the Z''-Score, to derive a credit score and then a bond-rating-equivalent of those scores. We then substitute our bond-rating-equivalent and apply it to past new issuance on a firm-by-firm basis. Because this process was quite tedious and many firms'

data were not available from electronic databases, we mainly used the most recent estimates of Z"-scores from *Bloomberg* (adding an appropriate constant term to get the bond-rating-equivalent). We only were able to apply this technique to the last several years of new issuance due to data matching difficulties. This technique, therefore, is really a blend of rating agency credit risk measures and the Z"-Score model. We call this forecasting approach the aged-bond-rating-equivalent method (ABRE).

The particular Z-Score model we used was:<sup>1</sup>

$$Z''\text{-Score} = 3.25 + 6.56 X_1 + 3.26 X_2 + 6.72 X_3 + 1.05 X_4$$

Where:

$X_1$  = Current Assets – Current Liabilities/Total Tangible Assets (TTA)

$X_2$  = Returned Earnings/TTA

$X_3$  = EBIT/TTA

$X_4$  = Book Equity/Total Liabilities

The Bond-Rating-Equivalents for the scores derived from this model are given in Figure 24.

### **Forecasted Results**

Using the ABR technique (agency ratings on new corporate bond issuance), the mortality rate percentages from Figure 18, and high yield bond market size estimates for 2004 and 2005 (mid-year), we forecast that the default rate will be 3.2% in 2004 and 3.8% in 2005. The size of the market for 2004 is based on the current (December 31, 2003) size of \$886.5 billion plus an expected growth in the first half of 2004 of about \$60 billion. We then assumed a 10% growth in the market for our estimate of 2005 market levels.

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<sup>1</sup> We originally built this version of Z-Score for emerging market credits and published it in "Emerging Market Corporate Bonds - A Scoring System," Salomon Brothers, May 15, 1995, (with J. Hartzell and M. Peck); reprinted in E. Altman, *Bankruptcy, Credit Risk and High Yield Bonds*, Blackwell, 2002 (Chapter 5).



Utilizing our own Z'-Score approach (ABRE) for only about 25% of the new issues for 2002-2003 new issuance, and the actual bond rating in other cases, our forecasted default rate was 3.8% in 2004 and 4.4% in 2005. Note that the Z'-Score approach assesses the quality of recent new issuance as somewhat lower than the rating agencies.

We present our final forecasted default amounts and rates in Figure 25. We decided to take an average of the ABR and the ABRE approaches to combine with our mortality rate estimate. The result is a default rate of 3.5% and 4.1% for 2004 and 2005 respectively. The 2004 rate of 3.5% is a reduction of about 1.1% from the level in 2003.

The higher rate in 2005 represents a combination of higher marginal mortality rates in the second year after issuance compared to the first year applied to 2003 new issuance and investors' increased appetite for risk in 2003. Note that both the rating agencies and especially our Z-Score approach detect a deterioration in credit quality in 2003 new issuance from prior years. Indeed, the proportion of split B, CCC and non-rated new issues in 2003 jumped to about 11% of new issuance compared to about 3.5% in 2001 and 2002. This proportion was about 16% in 2000 and 20% in 1998, which helped to lead to very high default rates in 2001 and 2002. In many cases, the bond rating equivalent of our Z-Score approach yielded lower bond ratings than the actual rating. Please note we put all D-rating equivalents into the CCC rated basket.

Figure 26 presents our estimates of the future size of distressed and defaulted debt. These default estimates are based on our default rate and amount forecast (Figure 25) and estimates of the debt that will emerge from corporate restructurings, primarily Chapter 11, in the next two years. It is always tricky to forecast default rates, and likewise market size estimates are also a challenge. Still, the size of new defaults, recovery rates, and estimates of supply and demand in the distressed securities market are critical elements to expected performance and flow-of-funds expectations.

Our forecast for the size of the defaulted public bond market starts from estimates of the size as of the end of 2003 (\$193.2 billion from Figure 22). We then add expected new defaults in 2004 and 2005 of \$33.1 billion and \$42.7 billion respectively (Figure 25) and subtract our estimate of bonds from companies emerging from corporate restructurings. For the latter, we subtract \$75 billion for each of 2004 and 2005. Since the average Chapter 11 filing takes between 18-24 months to complete, we expect that the vast majority of existing defaulted debt as of the end of 2003 to disappear within two years. We chose equal amounts to deduct in 2004 and 2005 since the added amounts in 2004 coming from “seasoned” Chapter 11’s (e.g., WorldCom’s expected emergence in early 2004 from a 2002 bankruptcy) could be similar to new defaults in 2004 (not in the 2003 figure) that will emerge in 2005. As one can see, these estimates are a bit crude but still quite reasonable.

For distressed debt, we assume that the year-end 2003 proportion of the high yield market remains unchanged at 5% in 2004 and then increases somewhat to 7.5% as of year-end 2005. We base the direction of the change (an increase) to the fact that we also expect defaults to increase in 2005 and the current level of distressed debt is historically quite low. The exact amount of the increase is, however, an educated guess at best.

We again assume a private-to-public debt ratio for defaulted and distressed firms of 1:4 to 1:0 to apply to our public debt forecasted levels. We also assume that the market value (percent of par value) for defaulted and distressed public and private debt will increase slightly in 2004 and 2005 based on average annual return expectations.

Our final estimate of the combined sizes of the public and private, defaulted and distressed debt market (Figure 26) is about \$482 billion (face value) and \$319 billion (market value) in 2004 and \$473 billion (face value) and \$328 billion (market value) as of year-end 2005. These values are similar to the market size found somewhere between 1999 and 2000 levels

(Figure 23). Clearly, however, the shift in size based on where these markets present opportunities for distressed investors is expected to move toward distressed rather than defaulted securities.

**FIGURE 1**

**HISTORICAL DEFAULT RATES - STRAIGHT BONDS ONLY  
EXCLUDING DEFAULTED ISSUES FROM PAR VALUE OUTSTANDING  
1971 - 2003 (\$ MILLIONS)**

<b>YEAR</b>	<b>PAR VALUE OUTSTANDING (a)</b>	<b>PAR VALUE DEFAULTS</b>	<b>DEFAULT RATES</b>	
2003	\$825,000	\$38,451	4.661%	
2002	\$757,000	\$96,858	12.795%	
2001	\$649,000	\$63,609	9.801%	
2000	\$597,200	\$30,295	5.073%	
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%	
				<b>Standard Deviation</b>
<b>ARITHMETIC AVERAGE DEFAULT RATE</b>		<b>1971 TO 2003</b>	<b>3.292%</b>	<b>3.161%</b>
		<b>1978 TO 2003</b>	<b>3.656%</b>	<b>3.394%</b>
		<b>1985 TO 2003</b>	<b>4.567%</b>	<b>3.515%</b>
<b>WEIGHTED AVERAGE DEFAULT RATE (b)</b>		<b>1971 TO 2003</b>	<b>5.352%</b>	
		<b>1978 TO 2003</b>	<b>5.382%</b>	
		<b>1985 TO 2003</b>	<b>5.474%</b>	
<b>MEDIAN ANNUAL DEFAULT RATE</b>		<b>1971 TO 2003</b>	<b>1.896%</b>	

**Notes**

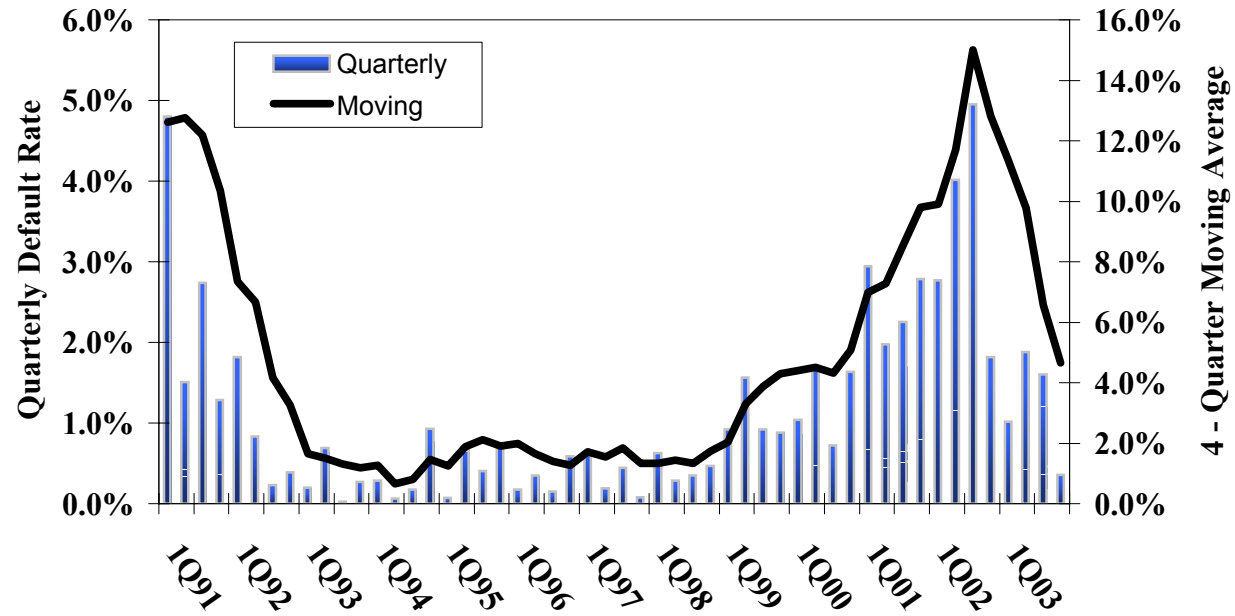
(a) As of mid-year.

(b) Weighted by par value of amount outstanding for each year

Source: Authors' Compilations and Citigroup Estimates

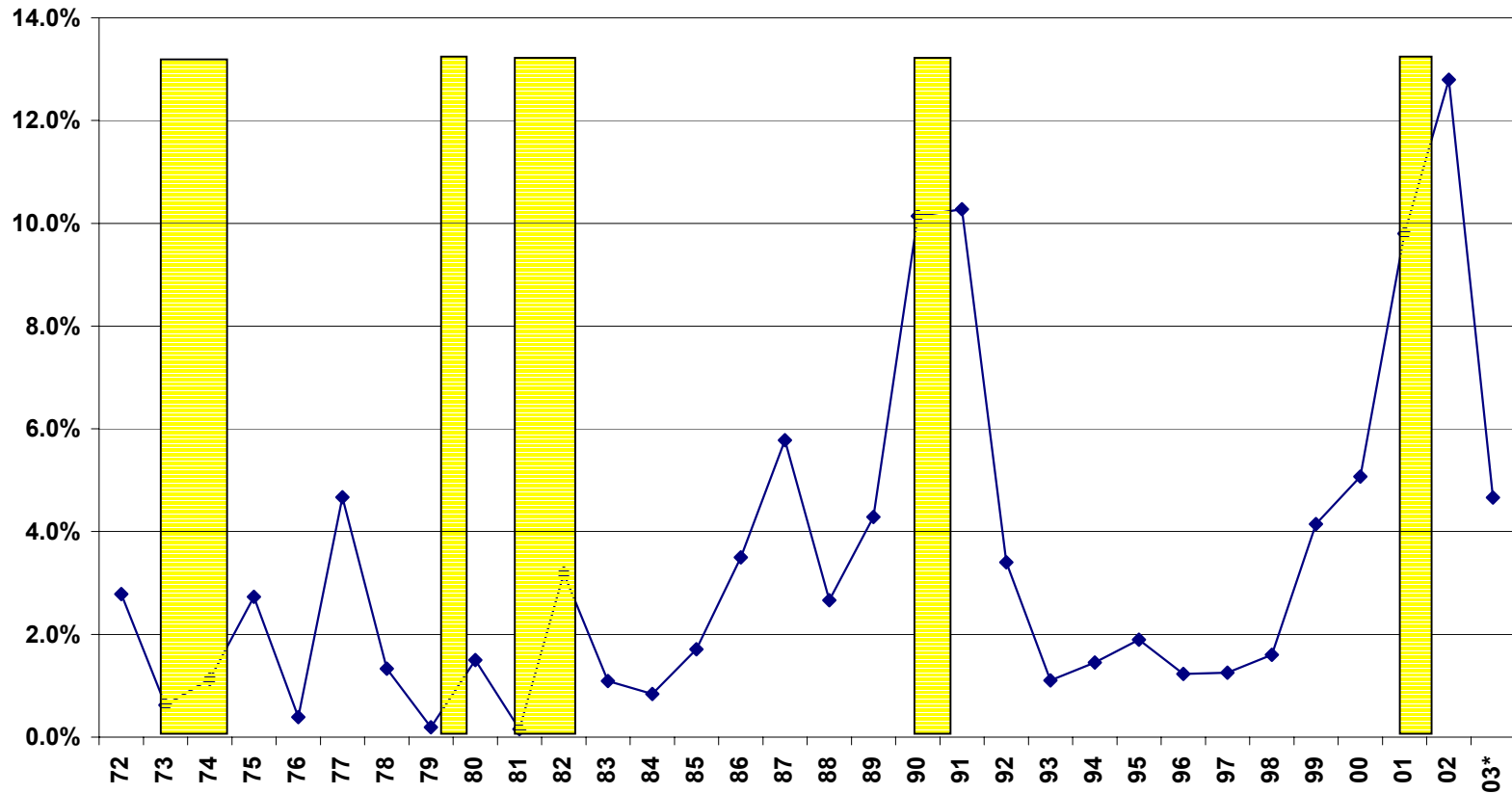
**FIGURE 2**

**QUARTERLY DEFAULT RATE AND FOUR QUARTER MOVING AVERAGE  
1991-2003**



Source: Authors' Compilations and Citigroup Estimates

**FIGURE 3**  
**HISTORICAL DEFAULT RATES AND RECESSION PERIODS IN THE US**  
**HIGH YIELD BOND MARKET 1972 - 2003**



\* 4Q months moving average as of September 30, 2003

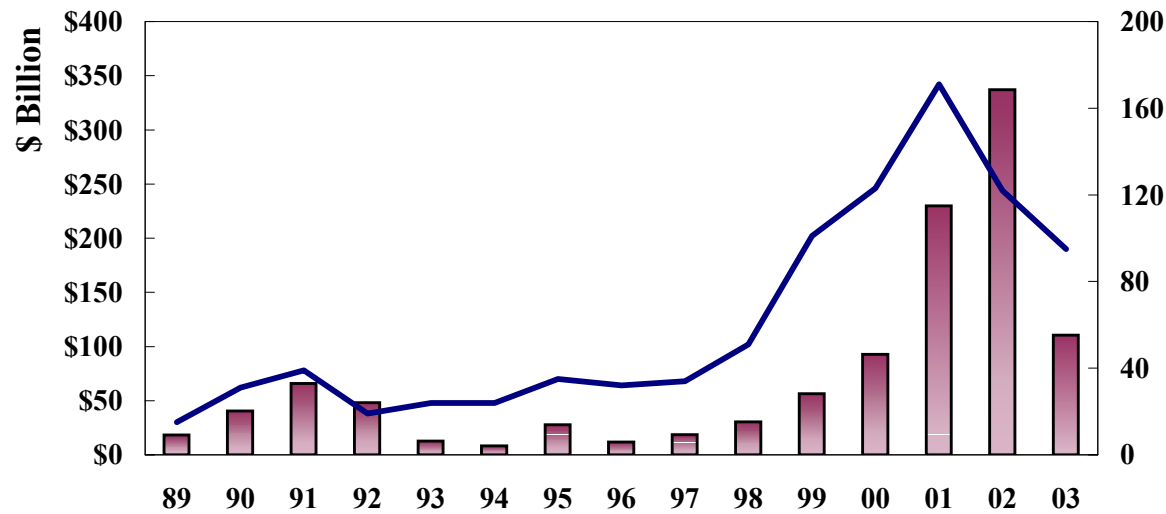
**Periods of Recession: 11/73 - 3/75, 1/80 - 7/80, 7/81 - 11/82, 7/90 - 3/91, 4/01 - 12/01**

Source: Figure 1 & Nat'l Bureau of Economic Research Data

**FIGURE 4**

**TOTAL LIABILITIES\* OF PUBLIC COMPANIES FILING  
FOR CHAPTER 11 PROTECTION  
1989-2003**

■ Pre- Petition Liabilities, in \$ billions (left axis)  
— Number of Filings (right axis)



**2003**  
95 filings and liabilities of \$110.4 billion

**2002**  
122 filings and pre-petition liabilities of \$337.5 billion

\*: Minimum \$100 million in liabilities  
Source: NYU Salomon Center Bankruptcy Filings Database  
Source: Appendix C

**FIGURE 5**  
**CORPORATE BOND DEFAULTS BY INDUSTRY**  
**(NUMBER OF COMPANIES)**

<u>INDUSTRY</u>	<u>1970-82</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>Total</u>
Auto/Motor Carriers	3							3	3					1				1			1		12
Conglomerates	0					1	3	1	1	3	3								1		0	1	14
Energy	3	3	5	7	12	2	4			4	2	3		1			1	13	1		8	9	78
Financial Services	4	1	1	1			4	11	7	14	3	2	1	2	1	2	6	1	6	4	5	6	82
Leisure/Entertainment	0					2	4	4	8	2	4	3	4	3	1	5	5	8	9	6	5	6	79
General Manufacturing	9	1	1	2	6	3	3	1	5	8	8	7	3	8	6	7	6	16	23	43	22	13	201
Health Care	0					1	2		2	1	1	1		2			2	8	6	3	4	3	36
Miscellaneous Industries	3	1	2	6	3	1			4	4	3	1	1	1		3	3	16	34	38	25	16	165
Real Estate/Construction	7		1	1		1	1	3	7	5	1			2	1	2	1	4	6	4	3		50
REIT	11	1									1										1		14
Retailing	6	1					1	2	6	15	6	4	5	6	3	6	6	12	7	12	5	5	108
Communication	7	2	2	1	1	3	1		3	4	1	1	3	2	2	1	6	11	8	39	26	21	145
Transportation (non auto)	4	2		1	1			1	1	2			2			2	1	8	5	7	7	6	50
Utilities						1	1				1				1	1			1		0	-	6
<b>Total</b>	<b>57</b>	<b>12</b>	<b>12</b>	<b>19</b>	<b>23</b>	<b>15</b>	<b>24</b>	<b>26</b>	<b>47</b>	<b>62</b>	<b>34</b>	<b>22</b>	<b>19</b>	<b>28</b>	<b>15</b>	<b>29</b>	<b>37</b>	<b>98</b>	<b>107</b>	<b>156</b>	<b>112</b>	<b>86</b>	<b>1040</b>

Source: Author's compilations



FIGURE 6

DISTRIBUTION OF YEARS TO DEFAULT FROM ORIGINAL ISSUANCE DATE  
(By Year of Default)  
(1989 - 2003)

Years to Default	1989		1990		1991		1992		1993/1994		1995		1996			
	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	6	3	3	0	0	0	0	3	8	1	3	2	8		
2	12	18	25	23	18	13	0	0	6	16	9	28	3	13		
3	15	23	23	21	26	19	7	13	5	14	7	22	3	13		
4	13	20	18	17	29	21	10	19	2	5	3	9	8	33		
5	1	2	23	21	35	26	8	15	4	11	1	3	1	4		
6	7	11	5	5	10	7	12	22	8	22	2	6	5	21		
7	7	11	5	5	4	3	5	9	7	19	2	6	0	0		
8	2	3	4	4	10	7	4	7	0	0	2	6	0	0		
9	1	2	1	1	3	2	0	0	0	0	4	13	0	0		
10	3	5	1	1	2	1	8	15	2	5	1	3	2	8		
<b>Total</b>	<b>65</b>	<b>100</b>	<b>108</b>	<b>100</b>	<b>137</b>	<b>100</b>	<b>54</b>	<b>100</b>	<b>37</b>	<b>100</b>	<b>32</b>	<b>100</b>	<b>24</b>	<b>100</b>		

Years to Default	1997		1998		1999		2000		2001		2002		2003		1989-2003	
	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	5	20	2	6	32	26	19	10	40	12	29	8	18	9	158	9
2	4	16	5	15	37	30	51	28	69	21	51	15	30	15	320	19
3	4	16	10	30	15	12	56	31	87	26	61	18	26	13	345	20
4	9	36	3	9	14	11	14	8	65	19	56	16	23	11	267	16
5	3	12	10	30	7	6	13	7	27	8	45	13	40	20	218	13
6	0	0	2	6	8	6	5	3	14	4	21	6	20	10	119	7
7	0	0	1	3	10	8	12	7	21	6	8	2	25	12	107	6
8	0	0	0	0	2	2	4	2	5	1	7	2	3	1	43	3
9	0	0	0	0	0	0	3	2	4	1	12	3	5	2	33	2
10	0	0	0	0	0	0	6	3	3	1	54	16	13	6	95	6
<b>Total</b>	<b>25</b>	<b>100</b>	<b>33</b>	<b>100</b>	<b>125</b>	<b>100</b>	<b>183</b>	<b>100</b>	<b>335</b>	<b>100</b>	<b>344</b>	<b>100</b>	<b>203</b>	<b>100</b>	<b>1705</b>	<b>100</b>

Source: Authors' Compilations

**FIGURE 7**

**DEFAULTS BY ORIGINAL RATING  
(INVESTMENT GRADE VS. NON-INVESTMENT GRADE)  
By Year**

	<b>Defaulted Issues*</b>	<b>% Originally Rated Investment Grade</b>	<b>% Originally Rated Non-Investment Grade</b>
2003	203	33%	67%
2002	322	39%	61%
2001	258	14%	86%
2000	142	16%	84%
1999	87	13%	87%
1998	39	31%	69%
1997	20	0%	100%
1996	24	13%	88%
1995	29	10%	90%
1994	16	0%	100%
1993	24	0%	100%
1992	59	25%	75%
1991	163	27%	73%
1990	117	16%	84%
1989	66	18%	82%
1988	64	42%	58%
1987	31	39%	61%
1986	55	15%	85%
1985	26	4%	96%
1984	14	21%	79%
1983	7	43%	57%
1982	20	55%	45%
1981	1	0%	100%
1980	4	25%	75%
1979	1	0%	100%
1978	1	100%	0%
1977	2	100%	0%
<b>Total</b>	<b>1795</b>	<b>24%</b>	<b>76%</b>

\* Where we could find an original rating from either S&P or Moody's.

Source: Authors' Compilations from S&P and Moody's records.

**FIGURE 8**  
**FALLEN ANGEL DEFAULTS 2003**

<b>Fallen Angels</b>	<b>Amount (\$ MM)</b>
<b>AES Drax Holdings (Energy)</b>	<b>\$ 302.4</b>
<b>AMERCO</b>	<b>\$ 475.0</b>
<b>Cone Mills Corp.</b>	<b>\$ 100.0</b>
<b>Fleming Cos. Inc.</b>	<b>\$ 5.9</b>
<b>HEALTHSOUTH Corp.</b>	<b>\$ 2,470.9</b>
<b>Marconi PLC</b>	<b>\$ 1,538.9</b>
<b>Mirant Corp.</b>	<b>\$ 4,018.9</b>
<b>Mississippi Chemical Corp.</b>	<b>\$ 200.0</b>
<b>NorthWestern Corp.</b>	<b>\$ 1,436.1</b>
<b>NRG Energy, Inc.</b>	<b>\$ 3,986.8</b>
<b>Petroleum Geo-Services ASA</b>	<b>\$ 1,460.0</b>
<b>PG&amp;E Corp. - USGen New England, Inc.</b>	<b>\$ 1,221.6</b>
<b>Solutia Inc.</b>	<b>\$ 450.0</b>
<b>Trenwick Group Ltd.</b>	<b>\$ 130.0</b>
<b>Total</b>	<b>\$ 17,796.5</b>

**% of Default Volume      46.3%**

\* Only those issues of the issuer that were rated BBB- or above at some point of time prior to default have been considered.

Source: S&p, Moody's and author's compilation.

**FIGURE 9**  
**FALLEN ANGEL(FA) VS ORIGINAL ISSUE & ALL HIGH YIELD DEFAULT RATES**  
**1985-2003**  
**(Issuer Based)**

<b>Year</b>	<b>Fallen Angel Average 12 Month Default Rate*</b>	<b>Original Issue Speculative Grade Default Rates*</b>	<b>All Speculative Grade Bond Default Rates*</b>	<b>Altman Dollar Weighted Annual Default Rates</b>
2003	5.88%	5.46%	5.53%	4.66%
2002	6.59%	8.55%	8.32%	12.79%
2001	8.46%	10.14%	10.99%	9.81%
2000	7.01%	7.10%	7.03%	5.07%
1999	4.01%	5.10%	4.62%	4.15%
1998	3.31%	2.75%	2.23%	1.60%
1997	2.04%	2.10%	1.71%	1.25%
1996	1.38%	2.00%	1.71%	1.23%
1995	0.25%	3.90%	3.07%	1.90%
1994	0.00%	2.31%	1.70%	1.45%
1993	1.72%	1.99%	1.79%	1.10%
1992	4.50%	5.48%	5.45%	3.40%
1991	7.53%	10.86%	11.66%	10.27%
1990	5.77%	8.30%	8.20%	10.14%
1989	3.74%	4.93%	5.33%	4.29%
1988	4.25%	3.39%	3.95%	2.66%
1987	4.36%	2.92%	2.41%	5.78%
1986	2.46%	6.29%	4.78%	3.50%
1985	6.77%	4.06%	3.24%	1.71%
<b>Arithmetic Average</b>	4.21%	5.14%	4.93%	4.57%
<b>Weighted Average(By number of issuers)</b>	4.19%	5.15%	5.10%	4.39%
<b>Standard Deviation</b>	2.48%	2.77%	3.09%	3.61%

Source: Author Compilation from Standard & Poor's "Credit Pro" Database

\*Each year's figure is based on the one year average of the 12 months for that year.

**FIGURE 10**  
**2003 DEFAULT LOSS RATE**

	<b>Unadjusted for Fallen Angels</b>	<b>Only Fallen Angels</b>	<b>All except Fallen Angels</b>	<b>Price Adjusted for Fallen Angels</b>
<b><i>BACKGROUND DATA</i></b>				
AVERAGE DEFAULT RATE, 2003	4.661%	5.873%	3.957%	4.844%
AVERAGE PRICE AT DEFAULT (a)	45.503%	56.951%	35.618%	45.492%
AVERAGE PRICE AT DOWNGRADE (a)		61.781%		
AVERAGE RECOVERY	45.503%	92.183%	35.618%	66.003%
AVERAGE LOSS OF PRINCIPAL	54.497%	7.817%	64.382%	33.997%
AVERAGE COUPON PAYMENT	9.554%	8.200%	10.720%	9.554%
 <b><i>DEFAULT LOSS COMPUTATION</i></b>				
DEFAULT RATE	4.661%	5.873%	3.957%	4.844%
X LOSS OF PRINCIPAL	<u>54.497%</u>	<u>7.817%</u>	<u>64.382%</u>	<u>33.997%</u>
DEFAULT LOSS OF PRINCIPAL	2.540%	0.459%	2.547%	1.647%
 DEFAULT RATE	4.661%	5.873%	3.957%	4.844%
X LOSS OF 1/2 COUPON	<u>4.777%</u>	<u>4.100%</u>	<u>5.360%</u>	<u>4.777%</u>
DEFAULT LOSS OF COUPON	0.223%	0.241%	0.212%	0.231%
 <b>DEFAULT LOSS OF PRINCIPAL AND COUPON</b>	<b>2.763%</b>	<b>0.700%</b>	<b>2.760%</b>	<b>1.878%</b>

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

Source: Author's Compilations and various dealer quotes.

**FIGURE 11**  
**DEFAULT RATES AND LOSSES (a)**  
**(1978 - 2003)**

YEAR	PAR VALUE OUTSTANDING (a) (\$ MMs)	PAR VALUE OF DEFAULT (\$ MMs)	DEFAULT RATE (%)	WEIGHTED PRICE AFTER DEFAULT	WEIGHTED COUPON (%)	DEFAULT LOSS (%) (b)
2003	\$825,000	\$38,451	4.66%	45.5	9.55%	2.76%
2002	\$757,000	\$96,858	12.79%	25.3	9.37%	10.15%
2001	\$649,000	\$63,609	9.80%	25.5	9.18%	7.76%
2000	\$597,200	\$30,295	5.07%	26.4	8.54%	3.95%
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%	0.65%
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%	72.0	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%
<b>ARITHMETIC AVERAGE 1978-2003:</b>			<b>3.66%</b>	<b>\$42.5</b>	<b>11.01%</b>	<b>2.52%</b>
<b>WEIGHTED AVERAGE 1978-2003:</b>			<b>5.38%</b>			<b>3.93%</b>

**Notes**

(a) Excludes defaulted issues.

(b) Default loss rate adjusted for fallen angels is 9.256% in 2002 and 1.82% in 2003

Source: Author's Compilations

Source: Figure 1 and 9

**FIGURE 12**

**WEIGHTED AVERAGE RECOVERY RATES ON DEFAULTED DEBT  
BY SENIORITY PER \$100 FACE AMOUNT (1978 - 2003)**

Default Year	Senior Secured		Senior Unsecured		Senior Subordinated		Subordinated		Discount and Zero Coupon		All Seniorities	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
2003	57	\$53.51	108	\$45.40	29	\$35.98	1	\$38.00	8	\$32.27	203	\$45.50
2002	37	\$52.81	254	\$21.82	21	\$32.79	0	\$0.00	28	\$26.47	340	\$26.48
2001	9	\$40.95	187	\$28.84	48	\$18.37	0	\$0.00	37	\$15.05	281	\$25.48
2000	13	\$39.58	47	\$25.40	61	\$25.96	26	\$26.62	17	\$23.61	164	\$25.83
1999	14	\$26.90	60	\$42.54	40	\$23.56	2	\$13.88	11	\$17.30	127	\$31.14
1998	6	\$70.38	21	\$39.57	6	\$17.54	0	0.00	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
<b>Total/Average</b>	<b>229</b>	<b>\$53.02</b>	<b>914</b>	<b>\$35.01</b>	<b>397</b>	<b>\$30.13</b>	<b>248</b>	<b>\$31.06</b>	<b>138</b>	<b>\$21.09</b>	<b>1926</b>	<b>\$34.46</b>
<b>Median</b>		<b>\$54.63</b>		<b>\$42.27</b>		<b>\$32.35</b>		<b>\$31.96</b>		<b>\$18.25</b>		<b>\$40.05</b>

Source: Authors' Compilations from Various Dealer Quote

**FIGURE 13**  
**Fallen Angels: An Analysis Of Recovery Rates And Loss Rates On Default**

**SUMMARY STATISTICS**

	<b>Price at Default</b>	<b>Price at Downgrade</b>	<b>Recovery</b>	<b>Years to default</b>
Mean	54.57	74.85	0.74	2.16
Median	53.49	76.48	0.77	1.80
Standard Deviation	18.52%	11.85%	0.25%	1.60%

**Analysis by Year of Default**

	<b>Price at Default</b>	<b>Price at Downgrade</b>	<b>Recovery</b>	<b>Years to default</b>	<b># of Data points</b>	<b>Fallen Angels (\$ MM)</b>
1982 Average	38.59	52.94	72.9%	0.54	10	498
1983 Average	71.17	89.08	79.9%	6.11	3	47
1984 Average	70.54	85.25	82.7%	1.79	3	47
1985 Average	36.63	67.75	54.1%	1.25	1	21
1986 Average	44.78	77.40	57.9%	3.54	10	317
1987 Average	71.85	82.77	86.8%	1.80	11	2,905
1988 Average	53.49	75.95	70.4%	3.77	22	741
1989 Average	53.39	66.75	80.0%	0.07	10	1,155
1990 Average	35.70	76.48	46.7%	2.41	17	1,516
1991 Average	67.28	86.92	77.4%	1.16	37	1,902
1992 Average	79.13	94.45	83.8%	3.04	7	133
1995 Average	69.00	67.06	102.9%	0.00	2	125
1999 Average	30.43	84.64	35.9%	2.56	7	1,013
2000 Average	29.46	80.76	36.5%	0.80	13	2,300
2001 Average	86.00	62.72	137.1%	0.33	17	3,825
2002 Average	33.38	59.79	55.8%	2.90	113	40,987
2003 Average	56.95	61.78	92.2%	2.90	66	17,797
<b>Arithmetic Average</b>	<b>54.57</b>	<b>74.85</b>	<b>73.7%</b>	<b>2.16</b>	<b>349</b>	<b>75,328</b>
<b>Weighted Average <sup>1</sup></b>	<b>44.62</b>	<b>63.69</b>	<b>70.0%</b>	<b>2.55</b>		
<b>Median</b>	<b>53.49</b>	<b>76.48</b>	<b>77.4%</b>	<b>1.80</b>		
<b>SD</b>	<b>18.5%</b>	<b>11.8%</b>	<b>0.3%</b>	<b>1.6%</b>		

1 - Weighted by \$ outstanding



**FIGURE 14**

**AVERAGE RECOVERY RATES FOR TELECOM FIRMS: 1998 - 2003**

<b>YEAR</b>	<b>NUMBER OF ISSUES</b>	<b>AVERAGE RECOVERY PRICE</b>	<b>WEIGHTED AVERAGE</b>
1998	8	\$20.81	\$18.84
1999	16	\$23.47	\$25.58
2000	18	\$24.50	\$24.69
2001	118	\$18.69	\$16.07
2002	88	\$19.38	\$16.56
2003	28	\$40.31	\$35.43
	276	\$21.82	\$19.38

\* Includes Wireless Equipment and Satellite Telecommunication Companies in addition to Telecommunication Service Companies.

Source: Authors' compilation from various Dealer Quotes.

**FIGURE 15**

**AVERAGE PRICE AFTER DEFAULT BY ORIGINAL BOND RATING  
(1971 - 2003)**

<b>Rating</b>	<b>No. of Observations</b>	<b>Average Price</b>	<b>Weighted Average Price</b>	<b>Median Price</b>	<b>Std. Dev.</b>	<b>Minimum Price</b>	<b>Maximum Price</b>
AAA	7	\$68.34	\$76.99	\$71.88	\$20.82	\$32.00	\$97.00
AA	21	\$58.02	\$76.20	\$54.25	\$26.09	\$17.80	\$99.88
A	111	\$54.26	\$47.87	\$55.25	\$27.77	\$2.00	\$100.00
<b>BBB</b>	312	\$41.67	\$32.67	\$41.75	\$23.76	\$1.00	\$103.00
<b>BB</b>	174	\$34.57	\$30.15	\$33.00	\$21.65	\$1.00	\$107.75
<b>B</b>	963	\$31.56	\$28.33	\$27.00	\$22.63	\$0.42	\$112.00
CCC	201	\$35.66	\$32.98	\$28.90	\$27.38	\$0.59	\$103.25
<b>Total</b>	<b>1789</b>	<b>\$35.93</b>	<b>\$31.44</b>	<b>\$32.00</b>	<b>\$24.64</b>	<b>\$0.42</b>	<b>\$112.00</b>

\* Total amount defaulted: \$ 310,383.9

Source: Authors' Compilation

**FIGURE 16**

**AVERAGE PRICE AT DEFAULT  
BY NUMBER OF YEARS AFTER ISSUANCE  
(1971 - 2003)**

<b>Years To Default</b>	<b>No. of Observations</b>	<b>Average Price</b>
<b>1</b>	<b>146</b>	<b>\$30.58</b>
<b>2</b>	<b>314</b>	<b>\$31.09</b>
<b>3</b>	<b>370</b>	<b>\$29.96</b>
<b>4</b>	<b>283</b>	<b>\$35.13</b>
<b>5</b>	<b>213</b>	<b>\$33.95</b>
<b>6</b>	<b>165</b>	<b>\$41.47</b>
<b>7</b>	<b>115</b>	<b>\$36.32</b>
<b>8</b>	<b>57</b>	<b>\$33.91</b>
<b>9</b>	<b>38</b>	<b>\$36.73</b>
<b>10</b>	<b>99</b>	<b>\$37.46</b>
<b>All</b>	<b>1,800</b>	<b>\$33.63</b>

Source: Authors' Compilation

**Figure 17**

**Default Dollar Amount by Original Rating**  
*(Issues defaulted from 1974 to 2003)*

<b>Year</b>	<b>#</b>	<b>Total (US\$M)</b>	<b>Mean (US\$M)</b>	<b>STD</b>	<b>Median (US\$M)</b>
<b>AAA</b>	7	764.00	109.14	73.92	125.00
<b>AA</b>	21	3,370.38	160.49	183.41	74.00
<b>A</b>	111	13,317.08	119.97	179.74	60.00
<b>BBB</b>	316	72,812.86	230.42	428.80	125.00
<b>BB</b>	173	33,338.94	192.71	200.84	125.00
<b>B</b>	953	159,130.40	166.98	168.61	120.00
<b>CCC</b>	190	25,206.66	132.67	122.68	100.00
<b>CC</b>	7	1,063.30	151.90	95.65	114.50
<b>C</b>	3	615.97	205.32	207.68	195.00
<b><u>NR</u></b>	<u>294</u>	<u>35,847.13</u>	<u>121.93</u>	<u>132.16</u>	<u>86.95</u>
<b>Total</b>	<b>2075</b>	<b>345,466.7</b>	<b>166.49</b>	<b>226.89</b>	<b>110.00</b>

*Source: Authors' Compilation*

Figure 18

MORTALITY RATES BY ORIGINAL RATING - ALL RATED CORPORATE BONDS (a)

(1971 - 2003)

Years after issuance

		1	2	3	4	5	6	7	8	9	10
<b>AAA</b>	<b>Marginal</b>	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
	<b>Cumulative</b>	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
<b>AA</b>	<b>Marginal</b>	0.00%	0.00%	0.33%	0.17%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%
	<b>Cumulative</b>	0.00%	0.00%	0.33%	0.50%	0.50%	0.50%	0.50%	0.50%	0.53%	0.55%
<b>A</b>	<b>Marginal</b>	0.01%	0.11%	0.02%	0.09%	0.05%	0.10%	0.06%	0.21%	0.11%	0.06%
	<b>Cumulative</b>	0.01%	0.12%	0.14%	0.23%	0.28%	0.38%	0.44%	0.65%	0.75%	0.82%
<b>BBB</b>	<b>Marginal</b>	0.40%	3.45%	1.58%	1.45%	0.98%	0.56%	0.28%	0.25%	0.16%	0.42%
	<b>Cumulative</b>	0.40%	3.84%	5.38%	6.73%	7.64%	8.16%	8.98%	9.11%	9.25%	9.63%
<b>BB</b>	<b>Marginal</b>	1.22%	2.52%	4.44%	2.05%	2.55%	1.10%	1.65%	0.88%	1.72%	3.70%
	<b>Cumulative</b>	1.22%	3.77%	7.98%	9.87%	12.17%	13.14%	14.57%	15.15%	16.61%	19.69%
<b>B</b>	<b>Marginal</b>	3.06%	6.92%	7.48%	8.58%	6.08%	4.18%	3.74%	2.31%	2.00%	0.88%
	<b>Cumulative</b>	3.06%	9.77%	16.52%	23.69%	28.32%	31.32%	33.89%	35.41%	36.70%	37.26%
<b>CCC</b>	<b>Marginal</b>	8.18%	15.57%	19.15%	12.18%	4.26%	10.25%	5.65%	3.15%	0.00%	4.28%
	<b>Cumulative</b>	8.18%	22.48%	37.32%	44.96%	47.30%	52.70%	55.37%	56.78%	56.78%	58.63%

(a) Rated by S&P at Issuance

Based on 1,719 issues

Source: Standard & Poor's (New York) and Author's Compilation

Figure 19

MORTALITY LOSSES BY ORIGINAL RATING - ALL RATED CORPORATE BONDS (a)

(1971 - 2003)

Years after issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Marginal	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	Marginal	0.00%	0.00%	0.06%	0.06%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%
	Cumulative	0.00%	0.00%	0.06%	0.12%	0.12%	0.12%	0.12%	0.12%	0.15%	0.17%
A	Marginal	0.00%	0.04%	0.01%	0.04%	0.02%	0.06%	0.02%	0.04%	0.08%	0.00%
	Cumulative	0.00%	0.04%	0.05%	0.09%	0.11%	0.17%	0.19%	0.23%	0.31%	0.31%
BBB	Marginal	0.28%	2.54%	1.15%	0.94%	0.65%	0.37%	0.47%	0.15%	0.10%	0.29%
	Cumulative	0.28%	2.81%	3.93%	4.83%	5.45%	5.80%	6.24%	6.38%	6.48%	6.75%
BB	Marginal	0.73%	1.51%	3.24%	1.46%	1.40%	0.75%	0.99%	0.28%	0.94%	1.18%
	Cumulative	0.73%	2.23%	5.40%	6.78%	8.08%	8.78%	9.68%	9.93%	10.78%	11.83%
B	Marginal	2.13%	5.05%	5.60%	6.00%	4.56%	2.51%	2.74%	1.64%	1.10%	0.67%
	Cumulative	2.13%	7.07%	12.38%	17.54%	21.30%	23.38%	25.00%	26.23%	27.04%	27.53%
CCC	Marginal	5.48%	11.68%	15.37%	9.72%	3.20%	8.21%	4.80%	2.52%	0.00%	3.22%
	Cumulative	5.48%	16.52%	29.35%	36.22%	38.26%	43.37%	46.05%	47.41%	47.41%	49.10%

(a) Rated by S&P at Issuance

Based on 1,535 issues

Source: Standard & Poor's (New York) and Author's Compilation

**FIGURE 20**

**ANNUAL RETURNS, YIELDS AND SPREADS  
ON TEN-YEAR TREASURY (TREAS)  
AND HIGH YIELD (HY) BONDS (a)  
(1978 - 2003)**

YEAR	RETURN(%)			PROMISED YIELD(%)		
	HY	TREAS	SPREAD	HY	TREAS	SPREAD
2003	30.62	1.25	29.37	8.00	4.26	3.74
2002	(1.53)	14.66	(16.19)	12.38	3.82	8.56
2001	5.44	4.01	1.43	12.31	5.04	7.27
2000	(5.68)	14.45	(20.13)	14.56	5.12	9.44
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:**

1978-2003	11.40	9.17	2.22	12.67	7.70	4.96
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**COMPOUND ANNUAL AVERAGE:**

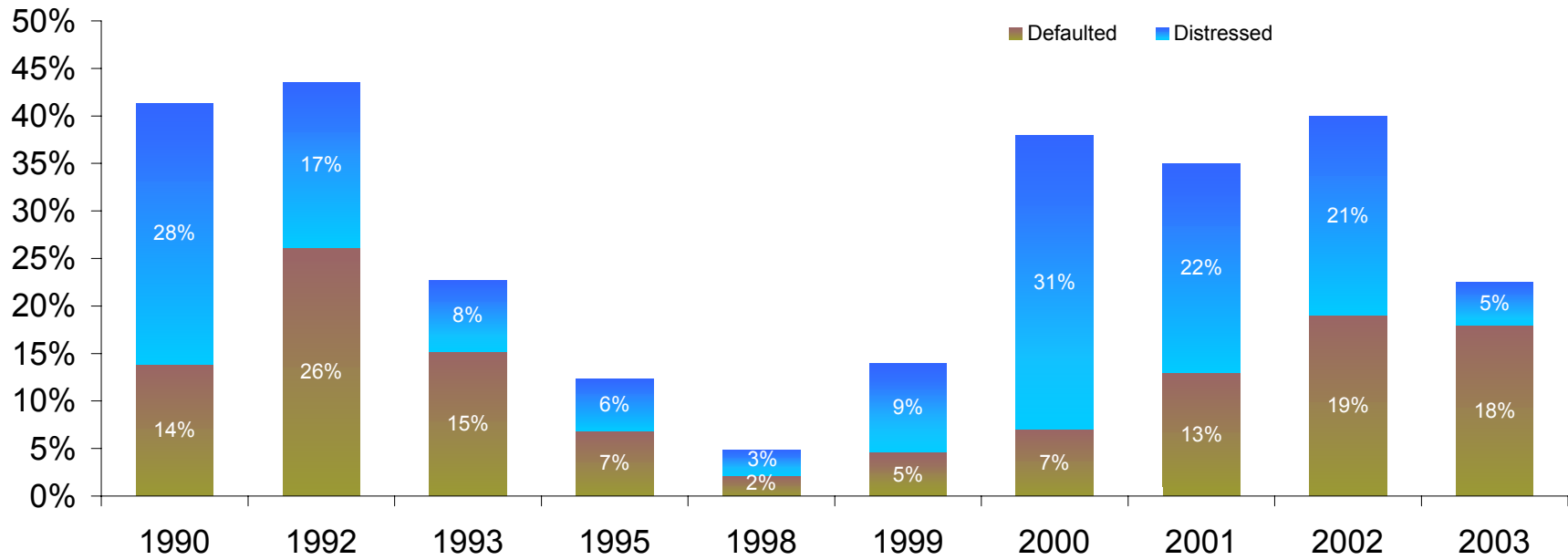
1978-2003	10.73	8.56	2.17
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(a) End of year yields.

Source: Citigroup's High Yield Composite Index.

**FIGURE 21**

**DISTRESSED (a) AND DEFAULTED DEBT AS A  
PERCENTAGE OF TOTAL HIGH YIELD PLUS DEFAULTED DEBT MARKET  
1990-2003 <sup>(b)</sup>**



(a) Defined as yield-to-maturity spread greater than or equal to 1000bp over comparable Treasuries

(b) Some years not available as no survey results available

Source: Citigroup and NYU Salomon Center



**FIGURE 22**

**ESTIMATED FACE AND MARKET VALUES OF DEFAULTED AND DISTRESSED DEBT  
2002-2003 (\$ billion)**

	<u>Face Value</u>		<u>Market Value</u>			
	12/31/2002	12/31/2003	12/31/2002	xFace Value	12/31/2003	xFace Value
<b><u>Public Debt</u></b>						
Defaulted	\$ 187.7	\$ 193.6 <sup>(1)</sup>	\$ 37.5	0.20	\$ 87.1	0.45
Distressed	\$ 204.7	\$ 50.5 <sup>(2)</sup>	\$ 102.4	0.50	\$ 32.8	0.65
<b>Total Public</b>	<b>\$ 392.5</b>	<b>\$ 244.1</b>	<b>\$ 139.9</b>		<b>\$ 119.9</b>	
<b><u>Private Debt</u></b>						
Defaulted	\$ 262.8	\$ 271.0 <sup>(3)</sup>	\$ 157.7	0.60	\$ 189.7 <sup>(2)</sup>	0.70
Distressed	\$ 286.6	\$ 70.7 <sup>(3)</sup>	\$ 215.0	0.75	\$ 60.1 <sup>(2)</sup>	0.85
<b>Total Private</b>	<b>\$ 549.5</b>	<b>\$ 341.7</b>	<b>\$ 372.7</b>		<b>\$ 249.8</b>	
<b>Total Public and Private</b>	<b>\$ 941.9</b>	<b>\$ 585.8</b>	<b>\$ 512.6</b>		<b>\$ 369.8</b>	

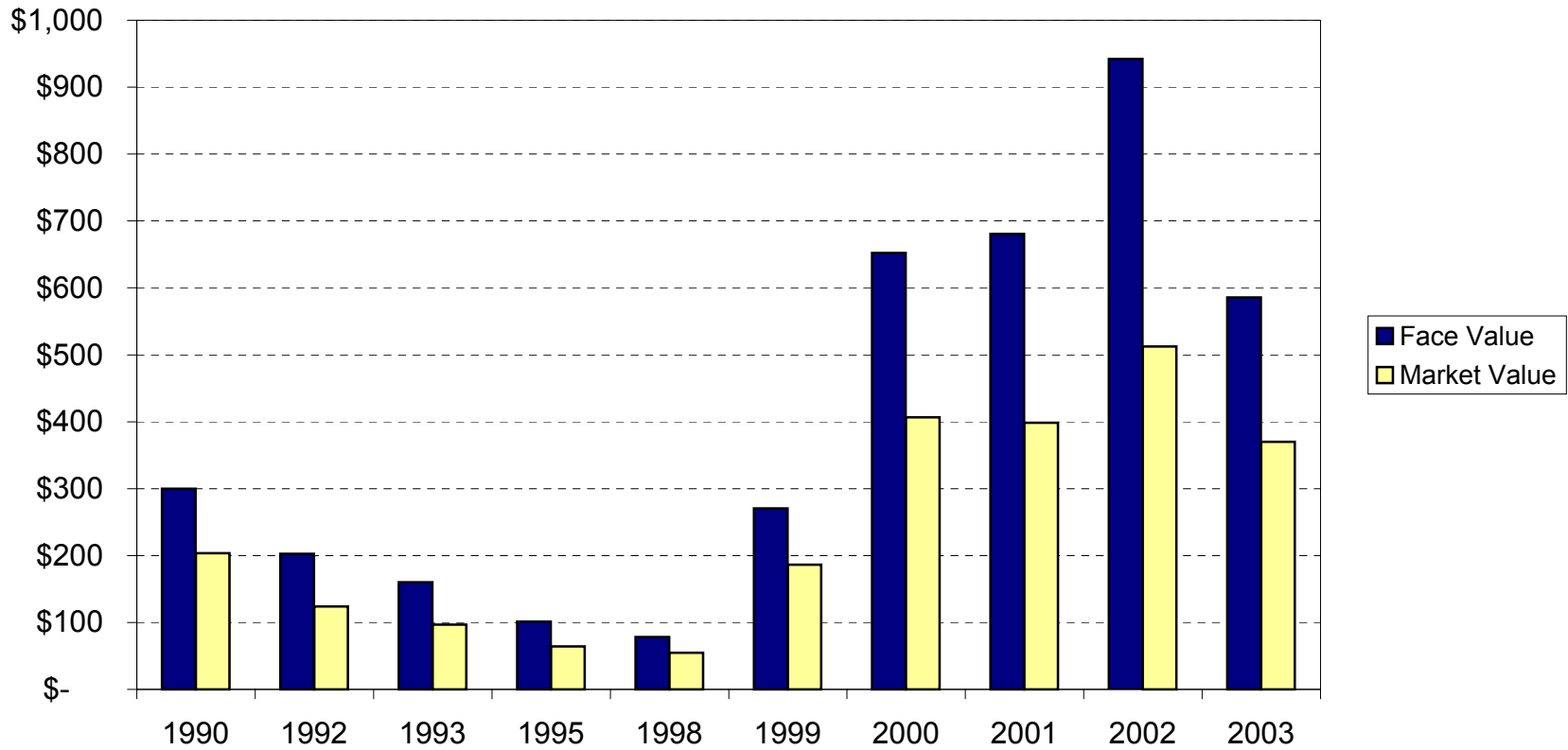
(1) Calculated using: (2002 defaulted population) + (2003 defaults) - (2003 Emergences)

(2) Based on 5.7% of size of high yield market (\$886.1 billion)

(3) For 12/31/02 and 12/31/03, we use a private/public ratio of 1.40.

Sources: Estimated by Professor Edward Altman, NYU Stern School of Business from Citigroup's High Yield Bond Database, NYU Salomon Center Defaulted Bond and Bank Loan Databases.

**FIGURE 23**  
**SIZE OF THE DEFAULTED AND DISTRESSED DEBT MARKET (\$ Billions)**  
**(1990-2003)**



Source: Author's compilation

**Figure 24**

**US Bond Rating Equivalent Based on Adjusted Z" Score Model**

$$Z''=3.25+6.56X_1+3.26X_2+6.72X_3+1.05X_4$$

<b>US Equivalent Rating</b>	<b>Average EM Score</b>	<b>Sample Size</b>
AAA	8.15	8
AA+	7.6	-
AA	7.3	18
AA-	7	15
A+	6.85	24
A	6.65	42
A-	6.4	38
BBB+	6.25	38
BBB	5.85	59
BBB-	5.65	52
BB+	5.25	34
BB	4.95	25
BB-	4.75	65
B+	4.5	78
B	4.15	115
B-	3.75	95
CCC+	3.2	23
CCC	2.5	10
CCC-	1.75	6
D	0	14

**Figure 25**

**Forecasted High Yield Market Size, Defaults and  
Default Rates for 2004 and 2005**

	<b>High Yield Market (\$ Billion)</b>	<b>Default Rate (%)</b>	<b>Default Amount (\$ Billions)</b>
<b>2004</b>	\$946.5	3.50%	\$33.10
<b>2005</b>	\$1,041.0	4.10%	\$42.70

**FIGURE 26**

**FORECASTED FACE AND MARKET VALUES OF DEFAULTED AND DISTRESSED DEBT  
2004-2005 (\$ billion)**

	<u>Face Value</u>		<u>Market Value</u>			
	12/31/2004	12/31/2005	12/31/2004	xFace Value	12/31/2005	xFace Value
<b><u>Public Debt</u></b>						
Defaulted	\$ 151.3	\$ 119.0 <sup>(1)</sup>	\$ 72.6	0.48	\$ 59.5	0.50
Distressed	\$ 49.7	\$ 78.0 <sup>(2)</sup>	\$ 32.3	0.65	\$ 50.7	0.65
<b>Total Public</b>	<b>\$ 201.0</b>	<b>\$ 197.0</b>	<b>\$ 104.9</b>		<b>\$ 110.2</b>	
<b><u>Private Debt</u></b>						
Defaulted	\$ 211.8	\$ 166.6 <sup>(3)</sup>	\$ 154.6	0.73	\$ 125.0	0.75
Distressed	\$ 69.6	\$ 109.2 <sup>(3)</sup>	\$ 59.1	0.85	\$ 92.8	0.85
<b>Total Private</b>	<b>\$ 281.4</b>	<b>\$ 275.9</b>	<b>\$ 213.8</b>		<b>\$ 217.8</b>	
<b>Total Public and Private</b>	<b>\$ 482.4</b>	<b>\$ 472.9</b>	<b>\$ 318.7</b>		<b>\$ 328.0</b>	

(1) Calculated using: (2003 defaulted population) + (2004 defaults) – (2004 emergences), same for 2005

(2) Based on 5.0% of size of high yield market (in 2004, \$994 billion); 7.5% of market in 2005 (\$1,041 billion)

(3) For 12/31/2004 and 12/31/2005, we use a private/public debt ratio of 1.40

Sources: Estimated by Professor Edward Altman, NYU Stern School of Business from Citigroup's High Yield Bond Database, NYU Salomon Center Defaulted Bond and Bank Loan Databases.

## APPENDIX A

## DEFAULTED CORPORATE STRAIGHT DEBT ISSUES IN 2003

<b>Company</b>	<b>Bond Issue</b>	<b>Coupon (%)</b>	<b>Maturity Date</b>	<b>Outstanding Amount (\$ MM)</b>	<b>Default Date</b>
Acterna Corp.	Senior Subordinated	9.750%	5/15/2008	275.00	5/6/2003
AES Drax Holdings (Energy)	Senior Secured	10.410%	12/31/2020	302.40	12/16/2002
AES Drax Holdings (Energy)	Senior Secured	11.500%	8/30/2010	199.99	3/3/2003
Air Canada	Senior Unsecured	FLOAT	7/31/2005	137.00	4/1/2003
Air Canada	Senior Unsecured	10.250%	3/15/2011	299.50	4/1/2003
Air Canada*	Senior Unsecured	6.750%	2/2/2004	120.69	4/1/2003
Air Canada*	Senior Unsecured	7.250%	10/1/2007	158.62	4/1/2003
Air Canada*	Senior Unsecured	9.000%	6/1/2006	172.41	4/1/2003
Airgate PCS, Inc.	Senior Subordinated	13.500%	10/01/09	300.00	9/24/2003
Alamosa Holdings, Inc.	Senior Secured	12.875%	2/15/2010	350.00	9/12/2003
Alamosa Holdings, Inc.	Senior Secured	12.500%	2/1/2011	250.00	9/12/2003
Alamosa Holdings, Inc.	Senior Secured	13.625%	8/15/2011	150.00	9/12/2003
All Star Gas Corp. (Empire Gas)	Senior Secured	11.000%	6/30/2003	53.00	7/21/2003
All Star Gas Corp. (Empire Gas)	Senior Unsecured	9.000%	12/31/2007	9.75	7/21/2003
Allegiance Tel	Discount	11.750%	2/15/2008	444.90	5/14/2003
Allegiance Tel	Senior Unsecured	12.875%	5/15/2008	205.00	5/14/2003
AMERCO	Senior Unsecured	8.800%	2/4/2005	200.00	6/30/2003
AMERCO	Senior Unsecured	7.850%	5/15/2003	175.00	6/30/2003
AMERCO	Senior Unsecured	7.135%	10/15/2049	100.00	6/30/2003
AMERCO	Senior Unsecured	7.470%	1/15/2027	40.00	6/30/2003
AMERCO	Senior Unsecured	7.230%	1/21/2027	33.00	6/30/2003
AMERCO	Senior Unsecured	7.050%	10/2/2006	30.00	6/30/2003
AMERCO	Senior Unsecured	6.710%	10/15/2008	25.00	6/30/2003
AMERCO	Senior Unsecured	7.440%	10/2/2006	25.00	6/30/2003
AMERCO	Senior Unsecured	7.100%	10/2/2006	20.00	6/30/2003
AMERCO	Senior Unsecured	8.040%	10/2/2006	20.00	6/30/2003
AMERCO	Senior Unsecured	8.040%	9/18/2006	10.00	6/30/2003
AMERCO	Senior Unsecured	7.700%	10/15/2004	5.00	6/30/2003
AMERCO	Senior Unsecured	8.030%	9/18/2006	5.00	6/30/2003
AMERCO	Senior Unsecured	8.080%	2/6/2017	1.50	6/30/2003
American Cellular Corp.	Senior Secured	9.500%	10/15/2009	693.60	7/15/2003
American Commercial Lines LLC	Senior Secured	11.250%	1/1/2008	134.67	1/31/03
American Commercial Lines LLC	Senior Secured	12.000%	7/1/2008	112.99	1/31/03
American Plumbing & Mechanical Inc.	Senior Secured	11.625%	10/15/08	95.00	10/13/2003
Anthony Crane Capital Corp.	Senior Unsecured	10.375%	8/1/2008	155.00	2/1/2003
Anthony Crane Capital Corp.	Senior Unsecured	13.375%	8/1/2009	48.00	2/1/2003
ATA Holdings Corp. (Amtran Inc.)	Senior Secured	10.500%	8/1/2004	175.00	8/29/2003
ATA Holdings Corp. (Amtran Inc.)	Senior Secured	9.625%	12/15/2005	125.00	8/29/2003
Atlas Air Inc.	Senior Unsecured	9.250%	4/15/2008	175.00	3/28/03
Atlas Air, Inc.	Senior Unsecured	9.375%	11/15/2006	150.00	3/28/2003
Atlas Air, Inc.	Senior Unsecured	10.750%	8/1/2005	137.50	3/28/2003

## APPENDIX A

## DEFAULTED CORPORATE STRAIGHT DEBT ISSUES IN 2003

<b>Company</b>	<b>Bond Issue</b>	<b>Coupon (%)</b>	<b>Maturity Date</b>	<b>Outstanding Amount (\$ MM)</b>	<b>Default Date</b>
Aurora Foods Inc.	Senior Subordinated	9.875%	2/15/2007	100.00	7/1/2003
Aurora Foods Inc.	Senior Subordinated	8.750%	7/1/2008	200.00	7/1/2003
Avado Brands Inc.	Senior Subordinated	11.750%	6/15/2009	100.00	6/17/03
Avado Brands Inc.	Senior Unsecured	9.750%	6/01/06	125.00	12/1/2003
Cable Satisfaction International Inc.	Senior Unsecured	12.750%	3/1/2010	155.00	3/1/2003
Cenargo International PLC	Senior Secured	9.750%	6/15/2008	175.00	1/14/2003
Cone Mills Corp.	Senior Unsecured	8.125%	3/15/05	100.00	9/15/2003
Congoleum Corp.	Senior Unsecured	8.625%	8/01/08	100.00	12/31/2003
Cybernet Internet Services International, Inc.	Senior Unsecured	14.000%	7/01/09	149.00	12/24/2003
DDI Corp. - <b>DDi Capital Corp.</b>	Discount	12.500%	11/15/2007	110.00	3/1/2003
DVI Inc.	Senior Unsecured	9.875%	2/01/04	55.00	8/1/2003
DVI Inc.	Senior Unsecured	9.875%	2/01/04	100.00	8/1/2003
Eagle Food Centers Inc.	Senior Unsecured	11.000%	4/15/2005	64.00	4/07/03
Fleming Cos. Inc.	Senior Secured	10.625%	7/31/2007	391.47	4/1/2003
Fleming Cos. Inc.	Senior Secured	10.125%	4/1/2008	355.00	4/1/2003
Fleming Cos. Inc.	Senior Secured	9.875%	5/1/2012	260.00	4/1/2003
Fleming Cos. Inc.	Senior Unsecured	9.250%	6/15/2010	200.00	4/1/2003
Fleming Cos. Inc.	Senior Unsecured	8.810%	8/6/2003	5.90	4/1/2003
Fleming Cos. Inc.	Senior Secured	10.625%	7/31/07	7.58	4/1/2003
General Chemical Industrial Products Inc.	Senior Subordinated	10.625%	5/1/2009	100.00	5/1/2003
General Media Inc.	Senior Secured	15.000%	3/29/2004	43.10	4/30/03
Golden Northwest Aluminium, Inc.	Senior Secured	12.000%	12/15/06	150.00	12/22/2003
Grant Geophysical, Inc.	Senior Unsecured	9.750%	2/15/2008	43.68	2/15/2003
HEALTHSOUTH Corp.	Senior Unsecured	6.875%	6/15/2005	250.00	4/1/2003
HEALTHSOUTH Corp.	Senior Unsecured	7.000%	6/15/2008	248.00	4/1/2003
HEALTHSOUTH Corp.	Senior Unsecured	7.375%	10/1/2006	200.00	4/1/2003
HEALTHSOUTH Corp.	Senior Unsecured	7.625%	6/1/2012	998.00	4/1/2003
HEALTHSOUTH Corp.	Senior Unsecured	8.375%	10/1/2011	400.00	4/1/2003
HEALTHSOUTH Corp.	Senior Unsecured	8.500%	2/1/2008	374.87	4/1/2003
HEALTHSOUTH Corp.	Senior Subordinated	10.750%	10/1/2008	350.00	4/1/2003
High Voltage Engineering Corp.	Senior Unsecured	10.750%	8/15/2004	155.00	8/15/2003
HomeGold Financial, Inc.	Senior Unsecured	10.750%	9/15/2004	6.20	3/31/2003
Horizon PCS, Inc.	Senior Unsecured	14.000%	10/01/10	295.00	8/15/2003
Horizon PCS, Inc.	Senior Unsecured	13.750%	6/15/11	175.00	8/15/2003
International Utility Structures Inc.	Senior Subordinated	10.750%	2/1/2008	75.00	8/1/2003
International Utility Structures Inc.	Senior Subordinated	13.000%	2/1/2008	29.10	8/29/2003
International Wire Group Inc.	Senior Secured	11.750%	6/01/05	150.00	12/1/2003
International Wire Group Inc.	Senior Secured	10.750%	2/28/05	82.00	12/1/2003
International Wire Group Inc.	Senior Subordinated	11.750%	6/01/05	150.00	12/1/2003
iPCS Inc.	Discount	14.000%	7/15/2010	300.00	2/23/2003
Iron Age Holdings Corp.	Discount	12.125%	5/01/09	45.18	12/2/2003

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DEFAULTED CORPORATE STRAIGHT DEBT ISSUES IN 2003

Company	Bond Issue	Coupon (%)	Maturity Date	Outstanding Amount (\$ MM)	Default Date
J. Crew Group, Inc.	Senior Unsecured	13.125%	10/15/2008	21.70	5/08/03
Jackson Products Inc.	Subordinated	9.500%	4/15/2005	115.00	4/15/2003
James Cable Partners L.P.	Senior Unsecured	10.750%	8/15/2004	88.00	2/15/2003
Leap Wireless Intl. Inc.	Senior Secured	12.500%	4/15/2010	225.00	4/13/2003
Leap Wireless Intl. Inc.	Senior Secured	14.500%	4/15/2010	668.00	4/13/2003
Loral Cyberstar Inc.	Senior Secured	10.000%	7/15/06	613.00	7/15/2003
Loral Space & Comm. Ltda.	Senior Unsecured	9.500%	1/15/06	345.37	7/15/2003
Loral Space & Comm. Ltda. (Orion Networks)	Discount	12.500%	1/15/07	49.00	7/15/2003
Loral Space & Comm. Ltda. (Orion Networks)	Senior Unsecured	11.250%	1/15/07	37.00	7/15/2003
Lumbermens Mutual Casualty Co. (Kemper)	Senior Subordinated	9.150%	07/01/26	400.00	3/26/03
Lumbermens Mutual Casualty Co. (Kemper)	Senior Unsecured	8.300%	12/01/37	200.00	3/26/03
Lumbermens Mutual Casualty Co. (Kemper)	Senior Unsecured	8.450%	12/01/97	100.00	3/26/03
Magellan Health Services, Inc.	Senior Unsecured	9.375%	11/15/2007	250.00	3/11/2003
Magellan Health Services, Inc.	Senior Subordinated	9.000%	2/15/2008	625.00	3/11/2003
Marconi PLC	Senior Unsecured	7.750%	9/15/2010	769.00	3/15/2003
Marconi PLC	Senior Unsecured	8.375%	9/15/1930	769.90	3/15/2003
Maxxim Medical Inc. - Maxxim Medical Group Inc.	Discount	11.000%	11/15/2009	144.55	2/11/2003
Mirant Americas Generating LLC	Senior Unsecured	7.625%	5/1/2006	500.00	6/03/03
Mirant Americas Generating LLC	Senior Unsecured	8.300%	5/01/11	850.00	7/14/2003
Mirant Americas Generating LLC	Senior Unsecured	8.500%	10/01/21	450.00	7/14/2003
Mirant Americas Generating LLC	Senior Unsecured	9.125%	5/01/31	400.00	7/14/2003
Mirant Americas Generating LLC	Senior Unsecured	7.200%	10/01/08	300.00	7/14/2003
Mirant Corp.	Senior Unsecured	7.900%	7/15/09	500.00	7/14/2003
Mirant Corp. - Mirant Mid-Atlantic LLC	Senior Secured	9.125%	6/30/2017	389.12	7/14/2003
Mirant Corp. - Mirant Mid-Atlantic LLC	Senior Secured	10.060%	6/30/2028	326.39	7/14/2003
Mississippi Chemical Corp.	Senior Unsecured	7.250%	11/15/2017	200.00	5/15/2003
Motels of America (MOA Hospitality)	Senior Subordinated	12.000%	4/15/2004	13.60	7/10/2003
MTS Inc.	Senior Subordinated	9.375%	5/1/2005	110.00	5/1/2003
National Equipment Services Inc.	Senior Subordinated	10.000%	11/30/2004	100.00	5/30/2003
National Equipment Services Inc.	Senior Subordinated	10.000%	11/30/2004	175.00	5/30/2003
Neenah Foundry Co.	Senior Subordinated	11.125%	5/1/2007	150.00	5/5/2003
Neenah Foundry Co.	Senior Subordinated	11.125%	5/1/2007	45.00	5/5/2003
Neenah Foundry Co.	Senior Subordinated	11.125%	5/1/2007	87.00	5/5/2003
New World Restaurant Group Inc.	Senior Secured	18.000%	6/15/2003	140.00	6/15/2003
Newmont Yandal Operations	Senior Unsecured	8.875%	6/30/2008	237.20	6/4/2003
NorthWestern Corp.	Senior Unsecured	7.875%	3/15/07	250.00	9/15/2003
NorthWestern Corp.	Senior Unsecured	8.750%	3/15/12	470.00	9/15/2003
NorthWestern Corp.	Senior Unsecured	6.950%	11/15/28	105.00	9/15/2003
NorthWestern Corp.	Senior Secured	7.000%	8/15/2023	55.00	9/15/2003
NorthWestern Corp.	Senior Secured	7.100%	8/1/2005	60.00	9/15/2003
NorthWestern Corp.	Senior Unsecured	7.875%	3/15/2007	250.00	9/14/2003



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DEFAULTED CORPORATE STRAIGHT DEBT ISSUES IN 2003

<b>Company</b>	<b>Bond Issue</b>	<b>Coupon (%)</b>	<b>Maturity Date</b>	<b>Outstanding Amount (\$ MM)</b>	<b>Default Date</b>
NorthWestern Corp. (Montana Power)	Senior Secured	8.250%	2/1/2007	0.37	9/15/2003
NorthWestern Corp. (Montana Power)	Senior Secured	8.950%	2/1/2022	1.47	9/15/2003
NorthWestern Corp. (Montana Power)	Senior Secured	7.000%	3/1/2005	5.50	9/15/2003
NorthWestern Corp. (Montana Power)	Senior Secured	7.300%	12/1/2006	150.00	9/15/2003
NorthWestern Corp. (Montana Power)	Senior Unsecured	7.875%	12/23/2026	35.00	9/14/2003
NorthWestern Corp. (Montana Power)	Senior Unsecured	7.960%	12/21/2026	5.00	9/14/2003
NorthWestern Corp. (Montana Power)	Senior Secured	8.680%	2/7/2022	7.00	9/14/2003
NorthWestern Corp. (Montana Power)	Senior Unsecured	9.200%	12/31/2004	8.80	9/14/2003
NorthWestern Corp. (Montana Power)	Senior Unsecured	7.070%	12/20/2006	15.00	9/14/2003
NorthWestern Corp. (Montana Power)	Senior Secured	7.250%	3/3/2008	13.00	9/14/2003
NorthWestern Corp. (Montana Power)	Senior Secured	7.250%	1/19/2024	5.00	9/14/2003
NRG Energy, Inc.	Senior Unsecured	7.875%	2/1/2006	125.00	2/1/2003
NRG Energy, Inc.	Senior Unsecured	6.750%	7/15/2006	340.00	1/15/2003
NRG Energy, Inc.	Senior Unsecured	7.500%	6/1/2009	300.00	5/14/03
NRG Energy, Inc.	Senior Unsecured	7.500%	6/15/2007	250.00	5/14/03
NRG Energy, Inc.	Senior Unsecured	8.000%	11/1/2003	240.00	5/14/03
NRG Energy, Inc.	Senior Unsecured	8.700%	3/15/2005	250.00	5/14/03
NRG Energy, Inc.	Senior Unsecured	8.250%	9/15/2010	350.00	5/14/03
NRG Energy, Inc.	Senior Unsecured	7.750%	4/1/2011	350.00	5/14/03
NRG Energy, Inc.	Senior Unsecured	8.625%	4/1/2031	500.00	5/14/03
NRG Northeast Generating LLC	Senior Secured	9.292%	12/15/2024	300.00	5/14/03
NRG Northeast Generating LLC	Senior Secured	8.065%	12/15/2004	126.50	5/14/03
NRG Northeast Generating LLC	Senior Secured	8.842%	6/15/2015	130.00	5/14/03
NRG South Central Generating LLC	Senior Secured	8.962%	3/15/2016	425.25	5/14/03
NRG South Central Generating LLC	Senior Secured	9.479%	9/15/2024	300.00	5/14/03
NTELOS	Senior Unsecured	13.000%	8/15/2010	258.60	2/18/2003
NTELOS	Senior Subordinated	13.500%	2/15/2011	95.00	2/18/2003
NTELOS	Senior Unsecured	13.000%	8/15/2010	21.40	2/18/2003
Oglebay Norton Co.	Senior Subordinated	10.000%	2/1/2009	100.00	8/1/2003
Pac-West Telecomm, Inc.	Senior Unsecured	13.500%	2/1/2009	95.10	4/29/2003
Penn National Gaming Inc. - Hollywood Casino Shreve	Senior Secured	13.000%	8/1/2006	39.00	8/1/2003
Penn National Gaming Inc. - Shreveport Capital Corp.	Senior Secured	13.000%	8/1/2006	150.00	8/1/2003
Penn Traffic Co. (The)	Senior Unsecured	11.000%	6/29/2009	100.00	5/30/2003
Petroleum Geo-Services ASA	Senior Unsecured	7.500%	3/31/2007	360.00	7/29/2003
Petroleum Geo-Services ASA	Senior Unsecured	6.625%	3/30/2008	200.00	7/29/2003
Petroleum Geo-Services ASA	Senior Unsecured	7.125%	3/30/2028	450.00	7/29/2003
Petroleum Geo-Services ASA	Senior Unsecured	6.250%	11/19/2003	250.00	7/29/2003
Petroleum Geo-Services ASA	Senior Unsecured	8.150%	7/15/2029	200.00	7/29/2003
PG&E Corp. - USGen New England, Inc.	Senior Unsecured	7.459%	1/2/2015	221.64	7/8/2003
PG&E Corp. - USGen New England, Inc.	Senior Unsecured	8.270%	1/2/2020	195.00	7/8/2003
PG&E National Energy Group	Senior Unsecured	10.375%	5/16/2011	1,000.00	9/30/2003

APPENDIX A

DEFAULTED CORPORATE STRAIGHT DEBT ISSUES IN 2003

<b>Company</b>	<b>Bond Issue</b>	<b>Coupon (%)</b>	<b>Maturity Date</b>	<b>Outstanding Amount (\$ MM)</b>	<b>Default Date</b>
Philip Services Corp	Senior Subordinated	6.000%	4/15/2010	37.01	2/6/2003
Picadilly Cafeterias, Inc.	Senior Secured	12.000%	11/01/07	55.50	10/29/2003
Precision Partners Inc	Senior Subordinated	12.000%	3/15/2009	100.00	3/15/2003
Radio Unica Communications Corp.	Senior Secured	11.750%	8/01/06	158.09	10/31/2003
Republic Engineering Products	Senior Secured	10.000%	8/16/2009	80.00	9/30/2003
Roma Restaurant Holdings Inc. - Romacorp Inc.	Senior Unsecured	12.000%	7/1/2006	57.00	7/1/2003
Saskatchewan Wheat Pool	Senior Secured	6.600%	7/18/2007	97.73	1/18/2003
Saskatchewan Wheat Pool	Senior Secured	7.250%	2/24/2004	98.72	1/18/2003
Seven Seas Petroleum	Senior Unsecured	12.500%	5/15/2005	110.00	1/14/03
Sirius Satellite Radio, Inc.	Senior Secured	14.500%	5/15/09	30.00	3/7/2003
Sirius Satellite Radio, Inc.	Discount	15.000%	12/01/07	25.20	3/7/2003
Solutia Inc.	Senior Secured	11.250%	7/15/09	223.00	12/17/2003
Solutia Inc.	Senior Unsecured	6.720%	10/15/37	150.00	12/17/2003
Solutia Inc.	Senior Unsecured	7.375%	10/15/27	300.00	12/17/2003
Southern Energy (Mirant Corp)	Senior Unsecured	7.400%	7/15/2004	200.00	6/03/03
Southern Energy (Mirant Corp)	Senior Secured	8.625%	6/30/12	303.43	7/14/2003
Sun World International Inc.	Senior Secured	11.250%	4/15/2004	115.00	1/30/2003
Texas Petrochemicals LP	Senior Subordinated	11.125%	7/1/2006	175.00	7/1/2003
Texas Petrochemicals LP	Senior Subordinated	13.500%	7/1/2007	57.70	7/20/2003
Texas Petrochemicals LP	Senior Subordinated	11.125%	7/1/2006	50.00	7/1/2003
Trenwick Group Ltd.	Senior Secured	8.820%	2/01/37	110.00	8/20/2003
Trenwick Group Ltd.	Senior Unsecured	6.700%	4/1/2003	20.00	4/1/2003
Trenwick Group Ltd. - <b>Trenwick America Corp</b>	Senior Unsecured	10.250%	3/1/2004	75.00	4/1/2003
Twin Lab Inc	Senior Subordinated	10.250%	5/15/06	39.92	9/4/2003
UbiquiTel Inc.	Discount	14.000%	4/15/2010	107.73	2/21/2003
US Unwired Inc.	Senior Unsecured	13.375%	11/1/2009	400.00	5/15/03
Venture Holdings Trust Co.	Senior Unsecured	9.500%	7/1/2005	205.00	3/31/03
Venture Holdings Trust Co.	Senior Secured	11.000%	6/01/07	125.00	3/31/2003
Venture Holdings Trust Co.	Senior Subordinated	12.000%	6/01/09	125.00	3/31/2003
WCI Steel Inc.	Senior Secured	10.000%	12/1/2004	300.00	6/12/03
WCI Steel Inc. (Renco Steel)	Senior Secured	10.875%	2/1/2005	120.00	6/12/03
Weirton Steel	Senior Unsecured	10.000%	4/1/2008	134.20	5/10/2003
Weirton Steel	Senior Unsecured	10.750%	6/1/2005	16.40	5/10/2003
Weirton Steel	Senior Unsecured	11.375%	7/1/2004	12.60	5/10/2003
WestPoint Stevens Inc.	Senior Unsecured	7.875%	6/15/2008	475.00	6/1/2003
WestPoint Stevens Inc.	Senior Unsecured	7.875%	6/15/2005	525.00	6/1/2003
Wickes Inc.	Senior Subordinated	11.625%	12/15/2003	63.24	2/27/2003
Winslow Furniture	Senior Unsecured	12.750%	3/18/03	104.00	2/15/2003
XM Satellite Radio Inc.	Senior Secured	14.000%	3/15/2010	24.80	1/28/2003

## APPENDIX A

### DEFAULTED CORPORATE STRAIGHT DEBT ISSUES IN 2003

<b>Company</b>	<b>Bond Issue</b>	<b>Coupon (%)</b>	<b>Maturity Date</b>	<b>Outstanding Amount (\$ MM)</b>	<b>Default Date</b>
				<b>38,451.3</b>	
				<b>203</b>	
				<b>86</b>	

\*: Canadian Dollar issues converted to US Dollar at an exchange rate of CAD 1.45/US\$

\*\* : Global US Dollar issues

Source: Author's compilations

## APPENDIX C

### Chapter 11 filings in 2003 List by liability size - liabilities greater than \$100 million

Mirant Corp.	Jul-03	\$	16,460
NRG Energy, Inc.	May-03	\$	11,580
PG&E National Energy Group, Inc.	Jul-03	\$	8,908
Air Canada	Apr-03	\$	6,182
Trenwick Group Ltd.	Aug-03	\$	5,017
Touch America Holdings, Inc.	Jun-03	\$	3,766
Solutia, Inc.	Dec-03	\$	3,591
AMERCO	Jun-03	\$	3,274
Fleming Cos. Inc.	Apr-03	\$	3,156
Loral Space & Communications Ltd.	Jul-03	\$	3,047
Petroleum Geo-Services ASA	Jul-03	\$	2,778
NorthWestern Corp.	Sep-03	\$	2,748
Leap Wireless International, Inc	Apr-03	\$	2,469
West Point Stevens, Inc.	Jun-03	\$	2,147
Spiegel Inc.	Mar-03	\$	1,675
Magellan Health Services	Mar-03	\$	1,506
Acterna Corporation	May-03	\$	1,451
DVI Inc.	Aug-03	\$	1,439
Allegiance Telecom. Inc.	May-03	\$	1,397
Weirton Steel Corp.	May-03	\$	1,361
Venture Holdings Co. LLC	Apr-03	\$	1,346
Alterra Healthcare Corporation	Jan-03	\$	1,300
Aurora Foods, Inc.	Dec-03	\$	1,211
AlphaStar Insurance Group Ltda.	Dec-03	\$	1,202
American Commercial Lines LLC	Feb-03	\$	900
National Equipment Services, Inc.	Jun-03	\$	853
Outsourcing Solutions, Inc.	May-03	\$	794
The Penn Traffic Co.	Jun-03	\$	668
Philip Services Corp.	Jun-03	\$	665
Redback Networks, Inc.	Nov-03	\$	647
WCI Steel, Inc.	Sep-03	\$	639
divine, inc.	Feb-03	\$	623
Horizon PCS, Inc.	Aug-03	\$	586
Crown Pacific Partner LP	Jun-03	\$	579
Rouge Industries, Inc.	Oct-03	\$	573
Key3Media Group, Inc.	Feb-03	\$	572
Maxxim Medical, Inc.	Feb-03	\$	511
Pillowtex Corp.	Jul-03	\$	486
Mississippi Chemical Corp.	May-03	\$	451
DDI Corp.	Aug-03	\$	385
Ivaco Inc.	Sep-03	\$	384
Navigator Gas Transport PLC	Feb-03	\$	384
iPCS, Inc.	Mar-03	\$	378
Seitel Inc.	Jul-03	\$	361
Chart Industries, Inc.	Jul-03	\$	361
Regus, Plc.	Jan-03	\$	355
Recoton Corp.	Apr-03	\$	351
AMERCO Real Estate	Aug-03	\$	350
Golden Northwest Aluminium, Inc.	Dec-03	\$	337
Slater Steel, Inc.	Jun-03	\$	335
Hawaiian Airlines, Inc.	Mar-03	\$	327
SONICblue, Inc.	Mar-03	\$	320
Prime Succession, Inc.	Jul-03	\$	314
FAO, Inc.	Dec-03	\$	292
General Chemical Industrial Production, Inc.	Dec-03	\$	283
HOME GOLD FINANCIAL	Apr-03	\$	272
MicroWarehouse, Inc.	Sep-03	\$	268

## APPENDIX C

### Chapter 11 filings in 2003 List by liability size - liabilities greater than \$100 million

LRCI, Inc.	Feb-03	\$	267
American Plumbing & Mechanical, Inc.	Oct-03	\$	248
The Thaxton Group, Inc.	Oct-03	\$	239
Cone Mills Corp.	Sep-03	\$	225
Congoleum Corp.	Dec-03	\$	220
Daisytek, Inc.	May-03	\$	218
Clinton Energy Management Services, Inc.	Jan-03	\$	210
Interdent, Inc.	May-03	\$	205
Wherehouse Entertainment, Inc.	Jan-03	\$	203
Louisiana Gas Marketing Company	Feb-03	\$	197
Eagle Food Centers Inc.	Apr-03	\$	194
Advanced Lighting Technologies, Inc.	Feb-03	\$	190
Read-Rite Corp.	Jun-03	\$	163
Mego Financial Corp.	Jul-03	\$	158
Bayou Steel Corporation	Jan-03	\$	156
Reptron Electronics, Inc.	Oct-03	\$	151
Sun World International, Inc.	Feb-03	\$	150
Radio Unica Communications Corp.	Oct-03	\$	137
FAO, Inc.	Jan-03	\$	135
MCSi, Inc.	Jun-03	\$	133
Hudson Hotels Corporation	Feb-03	\$	131
James Cable Partners LP	Jun-03	\$	128
Primedex Health System, Inc.	Sep-03	\$	123
Impath, Inc.	Sep-03	\$	118
Headway Corporate Resources, Inc.	Jul-03	\$	116
Promax Energy, Inc.	May-03	\$	110
Twinlab Corp.	Apr-03	\$	108
Piccadilly Cafeterias, Inc.	Oct-03	\$	103
Mallard Cablevision LLC	May-03	\$	102
International Utility Structures, Inc.	Oct-03	\$	101
Cannondale Corporation	Feb-03	\$	100
Cenargo International Plc	Jan-03	\$	100
Combustion Engineering, Inc.	Feb-03	\$	100
Eveleth Mines LLC	May-03	\$	100
Niagara Frontier Hockey, L.P.	Jan-03	\$	100
Plassein International Corp.	May-03	\$	100
Rand McNally & Company	Feb-03	\$	100
Troll Communications LLC	May-03	\$	100
		\$	110,355

Telecoms	\$	9,522
% Telecom		8.6%
# Telecom		10

Note: Financial Institutions are not included in this list.

Source: Authors' Compilations

## APPENDIX B

### QUARTERLY DEFAULT RATE COMPARISON: ALTMAN/SBC VS. MOODY'S HIGH YIELD DEBT MARKET 1990 - 2003

QUARTER		PAR VALUE DEBT OUTSTANDING (\$BILLIONS)	DEBT DEFAULTED BY QUARTER (\$BILLIONS)	QUARTERLY DEFAULT RATES (%)	ALTMAN/NYU-SC 12M MOVING AVERAGE	MOODY'S 12M ISSUER BASED MOVING AVERAGE
1990	1Q	\$185.00	\$4.16	2.25%		6.51%
	2Q	\$185.00	2.51	1.36%		7.93%
	3Q	\$181.00	6.01	3.32%		8.99%
	4Q	\$181.00	<u>5.67</u> \$18.35	3.13%	10.14%	9.74%
1991	1Q	\$182.00	\$8.74	4.80%	12.67%	12.28%
	2Q	\$182.00	2.75	1.51%	12.73%	13.00%
	3Q	\$183.00	5.01	2.74%	12.18%	11.97%
	4Q	\$183.00	<u>2.36</u> \$18.86	1.29%	10.31%	10.42%
1992	1Q	\$183.20	\$3.33	1.82%	7.35%	7.76%
	2Q	151.10	1.26	0.83%	6.52%	6.19%
	3Q	163.00	0.37	0.23%	4.84%	5.58%
	4Q	151.89	<u>0.59</u> \$5.55	0.39%	3.40%	5.16%
1993	1Q	\$193.23	\$0.38	0.20%	1.71%	4.98%
	2Q	193.23	1.33	0.69%	1.39%	4.59%
	3Q	206.91	0.05	0.03%	1.22%	4.23%
	4Q	190.42	<u>0.52</u> \$2.29	0.27%	1.10%	3.84%
1994	1Q	\$232.60	\$0.67	0.29%	1.35%	3.14%
	2Q	230.00	0.16	0.07%	0.60%	2.02%
	3Q	235.00	0.41	0.17%	0.76%	2.33%
	4Q	235.00	<u>2.18</u> \$3.42	0.93%	1.45%	2.07%
1995	1Q	\$240.00	\$0.17	0.07%	1.24%	1.40%
	2Q	240.00	1.68	0.70%	1.85%	2.39%
	3Q	240.00	0.98	0.41%	2.09%	2.70%
	4Q	240.00	<u>1.72</u> \$4.55	0.72%	1.90%	3.65%
1996	1Q	\$255.00	\$0.44	0.17%	2.01%	3.80%
	2Q	\$255.00	\$0.89	0.35%	1.58%	3.08%
	3Q	\$271.00	\$0.41	0.15%	1.36%	2.29%
	4Q	\$271.00	<u>1.59</u> \$3.34	0.59%	1.23%	1.93%

## APPENDIX B

### QUARTERLY DEFAULT RATE COMPARISON: ALTMAN/SBC VS. MOODY'S HIGH YIELD DEBT MARKET 1990 - 2003

QUARTER		PAR VALUE DEBT OUTSTANDING (\$BILLIONS)	DEBT DEFAULTED BY QUARTER (\$BILLIONS)	QUARTERLY DEFAULT RATES (%)	ALTMAN/NYU-SC 12M MOVING AVERAGE	MOODY'S 12M ISSUER BASED MOVING AVERAGE
1997	1Q	\$296.00	\$1.85	0.63%	1.75%	1.85%
	2Q	\$318.40	\$0.60	0.19%	1.51%	1.89%
	3Q	\$335.40	\$1.48	0.44%	1.74%	2.40%
	4Q	\$335.40	<u>\$0.27</u> \$4.20	0.08%	1.25%	2.17%
1998	1Q	\$379.00	\$2.37	0.63%	1.41%	2.66%
	2Q	\$425.70	\$1.22	0.29%	1.41%	2.99%
	3Q	\$465.50	\$1.62	0.35%	1.29%	2.75%
	4Q	\$481.60	<u>\$2.26</u> \$7.46	0.47%	1.60%	3.81%
1999	1Q	\$515.00	\$4.76	0.92%	2.05%	3.87%
	2Q	\$537.20	\$8.42	1.57%	3.31%	5.12%
	3Q	\$567.40	\$5.24	0.92%	3.85%	5.91%
	4Q	\$580.00	<u>\$5.11</u> \$23.53	0.88%	4.15%	5.77%
2000	1Q	\$584.00	\$6.06	1.04%	4.28%	5.69%
	2Q	\$595.60	\$9.97	1.67%	4.52%	5.52%
	3Q	\$597.50	\$4.32	0.72%	4.27%	5.23%
	4Q	\$608.15	<u>\$9.95</u> \$30.29	1.64%	5.07%	5.65%
2001	1Q	\$613.20	\$18.07	2.95%	6.96%	7.42%
	2Q	\$648.60	\$12.82	1.98%	7.37%	7.92%
	3Q	\$649.00	\$14.65	2.26%	8.56%	9.17%
	4Q	\$647.70	<u>\$18.07</u> \$63.61	2.79%	9.80%	11.11%
2002	1Q	\$669.00	\$18.54	2.77%	9.89%	11.24%
	2Q	\$674.00	\$27.07	4.02%	11.71%	10.29%
	3Q	\$757.00	\$37.48	4.95%	15.01%	9.01%
	4Q	\$756.30	<u>\$13.77</u> \$96.86	1.82%	12.79%	7.33%
2003	1Q	\$750.00	\$7.62	1.02%	11.36%	5.78%
	2Q	\$774.50	\$14.54	1.88%	9.79%	5.81%
	3Q	\$825.00	\$13.25	1.61%	6.56%	5.67%
	4Q	\$856.00	<u>\$3.04</u> \$38.45	0.36%	4.66%	5.39%

Source: Altman (1990 - 2003), Citigroup and Moody's (New York).

## APPENDIX C

### Chapter 11 filings in 2003 List by liability size - liabilities greater than \$100 million

Mirant Corp.	Jul-03	\$	16,460
NRG Energy, Inc.	May-03	\$	11,580
PG&E National Energy Group, Inc.	Jul-03	\$	8,908
Air Canada	Apr-03	\$	6,182
Trenwick Group Ltd.	Aug-03	\$	5,017
Touch America Holdings, Inc.	Jun-03	\$	3,766
Solutia, Inc.	Dec-03	\$	3,591
AMERCO	Jun-03	\$	3,274
Fleming Cos. Inc.	Apr-03	\$	3,156
Loral Space & Communications Ltd.	Jul-03	\$	3,047
Petroleum Geo-Services ASA	Jul-03	\$	2,778
NorthWestern Corp.	Sep-03	\$	2,748
Leap Wireless International, Inc	Apr-03	\$	2,469
West Point Stevens, Inc.	Jun-03	\$	2,147
Spiegel Inc.	Mar-03	\$	1,675
Magellan Health Services	Mar-03	\$	1,506
Acterna Corporation	May-03	\$	1,451
DVI Inc.	Aug-03	\$	1,439
Allegiance Telecom. Inc.	May-03	\$	1,397
Weirton Steel Corp.	May-03	\$	1,361
Venture Holdings Co. LLC	Apr-03	\$	1,346
Alterra Healthcare Corporation	Jan-03	\$	1,300
Aurora Foods, Inc.	Dec-03	\$	1,211
AlphaStar Insurance Group Ltda.	Dec-03	\$	1,202
American Commercial Lines LLC	Feb-03	\$	900
National Equipment Services, Inc.	Jun-03	\$	853
Outsourcing Solutions, Inc.	May-03	\$	794
The Penn Traffic Co.	Jun-03	\$	668
Philip Services Corp.	Jun-03	\$	665
Redback Networks, Inc.	Nov-03	\$	647
WCI Steel, Inc.	Sep-03	\$	639
divine, inc.	Feb-03	\$	623
Horizon PCS, Inc.	Aug-03	\$	586
Crown Pacific Partner LP	Jun-03	\$	579
Rouge Industries, Inc.	Oct-03	\$	573
Key3Media Group, Inc.	Feb-03	\$	572
Maxxim Medical, Inc.	Feb-03	\$	511
Pillowtex Corp.	Jul-03	\$	486
Mississippi Chemical Corp.	May-03	\$	451
DDI Corp.	Aug-03	\$	385
Ivaco Inc.	Sep-03	\$	384
Navigator Gas Transport PLC	Feb-03	\$	384
iPCS, Inc.	Mar-03	\$	378
Seitel Inc.	Jul-03	\$	361
Chart Industries, Inc.	Jul-03	\$	361
Regus, Plc.	Jan-03	\$	355
Recoton Corp.	Apr-03	\$	351
AMERCO Real Estate	Aug-03	\$	350
Golden Northwest Aluminium, Inc.	Dec-03	\$	337
Slater Steel, Inc.	Jun-03	\$	335
Hawaiian Airlines, Inc.	Mar-03	\$	327
SONICblue, Inc.	Mar-03	\$	320
Prime Succession, Inc.	Jul-03	\$	314
FAO, Inc.	Dec-03	\$	292
General Chemical Industrial Production, Inc.	Dec-03	\$	283
HOME GOLD FINANCIAL	Apr-03	\$	272
MicroWarehouse, Inc.	Sep-03	\$	268



## APPENDIX C

### Chapter 11 filings in 2003 List by liability size - liabilities greater than \$100 million

LRCI, Inc.	Feb-03	\$	267
American Plumbing & Mechanical, Inc.	Oct-03	\$	248
The Thaxton Group, Inc.	Oct-03	\$	239
Cone Mills Corp.	Sep-03	\$	225
Congoleum Corp.	Dec-03	\$	220
Daisytek, Inc.	May-03	\$	218
Clinton Energy Management Services, Inc.	Jan-03	\$	210
Interdent, Inc.	May-03	\$	205
Wherehouse Entertainment, Inc.	Jan-03	\$	203
Louisiana Gas Marketing Company	Feb-03	\$	197
Eagle Food Centers Inc.	Apr-03	\$	194
Advanced Lighting Technologies, Inc.	Feb-03	\$	190
Read-Rite Corp.	Jun-03	\$	163
Mego Financial Corp.	Jul-03	\$	158
Bayou Steel Corporation	Jan-03	\$	156
Reptron Electronics, Inc.	Oct-03	\$	151
Sun World International, Inc.	Feb-03	\$	150
Radio Unica Communications Corp.	Oct-03	\$	137
FAO, Inc.	Jan-03	\$	135
MCSi, Inc.	Jun-03	\$	133
Hudson Hotels Corporation	Feb-03	\$	131
James Cable Partners LP	Jun-03	\$	128
Primedex Health System, Inc.	Sep-03	\$	123
Impath, Inc.	Sep-03	\$	118
Headway Corporate Resources, Inc.	Jul-03	\$	116
Promax Energy, Inc.	May-03	\$	110
Twinlab Corp.	Apr-03	\$	108
Piccadilly Cafeterias, Inc.	Oct-03	\$	103
Mallard Cablevision LLC	May-03	\$	102
International Utility Structures, Inc.	Oct-03	\$	101
Cannondale Corporation	Feb-03	\$	100
Cenargo International Plc	Jan-03	\$	100
Combustion Engineering, Inc.	Feb-03	\$	100
Eveleth Mines LLC	May-03	\$	100
Niagara Frontier Hockey, L.P.	Jan-03	\$	100
Plassein International Corp.	May-03	\$	100
Rand McNally & Company	Feb-03	\$	100
Troll Communications LLC	May-03	\$	100
		\$	110,355

Telecoms	\$	9,522
% Telecom		8.6%
# Telecom		10

Note: Financial Institutions are not included in this list.

Source: Authors' Compilations

**APPENDIX D**  
**DEFAULTS BY INDUSTRY**  
**December 31<sup>st</sup>, 2003**

<u>COMPANY</u>	<u>INDUSTRY</u>
Acterna Corp.	Communication Test
AES Drax Holdings Ltd.	Energy
Air Canada	Air Transportation
Airgate PCS, Inc.	Telecommunications
Alamosa Holdings, Inc.	Communications
All Star Gas Corp. (Empire Gas)	Natural Gas
Alliegance Tel	Telecommunications
AMERCO	Connglomerate
American Cellular Corp.	Communications
American Commercial Lines LLC	Air Transportation
American Plumbing & Mechanical Inc.	Engineering
Anthony Crane Rental Holdings L.P.	Financial Services (leasing)
ATA Holdings Corp. (Amtram Inc.)	Air Transportation
Atlas Air, Inc.	Air Transportation
Aurora Foods Inc.	Food
Avado Brands Inc.	Restaurants (Leisure)
Cable Satisfaction International Inc.	Cable
Cenargo International PLC	Water Transportation
Cone Mills	Textile (Manufacturer)
Congoleum Corp.	Building Materials
Cybernet Internet Services International, Inc.	Telecommunications (Internet)
DDI Corp	Technology products Manufacturers
DVI Inc.	Financial Services
Eagle Food Center Inc.	Food Retailers
Fleming Cos. Inc.	Food Wholesaler
General Chemical Industrial Products Inc.	Chemical
General Media Inc.	Media
Golden Northwest Aluminium, Inc.	Miscellaneous Industries (Aluminium)
Grant Geophysical Inc.	Geophysical solutions (advice)
Healthsouth Corp.	Healthcare Services (Hospitals)
High Voltage Engineering Corp.	Engineering
Home Gold Financial	Financial Services
Horizon PCS, Inc.	Telecommunications
International Utility Structures Inc.	Utility related manufacturing
International Wire Group, Inc.	Manufacturing (copper wire)
iPCS Inc.	Telecommunications
Iron Age Holdings Corp.	Manufacturing (Safety Clothes)
J. Crew Group Inc.	General Manufacturing
Jackson Products Inc.	General Manufacturing (Safety Products)
James Cable Partners L.P.	Cable
Leap Wireless Intl. Inc.	Telecommunications
Loral Space & Comm. Ltd. (Orion Ntwk. Syst.)	Telecommunications (Satellite)

**APPENDIX D**  
**DEFAULTS BY INDUSTRY**  
**December 31<sup>st</sup>, 2003**

<u>COMPANY</u>	<u>INDUSTRY</u>
Lumbermens Mutual (Kemper Insurance Companies)	Insurance (P&C)
Magellan Health Services, Inc.	Healthcare Services (Hospitals)
Marconi Corp. PLC	Telecommunications
Maxxim Medical Inc.	Healthcare Services
Mirant Americas Generating LLC	Energy
Mississippi Chemical Corp.	Chemical
Motels of America	Lodging
MTS Inc	Retail
National Equipment Services Inc.	General Equipment Rental
Neenah Foundry Co.	General Manufacturing (Castings)
New World Restaurant Group Inc.	Leisure
Newmont Yandal Operations	Mining
Northwestern Corp. (Montana Power)	Energy
NRG Energy Inc.	Energy
NTELOS	Telecommunications
Oglebay Norton Co.	Shipping
Pac-West Telecom, Inc.	Telecommunications
Penn National Gaming Inc. (Hollywood Casino)	Leisure
Penn Traffic Co. (the)	Food Retailers
Petroleum Geo-Services	Energy
PG&E Corp. (USGen New England)	Energy
Philip Services Corp.	Outsourcing services
Picadilly Cafeterias, Inc.	Restaurants (Leisure)
Precision Partners Inc	Industrial Machinery
Radio Unica Communications Corp.	Radio
Republic Engineering Products	Manufacturing (Enigneering)
Roma Restaurant Holdings Inc. (Romacorp)	Leisure
Saskatchewan Wheat Pool	Agribusiness
Seven Seas Petroleum	Energy
Sirius Satellite Radio, Inc.	Telecommunications (Satellite)
Solutia Inc.	Chemical Manufacturig
Sun World International Inc.	Agriculture
Texas Petrochemicals LP	Energy
Trenwick Group Ltd.	Financial Services (Insurance)
Twin Lab Inc.	Nutrition Products
UbiquiTel Inc.	Telecommunications
Us Unwired Inc.	Telecommunications
Venture Holdings Trust Co.	Financial Services
WCI Steel Inc. (Renco Steel)	Miscellaneous Industries (Steel)
Weirton Steel	Miscellaneous Industries (Steel)
WestPoint Stevens Inc.	General Manufacturing (Bedding)
Wickes Inc.	Construction Materials (Dealer)
Winsloew Furniture	Household Furniture
XM Satellite Radio Holdings Inc.	Telecommunications

**Source: Author's Compilations**