New York University Salomon Center

Leonard N. Stern School of Business

Special Report on

Default and Returns in the High-Yield Bond Market

2006 in Review and Outlook

by

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with
Suresh Ramayanam

February 2007

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Executive Summary

The year 2006 turned out to be an excellent year for investors in high-yield bonds, with an extremely low default rate, almost a record-high recovery rate, a large increase in new issuance and an impressive absolute and relative return performance. The highly liquid, benign credit cycle continued with a default rate of 0.76%, registering the lowest level in 25 years (when the market was just $15 billion in size in 1981). This US and Canadian dollar denominated rate was based on a mid-year market size of $993.6 billion, which itself actually declined slightly from one year earlier, the first decline since 1992.

The fourth quarter default rate was 0.18%, actually slightly higher than the previous two quarters. The annual dollar-denominated S&P/LSTA default rate on leveraged loans decreased from 3.0% in 2005 to just 1.1% at year-end 2006 and to just 0.48% in January, 2007. The latter is the lowest level since its inception in December 1998.

Default losses were just 0.30%, based on a weighted average recovery rate just after default of 65.3%. This was a slight increase over last year's 61.1% and considerably above what our regression model would have predicted – even with this extremely low default rate. Fallen angels defaults in 2006 were below average in terms of both issuers and issues, but the issuer default rate was about twice that of the overall high-yield market's dollar-denominated rate.

Returns on high-yield bonds were considerably higher than last year, at 11.85%, and slightly above the historic average. The excess return vs. the ten-year US Treasuries was an impressive 10.47%, the fifth highest excess return in our 29 year database, which goes back to 1978. Yield-to-maturity spreads to ten-year Treasuries tumbled by almost 100 bp to 3.11%, the lowest level since 1984. The end of the year level was 169 bp, almost two standard deviations, below the historic average of 4.8%. The spread has continued to fall and was just 295 bp as of the end of January, 2007 (the lowest since 1979).

The distressed ratio of high-yield bonds trading 1000 bp over the risk-free rate declined again by year-end 2006 to just 1.7% of the market's size and just 1.5% of the total high-yield and defaulted bonds. This is the lowest rate since we began following the distressed ratio in 1990. This is an indicator that the near future's default rate will remain very low but it is also a function of the enormous appetite for existing high-yield bonds, no matter how risky.

The face value size of the distressed and defaulted debt markets declined to $627 billion from last year's $681 billion, despite our increased estimate of the private to public ratio from 2.2 to 2.6 times. The market value estimate of the market increased, however, by $15 billion to $525 billion.

Based on our mortality rate methodology of new issuance in the last ten years stratified by original rating, the Altman forecast for the high-yield bond market's default rate in 2007 is 2.50% and 3.72% in 2008. Our estimates are considerably higher than what is implied from year-end spreads.

Defaults and Default Rates

High-yield bond default rates plummeted in 2006 to almost a record-low level of 0.76%, the lowest annual rate since 1981 when the market size was just $ 15 billion. The 2006 rate is based on a market size of $993 billion as of mid-year (Figure 1). In the fourth quarter, the default rate was 0.18%, based on $1.74 billion of defaults. (See Appendix A). Fourth-quarter defaults were paced by Dura Automotive and Sea Containers Corp. Other sizable defaults during the entire year 2006 were Charter Communication Holdings, Dana Corp. and Pliant Corp. (See Appendix B). Every quarter in 2006 registered a default rate of under 0.40%, which has been the case essentially since the fourth quarter of 2003, except for the last two quarters of 2005 (See Figure 2 and Appendix A, again).

The dollar-denominated rate was below that of the issuer-denominated rate. For example, Moody's dollar denominated default rate was 1.03% compared to its issuer-denominated rate of 1.83%. Fitch's dollar denominated rate in 2006 was 0.80%. For leveraged loans, the S&P/LPC issuer default rate was 0.8% (Figure 3). This rate declined dramatically from one year earlier when the rate was 2.0%. Their dollar-denominated rate was 1.1% at the end of 2006 and dropped to an all-time low of 0.48% at the end of January, 2007.

The 52 issues from 23 defaulting issuers compares to 184 defaulting issues in 2005 from 34 issuers. The average defaulting issuer in 2006 had $337 million outstanding compared to $770 million in 2005.

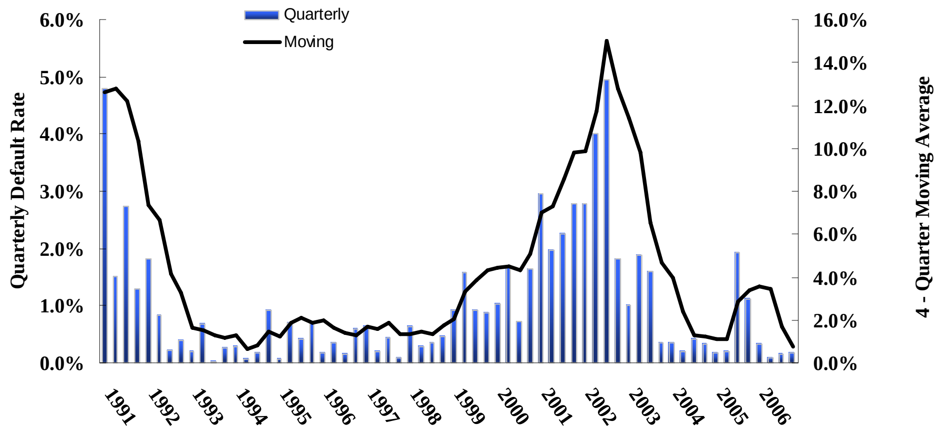
Figure 4 shows the usual default rates compared to US recession periods. No doubt the strong US economy has helped to reduce defaults. If the economy is expected to continue to remain relatively strong, investors will expect default rates to remain low. We caution, however, that the last two recessions were anticipated by rising defaults prior to the actual recession.

Figure 1. Historical Default Rates — Straight Bonds Only Excluding Defaulted Issues From Par Value Outstanding, 1971 – 2006 ($ Millions)

Year	Par Value Outstanding ($)[a]	Par Value Defaults ($)	Default Rates (%)	
2006	993,600	7,559	0.761	
2005	1,073,000	36,209	3.375	
2004	933,100	11,657	1.249	
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	
			%	**Standard Deviation (%)**
Arithmetic Average Default Rate		**1971 to 2006**	**3.167**	**3.072**
		1978 to 2006	**3.464**	**3.283**
		1985 to 2006	**4.189**	**3.428**
Weighted Average Default Rate[b]		**1971 to 2006**	**4.244**	
		1978 to 2006	**4.258**	
		1985 to 2006	**4.303**	
Median Annual Default Rate		**1971 to 2006**	**1.802**	

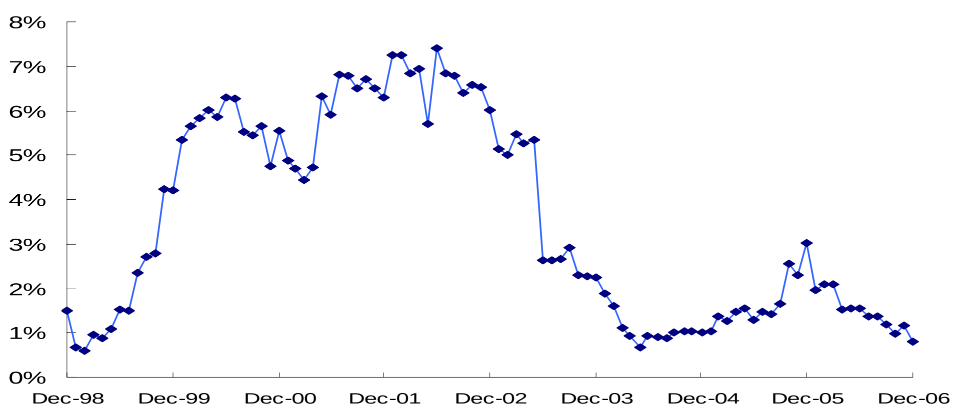
[a] As of mid-year. [b] Weighted by par value of amount outstanding for each year.
Sources: Authors' compilations.

Figure 2. Quarterly Default Rate and Four-Quarter Moving Average 1991 – 2006



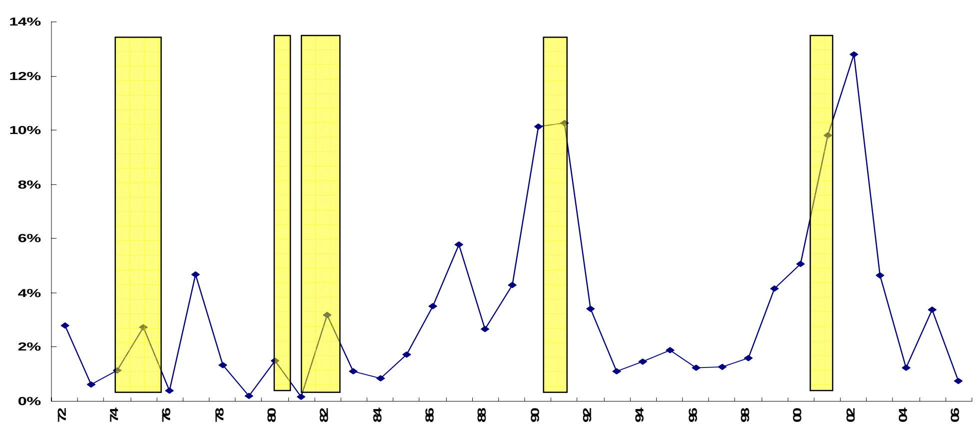
Source: Authors' compilations.

Figure 3. S&P Leveraged Loan Index 12 Month Moving Average Default Rate 1998 –2006



Sources: Standard & Poor's and LPC Corp.

Figure 4. Historical Default Rates and Recession Periods in the US High Yield Bond Market, 1972 – 2006



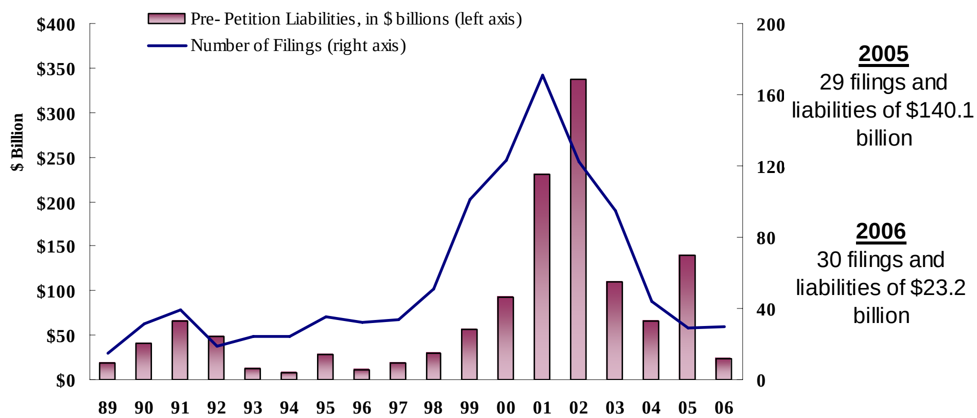
Periods of Recession: 11/73 - 3/75, 1/80 - 7/80, 7/81 - 11/82, 7/90 - 3/91, 4/01 - 12/01.

Sources: Figure 1 and National Bureau of Economic Research.

Bankruptcies

The number of Chapter 11 filings with liabilities greater than $100 million was 30 in 2006, one more than in 2005. But, the amount of liabilities entering the Chapter 11 process dropped considerably from $140 billion to just about $23 billion (Figure 5). The total was $66 billion in 2004. Except for the spike in late 2005, the trend in filings and liabilities has receded since 2002. The 2006 levels are similar to the benign period from 1993-1998.

Figure 5. Liabilities[a] of Public Companies Filing for Chapter 11 Protection, 1989-2006



[a] Minimum $100 million in liabilities

Source: NYU Salomon Center Bankrupcty Filings Database

The number of billion dollar bankruptcies in 2006 dropped to five from ten in the prior two years (See Figure 6). The average liability of the Chapter 11 filings in 2006 was $808 million, somewhat similar to 2004, and slightly above the average in the last benign credit cycle in the 1990's. The number of all Chapter 11 filings has steadily decreased since 2001 and was the lowest since 1980. See Appendix C for a complete list of Chapter 11 filings in 2006 with liabilities greater than $100 million.

Figure 6. Historical Bankruptcy Filings 1980-2006

Year	Total Filings(a)	Total Filings (b) (> $100 million)	Total Filings (c) (> $1 billion)	Total Liabilities(b) ($ mn) (> 100 million)	Average Liabilities(b) ($ mn) (> 100 million)
1980	62	4	0	746.0	186.5
1981	74	6	1	3960.0	660.0
1982	84	12	3	7113.0	592.8
1983	89	14	3	13674.0	976.7
1984	121	12	0	3440.0	286.7
1985	149	13	2	8473.0	651.8
1986	149	10	3	9230.0	923.0
1987	112	12	1	25421.0	2118.4
1988	122	14	2	6905.0	493.2
1989	135	15	6	18237.0	1215.8
1990	115	31	10	40365.0	1302.1
1991	123	39	10	65959.0	1691.3
1992	91	19	12	48179.0	2535.7
1993	86	24	3	12610.0	525.4
1994	70	24	1	8396.0	349.8
1995	85	35	7	27799.0	794.3
1996	86	32	0	11724.0	366.4
1997	83	36	5	18772.7	521.5
1998	122	51	6	30574.8	599.5
1999	145	101	18	56345.6	557.9
2000	179	125	20	92950.0	743.6
2001	263	171	44	229825.4	1344.0
2002	220	121	37	326812.7	2700.9
2003	172	95	24	110355.4	1161.6
2004	92	42	10	37187.7	885.4
2005	86	29	10	140093.9	4830.8
2006	66	30	5	23207.0	773.6
Total	**3181**	**1117**	**243**	**1,378,356.2**	**29,788.6**

(a) All chapter Filings

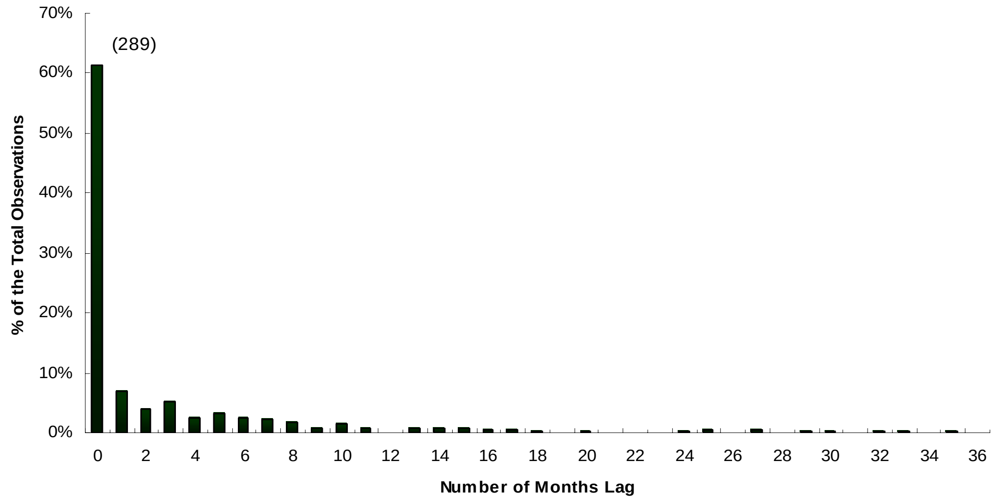
(b) Filings with Total Liabilities greater than $100 million

(c) Filings with Total Liabilities greater than $1 billion

Sources: NYU Salomon Center Bankruptcy Database and New Generation Research, Boston, USA

In Figure 7, we compare the date of default with the Chapter 11 filing date for all firms which both defaulted and went bankrupt. Based on 472 observations from the NYU Salomon Center databases, we find that the two dates were simultaneous in 289 of the cases (61.2%). Note that the remaining defaults preceded the bankruptcy filing by various amounts of the time but the bulk was within five months of each other. Of course, some firms default and never file for bankruptcy and also those firms which “default” and then cure their default before the grace period ends are not included in the statistics in Figure 7.

Figure 7. Time Differential Between Default and Bankruptcy Filing[1] (1981 – 2006)



(1) Based on 472 observations
Source: NYU Salomon Center Default and Bankruptcy Database

Industry Defaults

Figure 8 shows that of the 23 issuers that defaulted in 2006, three were auto-parts manufacturers, three were in the leisure/entertainment industry, and two each from the financial services, retailing and communication sectors. A finer distinction of these industry classifications is found in Appendix D. The ten general manufacturing and miscellaneous sector defaults were a diverse group across many industries.

Figure 9 shows the industry breakdown of defaults based on dollar amounts since 1990. Communication companies lead the way by a considerable margin over the next most "prolific" sectors, with more liabilities ($106 billion) than all the general manufacturing and miscellaneous industry companies combined. The bulk of these were telecommunications and cable companies. The largest dollar volume in 2006 comes out of the auto sector, which has seen both production cuts as well as price cuts from the manufacturers. In 2005, the numbers were dominated by airlines, energy and leisure/entertainment.

Figure 8. Corporate Bond Defaults by Industry (Number of Companies)

Industry	1970 – 1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
Auto/Motor Carrier	3							3	3					1				1			1			**4**	3	19
Conglomerates						1	3	1	1	3	3								1			1	1			15
Energy	3	3	5	7	12	2	4			4	2	3		1			1	13	1		8	9		**1**		78
Financial Services	4	1	1	1			4	11	7	14	3	2	1	2	1	2	6	1	6	4	5	6	2	**3**	2	88
Leisure/Entertainment						2	4	4	8	2	4	3	4	3	1	5	5	8	9	6	5	6			3	81
General Manufacturing	9	1	1	2	6	3	3	1	5	8	8	7	3	8	6	7	6	16	23	43	22	13	17	**12**	6	236
Health Care						1	2		2	1	1	1		2			2	8	6	3	4	3		**2**		39
Miscellaneous Industries	3	1	2	6	3	1			4	4	3	1	1	1		3	3	16	34	38	25	16	6	**1**	4	176
Real Estate/Construction	7		1	1		1	1	3	7	5	1			2	1	2	1	4	6	4	3		2	**1**		53
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	3	**2**	2	115
Communications	7	2	2	1	1	3	1		3	4	1	1	3	2	2	1	6	11	8	39	26	21	6	**3**	2	156
Transportation (non auto)	4	2		1	1			1	1	2			2			2	1	8	5	7	7	6	2	**5**	1	58
Utilities						1	1				1				1	1			1		0	0				6
Total	**57**	**12**	**12**	**19**	**23**	**15**	**24**	**26**	**47**	**62**	**34**	**22**	**19**	**28**	**15**	**29**	**37**	**98**	**107**	**156**	**112**	**86**	**39**	**34**	**23**	**1,134**

Source: Authors' compilations.

Figure 9. Corporate Bond Defaults by Industry (Amounts in $ Millions)

Industry	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
Auto/Motor Carrier	468	90				215		300	100	430	120	3,737	285		280	3,573	2,692	12,290
Conglomerates													100	690	275			1,065
Energy		60	103	600		75	100			3,812	217	4,200	4,085	11,857		8,895		34,004
Financial Services	928	696	536		78	687	700	66	689	375	1,968	5,062	3,803	1,079	110	541	156	17,474
Leisure/Entertainment	498	1,191	159		138	435	293		245	1,100	2,891	3,437	21,242	633	1,286	6,861	715	41,124
General Manufacturing	2,675	3,695	488	118		616	641	123	247	2,092	2,507	3,138	2,455	2,108	225	1,396	1,486	24,010
Health Care	18	1,120				75			125	2,214	1,715	692	115	3,843		360		10,277
Miscellaneous Industries	1,968	4,911	1,378	1,056	317	1,286	832	461	1,290	7,615	8,352	9,715	5,594	4,494	1,977	569	409	52,224
Real Estate/Construction	2,605	417	113	49	75	190		258	383	385	252	1,110	1,088	77	1,783	174		8,959
Retailing	4,443	2,937	1,489	18	2,814	395	164	2,504	1,241	2,052	3,081	1,586	4,092	877	749	1,059	332	29,833
Communications							460	286	1,549	2,980	5,983	34,827	47,953	7,603	2,551	150	1,496	105,838
Transportation (non auto)	1,028	1,452			301	562			1,125	310	2,890	1,430	4,711	2,086	2,421	12,376	272	30,964
Utilities		1,452	617	85			275	202		75			1,150	1,417				5,273
Total	14,631	18,021	4,883	1,926	3,723	4,536	3,465	4,200	6,994	23,440	29,976	68,934	96,673	36,764	11,657	35,954	7,559	373,336

Source: Authors' compilations.

Age of Defaults

Figure 10 shows the age distribution of defaults in 2006 and for the period 1989-2006. Note that the traditional pattern of low defaults in the first year after issuance followed by increased levels for years two and three are found in 2006. All of these years, however, had lower proportions in 2006 compared to historical averages. Also, the distribution is rather flat in the period two to nine years after issuance, with a slight spike in the sixth year (by number of issues). However, 2006 follows a trend seen over the last several years in which defaults are occurring later than historical norm (years 6 through nine). Likely, this is the result of fallen angel migration over the last several years.

Figure 10. Distribution of Years to Default From Original Issuance Date (by Year of Default), 1989–2006

	1989		1990		1991		1992		1993/1994		1995		1996		1997		1998	
Years to Default	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**No. of Issues**
1	4	6	3	3	0	0	0	0	175	9	1	3	2	8	5	20	2	6
2	12	18	25	23	18	13	0	0	333	17	9	28	3	13	4	16	5	15
3	15	23	23	21	26	19	7	13	362	19	7	22	3	13	4	16	10	30
4	13	20	18	17	29	21	10	19	291	15	3	9	8	33	9	36	3	9
5	1	2	23	21	35	26	8	15	239	12	1	3	1	4	3	12	10	30
6	7	11	5	5	10	7	12	22	151	8	2	6	5	21	0	0	2	6
7	7	11	5	5	4	3	5	9	124	6	2	6	0	0	0	0	1	3
8	2	3	4	4	10	7	4	7	56	3	2	6	0	0	0	0	0	0
9	1	2	1	1	3	2	0	0	38	2	4	13	0	0	0	0	0	0
10	3	5	1	1	2	1	8	15	164	8	1	3	2	8	0	0	0	0
Total	**65**	**100**	**108**	**100**	**137**	**100**	**54**	**100**	**1,933**	**100**	**32**	**100**	**24**	**100**	**25**	**100**	**33**	**100**

	1999		2000		2001		2002		2003		2004		2005		2006		1989-2006	
Years to Default	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**	**No. of Issues**	**% of Total**
1	32	26	19	10	40	12	29	8	18	9	8	10	16	9	2	4	184	9
2	37	30	51	28	69	21	51	15	30	15	7	9	13	7	4	8	344	17
3	15	12	56	31	87	26	61	18	26	13	8	10	9	6	6	12	368	18
4	14	11	14	8	65	19	56	16	23	11	6	8	22	12	5	10	300	15
5	7	6	13	7	27	8	45	13	40	20	10	13	14	8	4	8	246	12
6	8	6	5	3	14	4	21	6	20	10	16	21	17	9	9	17	161	8
7	10	8	12	7	21	6	8	2	25	12	9	12	13	7	6	12	135	7
8	2	2	4	2	5	1	7	2	3	1	6	8	11	6	7	13	67	3
9	0	0	3	2	4	1	12	3	5	2	1	1	5	3	6	12	45	2
10	0	0	6	3	3	1	54	16	13	6	6	8	64	34	3	6	168	8
Total	**125**	**100**	**183**	**100**	**335**	**100**	**344**	**100**	**203**	**100**	**77**	**100**	**184**	**100**	**52**	**100**	**2018**	**100**

Source: Authors' compilations.

Fallen Angel Defaults

Fallen angel defaults were present in 2006, with three out of the 23 defaulting issuers. The default rate (issuer based) of fallen angel defaults was 1.4%, below the historic annual average of about 4.0%, but still higher than the dollar-denominated default rate (See Figure 11). Consistent with the lower-than-average issuer rate for fallen angels was it’s lower-than-average rate based on the number on issues. In Figure 12, we observe that 13% of the issues were fallen angels compared to a historic average of twice that amount.

Figure 11. Fallen Angels vs. Original Issue and All U.S. High Yield Default Rates

Year	Fallen Angel Average 12 Month Default Rate	Original Issue Speculative Grade Default Rates[(a)]	All Speculative Grade Bond Default Rates
2006	**1.40%**	**n.a.**	**1.26%**
2005	**2.74%**	**3.70%**	**2.48%**
2004	**0.83%**	**2.65%**	**2.23%**
2003	**5.88%**	**5.46%**	**5.53%**
2002	**6.59%**	**8.55%**	**8.32%**
2001	**8.46%**	**10.14%**	**10.99%**
2000	**7.01%**	**7.10%**	**7.03%**
1999	**4.01%**	**5.10%**	**4.62%**
1998	**3.31%**	**2.75%**	**2.23%**
1997	**2.04%**	**2.10%**	**1.71%**
1996	**1.38%**	**2.00%**	**1.71%**
1995	**0.25%**	**3.90%**	**3.07%**
1994	**0.00%**	**2.31%**	**1.70%**
1993	**1.72%**	**1.99%**	**1.79%**
1992	**4.50%**	**5.48%**	**5.45%**
1991	**7.53%**	**10.86%**	**11.66%**
1990	**5.77%**	**8.30%**	**8.20%**
1989	**3.74%**	**4.93%**	**5.33%**
1988	**4.25%**	**3.39%**	**3.95%**
1987	**4.36%**	**2.92%**	**2.41%**
1986	**2.46%**	**6.29%**	**4.78%**
1985	**6.77%**	**4.06%**	**3.24%**
Arithmetic Average	**3.86%**	**4.95%**	**4.69%**
Weighted Average(By number of issuers)	**4.22%**	**5.15%**	**5.10%**
Standard Deviation	**2.43%**	**2.64%**	**2.96%**

Source: Author Compilation from Standard &Poor's "Credit Pro" Database, except in 2006 from author.

[(a)] S&P did not calculate this rate in 2006.

Figure 12. Defaults by Original Ratings (Investment Grade Versus Non-Investment Grade), by Year, 1977 - 2006

	Total # Defaulted Issues[a]	% Originally Rated Investment Grade	% Originally Rated Non-Investment Grade
2006	52	13	87
2005	184	49	51
2004	79	19	81
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
Total	**2,110**	**26%**	**74%**

[a] Where we could find an original rating from either S&P or Moody's.
Sources: Authors' compilations from Standard & Poor's and Moody's records.

Default Losses and Recoveries

The weighted-average recovery rate (based on market prices just after defaults) on high-yield bond defaults increased again in 2006 to 65.3% from 61.1% in 2005 and 57.7% in 2004. This is the fourth consecutive year of increases since the relatively low recovery years of 2000-2002. The default loss rate in 2006, including the loss of 3.5 bp from lost coupon payments, was just 0.30% (Figure 13) – the lowest loss rate since 1981, similar to 1981's benchmark on default rates (See Figure 14). Over the 29-year sample period, the average loss rate on high-yield bond defaults is 2.34%, a drop of 8 bp from last year's annual average level.

Figure 13. 2006 Default Loss Rate

	Unadjusted for Fallen Angels (%)	Only Fallen Angels (%)	All except Fallen Angels (%)	Price Adjusted for Fallen Angels (%)
Background Data				
Average Default Rate	0.761	1.402	0.671	0.836
Average Price At Default[a]	65.322	66.305	65.023	65.312
Average Price At Downgrade[a]		95.000		
Average Recovery	65.322	69.795	65.023	66.100
Average Loss Of Principal	34.678	30.205	34.977	33.900
Average Coupon Payment	9.330	6.388	10.103	9.265
Default Loss Computation				
Default Rate	0.761	1.402	0.671	0.836
X Loss Of Principal	34.678	30.205	34.977	33.900
Default Loss of Principal	0.264	0.423	0.235	0.283
Default Rate	0.761	1.402	0.671	0.836
X Loss of 1/2 Coupon	4.665	3.194	5.052	4.632
Default Loss of Coupon	0.035	0.045	0.034	0.039
Default Loss of Principal and Coupon	**0.299**	**0.468**	**0.269**	**0.322**

[a] If default date price is not available, end-of-month price is used.
Sources: Authors' compilations and various dealer quotes.

Figure 13 also shows that the recovery rate on fallen angel defaults in 2006 was slightly higher (69.8%) than on all defaults (65.3%) and original issue high-yield bond defaults (65.0%). The base price for the fallen angel defaults is the average price of the bonds just after downgrade, rather than the original face value. Using the issuer default rate on fallen angels (1.40%) and the recovery rate calculation, the default loss rate in 2006 adjusted for fallen angel defaults was 0.32%, slightly above the unadjusted loss.

Figure 14. Default Rates and Losses,[a] 1978–2006 (Dollars in Millions)

Year	Par Value Outstanding[a] ($)	Par Value of Default ($)	Default Rate (%)	Weighted Price After Default ($)	Weighted Coupon (%)	Default Loss (%)
2006	993,600	7,559	0.76	65.3	9.33	0.30
2005	1,073,000	36,209	3.37	61.1	8.61	1.46[b]
2004	933,100	11,657	1.25	57.7	10.30	0.59[b]
2003	825,000	38,451	4.66	45.5	9.55	2.76[b]
2002	757,000	96,858	12.79	25.3	9.37	10.15[b]
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
Arithmetic Average 1978–2006			**3.46**	**44.41**	**10.84**	**2.34**
Weighted Average 1978–2006			**4.26**			**2.94**

[a] Excludes defaulted issues. [b] Default loss rate adjusted for fallen angels is 9.3% in 2002, 1.82% in 2003, 0.59% in 2004, 1.56% in 2005, 0.039% in 2006

Sources: Authors' compilations and Figures 1 and 6.

Figure 15 lists the average recovery by seniority in 2006 and for the period 1978-2006. The usual hierarchy of recoveries by seniority mostly held in 2006, with the exception of the discounted bond recoveries, which were unusually high (78.3%) on the six issues in that category. The one subordinated issue also had an unusually high recovery. The weighted average recovery on senior secured bonds (90.6%) essentially was at a record level (tied with the Texaco-dominated 1987 rate), followed by senior-unsecured at 60.9% and senior- subordinated at 50.2%.

Figure 15. Weighted Average (by Issue) Recovery Rates on Defaulted Debt by Seniority Per $100 Face Amount, 1978 - 2006

	Senior Secured			Senior Unsecured			Senior Subordinated			Subordinated			Discount and Zero Coupon			All Seniorities	
Default Year	No.	%	$	No.	%	$	No.	%	$	No.	%	$	No.	%	$	No.	$
2006	9	**18**	90.60	26	**52**	60.90	8	**16**	50.24	1	**2**	60.33	6	**12**	78.31	50	65.32
2005	67	**54**	76.50	44	**36**	45.88	7	**6**	32.67	0	**0**	0.00	5	**4**	74.21	123	61.10
2004	27	**39**	63.67	33	**48**	56.77	2	**3**	37.44	0	**0**	0.00	7	**10**	43.06	69	57.72
2003	57	**28**	53.51	108	**53**	45.40	29	**14**	35.98	1	**0**	38.00	8	**4**	32.27	203	45.58
2002	37	**11**	52.81	254	**75**	21.82	21	**6**	32.79	0	**0**	0.00	28	**8**	26.47	340	25.30
2001	9	**3**	40.95	187	**67**	28.84	48	**17**	18.37	0	**0**	0.00	37	**13**	15.05	281	25.62
2000	13	**8**	39.58	47	**29**	25.40	61	**37**	25.96	26	**16**	26.62	17	**10**	23.61	164	26.74
1999	14	**11**	26.90	60	**47**	42.54	40	**31**	23.56	2	**2**	13.88	11	**9**	17.30	127	27.90
1998	6	**18**	70.38	21	**62**	39.57	6	**18**	17.54	0	**0**	0.00	1	**3**	17.00	34	40.46
1997	4	**16**	74.90	12	**48**	70.94	6	**24**	31.89	1	**4**	60.00	2	**8**	19.00	25	57.61
1996	4	**17**	59.08	4	**17**	50.11	9	**38**	48.99	4	**17**	44.23	3	**13**	11.99	24	45.44
1995	5	**15**	44.64	9	**27**	50.50	17	**52**	39.01	1	**3**	20.00	1	**3**	17.50	33	41.77
1994	5	**23**	48.66	8	**36**	51.14	5	**23**	19.81	3	**14**	37.04	1	**5**	5.00	22	39.44
1993	2	**6**	55.75	7	**22**	33.38	10	**31**	51.50	9	**28**	28.38	4	**13**	31.75	32	38.83
1992	15	**22**	59.85	8	**12**	35.61	17	**25**	58.20	22	**33**	49.13	5	**7**	19.82	67	50.03
1991	4	**3**	44.12	69	**44**	55.84	37	**24**	31.91	38	**24**	24.30	9	**6**	27.89	157	40.67
1990	12	**10**	32.18	31	**27**	29.02	38	**33**	25.01	24	**21**	18.83	11	**9**	15.63	116	24.66
1989	9	**12**	82.69	16	**21**	53.70	21	**28**	19.60	30	**39**	23.95				76	35.97
1988	13	**21**	67.96	19	**31**	41.99	10	**16**	30.70	20	**32**	35.27				62	43.45
1987	4	**13**	90.68	17	**55**	72.02	6	**19**	56.24	4	**13**	35.25				31	66.63
1986	8	**14**	48.32	11	**20**	37.72	7	**13**	35.20	30	**54**	33.39				56	36.60
1985	2	**7**	74.25	3	**11**	34.81	7	**26**	36.18	15	**56**	41.45				27	41.78
1984	4	**29**	53.42	1	**7**	50.50	2	**14**	65.88	7	**50**	44.68				14	50.62
1983	1	**13**	71.00	3	**38**	67.72				4	**50**	41.79				8	55.17
1982				16	**80**	39.31				4	**20**	32.91				20	38.03
1981	1	**100**	72.00													1	72.00
1980				2	**50**	26.71				2	**50**	16.63				4	21.67
1979										1	**100**	31.00				1	31.00
1978				1	**100**	60.00										1	60.00
Total/ Average	**332**	**15%**	**$59.65**	**1017**	**47%**	**$36.85**	**414**	**19%**	**$30.60**	**249**	**11%**	**$31.17**	**156**	**7%**	**$25.98**	**2,168**	**$37.16**
Median			**$59.08**			**$45.40**			**$32.79**			**$31.00**			**$19.82**		**$41.77**
Standard Dev			**$17.20**			**$13.97**			**$13.59**			**$17.77**					

Sources: Authors' compilations from various dealer quotes.

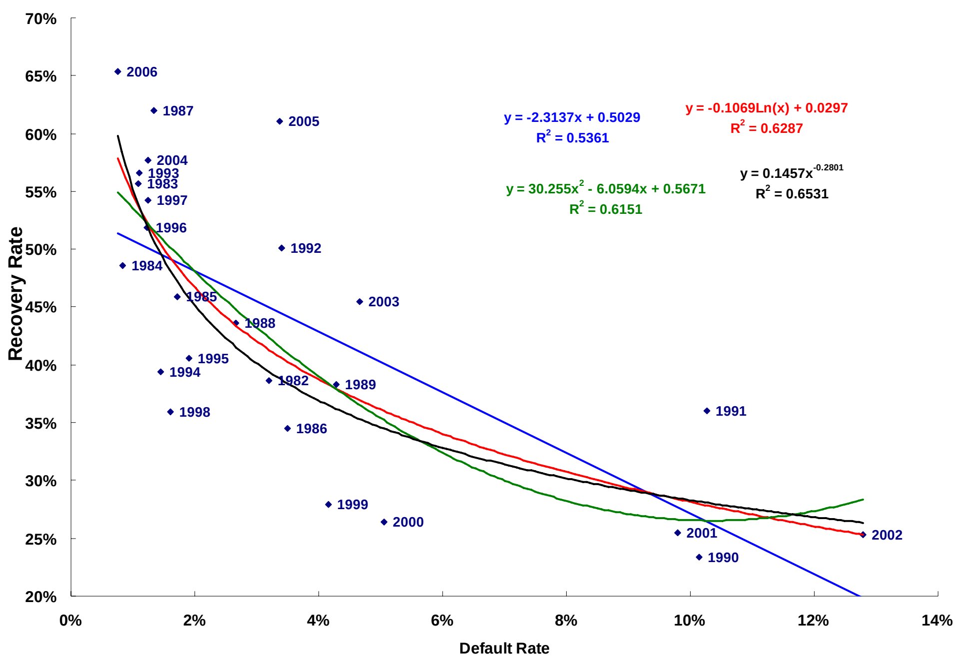
Forecast Recovery Versus Actual

Using our regression based model (Altman, Brady, Resti, and Sironi, 2003, 2005)[1], we can observe in Figure 16 that the actual recovery rate in 2006 was somewhat above the expectation based on the various models. Recall that our models are based on the concept that average recovery rates are mostly a function of the supply and demand for defaulted firms' securities. In a year like 2006, when the supply of new defaults, as proxied by the default rate, was considerably below the demand from hedge fund investors, the expected recovery should be fairly high. Indeed, our linear model has an expected recovery on defaults of 48.5%, considerably below the actual rate of 65.3%. The higher-powered estimate using the log-linear structure (our

[1] E. Altman, B.Brady, A.Resti, and A.Sironi, "The Link Between Default and Recovery Rates", NYU Salomon Center(2003) and Journal of Business, November 2005.

favorite), yields an expected recovery of 55.1% -- closer, but still below , the actual. So, like our default rate estimate (discussed at a later point), our forecast of recoveries "suffered " this year from the massive liquidity available in the high yield and distressed debt markets. Are companies in bankruptcy worth 50% more today than the average over the last 30 years? Perhaps they are valued higher today due to creative, active control distressed investors' strategies, merger synergies and the new Bankruptcy Code , but 50% is a huge premium to explain.

Figure 16. Recovery Rate/Default Rate Association

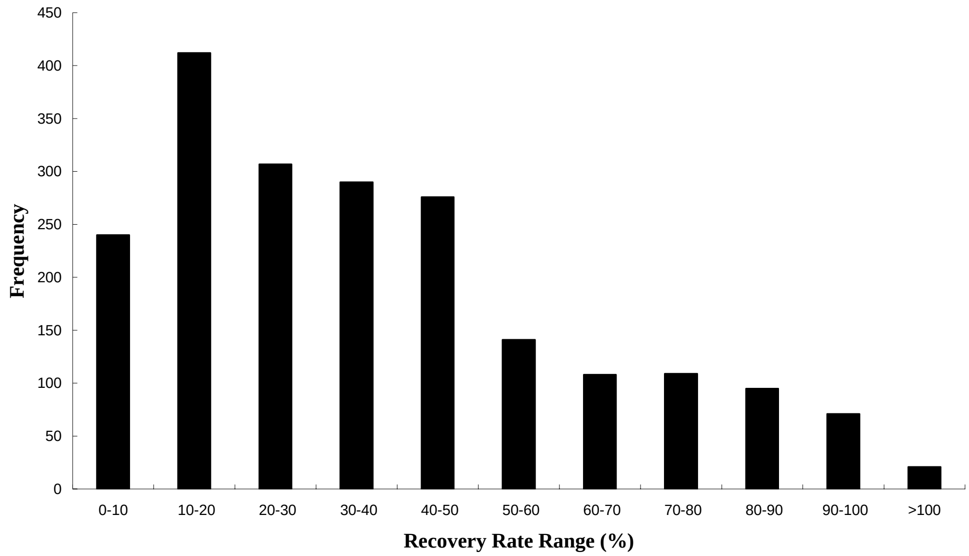


Source: Altman Defaulted Bond Database, NYU Salomon Center and Altman et al. (2003)

Related Recovery Statistics

We have noted the average historical recovery rate as being 35-40% on bonds, but, of course, with a standard deviation of around 25%, there is a fair amount of variation around the mean. Figure 17 shows the frequency distribution for almost 2,400 defaults over the period 1971-2006. Note that the majority is below 40% and many are in the 10-20% range. So, using a fixed expected recovery of 40% is likely to be an incorrect estimate.

Figure 17. Corporate Bond Default Recovery Rate Frequency (Based on number of Issues 1971 - 2006)



Number of Observations = 2383

Source: NYU Salomon Center Default Database

Figure 18 shows the average price at default based on the number of years after issuance. There appears to be some aging effect here with the first three years exhibiting lower average recovery rates than years 4-10.

Figure 18. Average Price at Default by Number of Years after Issuance (1971-2006)

Years to Default	No. of Observations	Average Price ($)
1	165	32.90
2	336	33.61
3	391	31.59
4	312	37.19
5	239	36.09
6	203	44.91
7	142	41.03
8	74	39.65
9	49	40.62
10	143	38.03
All	**2,054**	**36.32**

Source: Authors' Compilation

Figure 19 shows the recovery rate by original rating for the period 1971-2006.

Figure 19. Average Price after Default by Original Bond Rating

Rating	No. of Observations	Average Price ($)	Weighted Price($)	Median Price($)	Std. Dev($)	Minimum Price($)	Maximum Price($)
AAA	14	82.55	92.87	95.00	21.92	32.00	106.13
AA	29	65.68	76.84	60.00	26.69	17.80	103.00
A	132	53.91	48.18	55.13	26.89	2.00	100.00
BBB	387	42.15	34.03	42.63	23.52	1.00	103.00
BB	202	36.25	31.60	34.00	21.96	1.00	107.75
B	1040	34.11	33.16	29.00	24.45	0.42	112.00
CCC	214	37.67	37.65	29.63	28.38	0.59	106.75
Total	2018	38.29	35.34	33.00	25.73	0.42	112.00

Source: Authors' Compilation

Overall, the individual recoveries show a simple average of 38.3%, a weighted average of 35.3%, and a median of 33%. Investment grade, at birth, companies demonstrate significantly higher recoveries, especially in the A to AAA categories (53.9%, 68.7%, and 82.6% respectively). Once you go below A, there is very little difference in historical recoveries from BBB to CCC, especially based on the weighted average metric.

We saw earlier that seniority makes a big difference in the expected recoveries. It is also true that the likelihood that an investment grade issue at birth will have a senior priority (secured or unsecured) is greater than what one would expect from non-investment grade original issue bonds. Figure 20 shows the recovery rate by seniority contingent as to whether or not the original issue was rated investment grade or not. You could also read the results from this table, with a little more difficulty, of investment grade vs. non-investment grade issuance, contingent on seniority. One reason for the disparity is the high ratings associated with secured debt – like aircraft leases.

Figure 20. Recovery Rates By Seniority and By Original Rating, Corporate Bond Defaults (1971 - 2006 by Issue)

Seniority	Original Rating	# of Issues	Mean Price ($)	Weighted Price($)	Median Price ($)	STD	Minimum Price ($)	Maximum Price ($)
Senior Secured	Investment Grade	134	54.91	59.63	50.50	25.62	7.00	106.13
	Non-Investment Grade	224	41.98	41.29	37.75	28.56	1.00	106.75
	All	403	46.55	47.31	43.50	27.80	1.00	106.75
Senior Unsecured	Investment Grade	325	45.33	35.07	43.50	25.44	2.00	100.50
	Non-Investment Grade	467	35.82	34.31	31.50	23.46	1.00	100.00
	All	908	39.62	34.75	35.75	24.65	1.00	100.50
Senior Subordinated	Investment Grade	15	38.91	36.36	28.00	27.44	1.00	83.75
	Non-Investment Grade	371	32.79	29.51	28.00	23.98	0.50	107.75
	All	416	32.74	29.55	27.65	23.97	0.50	107.75
Subordinated	Investment Grade	10	37.67	25.29	35.69	32.99	2.00	103.00
	Non-Investment Grade	199	32.19	28.85	28.83	22.45	1.00	112.00
	All	224	32.28	28.57	29.00	22.81	1.00	112.00
Discount	Investment Grade	1	13.63	13.63			13.63	13.63
	Non-Investment Grade	91	28.12	27.97	18.00	25.55	0.42	102.50
	All	123	26.67	26.84	18.00	23.38	0.42	102.50

Source: NYU Default Database

From Figure 20, we observe considerable differences between investment grade and non-investment grade bonds for the two most senior priority classes, but little difference when the bonds are subordinated. Likewise, as seniority is reduced, we observe a reduction in recoveries for the investment grade issues, but not much difference for the non-investment grade securities.

Finally, in Figure 21, we break down recoveries by seniority for different major industrial sectors. The sectors are the same as itemized earlier when we observed the incidence of defaults by industrial sectors (Figure 8 and 9). The overall recovery rates are highest for conglomerates (75.6%), transport (non-auto) (68.9%) and utilities (68.9%) and lowest for communications (27.1%), retailing (28.9%) and healthcare (29.9%) sectors. The remainder varies between 31 and 45%. For a finer breakdown of default recoveries by industrial sectors, see Altman and Kishore (1996)[2].

[2] E.Altman and V.Kishore (1996), "Almost Everything You Wanted To Know About Recoveries on Corporate Bond Defaults", *Financial Analysts Journal*, November/December.

Figure 21. Recovery Rates By Industry and By Seniority (1971 - 2006)

Industry	Seniority	# of Issues	Mean Price ($)	Weighted Price($)	Median Price ($)	STD	Minimum Price ($)	Maximum Price ($)
Auto/Motor Carrier	Senior Secured	10	25.92	24.91	16.00	16.76	12.00	56.25
	Senior Unsecured	36	33.86	43.83	20.98	24.56	6.50	69.69
	Senior Subordinated	15	30.13	22.95	20.00	26.27	3.00	96.00
	Subordinated	2	20.50	18.39	20.50	3.54	18.00	23.00
	Senior Sub +Sub	17	29.00	22.50	20.00	24.79	3.00	96.00
	All	63	31.29	35.59	20.00	23.45	3.00	96.00
Conglomerates	Senior Unsecured	17	75.57	69.72	82.00	15.08	30.00	82.00
	All	17	75.57	69.72	82.00	15.08	30.00	82.00
Energy	Senior Secured	36	64.69	65.88	75.63	32.57	2.00	104.50
	Senior Unsecured	68	44.44	45.78	43.50	20.89	12.00	86.38
	Senior Subordinated	28	39.07	46.98	35.00	24.34	1.00	107.75
	Subordinated	22	25.26	25.04	21.00	12.94	9.50	55.00
	Discount	1	45.26	45.26			45.26	45.26
	Senior Sub +Sub	50	32.99	42.99	29.50	21.13	1.00	107.75
	All	155	45.46	53.02	40.00	26.65	1.00	107.75
Financial Services	Senior Secured	17	37.48	26.67	37.00	26.31	14.00	94.00
	Senior Unsecured	82	46.84	51.90	38.00	30.82	1.00	100.00
	Senior Subordinated	21	38.56	40.22	35.58	24.63	1.00	92.00
	Subordinated	17	24.95	21.23	14.50	28.31	1.00	103.00
	Senior Sub +Sub	38	32.47	33.49	30.00	26.86	1.00	103.00
	All	137	41.69	42.95	35.00	29.76	1.00	103.00
Leisure & Entertainment	Senior Secured	19	56.38	59.66	54.00	27.31	7.00	101.50
	Senior Unsecured	59	45.14	46.64	44.00	19.02	3.75	100.00
	Senior Subordinated	24	33.90	33.78	23.50	27.84	4.00	99.00
	Subordinated	9	33.87	36.00	29.50	10.78	17.50	55.00
	Discount	27	38.26	39.52	36.00	21.71	12.00	85.00
	Senior Sub +Sub	33	33.89	34.13	28.83	24.21	4.00	99.00
	All	138	42.65	44.15	41.00	22.99	3.75	101.50
General Mfg	Senior Secured	26	41.84	45.87	39.00	29.30	2.00	106.75
	Senior Unsecured	55	35.43	32.32	32.63	20.53	7.00	93.50
	Senior Subordinated	71	29.47	28.01	28.00	19.30	0.75	89.30
	Subordinated	23	21.92	18.30	14.00	18.30	2.00	57.00
	Discount	5	18.17	28.61	8.00	27.53	1.22	66.50
	Senior Sub +Sub	94	27.62	25.61	25.50	19.24	0.75	89.30
	All	180	31.80	31.38	28.00	22.12	0.75	106.75
Healthcare	Senior Secured	2	76.75	71.23	76.75	10.25	69.50	84.00
	Senior Unsecured	10	45.28	49.41	56.00	16.48	8.75	56.00
	Senior Subordinated	23	22.14	20.42	9.50	22.89	2.00	80.00
	Subordinated	7	22.54	15.51	18.00	15.61	4.75	39.00
	Discount	2	21.05	27.07	21.05	18.32	8.09	34.00
	Senior Sub +Sub	30	22.23	19.65	10.50	21.16	2.00	80.00
	All	44	29.89	30.74	27.00	23.89	2.00	84.00
Misc Industries	Senior Secured	79	37.06	30.95	35.75	22.24	1.75	97.00
	Senior Unsecured	159	39.82	38.04	37.00	22.77	3.00	99.00
	Senior Subordinated	112	36.06	31.26	29.00	25.67	1.75	106.00
	Subordinated	79	38.53	33.76	35.00	21.12	4.00	90.88
	Discount	15	14.78	10.61	13.48	18.40	0.75	74.06
	Senior Sub +Sub	191	37.08	32.04	31.00	23.87	1.75	106.00
	All	444	37.30	32.92	33.25	23.38	0.75	106.00
Real Estate & Construction	Senior Secured	20	47.86	57.36	51.25	26.36	3.00	106.00
	Senior Unsecured	20	45.60	46.85	30.25	32.09	6.00	100.50
	Senior Subordinated	20	33.71	28.36	19.00	27.96	2.13	95.50
	Subordinated	20	48.31	55.03	32.19	37.68	2.00	112.00
	Discount	2	19.81	25.28	19.81	8.75	13.63	26.00
	Senior Sub +Sub	40	41.01	40.91	25.63	33.58	2.00	112.00
	All	82	43.28	48.90	32.00	31.16	2.00	112.00
Retailing	Senior Secured	17	45.44	43.15	43.50	25.40	2.50	90.00
	Senior Unsecured	119	42.95	45.65	42.75	17.94	3.00	98.50
	Senior Subordinated	67	30.53	27.70	26.00	21.09	0.50	87.90
	Subordinated	36	25.97	24.65	20.00	17.03	3.38	70.00
	Discount	3	31.67	54.74	20.00	27.43	12.00	63.00
	Senior Sub +Sub	103	28.94	26.94	23.00	19.80	0.50	87.90

	All	**242**	**37.02**	**35.95**	**40.00**	**20.57**	**0.50**	**98.50**
Communications	**Senior Secured**	**33**	**31.79**	**27.95**	**20.00**	**28.40**	**1.00**	**93.00**
	Senior Unsecured	**177**	**26.60**	**21.08**	**17.00**	**22.04**	**1.38**	**95.75**
	Senior Subordinated	**25**	**31.19**	**26.60**	**25.00**	**23.00**	**3.00**	**92.00**
	Discount	**67**	**24.55**	**17.59**	**17.34**	**23.37**	**0.42**	**102.50**
	Senior Sub +Sub	**25**	**31.19**	**26.60**	**25.00**	**23.00**	**3.00**	**92.00**
	All	**302**	**27.09**	**21.51**	**18.00**	**23.18**	**0.42**	**102.50**
Transport (non-auto)	**Senior Secured**	**119**	**50.19**	**61.19**	**44.00**	**26.81**	**2.00**	**106.13**
	Senior Unsecured	**75**	**29.77**	**28.16**	**24.00**	**18.81**	**6.00**	**99.00**
	Senior Subordinated	**5**	**41.90**	**16.31**	**45.50**	**30.94**	**10.25**	**83.75**
	Subordinated	**5**	**29.38**	**13.80**	**12.88**	**25.59**	**10.00**	**65.50**
	Senior Sub +Sub	**10**	**35.64**	**15.13**	**29.25**	**27.57**	**10.00**	**83.75**
	All	**204**	**41.97**	**44.65**	**34.00**	**26.02**	**2.00**	**106.13**
Utilities	**Senior Secured**	**24**	**62.44**	**54.18**	**58.44**	**19.37**	**4.63**	**99.88**
	Senior Unsecured	**27**	**78.34**	**65.03**	**84.00**	**18.34**	**28.88**	**98.63**
	Senior Subordinated	**2**	**43.88**	**52.92**	**43.88**	**36.95**	**17.75**	**70.00**
	Subordinated	**2**	**44.00**	**44.00**	**44.00**	**0.00**	**44.00**	**44.00**
	Discount	**1**	**68.00**	**68.00**			**68.00**	**68.00**
	Senior Sub +Sub	**4**	**43.94**	**51.51**	**44.00**	**21.33**	**17.75**	**70.00**
	All	**56**	**68.88**	**59.99**	**78.38**	**21.17**	**4.63**	**99.88**

Source: NYU Default Database

Mortality Rates and Losses

Updated mortality statistics are reported in figures 22-23[3] . This default measurement includes the impact of bond aging by adjusting the base population over time for such disappearances as defaults, calls and other non-credit related events. Results are calculated based on rating at birth and amount of issuance. Similar statistics for cumulative default rates can be found from rating agency compilations, only the base is usually number of issuers and not from birth. These agency-calculated cumulative default rates are based on the number of issuers as of the beginning of same year in a certain rating category, regardless of when they were issued. Hence, they are not impacted by aging and the statistics are more appropriate for seasoned portfolios. Of late, Moody's has recognized the aging factor and they now produce a version of our mortality rates (Moody's, 2006)[4].

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[3] See E. Altman and E.Hotchkiss (2005) , " *Corporate Financial Distress and Bankruptcy, 3rd edition*, John Wiley and Sons for details on the mortality rate.

[4] D. Hamilton and R. Cantor (2006), "Measuring Corporate Default Rates", Special Comment, *Moody's* (NY), November.

Figure 22. Mortality Rates By Original Rating – All Rated Corporate Bonds (a) (1971 - 2006)

Years after issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Marginal	0.00%	0.00%	0.00%	0.00%	0.05%	0.03%	0.01%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.05%	0.08%	0.09%	0.09%	0.09%	0.09%
AA	Marginal	0.00%	0.00%	0.30%	0.14%	0.02%	0.02%	0.00%	0.00%	0.05%	0.01%
	Cumulative	0.00%	0.00%	0.30%	0.44%	0.46%	0.48%	0.48%	0.48%	0.53%	0.54%
A	Marginal	0.01%	0.08%	0.02%	0.06%	0.06%	0.09%	0.05%	0.20%	0.09%	0.05%
	Cumulative	0.01%	0.09%	0.11%	0.17%	0.23%	0.32%	0.37%	0.57%	0.66%	0.71%
BBB	Marginal	0.33%	3.13%	1.34%	1.24%	0.74%	0.31%	0.25%	0.19%	0.14%	0.40%
	Cumulative	0.33%	3.45%	4.74%	5.92%	6.62%	7.10%	7.33%	7.51%	7.63%	8.00%
BB	Marginal	1.15%	2.42%	4.32%	2.26%	2.53%	1.27%	1.61%	1.11%	1.71%	3.47%
	Cumulative	1.15%	3.54%	7.72%	9.88%	12.10%	13.20%	14.60%	15.56%	17.00%	19.88%
B	Marginal	2.84%	6.78%	7.35%	8.49%	6.01%	4.32%	3.95%	2.40%	1.96%	0.83%
	Cumulative	2.84%	9.43%	16.08%	23.21%	27.82%	30.94%	35.67%	35.26%	36.53%	37.06%
CCC	Marginal	8.12%	15.42%	18.75%	11.76%	4.14%	9.33%	5.79%	5.70%	0.85%	4.70%
	Cumulative	8.12%	22.30%	36.86%	44.30%	46.60%	51.57%	54.38%	56.98%	57.34%	59.36%

(a) Rated by S&P at issuance based on 1,955 issues

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

Figure 23. Mortality Losses By Original Rating – All Rated Corporate Bonds (a) (1971 - 2006)

Years after issuance

		1	2	3	4	5	6	7	8	9	10
AAA	Marginal	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.00%	0.00%	0.00%
	Cumulative	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.03%	0.03%	0.03%	0.03%
AA	Marginal	0.00%	0.00%	0.05%	0.04%	0.01%	0.01%	0.00%	0.00%	0.02%	0.00%
	Cumulative	0.00%	0.00%	0.05%	0.09%	0.10%	0.11%	0.11%	0.11%	0.13%	0.14%
A	Marginal	0.00%	0.03%	0.01%	0.04%	0.03%	0.04%	0.02%	0.03%	0.06%	0.00%
	Cumulative	0.00%	0.03%	0.04%	0.08%	0.11%	0.15%	0.17%	0.20%	0.26%	0.26%
BBB	Marginal	0.23%	2.19%	1.06%	0.45%	0.44%	0.21%	0.10%	0.11%	0.07%	0.23%
	Cumulative	0.23%	2.41%	3.45%	3.88%	4.31%	4.54%	4.63%	4.74%	4.80%	5.02%
BB	Marginal	0.67%	1.41%	2.50%	1.27%	1.47%	0.65%	0.90%	0.48%	0.85%	1.25%
	Cumulative	0.67%	2.07%	4.52%	5.73%	7.12%	7.72%	8.55%	8.99%	9.76%	10.89%
B	Marginal	1.83%	4.74%	4.92%	5.49%	3.90%	2.37%	2.56%	1.34%	1.03%	0.61%
	Cumulative	1.83%	6.48%	11.08%	15.97%	18.37%	19.24%	21.31%	22.36%	23.16%	23.63%
CCC	Marginal	5.44%	11.10%	13.50%	8.46%	2.90%	7.00%	4.34%	4.41%	0.51%	3.01%
	Cumulative	5.44%	15.94%	27.38%	33.44%	35.37%	39.89%	42.50%	45.04%	45.32%	46.96%

(a) Rated by S&P at issuance based on 1,777 issues

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

As expected, due to the relatively low default rates in 2006 and the relative "longer-to-default" recent experience, mortality statistics are generally lower than as of year-end 2005. For example, the one- and five-year B rated category had cumulative rates of 2.84% and 27.82% through 2006 vs. 2.87% and 27.95% through 2005. This reduction in rates is relatively small since the 2006 contribution is small compared to the entire time series going back to 1971. We will utilize our mortality rate statistics in our default rate forecasts found at the end of this report.

Mortality losses in Figure 23 indicate a similar story to that of our mortality rate statistics. Most are lower than at the end of 2005.

Returns and Spreads

Figure 24 shows the above-average absolute return performance of high yield bonds in 2006 and the excellent relative performance compared to ten-year US Treasuries. The absolute return on Citigroup's High-Yield Bond Market Index registered an 11.85% return compared to the 11.07% historical average of the period 1978-2006. The excess return in 2006 vs. ten-year Treasuries was an impressive 10.47%. This is the fifth largest in our 29 year time series and greater than most analysts had expected. Note that the historical average excess of high yield vs. Treasury returns is now 2.56%, up 28 bp over the average annual excess calculated one year earlier (2.28%). One can also observe that in the 29 years of our calculations during the so-called modern era of high yield bonds since 1978, there were only five years of negative absolute returns compared to six for Treasuries.

The spread between the yield-to-maturity of high-yield bonds vs. ten-year Treasuries dropped considerably in 2006 to just 3.11% by year-end 2006 – 94 bp lower than one year earlier. In this one year period, yields dropped by 62 bp on high-yield bonds, while the US Treasuries' yield increased by 31 bp. The 311 bp spread is the lowest in 22 years when it was 310 bp in 1984. Since spreads imply risk tolerance on the part of investors, it appears that high-yield investors perceive the market to be quite benign with respect to both liquidity and default risk. This spread continued to drop in January, 2007 to 295 bp.

In terms of the history of the high-yield market, one can observe that the differences between the average historical yield spread (4.80%) and the average annual loss rate from defaults (2.34% from Figure 14) is 2.46%. In other words, investors have required a spread of 246 bp between the yield that they were promised and the expected average annual loss from defaults. Not by coincidence, we believe, the actual realized average annual *excess return* has been very close (256 bp).

Figure24. Annual Returns, Yields And Spreads on Ten-Year Treasury (Treas) and High Yield (HY) Bonds,[a] 1978–2006

	Return (%)			Yield to Maturity (%)		
Year	HY	Treas	Excess Returns	HY	Treas	Spread
2006	11.85	1.37	10.47	7.82	4.70	3.11
2005	2.08	2.04	0.04	8.44	4.39	4.05
2004	10.79	4.87	5.92	7.35	4.21	3.14
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						
1978–2006	11.07	8.51	2.56	12.17	7.36	4.80
Standard Deviation	12.13	11.64	12.00	2.97	2.63	2.01
Compound Annual Average						
1978–2006	10.46	7.94	2.51			

[a] Year-end yields.

Source: Citigroup's High Yield Composite Index and author's compilations.

New Issues and other changes in the High Yield market

New high-yield bond issuance in 2006 increased by 47.5% from last year's level and approached the record set in 2004. There were $144.0 billion of new high-yield issues in the United States with about $61 billion in the fourth quarter and the total was just about $3 billion shy of the previous record. There was $97.6 billion in all of 2005. A relatively large number of highly leveraged transactions, reminiscent of the 1980's, helped fuel this impressive growth. If you include other changes in the market (see Figure 25), the size of the high-yield bond market increased slightly, by $15 billion, to $1.05 trillion.

The static growth in the market, despite almost new record issuance, was due to the enormous amount of repurchases ($67 billion) and maturities ($39 billion). The low interest rate environment continued to motivate repurchases.

Figure25. Market Changes in 2006 and Size of the High-Yield Bond Market (in $ billion)

Size of Market (as of December, 2005)	$	1,039.0
New Issues	$	144.0
Fallen Angels	$	27.6
Rising Stars	$	(24.8)
Defaults	$	(7.6)
Call Redemptions	$	(24.5)
Repurchases	$	(68.6)
Exchange Offers[(a)]	$	7.7
Maturities	$	(39.1)
S.F., PIK Adj.	$	0.2
Size of Market (as of December, 2006)	$	1,053.9

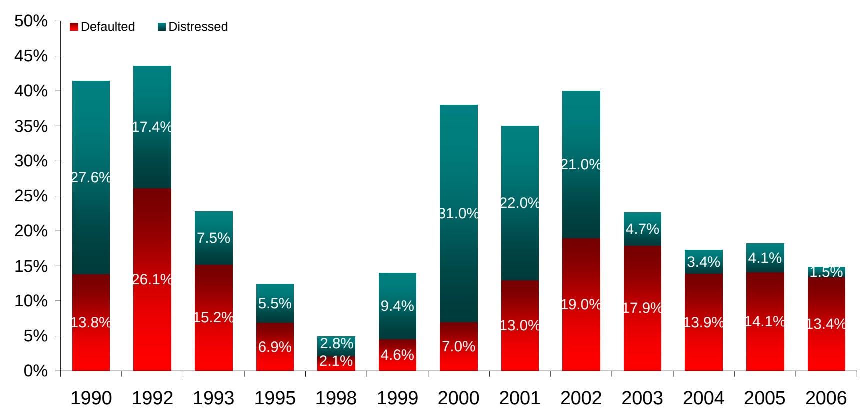
(a) Includes Tenders, Reorganizations, Distressed Exchanges

Sources: Citigroup summary statistics and NYU Salomon Center database.

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 14.9 % of the total of these two markets as of December 31, 2006, considerably below last year's level of 18.2% and the lowest total since 1999 (see Figure 26). The distressed segment (bonds selling at 10% above the risk –free rate) dropped to its lowest level in history to 1.5%, from when we first started following this proportion in 1990. The defaulted segment also decreased to 13.4% from last year's 14.1%.

Figure 26. Distressed[a] and Defaulted Debt As a Percentage of Total High Yield Plus Defaulted Debt Market [b], 1990–2006[c]



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

[b] $1218.4 billion as of 12/31/2006

c Some years not available as no survey results available.
Source: NYU Salomon Center.

No doubt the unusual liquidity provided by non traditional (e.g. hedge funds and CBOs), as well as traditional, high-yield bond market participants lowered the required yield, especially on the more highly distressed firms' securities. Indeed, distressed hedge-funds now own more than 25% of the high-yield market's supply as they look to supplement their more traditional defaulted debt purchases. And, new issues rated CCC to CCC- were at an all time high ($20.1 billion).

The defaulted bond amount total is derived by adding new defaults in 2006. ($7.6 billion), subtracting those bonds from companies emerging from Chapter 11 on other restructurings ($14.9 billion – see Appendix E) and adding those bonds in default at the start of the year ($163.5 billion). The net amount of defaulted bonds outstanding is therefore $156.2 billion as of December 31, 2006, about $7 billion less than last year.

Figure 27. Estimated Face and Market Values of Defaulted and Distressed Debt, 2004–2006 (Dollars in Billions)

	Face Value ($)			Market Value ($)			
	31 Dec 04	31 Dec 05	31 Dec 06	31 Dec 04	31 Dec 05	30 Dec 06	Market/Face Ratio
Public Debt							
Defaulted	152.0	163.5	156.2[a]	76.0	89.9	101.5	0.65
Distressed	36.6	49.3	17.9[b]	23.8	34.5	13.4	0.75
Total Public	**188.6**	**212.8**	**174.1**	**99.8**	**124.5**	**115.0**	
Private Debt							
Defaulted	334.4	359.8	406.1[c]	234.1	287.8	365.5[c]	0.90
Distressed	80.6	108.5	46.6[c]	68.5	97.6	44.3[c]	0.95
Total Private	**415.0**	**468.2**	**452.7**	**302.6**	**385.4**	**409.7**	
Total Public and Private	**603.6**	**681.1**	**626.8**	**402.4**	**509.9**	**524.7**	

[a] Calculated using: (2005 defaulted population) + (2006 defaults) - (2006 Emergences). [b] Based on 1.7% of size of high yield market ($1,053.9 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 defauled 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 27 shows our estimates of the amounts of public and private, defaulted and distressed debt outstanding. As discussed above, the public defaulted bonds totaled $156.2 billion and public distressed were down considerably to $17.9 billion from $49.3 billion one year earlier. The distressed amount is just 1.7% of the total high-yield market. This proportion is very low historically and down from an already low 4.75% last year.

In our most recent reports, we had been using a private/public debt ratio of 2.2 to determine the private defaulted and distressed debt amounts. Periodically, we review this ratio and update this estimate by analyzing a recent large sample of bankrupt and defaulted firms' balance sheets. In this case, we examined a total of 106 corporate bankruptcies or firms which defaulted but did not go bankrupt over the period 2004 - 2006. Two-thirds of these firms had both public and private debt, while the balance only had private debt. The resulting private/public debt ratio was 2.6, about 0.4 greater than our previous estimates.

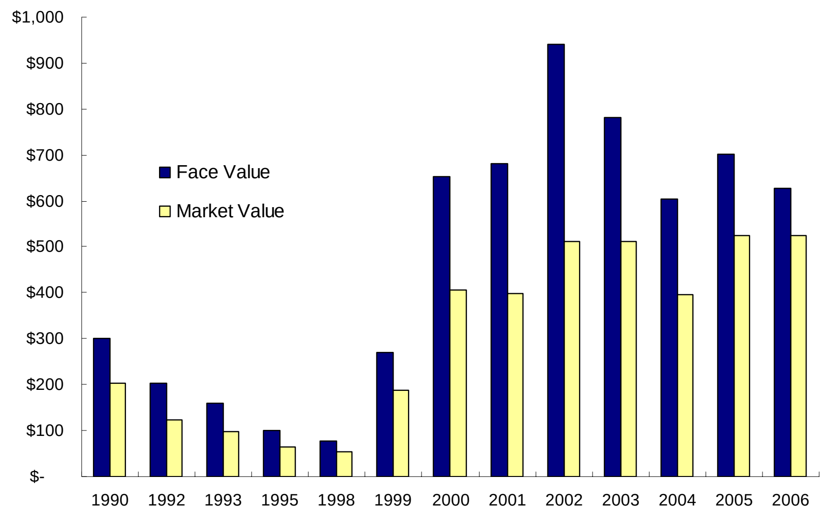
Applying the new private/public debt ratio to our public defaulted and distressed totals yielded our private debt estimates. So, as of December 31, 2006, we show in Figure 27 our estimate of a total defaulted and distressed population of $626.8 billion, down by $54.3 billion from last year but above 2004's total face value. All of these recent totals are considerably below the 2002 estimate (the historic high).

The market value estimates are based on our slightly revised-upward "haircuts" from face values. For example, we now use a 65% ratio for public defaulted bonds and a

75% for public distressed bonds. The former is based on our recent observation of the average price of defaulted bonds comprising the Altman – NYU Solomon Center Index of Defaulted Bonds. We also use our Index as a guide for the 90% ratio for private defaulted loans. Applying these ratios, we conclude that the combined public and private, defaulted and distressed market value amounts were $524.7 billion as of December 31, 2006, an increase of about $15 billion from the prior year (Figure 27).

Figure 28 shows the latest totals for the combined defaulted and distressed face and market values, as well as a time series of most, but not all, of the years since 1990. It is of interest to note that the estimated market value of these markets today is actually somewhat higher than it was in 2002 when the face value was 30% greater than today due to higher pricing and higher "haircuts".

Figure 28. Size of the Defaulted and Distressed Debt Market, 1990–2006 (Dollars in Billions)



Source: Authors' compilations.

This is due to the incredible demand for and the resulting positive performance of distressed and defaulted debt over this four-year period. During this period, the average market/face value ratio of defaulted bonds increased from 17% to 75% and defaulted loans from 46% to about 90%.

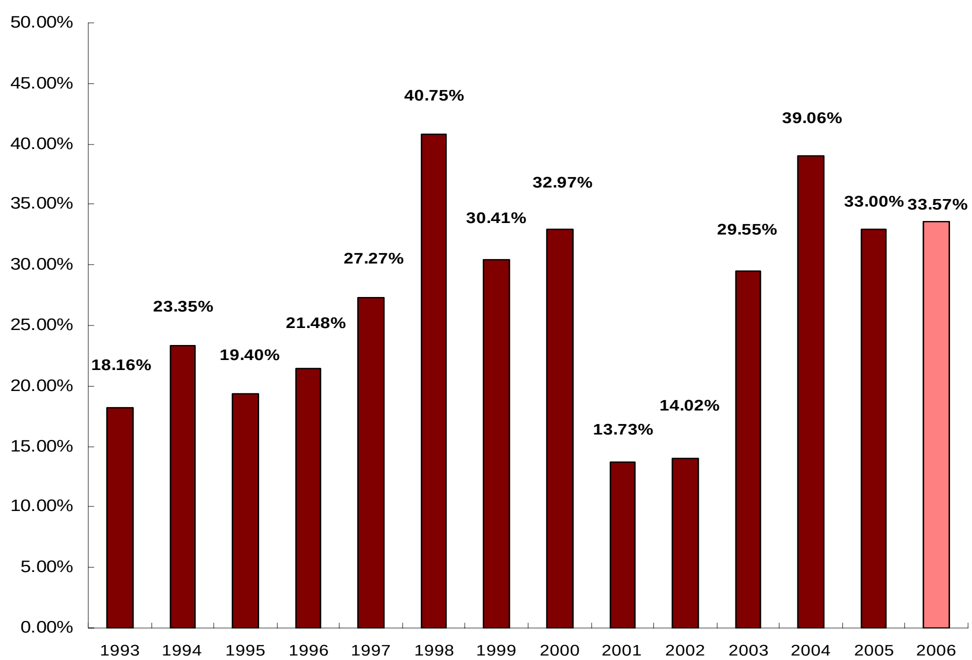
We expect the market size of distressed and defaulted bonds to increase in the next two years as both the distressed ratio (now at its all time low) and default rate (see next section) increase.

Our Forecast

We have discussed in our past reports and in a working paper (eg: E.Altman, “Are Historically Based Default and Recovery Models Still Relevant in Today’s Credit Environment “, NYU Salomon Center Report, November 2006) why we believe today’s default rates are so low and recoveries above average. Using our mortality rate estimates and the past new issuance rating amounts, we expect defaults to increase in both 2007 and 2008 and the default rate to reach 2.5 in 2007 and 3.7% in 2008. While still below the historic average, these rates imply about $27.5 billion of defaults in 2007 and $44.4 billion in 2008.

Implicit in the mortality rate forecast is the rating distribution of new issues. Figure 29 shows the proportion of new issue amounts rated B- or below (including non-rated issues). Note that this proportion has been relatively high in recent years. Indeed, the CCC rating proportion exceeded 14% (over $20 billion) in 2006. In terms of the number of issues, the B- or lower proportion was about 42% in each of the last three years.

Figure 29. Percentage of New High-Yield Issues Rated B- or Below Based on Amount of Issuance



Source: From Standard & Poor’s statistics.

Appendix A

Figure 30. Quarterly Default Rate Comparison — Altman/SC and Moody's, High Yield Debt Market, 1990–2006 (Dollars in Billions)

Quarter		Par Value Debt Outstanding ($)	Debt Defaulted By Quarter ($)	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	5.67	3.13	10.14	9.74
			18.35			
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	2.36	1.29	10.31	10.42
			18.86			
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	0.59	0.39	3.40	5.16
			5.55			
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	0.52	0.27	1.10	3.84
			2.29			
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	2.18	0.93	1.45	2.07
			3.42			
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	1.72	0.72	1.90	3.65
			4.55			
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	1.59	0.59	1.23	1.93
			3.34			
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	0.27	0.08	1.25	2.17
			4.20			
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	2.26	0.47	1.60	3.81
			7.46			
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	5.11	0.88	4.15	5.77
			23.53			

Figure 30. Quarterly Default Rate Comparison — Altman/SC and Moody's, High Yield Debt Market, 1990–2006 (Dollars in Billions) (Continued)

Quarter		Par Value Debt Outstanding ($)	Debt Defaulted By Quarter ($)	Quarterly Default Rates (%)	Altman/NYU-SC 12M Moving Average (%)	Moody's 12M Issuer Based Moving Average (%)
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	9.95	1.64	5.07	5.65
			30.29			
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	18.07	2.79	9.80	11.11
			63.61			
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	13.77	1.82	12.79	7.33
			96.86			
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	3.04	0.36	4.66	5.39
			38.45			
2004	1Q	886.00	3.07	0.35	3.96	4.40
	2Q	919.60	1.75	0.19	2.38	3.76
	3Q	933.10	3.80	0.41	1.27	2.73
	4Q	948.50	3.04	0.32	1.25	2.70
			11.66			
2005	1Q	939.30	1.68	0.18	1.08	2.40
	2Q	952.00	1.87	0.20	1.11	2.10
	3Q	1,073.00	20.71	1.93	2.87	2.37
	4Q	1066.10	11.95	1.12	3.37	2.20
			36.21			
2006	1Q	1039.00	3.39	0.33	3.56	2.26
	2Q	1022.35	0.96	0.09	3.47	2.36
	3Q	993.60	1.47	0.15	1.71	1.92
	4Q	970.40	1.74	0.18	0.76	1.82
			7.56			

Sources: Altman (1990–2006), Citigroup, and Moody's.

Appendix B

Figure 31. Defaulted Corporate Straight Debt Issues — 2006 (Dollars in Millions)

Company	Bond Issue	Coupon (%)	Maturity Date	Outstanding Amount ($)	Default Date
AMTROL Inc.	Senior Subordinated	10.625	12/31/2006	115.00	12/18/2006
Anvil Knitwear	Senior Unsecured	10.875	3/15/2007	130.00	10/2/2006
Atlantic Mutual Insurance	Subordinated	8.150	2/15/2028	100.00	8/15/2006
Autocam Corporation	Senior Subordinated	10.875	6/15/2014	140.00	12/15/2006
Carmike Cinemas	Senior Subordinated	7.500	2/15/2014	150.00	6/6/2006
Charter Communications Holdings(b)	Senior Unsecured	8.625	4/1/2009	104.66	9/12/2006
Charter Communications Holdings(b)	Senior Secured	10.000	4/1/2009	49.33	9/12/2006
Charter Communications Holdings(b)	Senior Unsecured	10.750	10/1/2009	60.14	9/12/2006
Charter Communications Holdings(b)	Senior Unsecured	9.625	11/15/2009	55.22	9/12/2006
Charter Communications Holdings(b)	Senior Unsecured	10.250	1/15/2010	16.58	9/12/2006
Charter Communications Holdings(b)	Discount	11.750	1/15/2010	21.97	9/12/2006
Charter Communications Holdings(b)	Senior Unsecured	11.125	1/15/2011	164.75	9/12/2006
Charter Communications Holdings(b)	Discount	9.920	4/1/2011	134.57	9/12/2006
Charter Communications Holdings(b)	Senior Unsecured	10.000	5/15/2011	65.29	9/12/2006
Charter Communications Holdings(b)	Discount	11.750	5/15/2011	64.42	9/12/2006
Charter Communications Holdings(b)	Discount	13.500	1/15/2011	32.51	9/12/2006
Charter Communications Holdings(b)	Discount	12.125	1/15/2012	21.85	9/12/2006
Dana Corp.	Senior Unsecured	7.000	3/1/2029	400.00	3/3/2006
Dana Corp.	Senior Unsecured	7.000	3/15/2028	200.00	3/3/2006
Dana Corp.	Senior Unsecured	5.850	1/15/2015	450.00	3/3/2006
Dana Corp.	Senior Unsecured	9.000	8/15/2011	115.63	3/3/2006
Dana Corp.	Senior Unsecured	10.125	3/15/2010	74.75	3/3/2006
Dana Corp.	Senior Unsecured	6.500	3/1/2009	350.00	3/3/2006
Dana Corp.	Senior Unsecured	6.500	3/15/2008	150.00	3/3/2006
Delta Mills	Senior Unsecured	9.625	9/1/2007	31.90	4/17/2006
Dura Automotive	Senior Unsecured	9.000	5/1/2009	409.12	10/15/2006
Dura Automotive	Senior Subordinated	9.000	5/1/2009	2.35	10/15/2006
Dura Automotive	Senior Unsecured	8.625	4/15/2012	400.00	10/15/2006
G&G Retail	Senior Unsecured	11.000	5/15/2006	107.00	1/25/2006
Granite Broadcasting(a)	Senior Secured	9.750	12/1/2010	405.00	6/2/2006
Home Products International Inc.	Senior Subordinated	9.625	5/15/2008	125.00	11/15/2006
Inland Fiber group	Senior Unsecured	9.625	11/15/2007	225.00	8/18/2006
Le-Natures Inc	Senior Subordinated	9.000	6/15/2013	150.00	11/1/2006
Level 3 Communications(b)	Senior Unsecured	9.125	5/1/2008	705.00	1/13/2006
Level 3 Communications(b)	Senior Unsecured	11.000	3/15/2008	0.00	1/13/2006
Level 3 Communications(b)	Discount	10.500	12/1/2008	0.00	1/13/2006
PCA	Senior Unsecured	11.875	8/1/2009	165.00	6/22/2006
PCA	Senior Secured	14.000	6/1/2009	50.00	6/22/2006
PCA	Senior Subordinated	13.750	6/27/2010	10.00	6/22/2006
Pliant Corp.	Senior Subordinated	13.000	6/1/2010	220.00	1/5/2006
Pliant Corp.	Senior Unsecured	13.000	6/1/2010	100.00	1/5/2006
Pliant Corp.	Senior Secured	11.125	9/1/2009	250.00	1/5/2006
Pliant Corp.	Senior Secured	11.625	6/15/2009	268.50	1/5/2006
Pliant Corp.	Senior Secured	11.125	6/15/2009	7.80	1/5/2006
Premier Entertainment Biloxi	Senior Secured	10.750	2/1/2012	160.00	9/20/2006
Radnor Holdings	Senior Unsecured	11.000	3/15/2010	135.00	8/21/2006
Sea Containers	Senior Unsecured	7.875	2/15/2008	149.75	10/15/2006
Sea Containers	Senior Unsecured	12.500	12/1/2009	19.10	10/15/2006
Sea Containers	Senior Secured	10.500	5/15/2012	103.00	10/15/2006
Silicon Graphics	Senior Secured	11.750	6/1/2009	2.40	5/8/2006
Vesta Insurance	Senior Unsecured	8.750	7/15/2025	56.00	7/15/2006
Werner Holding	Senior Subordinated	10.000	11/15/2007	135.00	5/16/2006
Total				**7,558.6**	
Total Number of Issues				**52**	
Total Number of Companies				**23**	

(a) Cured after 30 day grace period, (b) Defaulted with different outstanding amounts than in 2005. Only 9.125% had smaller amount outstanding
Source: Authors' compilations.

Appendix C

Figure 32. Chapter 11 Filings in 2006 — List by Liability Size, Liabilities Greater Than $100 Million (Dollars in Millions)

	Date of Filing	$ (million)
Dana Corp.	Mar-06	6,820
Dura Automotive Systems, Inc.	Oct-06	1,863
Vesta Insurance	Jul-06	1,810
Sea Containers Ltd.	Oct-06	1,724
Pliant Corp.	Jan-06	1,456
Granite Broadcasting Corporation	Dec-06	866
Le-Natures Inc	Nov-06	750
Satelites Mexicanos, S.A. de C.V.	Aug-06	747
J.L. French Automotive Castings	Feb-06	726
Silicon Graphics	May-06	651
Blue Bird[a]	Jan-06	498
Werner Holding	Jun-06	482
Magnolia Energy[a]	Sep-06	479
Radnor Holdings Corp	Aug-06	435
ABB Lummus[a]	Apr-06	414
Complete Retreats	Jul-06	411
Integrated Electrical Services	Feb-06	386
Oneida Ltd.	Mar-06	335
Curative Health Services	Mar-06	264
Inland Fiber group	Aug-06	253
Anvil Knitwear	Oct-06	231
AMTROL	Dec-06	222
Global Power Equipment	Sep-06	215
OCA Inc.	Mar-06	211
Home Products International, Inc.	Dec-06	180
Riverstone Networks	Feb-06	174
Premier Entertainment	Sep-06	162
PCA	Aug-06	161
G+G Retail	Jan-06	160
Easy Gardener Products	Apr-06	120
Total		23,207

[a] Private Companies, liability estimate based on total assets.

Source: NYU Salomon Center database.

Appendix D

Figure 33. Defaults by Industry — 2006

Company	Industry
AMTROL Inc.	Pressure Control Products
Anvil Knitwear	Activewear Products (Apparel)
Atlantic Mutual Insurance	Property and Casualty Insurance
Autocam Corporation	Automotive Parts
Carmike Cinemas	Entertainment
Charter Communications Holdings	Cable
Dana Corp.	Automotive Parts
Delta Mills	Miscellaneous Manufacturer
Dura Automotive	Automotive Parts
G&G Retail	Retail
Granite Broadcasting	Entertainment
Home Products International Inc.	Consumer Houseware Products
Inland Fiber Group	Forest Products
Le-Natures Inc	Beverage Producst
Level 3 Communications	Communications
PCA	Retail Potrait Studios
Pliant Corp.	Containers- Paper/Plastic
Premier Entertainment Biloxi	Casinos and Gaming
Radnor Holdings Corp	Packaging & Specialty Chemical Products
Sea Containers	Freight Transport
Silicon Graphics	Diversified Computer Systems
Vesta Insurance	Property and Casualty Insurance
Werner Holding	Aluminium Products

Source: Authors' compilations.

Appendix E

Figure 34. 2006 Emergences From Default (US Dollars in Millions)

First Quarter	Restructured Bonds ($)
aaiPharma, Inc.	175
ATA Holdings	291
Stelco Inc.	207
UAL Corporation	3,590
Healthsouth	2,573
Total 1st Quarter	6,836
Second Quarter	
WCI Steel	420
O'Sullivan Industries	200
Integrated Electrical Services	200
Romacorp	57
Anchor Glass Container	850
Curative Health Services	185
USG Corporation	1,816
Boyd's Collection	34
JL French Automotive Castings Inc.	28
Pliant Corp.	846
EaglePicher Holdings, Inc. (2005)	250
Total 2nd Quarter	*4,886*
Third Quarter	
High Voltage Engineering Corp.	155
Silicon Graphics	2
Owens Corning	400
Total 3rd Quarter	*557*
Fourth Quarter	
Geneva Steel Holdings Corp. (2002)	190
Winn-Dixie Stores, Inc.	174
Inland Fiber Group, LLC	225
President Casinos, Inc.	100
Refco Inc.	390
Vesta Insurance	56
Total 4th Quarter	**1,135**
Total	**13,414**

Sources: New Generation Research and NYU Salomon Center Defaulted Bonds Database.