

**New York University Salomon Center
Leonard N. Stern School of Business**

Special Report on

**The Investment Performance and Market Size of
Defaulted Bonds and Bank Loans:
2007 Review and 2008 Outlook**

By

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with

Brenda Karlin and Louis Kay

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Acknowledgments

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The year 2007 was an unimpressive one for defaulted debt investments, with returns that were well below average. This is not surprising given what appeared to us as a fully priced market at the year's outset. Still, most of the losses came in the second-half of the year. The return of the Combined Altman-NYU Salomon Center Index was -3.30%. This long-only, US and Canadian debt index, was "paced" by a poor performance from defaulted bonds, which was only partially tempered by a better, but still below average, performance from defaulted loans.

The Altman Defaulted Bond Index performed considerably worse than last year, much below its historical average. The long-only defaulted bond index lost 11.83%, the fifth poorest annual performance since we began monitoring this market in 1987. Defaulted bank loans, on the other hand, performed better with a modest but still positive performance of +2.27%.

The market-to-face-value ratio of the defaulted bond index fell significantly to 46%, a decrease of 29 percentage points below the record-high 2006 figure, but still slightly above the historical average of 42% (46% median). This decrease occurred despite the near-record recovery rate on newly defaulted bonds in 2007 of 66.6%. Auto-parts companies led the decline in prices as pending emergencies from Chapter 11 were overshadowed by uncertainty in the ability to raise exit financing coupled with unpromising revenue outlooks. The market-to-face value of defaulted bank loans fell to 79% from the record high level in 2006 of 89%.

The benign credit market continued, at least with respect to default rates on high-yield bonds (0.51%) and leveraged loans (0.26%) -- both dollar denominated measures. The low new total of defaults combined with greater amounts of emergencies from Chapter 11 and distressed restructurings, reduced the face and market values of defaulted bonds and loans at year-end 2007.

These reductions, however, were much more than compensated by the enormous increase in distressed bonds and loans, resulting in a very large increase in the size of the defaulted and distressed, public and private debt market. This market's face value increased to \$867 billion, a remarkable 38% growth. The market value's increase was almost as impressive, gaining 35% to \$709 billion. The increase in the distressed ratio to over 10% by year-end is certainly an indication of the likelihood of increased defaults in 2008 and 2009.

The almost 200 institutional distressed debt investment funds (Appendix A) were active in 2007 – albeit, mostly short – and their various strategies, including long-short and control positions, enabled the average hedge fund performance to outpace our long-only defaulted debt indexes in 2007. Appendix B lists those distressed debt funds operating in Europe while Appendix C lists those that have an active/control strategy.

Measuring and Monitoring Performance of Defaulted Bonds

Defaulted Bond Index

The Altman-NYU Salomon Center Defaulted Bond Index was developed in 1990 for the purpose of measuring and monitoring the performance of defaulted debt securities.¹ This work was complemented two years later by an analysis of the distressed bank loan market.² The performance statistics on bonds went back to 1987 and a later time series on defaulted loans was started in 1996. As of December 31, 2007, the number of issues in our defaulted bond index was 48, down 37 from the year-end 2006 figure and about one quarter the number of its previous highs in the early 1990s and in 2001 (Figure 1).

The number of firms supplying defaulted bonds at year-end 2007 was just 17, about half the number of 2006. This points to a smaller number of entrances and more exits amongst defaulted companies. It should be noted that the number of defaulted bonds is considerably greater than those listed in Figure 1, since our Index totals are limited to any one issuer comprising no more than 10% of the Index's total market value.

Combined with the decrease in prices of existing defaulted bonds in 2007, the market value of our Index decreased by \$17 billion, and the market-to-face value ratio fell to 0.46, 29 percentage points below the record high level of 2006.

Figure 1. Size of the Altman-NYU Salomon Center Defaulted Bond Index, 1987–2007

Year-End	Number of Issues	Number of Firms	Face Value (\$ Billions)	Market Value (\$ Billions)	Market/Face Ratio
1987	53	18	5.7	4.2	0.74
1988	91	34	5.2	2.7	0.52
1989	111	35	8.7	3.4	0.39
1990	173	68	18.7	5.1	0.27
1991	207	80	19.6	6.1	0.31
1992	231	90	21.7	11.1	0.51
1993	151	77	11.8	5.8	0.49
1994	93	35	6.3	3.3	0.52
1995	50	27	5.0	2.3	0.46
1996	39	28	5.3	2.4	0.45
1997	37	26	5.9	2.7	0.46
1998	36	30	5.5	1.4	0.25
1999	83	60	16.3	4.1	0.25
2000	129	72	27.8	4.3	0.15
2001	202	86	56.2	11.8	0.21
2002	166	113	61.6	10.4	0.17
2003	128	63	36.9	17.7	0.48
2004	104	54	32.1	16.9	0.53
2005	98	35	29.9	17.5	0.59
2006	85	36	31.2	23.3	0.75
2007	48	17	13.8	6.3	0.46

Source: NYU Salomon Center Defaulted Bond Database.

¹ This index, originally developed in Altman's Foothill Report, "Investing in Distressed Securities", (1990), is maintained and published on a monthly basis at the NYU Salomon Center of the Leonard N. Stern School of Business. It is available, by subscription, from the Center (212) 998-0701 or (212) 998-0709.

² E. Altman (1992), "The Market For Distressed Securities and Bank Loans", The Foothill Group, Los Angeles, CA.

Defaulted Bank Loan Index

Bank loans –another major market in defaulted debt securities -- did not have the same experience in 2007. As can be seen in Figure 2, the number of issues, face values, and market values increased slightly in 2007. Despite this size increase in face and market values, the important market-to-face value ratio decreased from a recorded high of 0.89 in 2006 to 0.79 by year-end.

Figure 2. Size of the Altman-NYU Salomon Center Defaulted Bank Loan Index, 1995–2007 (Dollars in Billions)

Year-End	Number of Issues	Number of Firms	Face Value (\$ Billions)	Market Value (\$ Billions)	Market/Face Ratio
1995	17	14	2.9	2.0	0.69
1996	23	22	4.2	3.3	0.79
1997	18	15	3.4	2.4	0.71
1998	15	13	3.0	1.9	0.63
1999	45	23	12.9	6.8	0.53
2000	100	39	26.9	13.6	0.51
2001	141	56	44.7	23.8	0.53
2002	64	51	37.7	17.4	0.46
2003	76	43	39.0	23.9	0.61
2004	45	26	22.9	18.2	0.80
2005	41	21	18.7	16.2	0.86
2006	27	23	11.2	10.0	0.89
2007	31	13	13.0	10.4	0.79

Source: NYU Salomon Center Defaulted Bank Loan Index Database.

Market-to-Face-Value Ratios

Figure 3 shows the time series trend in the market-to-face value ratios of defaulted bonds and bank loans. The unmistakable increasing trend since the depth-years of 2000-2002, that we discussed last year as indicating a fully priced market, is now less dramatically above the historical average. This implies that if distressed investors had enjoyed above average returns in 2007, they must have done so in either special situations, short-selling, non-traditional distressed strategies, equities, foreign opportunities, or the increased use of leverage. Of course, if the recovery rate on new defaults in 2008 and 2009 tumbles, as we expect, new opportunities in traditional defaulted securities should re-emerge.

Figure 3. Altman-NYU Salomon Center Default Debt Indexes — Market-to-Face Value Ratios, Annual 1987–2007



Note: The loans median market to face value is 0.69 and average market to face value is 0.68. Bonds median market to face value is 0.46 and the average market to face value is 0.42.

Source: Figures 1 and 2 from the NYU Salomon Center's Defaulted Bond and Bank Loan database.

Performance Measurement

Our indexes include the securities of firms at various stages of reorganization -- either in bankruptcy or restructuring. We calculate the returns for the index using data compiled just after default to the point when the bankrupt firm emerges from Chapter 11, is liquidated, or until the default is “cured” or resolved through an exchange. The Bond Index includes issues of all seniorities, from senior-secured to junior unsecured debt. A study by Altman and Eberhart (1994), updated by Standard & Poor’s (Brand and Behar, 2000), measures the performance of defaulted debt from the time of original issuance through default and then to emergence from bankruptcy. These studies found that seniority of the issue is an extremely important characteristic of the performance of defaulted securities over specific periods, whether from issuance to emergence or from default to emergence.

Our indexes do not include convertible or non-US and non-Canadian company issues, nor do they include distressed, but not defaulted, securities. The performance measure is based on a fully invested, long-only strategy. Returns are calculated from individual bond and bank loan security movements; they are not based on some average performance by managers. Returns are gross returns and do not reflect manager fees and expenses. A manager performance index of distressed debt investors can now be found in the *The Wall Street Journal*, on a daily basis, and there are several distressed debt hedge fund indexes reflecting a sample of investment firms’ performances (discussed later in this report).

2007 Performance of Defaulted Bonds

The Altman-NYU Salomon Center Index of Defaulted Bonds performed poorly in 2007, decreasing by 11.53%. This past year’s performance reduced the average annual rate of return on our Index by 112bp, to +10.78% (Figure 4). This is still 165bp greater than the average annual performance of US high-yield bonds over the same period (1987-2007), but about 200bp less than the S&P 500 (dividends reinvested). The compound rate of return, however, is considerably lower, reflecting its time series negative performance in seven of the 21 years in our sample period. The entire time series of returns of these three indexes is shown in Figure 5.

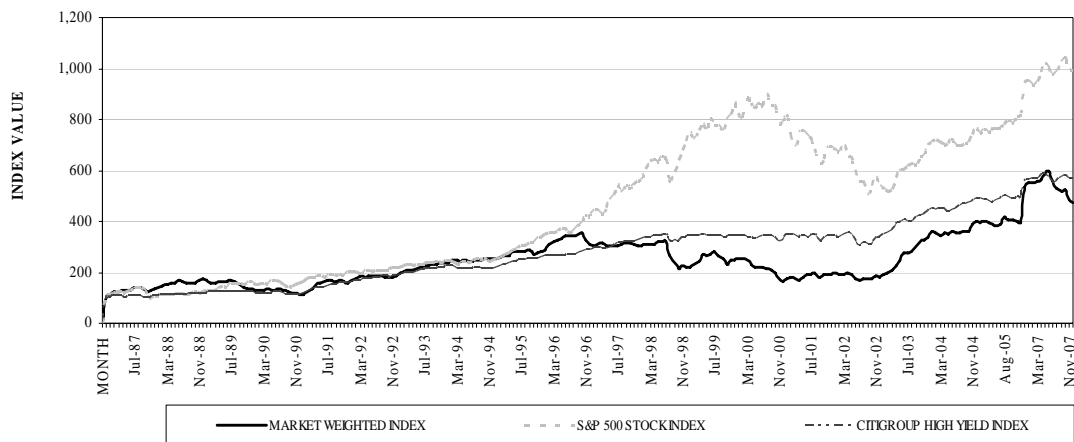
The volatility of the defaulted bond index is considerably greater than either high-yield bonds or common stocks when returns are measured on an annual basis, but slightly less than the S&P index when measured on a monthly basis. The “calming” influence of coupon payments on high-yield bonds no doubt is a major reason why that index’s volatility measure (both annual and monthly) is considerably below that of defaulted bonds and common stocks. Indeed, defaulted bonds are “no-yield” bonds since they trade “flat.” Still, as we will show at a later point, this high relative volatility of defaulted bonds is somewhat mitigated by its low correlations with most other asset classes.

Figure 4. Altman-NYU Salomon Center Defaulted Bond Index Comparison of Returns, 1987–2007

Year	Altman-NYU Salomon Center Defaulted		Citigroup High Yield Market Index (%)
	Bond Index (%)	S&P 500 (%)	
1987	37.85	5.26	3.63
1988	26.49	16.61	13.47
1989	-22.78	31.68	2.75
1990	-17.08	-3.12	-7.04
1991	43.11	30.48	39.93
1992	15.39	7.62	17.8
1993	27.91	10.08	17.36
1994	6.66	1.32	-1.25
1995	11.26	37.56	19.71
1996	10.21	22.96	11.29
1997	-1.58	34.36	13.18
1998	-26.91	28.58	3.60
1999	11.34	20.98	1.74
2000	-33.09	-9.11	-5.68
2001	17.47	-11.87	5.44
2002	-5.98	-22.08	-1.53
2003	84.87	28.70	30.62
2004	18.93	10.88	10.79
2005	-1.78	4.92	2.08
2006	35.62	15.80	11.85
2007	-11.53	5.50	1.83
Arithmetic Average (Annual) Rate, 1987–2007	10.78	12.72	9.13
Standard Deviation	27.31	16.34	11.60
Compounded Average (Annual) Rate, 1987–2007	7.68	11.53	8.57
Arithmetic Average (Monthly) Rate, 1987–2007	0.71	0.99	0.71
Standard Deviation	4.22	4.24	2.02
Compounded Average (Monthly) Rate, 1987–2007	0.62	0.90	0.69

Sources: NYU Salomon Center Index of Defaulted Bonds, Standard & Poor's, and Citi.

Figure 5. Defaulted Bond, Stock, and High Yield Bond Indices, Dec 86–Dec 07



Sources: NYU Salomon Center Index of Defaulted Bonds, Standard & Poor's, and Citi.

Defaulted Bank Loan Performance

While our Defaulted Bank Loan Index suffered poorer returns in 2007 compared both to its historic average and to last year's return, its return was down only 2.08% (2.27% versus 4.35% in 2006, see Figure 6). In contrast, the Defaulted Bond Index returns plummeted from one year earlier by over 47 percentage points (Figure 4). The 2007 performance of Defaulted Loans, while relatively low at +2.27%, was about four percentage points below its historical average of 6.26% per year from 1996-2007. The historical average annual return over our 12-year time series compares unfavorably to the S&P 500 Index (10.80%) and is slightly below that of high-yield bonds (7.10%).

The volatility of the Defaulted Loan Index compares favorably, with common stocks (about a 7% lower standard deviation based on annual returns compared to common stocks) and even more favorable when based on monthly returns (Figure 6). The volatility of defaulted loans is just a bit higher than high-yield bonds. Some of our defaulted loans continue to pay interest each month, even in the post-Chapter 11 petition period. In general, price changes are less volatile than that of generally lower-priority bonds, as the market had been still developing for much of the sample period. The correlations of defaulted loans and other asset classes, as is the case with defaulted bonds, are very low, or even negative in some cases.

Figure 6. Altman-NYU Salomon Center Defaulted Bank Loan Index Versus S&P 500 and Citigroup High Yield Market Index — Comparison of Returns, 1996–2007

Year	Altman-NYU Salomon Center Defaulted Bank Loan Index (%)	S&P 500 Stock Index (%)	Citigroup High Yield Market Index (%)
1996	19.56	22.96	11.29
1997	1.75	34.36	13.18
1998	-10.22	28.58	3.60
1999	0.65	20.98	1.74
2000	-6.59	-9.11	-5.68
2001	13.94	-11.87	5.44
2002	3.03	-22.08	-1.53
2003	27.48	28.70	30.62
2004	11.70	10.88	10.79
2005	7.19	4.92	2.08
2006	4.35	15.80	11.85
2007	2.27	5.50	1.83
Arithmetic Average (Annual) Rate, 1996–2007	6.26	10.80	7.10
Standard Deviation	10.60	17.89	9.43
Compounded Average (Annual) Rate, 1996–2007	5.78	9.38	6.74
Arithmetic Average (Monthly) Rate, 1996–2007	0.52	0.84	0.57
Standard Deviation	2.50	4.21	2.14
Compounded Average (Monthly) Rate, 1996–2007	0.48	0.73	0.54

Sources: NYU Salomon Center Index of Defaulted Bank Loans, Standard & Poor's, and Citi.

Winners and Losers in 2007

There were very few positive performing defaulted bonds in 2007 and only one (Federal Mogul Corp.) that showed a double-digit percentage return (Figure 7). Indeed, the four best performing bonds were those with positive returns of only 4.2% or more. Although nearly all auto-parts companies performed poorly, only Dana's bonds and loans had even a positive rate of return. Most of the biggest losers were

from this troubled sector. Defaulting loans tell a similar story, although not as dramatic.

Collins and Aikman appeared on the worst performers list for bonds and loans for the second year in a row. The best performers include W.R. Grace (loans), which was on the positive side in 2006, as well. Calpine's bonds and loans were among the top performers in 2006 and worst (loans only) in 2007.

Figure 7. Top and Bottom Performing Defaulted Bonds and Loans 2007

Top 4 Bonds	Coupon (%)	Maturity	Return (%)
Federal Mogul Corp.	8.8	4/15/2007	16.3
Dana Corp.	7.0	3/1/2029	8.0
Salton, Inc.	12.3	4/15/2008	8.0
Asarco, Inc.	7.9	4/15/2013	4.2
Bottom 4 Bonds	Coupon (%)	Maturity	Return (%)
Werner Holdings, Inc.	10.0	11/15/2007	-99.9
Collins & Aikman	10.8	12/31/2011	-94.0
Dura Automotive	9.0	5/1/2009	-93.8
Delphi Corp.	6.5	5/1/2009	-45.6
Top 3 Loans		Facility	Return (%)
W.R. Grace & Co.		Revolver	15.0
Interstate Bakeries		Revolver	2.7
Dana Corp.		DIP-Term B	1.6
Bottom 3 Loans		Facility	Return (%)
Collins & Aikman		Term Loan B	-24.3
Calpine Corp.		2 nd Term	-8.3
Delphi Corp.		Term	-0.2

Source: NYU Salomon Center Defaulted Bond and Bank Loan Databases.

Combined Bond and Bank Loan Index

Our market-weighted combined defaulted debt index was down by 3.30% in 2007 and now shows an average annual rate of return of 7.40% for 1996-2007, down about 100bp from last year's annual average return (Figure 8). The average annual return over this 11-year period was slightly above that of high-yield bonds (7.10%) but below the return on common stocks (10.81%). The 2007 performance was below that of both common stocks (5.58%) and high-yield bonds (1.84%)

The weights for the Combined Index as of year-end 2007 were 62% loans vs. 38% bonds, compared to 70% bonds and 30% loans in 2006. This represents a dramatic shift, as bond prices and new bond defaults plummeted in 2007. The annual volatility of defaulted bonds and loans was comparable to common stocks, but almost twice that of high-yield bonds.

Performance Comparison with Other Distressed Debt Indexes

There are at least six other "distressed" debt indexes with which we can compare our Index returns. Five of these (Dow Jones, CSFB/Tremont, Hennessey, HFR, and Van Hedge) are indexes based on average manager performance, while the other is based only on bankrupt bonds (Moody's). All of the manager-based indexes outperformed our three defaulted debt indexes, with the average performance ranging between 0.14% (Dow Jones) and 8.85% (Hennessey). Keep in mind that the manager-based indexes incorporate all strategies of distressed hedge funds. The returns to the funds are after transaction costs and fees to the manager, which together average over 2%

per year. The average performance of these five hedge-fund-manager indexes in 2007 was 6.11%.

The one bankrupt bond index (Moody's) which is similar to our defaulted bond index posted returns in 2007 of -11.1%, similar to our -11.53% defaulted bond index return.

Figure 8. Combined Altman-NYU Salomon Center Defaulted Public Bond and Bank Loan Index Comparison of Returns, 1996–2007

Year	Altman-NYU Salomon Center Defaulted Public Bond and Bank Loan Index (%)	S&P 500 (%)	Citigroup High Yield Market Index (%)
1996	15.62	22.96	11.29
1997	0.44	34.36	13.18
1998	-17.55	28.58	3.60
1999	4.45	20.98	1.74
2000	-15.84	-9.11	-5.68
2001	15.53	-11.87	5.44
2002	-0.53	-22.08	-1.53
2003	49.30	28.70	30.62
2004	15.40	10.88	10.79
2005	1.84	4.92	2.08
2006	23.40	15.80	11.85
2007	-3.30	5.58	1.84
Arithmetic Average (Annual) Rate, 1996–2007	7.40	10.81	7.10
Standard Deviation	18.18	17.89	9.43
Compounded Average (Annual) Rate, 1996–2007	6.06	9.39	6.74
Arithmetic Average (Monthly) Rate, 1996–2007	0.53	0.81	0.56
Standard Deviation	3.03	4.22	2.15
Compounded Average (Monthly) Rate, 1996–2007	0.48	0.72	0.54

Sources: NYU-Salomon Center Defaulted Public Bond and Loan Index, Standard & Poor's, and Citigroup.

The Benign Credit Cycle Continued for Defaults and Recoveries

The number of new bankruptcies in 2007 continued to be relatively low, although storm clouds indicating a change in these numbers formed in the second half of the year. Figure 9 shows that the number of new Chapter 11 filings with liabilities greater than \$100 million in 2007 totaled 38, slightly more than in 2006 and 2005, with 30 and 29, respectively. The amount of liabilities increased to about \$73 billion, about three times the extremely low total in 2006, but still far below most years since 2001. The number of mega-bankruptcies with liabilities greater than \$1 billion increased slightly to eight from five last year, but remained below the totals from recent years.

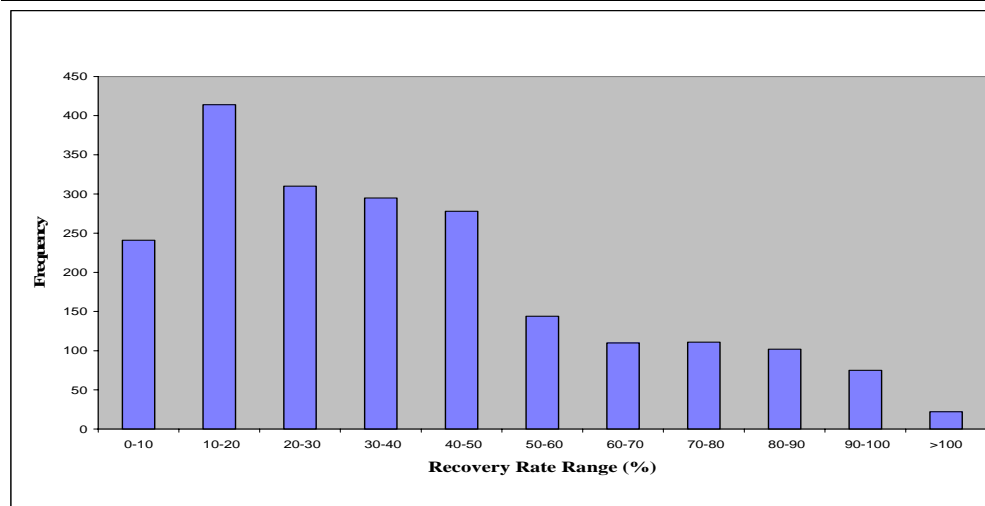
The default rate on high-yield bonds registered a miniscule 0.51% in 2007 and fell to a 26-year low, with just \$5.5 billion in new bond defaults (Figure 10).

until June 2007. Indeed, recovery rates dropped on new defaults in the second half of the year.

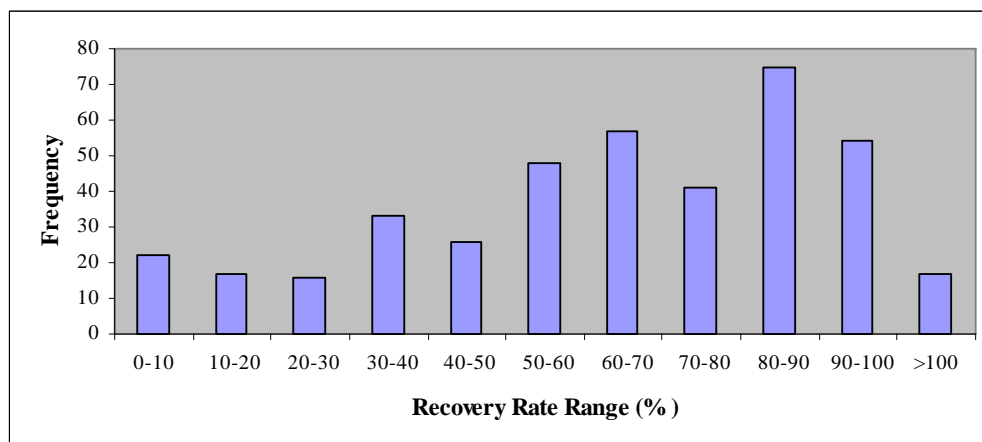
While the historical average of recovery rates is 33-38% (depending how the average is calculated), there is a considerable amount of variance. Figure 11 shows the frequency distribution of recovery rates across all seniority and industry classifications for over 2,100 bond defaults during 1971 – 2007. Note that the majority was below 40% and a considerable amount was below even 20%. These low recoveries were almost non-existent in 2007, however. For a more complete treatment and discussion of bond recovery rates, see our companion report on defaults in the high-yield bond market (February 6, 2007).

The frequency distribution of default recovery rates was quite different for corporate loans. Based on a considerably smaller sample of 406 loan defaults during 1996-2007, we can observe loan recoveries based on the price one month after default (Figure 12). The distribution of loan recoveries was more skewed to the higher end than the bond default distribution, with the bulk in the 50-100% range. The most frequent decile was 80-90%. The historical average loan recovery rates were about 64.5%, reflecting its senior and oftentimes secured priority. The standard deviation of loan recoveries was about 26%.

Figure 11. Corporate Bond Default Recovery Rate Frequency (Based on number of Issues 1971 - 2007)^a



^aNumber of Observations = 2102; Source: NYU Salomon Center Defaulted Bond Database.

Figure 12. Loan Default Recovery Rate Frequency (Based on number of Issues 1996 - 2007)^a

^aNumber of Observations = 406; Source: NYU Salomon Center Defaulted Loan Database.

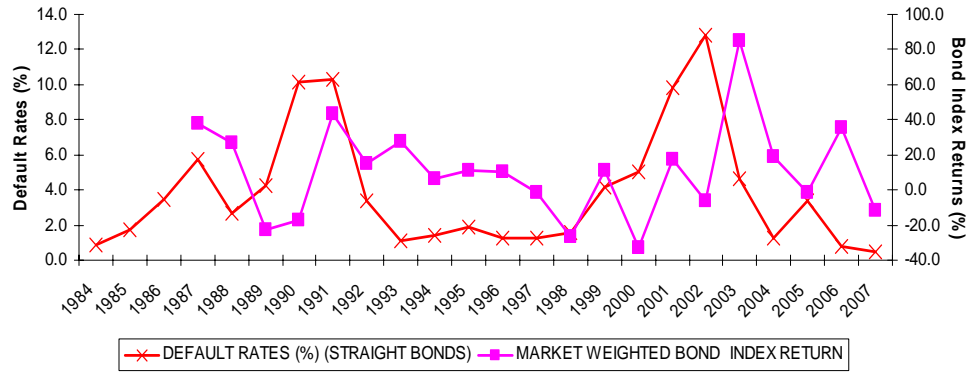
Defaulted Debt Performance Versus Default Rates

We have sometimes commented upon the incredibly high returns on defaulted bonds and loans in the year(s) following a surge in defaults in one or more prior years. The best example of this is the huge outperformance on defaulted bonds (84.9%) and loans (27.5%) in 2003, following the record default rate year of 2002 (12.8%). Something similar occurred in 1991, when defaulted bonds returned 43.1%, although the high default rate year of 1990 was followed by an equally high rate in 1991, mostly in the early months of that year.

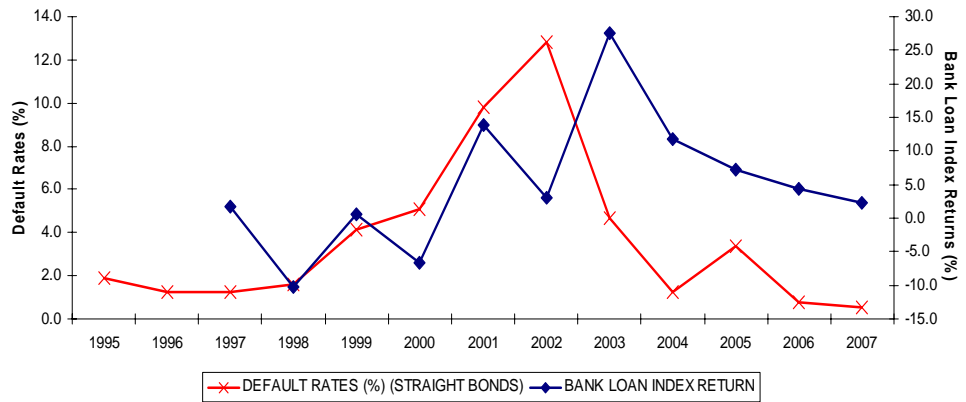
We can examine the relationship between default rates and either concurrent or subsequent returns on defaulted bonds, bank loans and our Combined Index, in Figure 14. We can analyze this data more rigorously, statistically, by running univariate regressions where the independent variable is the default rate and the dependent variable is either the defaulted bond, loan or combined index performance (Figure 13). It appears that the strongest relationship between default rates and subsequent returns is when the default rate is from one to two years prior to the performance year. There is absolutely no relationship between default rates and returns measured on a concurrent basis.

Figure 13. Default Rates vs. Defaulted Debt Returns

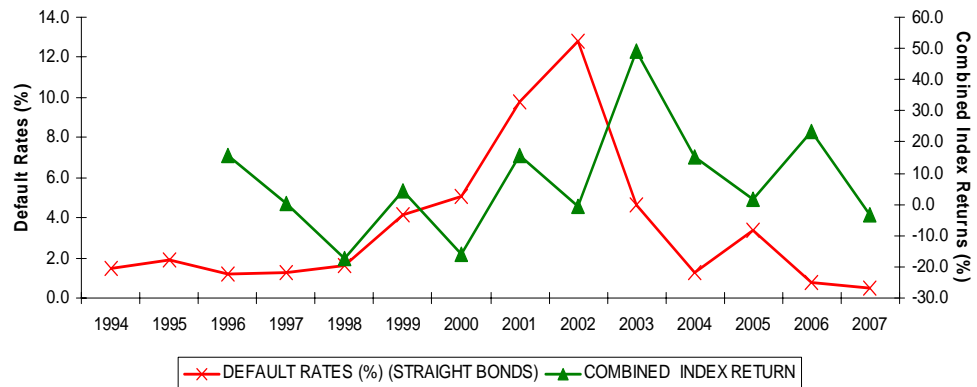
Panel A: Annual Default Rate vs. Market-Weighted Bond Index Returns (1987-2007)



Panel B: Annual Default Rate vs. Bank Loan Index Returns (1997-2007)



Panel C: Annual Default Rate vs. Combined Index Returns (1996-2007)



Source: Author's Compilation from Figures 4, 6, and 8

Figure 14. Regression (Correlation) Analysis of Defaulted Debt Index Returns Versus Default Rates**Panel A: Defaulted Debt (t+1) vs. Default Rate (t)**

Defaulted Bonds (t+1) = -9.45 + 4.34 (Default Rate (t))	
Correlation (y/x)	= 58.0%
R ²	= 33.6%
t-test	= 3.01 (.05 level)
Defaulted Loans (t+1) = -2.56 + 1.77 (Default Rate (t))	
Correlation (y/x)	= 66.0%
R ²	= 43.6%
t-test	= 2.48 (.05 level)
Combined Index (t+1) = -4.13 + 2.88 (Default Rate (t))	
Correlation (y/x)	= 59.8%
R ²	= 35.8%
t-test	= 2.36 (.05 level)

Panel B: Defaulted Debt (t+2) vs. Default Rate (t)

Defaulted Bonds (t+2) = -6.80 + 3.38 (Default Rate (t))	
Correlation (y/x)	= 44.0%
R ²	= 19.4%
t-test	= 2.04 (.05 level)
Defaulted Loans (t+2) = -1.22 + 1.71 (Default Rate (t))	
Correlation (y/x)	= 69.8%
R ²	= 48.6%
t-test	= 2.57 (.05 level)
Combined Index (t+1) = -5.56 + 2.85 (Default Rate (t))	
Correlation (y/x)	= 57.5%
R ²	= 33.0%
t-test	= 2.10 (.05 level)

Panel C: Defaulted Debt (t) vs. Default Rate (t)

Defaulted Bonds (t) = 10.60 + 0.03 (Default Rate (t))	
Correlation (y/x)	= 0.0%
R ²	= 0.0%
t-test	= 0.02 (not significant)
Defaulted Loans (t) = 3.12 + 0.47 (Default Rate (t))	
Correlation (y/x)	= 18.5%
R ²	= 3.3%
t-test	= 0.02 (not significant)
Combined Index (t) = 7.27 + 0.02 (Default Rate (t))	
Correlation (y/x)	= 0.0%
R ²	= 0.0%
t-test	= 0.02 (not significant)

Source: Author's Compilation from Figures 4, 6, and 8

We find that the correlation between the default rate on high-yield bonds and the next year's Combined Index of Defaulted Bonds and Bank Loans was quite high, at close to 60% (Panel A). Indeed, the default rate explained about 36% of the variance of the combined index's next year's performance. Similar results can be seen for the bond and bank loan association with the default rate. While our time-series is only 11 years, the t-statistic (2.36) measuring whether the independent variable (default rate) is statistically meaningful has been extremely significant at the 5% level of confidence.

To interpret the regression equation in Figure 14 (Combined Return = $-4.13\% + 2.88$ [default rate]), when the default rate in period (t) is zero (0), the expected rate of return on our combined index is -4.13% . If the default rate is at the historical weighted average annual rate (3.86%), the expected return will be about 7.00% . If, however, the rate of default is 10.0% , the next year's expected return should be almost 25% . Similar results can be observed for a t+2 year lag. Of course, many other variables affect the sector's performance and that of individual manager's, but it appears that the supply of distressed securities in the prior year(s) is an important factor.

It is important to note that the coincident relationship between default rates and defaulted debt returns shows absolutely no association ($R^2 = 0.0\%$ for the combined index, 3.3% for the defaulted bank loans and 0.0% for the defaulted bonds; see Panel C in Figure 13). So, investors still may face a challenging environment during the early stages of an increase in defaults, as could occur in 2008. Similar results can be seen for the defaulted bond and defaulted bank loan relationship, respectively, with default rates.

Diversification: Management Styles and Return Correlations

Return Correlations

We have often noted the attractive diversification strategies with distressed debt and most other asset classes. Several domestic pension and hedge funds and foreign investors have used this strategy by allocating a portion of their total investments to distressed debt money managers. In addition, fund of funds, which invest in alternative investment managers, now typically consider distressed debt as an important asset class. The principal idea behind this strategy is that returns from distressed debt portfolios have relatively low correlations with returns of most other asset classes.

In addition, managers have carved out distinctive styles (Appendix D) within the distressed space (for example, passive, active, control or near control, long-short, arbitrage, mid-caps, to name a few). We estimate that there are at least 190 investment institutions in the United States that specialize in distressed securities with combined assets under management of perhaps \$350 billion or more. This is at least twice the amount of just a few years ago.

Figure 15 shows the correlations between monthly returns on the Altman-NYU Salomon Center Defaulted Bond Index and two other risky asset classes, as well as 10-year Treasury Bonds, for the 21-year period 1987-2007. Over this period, the correlation of defaulted bond returns with the S&P 500 was just 29.43%, with Citigroup's High Yield Bonds (60.23%) and a -22.32% with 10-Yr Treasury Bonds. The latter's negative correlation was magnified considerably in 2007.

Figure 15. Correlation of Altman-NYU Salomon Center Monthly Indexes of Defaulted Bonds With Other Securities Indexes, 1987–2007

	Altman Defaulted Bond Index (%)	S&P 500 (%)	Citi High-Yield Bond Index (%)	Ten-Year Tsy Bond (%)
Altman Defaulted Bond Index	100.00	29.43	60.23	-22.32
S&P 500		100.00	50.19	1.43
Citi High-Yield Bond Index			100.00	8.20
Ten-Year Treasury Bond				100.00

Source: Credit and Debt Markets Program, NYU Salomon Center.

As was the case in the past, the correlation of high-yield bonds and the Defaulted Bank Loan Index (43.57%) is weaker than with defaulted bonds (61.44%, see Figure 16, shorter measurement period). The correlation of returns on defaulted bank loans and 10-Yr Treasuries remained negative through 2007 at -22.31% and was just about zero with the S&P 500 stock index.

Finally, the monthly return correlation between our two defaulted debt indexes remained relatively low at 58.65%. Indeed, in 2007 we observed that the annual returns on defaulted bonds (-11.8%) and defaulted loans (2.3%) were directionally different. In fact, in four of the 11 years from 1996 to 2007, the returns of these two indexes moved in an opposing manner (see Figures 4 and 6 above).

Figure 16. Correlation of Altman-NYU Salomon Center Indexes of Defaulted Loans With Other Securities Indexes, 1996–2007

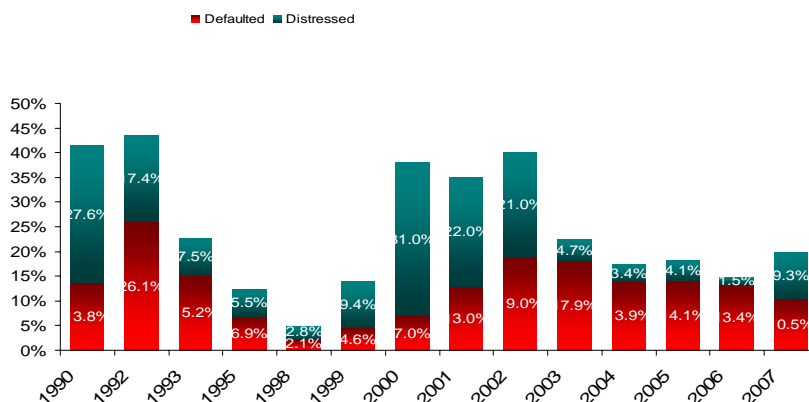
	Altman Bond Index (%)	Altman Loan Index	Altman Combined Index	S&P 500 (%)	Citi High- Yield Bond Index (%)	Ten-Year Tsy Bond (%)
Altman Defaulted Bond Index	100%	58.65%	91.98%	25.64%	61.44%	-29.96%
Altman Defaulted Loan Index		100%	84.12%	0.21%	43.57%	-22.31%
Altman Combined Index			100%	16.26%	58.48%	-29.96%
S&P 500				100%	51.59%	-18.54%
Citi High-Yield Bond Index					100%	-6.68%
Ten-Year Treasury Bond						100%

Source: Credit and Debt Markets Program, NYU Salomon Center.

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

The distressed and defaulted debt proportion of the high-yield and defaulted debt markets in the United States comprised about 19.8% as of December 31, 2007, up considerably from the 14.9% proportion one year earlier (see Figure 17). Without question, the cause of this significant increase is the staggering growth of distressed debt (bonds selling at 1,000bp or more above the risk-free, 10-Yr US Treasury bond rate). Indeed, this so-called “distress ratio” jumped from just 1.7% of the high-yield bond market or 1.5% of high-yield plus defaulted bonds as of year-end 2006 to 10.4% of the high-yield market and 9.3% of the high-yield \$1,089.9 billion plus defaulted bond (\$127.3 billion) markets, as of year-end 2007.

Figure 17. Distressed^a and Defaulted Debt As a Percentage of Total High Yield Plus Defaulted Debt Market^b, 1990–2007^c



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

^b \$1089.9 billion as of December 31, 2007.

^c Some years not available as no survey results available.

Source: NYU Salomon Center.

Since the distressed ratio is an important indicator of the vulnerability of the high-yield market to future defaults, we now find that investors are indeed concerned about an imminent increase in default. The average year-end distressed ratio for 1990-2007 was approximately 12.0% of the high-yield bond market. So, as of year-end 2007, the distressed ratio was still below the historical average. This ratio actually increased further in the first 15 days of January 2008, when it exceeded 15% of the high-yield market and was greater than the historical average for the first time since 2003. The defaulted bond segment actually dropped considerably in 2007, ending the year at 10.5% of high-yield plus defaulted debt, down from 13.4% in 2006.

Figure 18 shows our estimates of the amounts of public and private, defaulted and distressed debt outstanding. Public defaulted bonds totaled \$127.3 billion, down \$30 billion from the prior year. Distressed debt, however, increased in one year from about \$18 billion in 2006 to almost \$114 billion in 2007.

We continue to use a private-to-public debt ratio of 2.6 times to estimate the amounts of defaulted and distressed private debt (mainly bank loans, mortgages, and trade debt). We expect this ratio to increase after the next cycle of defaults since leveraged loans became such an important part of noninvestment-grade firm financings in recent years.

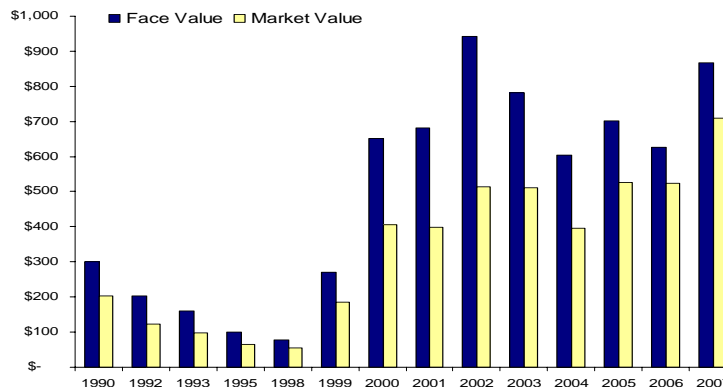
Applying the “2.6:1.0” ratio to our public debt totals, we estimate that the face value of private defaulted and distressed debt is \$626 billion. The total face value of public and private, defaulted and distressed debt as of December 31, 2007, is an estimated \$867.2 billion (Figure 18). This is an impressive increase of about \$240 billion from one year earlier. Figure 19 shows that the total value of distressed and defaulted debt was at the closest level to the largest recorded amount as of year-end 2002.

We have revised downward our market-to-face value ratios of defaulted and distressed debt so as to recognize the fall in prices of outstanding distressed debt. This is based on the Altman-NYU Salomon Center Indexes of portfolios of defaulted bonds and bank loans and our estimate for private debt. Applying these market-to-face value ratios to our face value totals results in a total market value estimate of \$708.7 billion. This is a substantial increase of 35% over the 2006 total, completely caused by the enormous increase in the distressed debt segment.

Figure 18. Estimated Face and Market Values of Defaulted and Distressed Debt, 2004–2007 (Dollars in Billions)

	Face Value (\$)			Market Value (\$)			Market/Face Ratio
	Dec 05	Dec 06	Dec 07	Dec 05	Dec 06	Dec 07	
Public Debt							
Defaulted	163.5	156.2	127.3 ^a	89.9	101.5	76.4	0.60 ^d
Distressed	49.3	17.9	113.6 ^b	34.5	13.4	85.2	0.75 ^d
Total Public	212.8	174.1	240.9	124.5	115.0	161.6	
Private Debt							
Defaulted	359.8	406.1	331.0 ^c	287.8	365.5	281.4 ^c	0.85 ^d
Distressed	108.5	46.6	295.3 ^c	97.6	44.3	265.7 ^c	0.90 ^d
Total Private	468.2	452.7	626.3	385.4	409.7	547.1	
Total Public and Private	681.1	626.8	867.2	509.9	524.7	708.7	

^a Calculated using: (2006 defaulted population) + (2007 defaults) - (2007 Emergences) - (Distressed Restructurings). ^b Based on 10.42% of size of high yield market (\$1,089.9 billion). ^c Based on a private/public ratio of 2.6. ^d The market/face value ratio was 0.65 for public defaulted debt, 0.75 for public distressed debt, 0.90 for private defaulted debt and 0.95 for private distressed debt in 2006. Source: Estimated by Professor Edward Altman, NYU Stern School of Business, from NYU Salomon Center Defaulted Bond and Bank Loan databases.

Figure 19. Size of the Defaulted and Distressed Debt Market, 1990–2007 (Dollars in Billions)

Source: Authors' compilations.

Our Default and Recovery Forecast

We have discussed in our past reports and in a recent paper³ why we believe today's default rates are so low and why recoveries are above average. Using our mortality rates estimates (see our companion annual report on high-yield bonds, February 6, 2008 and Altman, 1989) and the past new issuance rating amounts, we expect defaults to increase in both 2008 and 2009 and the default rate to reach 4.64% in 2008 and 5.05% in 2009 (Figure 20). These are both slightly above the historical average (3.1% arithmetic average and 3.9% weighted-average for 1971-2007).

These rates imply about \$53.1 billion of defaults in 2008 and \$62.1 billion in 2009. As shown in Figure 20, our 2007 estimate was considerably above the actual, but our new estimates are reinforced by a considerably higher distressed ratio and higher spreads. Note also the expected fall in recovery rates in 2008.

Implicit in the mortality rate forecast is the rating distribution of new issues. Figure 21 shows the proportion of new issue amounts rated B- or below (including nonrated issues). Note that this proportion has been relatively high in recent years. In conclusion, our models, which do not factor in GDP forecasts or any other macroeconomic factors, are expecting a significant increase in defaults (and bankruptcies) and lower recoveries in 2008.

³ E. Altman (2007) "Global Debt Markets in 2007: New Paradigm or Great Credit Bubble?", *Journal of Applied Corporate Finance*, vol. 19, No. 3, 19-31.

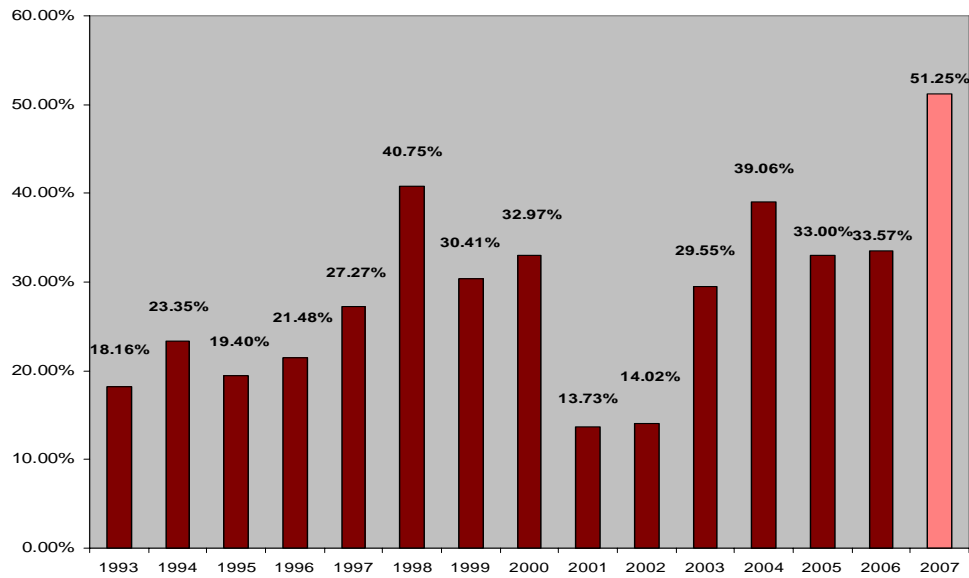
Figure 20. Forecasts of Default and Recovery Rates in the High-Yield Bond Market, 2007 - 2009

<u>Year</u>	<u>Default Rate</u>	<u>Default Amount (\$ billion)</u>	<u>Recovery Rate*</u>
2007 (Forecast)	2.50%	\$27.5	59.4%
2007 (Actual)	0.51%	\$5.5	66.6%
2008 (Forecast)	4.64%	\$53.1	35.8%
2009(Forecast)	5.05%	\$62.1	34.9%

*Based on the log-linear default/recovery rate regression.

Source: Author's compilations.

Figure 21. Percentage of New High-Yield Issues Rated B- or Below Based on Amount of Issuance



Source: From Standard & Poor's.

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Appendix A

US Distressed Debt Managers — 2007

Abrams Capital	Forest Investment Management	Oakhill
ADM Maculus	Franklin Mutual Recovery	Oaktree Capital
AEG	Fortress Capital Corp.	Och Ziff Friedheim
Angelo, Gordon & Company	GE Finance	Owl Creek Capital
Apex Fundamental Partners	Glenview Capital Management	Pacholder Associates, Inc.
Apollo Management	Golden Capital	Pacific Alternative Asset Mgmt.
Appaloosa Management	Golden Tree	Paige Capital
Ares Corporate Opportunities Fund	Gracie Capital	Pardus Capital
Ashmore Asian Recovery	Gradient Partners	Patriarch
Aurelius Capital Management	Gramercy Capital	Pegasus Investors
Avenue Capital Group	Greenwich Capital	Pequot Capital
Basso Asset Management	Greywolf Capital	Perry Partners
Bay Harbour Advisors	Gross Asset Management	Peter Schoenfeld Asset Management
Bayside Capital	GSC Capital	Pine Creek
Beltway Capital	H.I.G.	Pinewood Capital Partners
Bennett Management Company	Halbis Cap. Mgmt. (USA), Inc.	Plainfield Asset Management
Black Diamond Capital	Halcyon/Slika (Alan B.) Mgmt.	PMI
Blackport Capital Fund, Ltd	Harbert Capital	Post Advisory Group
Blackstone Group	Harvest Capital	PPM America
Blue Wolf Capital	Helios Advisors	Proprietary Trading of Market Makers
Boone Capital Management	Highbridge Capital Management	Quadrangle Group
Brigade Capital	Highland Capital	Questor Management
The Broe Companies	Highland Rest. Cap. Partners	Radius Equity Partners
Buckeye Capital Partners	Huizenga Capital Management	Redwood Capital
Canyon Capital	Industria Partners	Republic
Camulos Capital	Insight Equity	Resolution Partners
Candlewood Partners	Ivory Investment Management	Restoration Capital Management
Cardinal Capital	JLL Partners	Resurgence Corporate Fund
Carl Marks	JMB Capital	Rebeco/Weiss Peck & Greer
Carlyle Strategic Partners	K Capital Partners	Salisbury
Cargill Value Investment	KD Distressed Capital	Sandell Asset Management
Catlock Capital	Kilimanjaro Advisors	Satellite Asset Management
Centerbridge Capital	King Street Advisors	Sato Capital
Cerberus Partners	KPS Special Situations Fund	Schultz Partners
Chrysalis Capital Partners	KS Distressed Debt	Scoggin Capital
Citadel Investments	Lampe Conway	Scott's Cove Capital Mgmt.
Cohanzick Management	Langley Management	Seneca Capital Inv't. Partnership
Columbus Hill Cap.	Laurel Ridge Asset Management	Signature Capital Partners
Commonwealth	Leucadia National Corporations	Silvergang
Concordia Advisors	Levco Debt Opportunities	Silverpoint Capital
Contrarian Capital Management	Litespeed Partners	Spring Street
Corsair	Littlejohn & Co.	Stanfield Capital Management
Cypress Management	Loeb Partners	Stairway Capital Advisors
D.B. Zwirn Partners	Lonestar Partners	Stark Investments
D.E. Shaw	LongAcre Capital Partners	Strategic Value Partners
Davidson/Kempner (MH Davidson)	Longroad Asset Management	Summit
DDJ Capital Management	Marathon Capital	Stonehill Capital
Deephaven Capital Management	Mariner Investment Group	Stony lane Partners
Delaware Street Capital	Mason Capital Management	Sun Capital Partners, Inc.
Deltec Recovery Fund	MatlinPatterson Global Advisors	Sunrise Capital Partners
Drucker Capital Management	Mellon HBV Capital Mgmt.	TA Mckay & Co.
Durham Asset Management	MHR	Taconic Capital Partners
Eagle Rock Capital	Millennium	Tennenbaum Capital
Elliott Advisors	MJ Whitman Mgmt Co.	The Baupost Group
Endurance Capital	Monomoy Capital	Third Avenue Value Fund
EOS Partners	Moore Asian Recovery Fund	TPG Credit Management
Epic Asset Management	MSD Capital	Treadstone Group
Fairfield Greenwich	Murray Capital	Triage Capital
Farallon Partners	MW Post	Trilogy Capital
Fir Tree Partners	New Generation Advisers	Trust Company of the West

Appendix A

US Distressed Debt Managers — 2007 (continued)

Tuckerbrook	W.L. Ross & Co.	William E. Simon & Sons
Turnberry Capital	Washington Corner Cap. Mgmt	Woodside Management
Tyndall Partners	Wayland Fund	Whippoorwill Associates, Inc.
Van Kampe	Wayzata Investment Partners	Xerion Partners
Varde Partners, Inc.	Wellspring Capital Partners	York Capital Management
Venor Capital Management	Wexford Capital	Z Capital Partners

Source: Authors' compilations.

Appendix B

US Distressed Funds with European Offices — 2007

Apollo Management	Elliott Advisors	Matlin Patterson Global Advisors
Avenue Capital Group	EOS Partners	Millennium Capital
Camulos Capital	Fortress Capital Corp	Oaktree Capital
Cargill Investors	HBK Investments	Och Ziff Capital Management
Cerberus Partners	Highbridge Capital Management	Peter Schoenfeld Asset Management
Citadel Investments	Kelso Place Asset Management	Silverpoint Capital
Davidson Kempner	Lonestar Partners	Strategic Value Partners
D.E. Shaw	Marathon Capital	TPG Credit Management

Source: Authors' compilations.

European Distressed Debt Managers (Home Grown) — 2007

Alchemy Partners	Equinox	RAB Capital
Argo Capital	EQT Opportunities	Rutland Fund
Bluebay Asset Management	Fortelus Capital Management	Sisu Capital
Butler Capital Management	H2 Equity Partners	Thames River
Centaurus Capital	Klesch Capital Partners	Tisbury Capital
Cheyne Capital	Omnis Capital	Trafalgar Asset Managers
Cognis Capital	Orn Capital	
Cyrus Capital	Picus Capital Management	

Source: Authors' compilations.

Appendix C

Distressed Active/Control Investors — 2007

American Securities	Harbinger Capital Partners	Ramius Capital Group
Angelo, Gordon & Co.	Highland Rest.Cap. Ptnrs,	Relativity Fund
Apollo management	Industria Partners	Remedial Capital
Appaloosa Management	Levine Liechtman	Resurgence Asset Management
Audax Credit Opportunities	Littlejohn & Co.	Sandell Asset Management Corp
Aurelius Capital Management	Lone Star Partners	Saybrook Capital
Avenue Capital Partners	Longroad Asset Management	Silver Point Capital,
Bay Harbour Mgmt.,	KPS Special Situations Fund	Stark Investments
Black Diamond	Marathon Capital	Stony Lane Partners
BlackEagle Partners	MatlinPatterson Asset Management	Strategic Value Partners
Carlyle Strategic Partners	Mellon HBV	Sun Capital Partners
Catalyst Partners	MHR Institutional Partners	Sunrise Capital
Centerbridge Capital Partners	Millroad Partners	TCW Crescent Mezzanine
Cerberus Partners	Monomoy Capital Partners	TPG Credit Management
Citadel Limited Partnership	Newport Global Advisors	Tuckerbrook
D.B. Zwirn Partners	Oakhill	Tudor Investment Corp et al
DDJ Capital Management	Oaktree Capital Management	Wayzata Investment Partners
D.E. Shaw	Panagaen Capital Management	Whippoorwill Associates
Elliott Associates	P. Schoenfeld Asset Mgt.	Wingate Partners
Ewing Management	Pequot Investors	W.L. Ross & Co
Farallon Capital	Perry Capital	York Capital
GSC Group	Plainfield Asset Mgt	Z Capital Partners

Source: Authors' compilations.

Appendix D

Investment Styles and Target Returns in Distressed Debt Investing

<u>Active/Control</u>	<u>Active/Non-Control</u>	<u>Passive</u>
Requires 1/3 minimum to block and ½ to control; may require partner(s)	Senior secured, senior unsecured	Invest in undervalued securities trading at distressed levels
Take Control of company through debt/equity swap	Active participation in restructuring process; Influence process	Sub-strategies: trading/buy-hold/senior or senior secured/sub debt/"busted converts"/capital structure arbitrage/long-short, value
Restructure or even purchase related businesses; roll-up	Exit via debt or equity (post-chapter 11) markets	Trading oriented; Sometimes get restricted
Equity infusion; run Company	Generally do not control	Holding period of 6 months to 1 year generally; Longer sometimes
Exit 2-3 years	Holding period of 1-2 years	Target return: 12-20%
Large or Mid-Small Cap focus	Large or Mid-Small Cap focus	
Target return: 20-25%	Target return: 15-20%	

Source: NYU Salomon Center and Common Fund.