Review

Revisiting the High-Yield Bond Market

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■ The yields on various fixed-income securities are determined by the market's assessment of three major risks in holding a given issue: (*i*) its sensitivity to changes in interest rates, (*ii*) its illiquidity, and (*iii*) its probability of default. Such yields are set by the market to provide investors with realized total returns that increase with the level of each of these three risks.

The most risky debt securities, at least in terms of illiquidity and default risk, are lower-rated corporate bonds — better known as "junk" bonds. Junk bonds are issued by three types of issuers. About 25% of the market is comprised of "fallen angels" — securities originally issued as investment-grade bonds that have seen their credit profile deteriorate and their bond rating reduced to categories below BBB (or Baa). Corporate bonds originally issued with below-investment-grade ratings for "normal business purposes" make up about another 25% of the market. The remaining 50% — and the principal cause of the fierce controversy over junk bonds — consist of high-yield (mainly B-rated) bonds issued to finance large corporate restructurings, particularly in the period 1986-1989. This paper revisits the high-yield junk bond market after over a decade of recent dynamic, controversial and important activity, both to investors and corporate issuers.

Overview of Recent Market Dynamics

When I wrote one of the early versions of the high-yield debt market's "anatomy" study (Altman [1]),[1] this low-grade debt sector had grown from a relatively insignificant $7 billion total in the early and mid-1970s to a dynamic, continuously increasing force in corporate finance of about $125 billion outstanding, as of the beginning of 1987. The outlook was extremely bullish, as the normal investment needs of corporations for growth and refinancing that fueled the earlier new issue market growth continued, and was complemented by the enormous increase in highly leveraged restructuring, e.g., LBOs. Indeed, in the succeeding three years, the size of the high-yield debt market grew to about $190 billion in 1989 and if you include defaulted debt, to well over $200 billion (see Exhibit 1). Over the next two years, however, the market suffered considerable shocks and its very survival was questioned.

By the end of 1991, the size of the high-yield debt market had survived and indeed had grown to almost $209 billion. New issues totalled $10.5 billion in the first four

[1] References and a more complete bibliography are combined.

Exhibit 1. New Nonconvertible Domestic Debt Issues and Size of Market 1978-1991 ($ Millions)

	Total Par Value New Public Straight Debt Issues		Total Par Value New High-Yield Debt Issues		% of New Issue	Total High-Yield Debt	High-Yield Debt to Total
Year	Amount	Number	Amount	Number	Dollars	Outstanding*	Corporate Debt
1978	22,416	287	1,493	52	6.7	9,401	4%
1979	25,678	277	1,307	45	5.1	10,675	4
1980	37,272	398	1,442	43	3.9	15,126	6
1981	41,651	357	1,648	32	4.0	17,362	7
1982	47,798	513	2,798	48	5.9	18,536	7
1983	46,903	511	7,417	86	15.8	28,233	9
1984	99,416	721	14,952	124	15.0	41,700	12
1985	101,098	1,212	14,670	188	14.5	59,078	14
1986	155,672	1,041	34,177	234	22.0	92,985	19
1987	126,541	1,324	30,680	176	24.2	136,952	24
1988	113,840	673	26,380	151	23.2	159,223	26
1989	152,145	859	27,661	167	18.2	201,000	26
1990	92,105	627	1,297	9	1.4	210,000	26
1991	$156,663	1,367	$9,901	42	6.3	$209,400	25
Total	$1,219,198	10,167	$175,823	1,397	14.4	—	—

Note: *Includes defaulted issues.

months of 1992 and the second quarters' new issues ($12.5 billion) broke the record for a single quarter, as the market continued to rebound from its 1989-1990 doldrums. The size of the market actually *fell* dramatically, however, in early 1992 as firms redeemed or recapitalized their debt in substantial amounts. By March 31, 1992, this market, including over $30 billion in defaults, had shrunk to about $190 billion!

With respect to returns to investors, junk bonds outpaced all other fixed income markets with the compound average annual return from 1978-1988 totaling 12.1% per year. Although the market's size continued to increase in 1989 — at least during the first half of the year — the annual return spread over U.S. Treasurys from 1978-1989 dropped considerably to just under one percent per year. (See Exhibits 2 and 3 for a matrix of total returns per year and return spreads over U.S. Treasury bonds measured on a compound average annual return basis over the period 1978-1991.) By the end of 1989, for the first time a different category of corporate debt (BBB-rated bonds) supplanted junk bonds as the highest return sector for the decade of the 1980s (Altman [8]).

The seeds of real problems in the junk bond market were present in the last six months of 1989, as a few large defaults and unsuccessful restructurings took place, e.g., Campeau's default and United Airlines' unsuccessful LBO attempt. The total dollar amount of defaults in 1989 reached a record $8.1 billion. Indeed, defaults from many ill-fated, poorly structured leveraged restructurings grew dramatically in 1990 and reached the astounding level of over $18 billion and a default rate, measured by the traditional method, of over 8.7%. The rate was actually as much as 10% of the market if one does not include defaults in the population base (see the discussion below on the controversies surrounding default rate measurement).

The junk bond market was in disarray in 1990 as defaults mounted, the market's leading underwriter and trader of securities, Drexel Burnham Lambert, went bankrupt, and S&Ls were barred from buying new bonds and forced to liquidate. Returns to investors in 1990 were negative for the first time (-4.4%) since a small negative year a decade earlier, and spreads vs. U.S. Treasurys were -14.4%. Indeed, the compound average annual return spread from 1978-1990 fell to slightly below zero (-0.04% or -4 basis points per year).

For a compilation of the compound average annual total return for various holding periods from 1978-1991, see Exhibit 2. For the spread over ten-year U.S. Treasury bonds for that same period, see Exhibit 3. Note the *average annual return spread* was 1.06% for the entire period.

New high-yield bond issues all but disappeared in 1990 (Exhibit 1) and there was considerable concern about the very survival of the market as the year 1991 commenced. Most analysts and knowledgeable commentators expected continued high default rates. With additional pressure exerted by liquidity concerns, the market's average yield spread over ten-year U.S. Treasury bonds reached the rarefied level of about 1,200 basis points (12%).[2]

[2]The Merrill Lynch High Yield 175 Index of the most actively traded securities had a yield spread of about 1,200 basis points in October 1990 and over 1,200 in December. Fridson [26] has commented on the fact that the "average" is not very meaningful since the distribution around the average is enormous. Still, prices were at extremely low levels for a large number of securities that comprised the index.

Exhibit 2. Compound Average Annual Returns of High-Yield Bonds for Various Holding Periods, 1978-1991

Base Period (Jan. 1)	Terminal Period (December 31)													
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
1978	7.57	5.61	3.36	4.39	9.48	11.45	11.02	12.40	12.80	11.96	12.10	11.18	9.90	11.50
1979		3.69	1.32	3.36	9.97	12.24	11.61	13.10	13.47	12.46	12.56	11.52	10.10	11.81
1980			(1.00)	3.19	12.14	14.48	13.26	14.75	14.94	13.61	13.59	12.33	10.70	12.52
1981				7.56	19.36	20.17	17.14	18.19	17.84	15.86	15.56	13.92	11.95	13.84
1982					32.45	27.01	20.52	21.01	20.01	17.31	16.75	14.74	12.44	14.48
1983						21.80	14.96	17.42	17.09	14.49	14.32	12.41	10.17	12.64
1984							8.50	15.29	15.56	12.73	12.88	10.92	8.60	11.55
1985								22.51	19.26	14.18	14.00	11.41	8.61	11.99
1986									16.09	10.23	11.30	8.80	6.03	10.33
1987										4.67	8.98	6.47	3.65	9.21
1988											13.47	7.38	3.32	10.37
1989												1.62	(1.42)	9.36
1990													(4.36)	13.45
1991														34.58

Source: Merrill Lynch High Yield Master Index and author's compilation.

Exhibit 3. Compound Annual Return Spreads Between High-Yield and Long-Term Government Bonds for Various Holding Periods, 1978-1991

Base Period (Jan. 1)	Terminal Period (December 31)													
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
1978	8.68	6.60	5.01	5.51	3.17	5.82	4.13	2.70	1.59	2.22	2.41	0.98	(0.04)	1.06
1979		4.55	3.23	4.48	1.71	5.22	3.32	1.77	0.62	1.44	1.73	0.23	(0.82)	0.43
1980			1.96	4.45	0.67	5.39	3.05	1.24	(0.02)	1.01	1.38	(0.25)	(1.35)	0.05
1981				7.08	(0.13)	6.74	3.36	1.07	(0.42)	0.85	1.29	(0.54)	(1.73)	(0.16)
1982					(9.63)	6.49	1.93	(0.69)	(2.16)	(0.33)	0.36	(1.60)	(2.80)	(0.96)
1983						19.57	6.62	1.84	(0.56)	1.22	1.74	(0.65)	(2.11)	(0.16)
1984							(6.32)	(7.60)	(7.73)	(3.48)	(1.89)	(4.06)	(5.19)	(2.65)
1985								(9.03)	(8.50)	(2.50)	(0.76)	(3.60)	(5.00)	(2.12)
1986									(7.99)	0.34	1.64	(2.41)	(4.30)	(1.12)
1987										7.34	5.89	(0.76)	(3.49)	0.13
1988											4.27	(5.16)	(7.31)	(1.85)
1989												(14.37)	(12.76)	(3.89)
1990													(11.24)	1.54
1991														17.40

Note: Parentheses indicate negative annual return spreads.

What happened in 1991, however, was a complete turnaround in total returns with high-yield bonds outdistancing U.S. Treasurys by 17.4%, but default reached record yearly levels. The high return spread over Treasurys continued for the first half of 1992, when junk bonds had a return of 11.4% compared to 0.4% for long-term Treasurys.

The new issue market also rebounded with 33 companies raising almost $10 billion from 40 issues. The new issue market's rebound was derived mainly from $6 billion used to repay LBO debt. Although this was a year of revival, the proportion of total new issue straight corporate debt in 1991 that was comprised of high-yield bonds was still fairly low at about 6%, considerably below the record years of almost 25% in 1987 and 1988.

Despite the relatively low volume of new issue junk bonds in 1990 and 1991, the high-yield market still comprised about 25% of the total corporate straight debt market at the end of 1991. One type of junk bond that has increased of late is original issue investment grade bonds which have fallen to noninvestment grade. In the last two years, almost $23 billion of these "fallen angels" have swelled the market for high-yield debt, more than counter-

balancing the $18 billion of debt that has been upgraded out of the "junk" category.[3]

Another distinguishing feature in 1991 of this dynamic, volatile market was the swing to less leveraged capital structures, as 64 high-yield companies issued $11.6 billion of common stock. By far, the main use of these proceeds was to reduce debt. Combined with $6 billion of new, relatively low-cost debt refinancing, the interest burden of these companies will be significantly reduced going forward.

The Default Rate Controversy

Ever since the classic study of corporate bonds published by Hickman [31], economists have been measuring and reporting default rates. Despite this considerable scholarly lineage, early in 1989, well-established methods for measuring default rates suddenly became the subject of intense controversy in the financial press and later in academic journals. Articles appeared announcing the results of supposedly "new" research that led to a more negative view of junk bonds than that projected by existing works. In this paper, I will attempt to shed some light on the lingering debate over the proper measurement of default rates. I will start by explaining the traditional method for measuring defaults of junk bond portfolios and then compare the results of using this method with the default rates produced by the more recent "mortality" or "aging" concepts. I will also present some new findings related to the mortality/aging of corporate debt. The bottom line here is that the new default studies, however much their differences with the old have been exaggerated by the press, are really quite consistent in their findings with existing, more traditional work. And, finally, I will attempt to use the existing research on junk bonds as a basis for speculating about future default rates and investor returns in the high-yield market.

Traditional Measures of Default Rates and Losses

Accurate measurement of default risk is, of course, critical to the task of determining the required risk premiums on bonds of different credit quality and evaluating the returns on those securities. The traditional method of measuring annual default rates is based on comparing the dollar amount of all issues defaulting in a given year divided by the dollar value of all bonds outstanding as of some point during that year. For any given category of bonds, the annual default rates are then added and averaged over some longer time horizon to provide an estimate of the average yearly rate of default.

Historical Default Rates

Exhibit 4 shows the average annual default rate, calculated using the method described above, for below-investment-grade debt for the period 1970 to 1991, as well as for selected intervals within that 22-year period. The arithmetic average annual default rate for the period 1970 to 1991 is 3.1%, which is also the rate for the period from 1978 to 1991. In the most recent nine years (1983 to 1991), however, the average default rate increased to 4.1%. These average rates give equal weights to each year. If, however, one weights the individual year results by the amount of high-yield debt outstanding, then the weighted average default rates are considerably higher, since the last three years (1989 to 1991) have been relatively high default years with greater amounts outstanding. Indeed, the weighted average annual rate for the period 1978 to 1991 increased to 5.2% compared to the arithmetic average 3.1%.

Recently (Altman [5]), I have calculated "traditional" default rates in a slightly modified fashion by subtracting, from the population base, those issues which are already in default. For the years prior to 1990, this modification made little difference, since defaulting issues were small relative to the total market size. With the huge increase in defaults of late, this differential is now material. For example, the modified default rates for 1990 and 1991 are 10.14% and 10.27%, respectively (Exhibit 5), compared to 8.74% and 9.01% (Exhibit 4). I believe the modified method is more representative of default incidence since the reduced population base represents the portfolio of high-yield bonds that could default.

During the first quarter of 1992, default amounts and rates have fallen considerably from the record levels of 1990 and 1991. Defaults involved $2.83 billion, a quarterly rate of 1.5% measured on a population base that does not include defaults — the preferred base in my opinion.

The more relevant default statistic for most investors is not the rate of default, but rather the amount lost from defaults. The use of default rates alone effectively assumes that the value of defaulting bonds turns out to be zero. In reality, however, defaulting debt has sold over the years for about 40% of par, on average, at the end of the month in which the default occurs. This 40% figure can in turn be interpreted as the market's best guess, based on extensive

[3]Most prominent in the latter group were RJR Nabisco ($4.2 billion), Occidental Petroleum ($2.1 billion) and Long Island Lighting ($1.5 billion). Chrysler Financial's $4.4 billion and its parent company's $1.9 billion were by far the largest fallen angels in 1991.

Exhibit 4. Historical Default Rates — Straight Debt Only, 1970-1991 ($ Millions)

Year	Par Value Outstanding[a]	Par Value Defaults	Default Rates (%)
1970	$6,996	$797	11.388
1971	6,643	82	1.234
1972	7,106	193	2.720
1973	8,082	49	0.607
1974	11,101	123	1.106
1975	7,720	204	2.644
1976	8,015	30	0.368
1977	8,479	381	4.488
1978	9,401	119	1.265
1979	10,675	20	0.187
1980	15,126	224	1.482
1981	17,362	27	0.156
1982	18,536	577	3.115
1983	28,233	301	1.066
1984	41,700	344	0.825
1985	59,078	992	1.679
1986	92,985	3,156	3.394
1987	136,952	7,486[b]	5.466[b]
1988	159,223	3,944	2.477
1989	201,000	8,110	4.035
1990	210,000	18,354	8.740
1991	209,400	18,862	9.008

Arithmetic average default rate, 1970 to 1991: 3.066%
Arithmetic average default rate, 1978 to 1991: 3.064%
Arithmetic average default rate, 1983 to 1991: 4.077%

Weighted average default rate, 1970 to 1991: 5.054%
Weighted average default rate, 1978 to 1991: 5.168%
Weighted average default rate, 1983 to 1991: 5.406%

Notes:
[a]Market size includes defaulted issues.
[b]$1,841.7 million without Texaco Inc., Texaco Capital, and Texaco N.V. The default rate without these is 1.345%.
[c]Weighted by par value of amount outstanding for each year.

Exhibit 5. Historical Default Rates — Straight Debt Only, Excluding Defaulted Issues From Par Value Outstanding, 1970-1991 ($ Millions)

Year	Par Value Outstanding[a]	Par Value Defaults	Default Rates (%)
1970	$6,598	$797	12.080
1971	5,805	82	1.413
1972	6,529	193	2.956
1973	7,824	49	0.626
1974	10,894	123	1.129
1975	7,471	204	2.731
1976	7,735	30	0.388
1977	8,157	381	4.671
1978	8,946	119	1.330
1979	10,356	20	0.193
1980	14,935	224	1.500
1981	17,115	27	0.158
1982	18,109	577	3.186
1983	27,492	301	1.095
1984	40,939	344	0.840
1985	58,088	992	1.708
1986	90,243	3,156	3.497
1987	129,557	7,486[a]	5.778[a]
1988	148,187	3,944	2.662
1989	189,258	8,110	4.285
1990	181,000	18,354	10.140
1991	183,600	18,862	10.273

Arithmetic average default rate, 1970 to 1991: 3.302%
Arithmetic average default rate, 1978 to 1991: 3.332%
Arithmetic average default rate, 1983 to 1991: 4.475%

Weighted average default rate, 1970 to 1991: 5.461%
Weighted average default rate, 1978 to 1991: 5.593%
Weighted average default rate, 1983 to 1991: 5.871%

Notes:
[a]$1,841.7 million without Texaco Inc., Texaco Capital, and Texaco N.V. The default rate without these is 1.345%.
[b]Weighted by par value of amount outstanding for each year.

experience with past defaults, about the eventual recovery value in defaulting securities. And, the ability to sell defaulting debt at nontrivial levels signifies a positive liquidity aspect of publicly traded corporate debt that, until recently, was not evident in privately placed debt.

Altman and Nammacher [9] and [10] published studies that attempted to measure the amount lost from defaults. In making these calculations, we assumed investors had purchased each defaulting issue at par value and sold it at the end of the month in which the default occurred, losing one coupon payment as well as any capital depreciation.

The default loss calculation for 1991 is shown in Exhibit 6. The loss was 7.16% using the population base without defaults. Over the period 1985 to 1991, the weighted average default loss was 4.24% per year. Note that the average weighted price after default (the "recovery rate") was slightly over 40%, although the individual year rates varied considerably (Exhibit 7). Exhibit 8 breaks down the recovery rate by seniority of the bond issues. We find that the most senior issues recover about 60% of their par value upon default while the most junior, noncash pay, subordinated issues return just 19.5% of their accreted

Exhibit 6. 1991 Default Loss Rate

	Weighted Average Calculation[a]	Weighted Average Calculation[b]
Background Data		
Average default rate	9.01%	10.27%
Average end of month price after default	36.04%	36.04%
Average loss of principal	63.96%	63.96%
Average coupon payment[c]	11.59%	11.59%
Default Loss Computation		
Default rate	9.01%	10.27%
× loss of principal	63.96%	63.96%
Default loss of principal	5.763%	6.569%
Default rate	9.01%	10.27%
× loss of 1/2 coupon	5.795%	5.795%
Default loss of coupon	0.522%	0.595%
Default Loss of Principal and Coupon	6.285%	7.164%

Notes:

[a]Market size includes defaulted issues.

[b]Market size does not include defaulted issues.

[c]For issues with prices only; including all issues, the average coupon was 10.49%.

Exhibit 7. Default Rates and Losses, 1985-1991

Year	Par Value Outstanding[a] ($ Millions)	Par Value of Default ($ Millions)	Default Rate (%)	Weighted Price After Default	Weighted Coupon (%)	Default Loss (%)
1985	$58,088	$992.1	1.71	$45.9	13.69	1.04
1986	90,243	3,155.8	3.50	34.5	10.61	2.48
1987[b]	129,557	7,485.7	5.78	75.9	12.07	1.74
1988	148,187	3,944.2	2.66	43.6	11.91	1.66
1989	189,258	8,110.3	4.29	38.3	13.40	2.93
1990	181,000	18,354.0	10.14	23.4	12.94	8.42
1991	183,600	18,862.0	10.27	36.0	11.59	7.16
Weighted average 1985-1991			6.22%	$41.00	12.34%	4.24%

Notes:

[a]Excludes defaulted issues.

[b]Includes Texaco.

values. Interestingly, the overall average recovery of 486 defaulting issues weighted by the amount outstanding of each issue, was just under the venerable 40%, at 39.2%. The breakdown of recovery rates by seniority is extremely relevant to investors who hold different tranches of debt and also to analysts who attempt to assess expected default loss rates on nonpublic debt issues and on commercial loans. Finally, it is relevant to corporate issuers in their negotiations with advisors, bond raters and debtholders as to the seniority of new debt offerings.

Rating Drift of Defaulted Bonds

Altman and Kao [11] and [12] explored the phenomenon that we call rating drift or credit quality changes over time. We observed the ten-year post-issuance bond rating change experience of all new issues from 1971 to 1988. In this article, I only concentrate on defaulted issues and observe the S&P bond rating at several specific points in time: (*i*) at issuance, (*ii*) at one year prior to default, and (*iii*) at six months prior to default.

In Exhibit 9, we can observe that of the 556 issues that defaulted from 1970 to 1991, 26.3% were investment grade at birth and subsequently dropped to noninvestment grade (fallen angels) and then defaulted. Therefore, 73.7% of all defaulting issues were original issue high-yield "junk" bonds.[4]

[4]In 1991, 40 of the 182 defaulting issues (22%) were originally rated investment grade, representing $2.97 billion or about 16% of the $18.4 billion of defaults for which we found an original rating.

Exhibit 8. Average Recovery Prices on Defaulted Debt By Seniority Per $100 Face Amount, 1985-1991[a] (Number in Parentheses Represents Number of Issues)

Year	Secured	Senior	Senior Subordinated	Subordinated	
				Cash Pay	Noncash Pay
1985	$74.25 (02)	$34.81 (03)	$36.18 (07)	$41.45 (15)	None
1986	48.32 (07)	37.09 (08)	37.74 (10)	31.58 (34)	None
1987	12.00 (01)	70.52 (29)[c]	53.50 (10)	40.54 (07)	None
1988	67.96 (13)	41.99 (19)	30.70 (10)	35.27 (20)	None
1989	82.69 (09)	53.70 (16)	19.60 (21)	23.95 (30)	None
1990	35.04 (07)	32.02 (27)	24.04 (28)	17.93 (17)	$18.99 (12)
1991	54.50 (02)	58.15 (62)[b]	34.62 (21)	20.28 (35)	21.06 (04)
Average 1985-1991	$60.51 (41)	$52.28 (164)	$30.70 (107)	$27.96 (158)	$19.51 (16)
Average of all issues	$39.24 (486)				

Notes:

[a]Prices at end of default month.

[b]Includes 23 issues of Columbia Gas; without these issues, the recovery rate was $43.30.

[c]Without Texaco, the 1987 recovery rate was $29.77.

Exhibit 9. Rating Distribution* of Defaulted Issues at Various Points Prior to Default, 1970-1991

	Original Rating		Rating One Year Prior to Default		Rating Six Months Prior to Default	
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
AAA	5	0.9	0	0.0	0	0.0
AA	19	3.4	0	0.0	0	0.0
A	60	10.8	2	0.4	2	0.4
BBB	62	11.2	45	9.3	36	7.3
Total investment grade	146	26.3	47	9.7	38	7.7
BB	59	10.6	47	9.8	29	5.9
B	266	47.8	238	49.4	199	40.4
CCC	81	14.6	137	28.4	198	40.2
CC	4	0.7	10	2.1	25	5.1
C	0	0.0	3	0.6	3	0.6
Total noninvestment grade	410	73.7	435	90.3	454	92.3
Total	556	100.0	482	100.0	492	100.0

Notes:

*Based on Standard & Poor's bond ratings.

The proportion of defaulting issues that were still investment-grade one year and six months prior to default were 9.7% and 7.7%, respectively.[5] These rates could appear to be surprisingly high to those who believe that, except in rare cases, e.g., Manville's surprise announcement of their bankruptcy filing in 1982, the firm's deterioration could have been detected early and the bonds downgraded long before default. On the other hand, the fact that the proportion of defaults that were still investment-grade is smaller as default approaches, and almost none were still in this category at the time of default, could lead the rating agencies and perhaps others to comment that these percentages vindicate the accuracy of their overall ratings. Obviously, these statistics have relevance to high-grade as well as low-grade debt securities investors.

Finally, it is important to mention that bondholders lose not only from defaults, but also in cases of financial distress that do not result in a legal default but rather in distressed exchange arrangements. An earlier study by Vanderhoof, et al [40] found that over the period 1900 to 1943, almost 20% of the 549 reported "defaults" never experienced a legal default because contracts were modified before failure took place. Our default statistics include

[5]The six-month 7.7% would drop to 3.2% (15 of 469) if we exclude the 23 Columbia Gas System issues that defaulted in 1991.

distressed exchanges whereby creditors accept cash and/or securities of lower value and lower interest rates than originally promised. Of late, these distressed exchange, out-of-court arrangements are being replaced in many cases by so-called "prepackaged Chapter 11 bankruptcies," where the exchange takes place under the less stringent voting requirements of the Bankruptcy Code.

The Mortality/Aging Approaches

Although the traditional method for assessing default rates and losses has considerable relevance for measuring bond performance, it also has potential biases. Because of such biases, the most recent default history — while immensely useful to portfolio managers and other investment officers in projecting near-term expected losses and setting aside adequate reserves to cover such losses — may turn out to have been an unreliable basis for assessing longer-term losses.

Why is that so? First of all, as with all historical studies, it could be suggested that the future is not likely to repeat the past. Both the numerator (that is, the amount of annual defaults) and the denominator (the amount of bonds outstanding) in the default rate ratio will surely change in the future. And, if the amount of "junk" bonds outstanding that could default does not increase as it has in the past (or even falls, as it has in the last two years) while the amount of defaults continues to grow, then default rates and investor losses will rise above the historical levels reported using the traditional approach.

I have also argued (Altman [7]), however, that the opposite trend will take place in the near future. That is, in 1992 and beyond, as new issues begin to rise from depressed levels and as the defaults arising from past excesses are purged from the market, default rates for 1990 and 1991 measured traditionally are likely to be overestimates owing to this same bias. Indeed, this appears to be occurring, and Fons [22] is now predicting a lower default rate for 1992.

A related criticism of the traditional method for calculating default rates — and the one that was seized upon by the press — is its failure to consider the possibility that the likelihood of default rises with the age of the bond. In putting all junk bonds outstanding at a given point in time in the same basket, the average annual method effectively assumes that the probability of default for a newly issued bond is identical with that of a bond that has been outstanding for, say, five years. But if it is true that the probability of default rises with age — especially in the case of junk bonds which are often "called" after the early years — then default rates on currently outstanding issues will begin to rise. And if the rate of new issuance is expected to fall, then current annual default rates would provide a misleadingly low predictor of future expected default rates.

Briefly stated, the basic contention is this: because of the rapid growth of the junk bond market during the 1980s, use of the traditional methods for measuring defaults could have blinded investors to the reality that effective default rates were rising well above reported levels.

While the aging argument has some intuitive appeal, the more important reason for the considerable rise in default rates in 1990 and 1991 was the debt excesses of 1987 to 1989 caused by the incredibly high premiums paid for corporate acquisitions and restructurings. The combination of increased cash-flow-multiplier transaction prices and the consequent excessive debt necessary to finance these high price transactions of questionable LBO firms to start with, resulted in a large number of distress situations. And, as Altman and Smith [13] demonstrate, unless the firm can pay down that considerable debt burden rather quickly, the probability of distress increases. Combined with declining asset sales and the lack of refinancing opportunities, the highly leveraged, e.g., debt to equity ratios of 6:1 and above, corporate restructuring disappeared after 1989 and defaulting LBOs became increasingly more common.

Two Recent Studies — And Much Confusion

Two recent academic studies explored the aging issue by attempting to determine whether the probability of default of individual high-yield issues increases with time after issuance. The first of these was a working paper I produced at NYU in 1988 which was later published, Altman [3]. The second study — and the one whose circulation in early 1989 aroused such intense interest in the press — was a study by Paul Asquith, David Mullins, and Eric Wolff [15].

Now, what exactly did these studies set out to do? And what did they find? In my 1988 working paper, I examined all corporate bonds issued between 1971 and 1986 (updated in this paper through 1991) in an attempt to determine whether the probability of default increases with age (a trait I referred to as bond "mortality"). In so doing, I classified all bonds into one of seven individual bond rating cohort groups, including the four investment-grade as well as the three noninvestment-grade ratings. I then sought to estimate what proportion of the par value of bonds originally issued in a given year and in a given rating were still outstanding after the lapse of different periods of time. The original group of bonds was therefore reduced

Exhibit 10. 1991 Mortality Rates By Original Rating (1971-1991 Experience)

		Years After Issuance									
Rating		1 (in %)	2 (in %)	3 (in %)	4 (in %)	5 (in %)	6 (in %)	7 (in %)	8 (in %)	9 (in %)	10 (in %)
AAA	Yearly	0.00	0.00	0.00	0.00	0.00	0.12	0.05	0.00	0.00	0.00
	Cumulative	0.00	0.00	0.00	0.00	0.00	0.12	0.17	0.17	0.17	0.17
AA	Yearly	0.00	0.00	1.09	0.32	0.11	0.00	0.19	0.00	0.08	0.09
	Cumulative	0.00	0.00	1.09	1.41	1.52	1.52	1.71	1.71	1.79	1.87
A	Yearly	0.00	0.19	0.26	0.31	0.17	0.04	0.12	0.24	0.17	0.00
	Cumulative	0.00	0.19	0.45	0.76	0.93	0.97	1.08	1.32	1.49	1.49
BBB	Yearly	0.10	1.00	0.42	0.52	0.70	0.19	1.09	0.00	0.13	0.75
	Cumulative	0.10	1.10	1.51	2.03	2.72	2.90	3.96	3.96	4.09	4.81
BB	Yearly	0.00	0.91	3.66	1.93	2.78	1.27	4.33	0.00	0.00	2.66
	Cumulative	0.00	0.91	4.53	6.37	8.97	10.13	14.02	14.02	14.02	16.31
B	Yearly	1.72	4.67	9.16	5.61	6.64	2.65	4.24	2.88	5.07	3.58
	Cumulative	1.72	6.31	14.90	19.67	25.00	26.99	30.09	32.10	35.54	37.85
CCC	Yearly	1.55	14.84	11.74	9.23	3.82	3.86	1.54	N.A.	N.A.	N.A.
	Cumulative	1.55	16.16	26.01	32.84	35.40	37.90	38.85	N.A.	N.A.	N.A.

by calls, sinking funds, and maturation, as well as by defaults and exchanges.

My findings are summarized in Exhibit 10, which shows marginal yearly default rates calculated similar to the traditional method, as well as the cumulative rates of default over a horizon extending ten years from the date of issue. These results cover new issues from 1971 to 1990 and defaults through 1991.

Before elaborating on the results of my own study, let me mention the approach taken by Asquith, et al [15]. They too calculated cumulative default rates by tracking the "aging process" in specific year cohort groups. They focused almost exclusively on junk bonds without attempting to distinguish among the three different classes of low-grade bonds nor do they treat investment-grade bonds.

Comparison of the Results

As compared in Exhibit 11, the results of the two studies are quite similar. For example, in calculating the default rates five years after issuance of all B-rated bonds, I found the cumulative mortality on default through 1988 for this dominant junk bond category to have been 11.5%.[6] By comparison, the aging approach calculated by Asquith, et al [15], through 1988, produced a five-year cumulative default of 12.2% when averaging across all three classes of junk bonds. The ten-year cumulative default rates reported by the two studies are also very similar. Whereas Asquith, et al reported that 29.3% of all junk bonds issued in the three years 1977 to 1979 had either defaulted or been exchanged ten years after issuance, I found a cumulative mortality of 31% for just the B-rated bonds issued in the same period. The single-B mortality increases somewhat to about 38% when defaults through 1991 are included. Asquith, et al also found that roughly a third of the bonds had been called.

Also summarized in Exhibit 11 are the results of one other recent study of junk bond mortality, by Lucas and Lonski of Moody's [37]. The Moody's study, which focused on default rates among issuers rather than issues, came up with results pretty much consistent with the others. For example, although Moody's does find somewhat higher five-year cumulative defaults for single-B and double-B issuers, the total weighted average rate of 11.8% is quite comparable — as is the 29% ten-year cumulative defaults for single-B issuers. And, Asquith, et al do not attempt to measure default losses, to which we now turn.

Mortality Losses

We can measure mortality losses in a manner similar to the earlier default loss calculation. By considering recovery rates and lost coupon payments on all defaults in our mortality database, we can calculate mortality losses in Exhibit 12. As in Exhibit 10, the results are listed for data through 1991. The five-year cumulative mortality loss increased to 19.3% while the ten-year loss was 29.3%. The average annual loss calculated from the five-year cumulative rate is very similar to the average rate of 4.24% per year that we saw earlier in Exhibit 7.

[6]The five-year cumulative mortality for B-rated bonds increased to 25% for data through 1991 (Exhibit 10). This 1991 mortality computation implies an annual mortality of over 5% per year — consistent with the overall high-yield bond default rate for 1970 to 1991 (5.1 to 5.5%, see Exhibits 4 and 5) measured the traditional way.

Exhibit 11. Comparative Junk Bond Mortality/Aged Default Statistics: Three Recent Studies

	Rating	Mortality (Altman) 1971-1988	Aging (Asquith, et al) 1977-1988	Original Issuer (Moody's) 1970-1988
Five-year	Ba/BB	1.9%	N.A.	8.3%
Cumulative	B/B	11.5%	N.A.	22.3%
Default rate	Caa/CCC	24.6%	N.A.	N.A.
Total (weighted average)		8.1%	12.2*	11.8%
Ten-year	Ba/BB	10.7%	N.A.	14.2%
Cumulative	B/B	30.9%	N.A.	29.3%
Default rate	Caa/CCC	N.A.	N.A.	N.A.
Total (weighted average)		N.A.	29.3*	17.4%

Note: *Based on combined 1977 - 1979 issuance.
Source: E. Altman [7].

Exhibit 12. 1991 Mortality Losses By Original Rating (1971-1991 Experience)

		Years After Issuance									
Rating		1 (in %)	2 (in %)	3 (in %)	4 (in %)	5 (in %)	6 (in %)	7 (in %)	8 (in %)	9 (in %)	10 (in %)
AAA	Yearly	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00
	Cumulative	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.05	0.05	0.05
AA	Yearly	0.00	0.00	0.20	0.12	0.02	0.00	0.10	0.00	0.05	0.05
	Cumulative	0.00	0.00	0.20	0.32	0.34	0.34	0.43	0.43	0.48	0.53
A	Yearly	0.00	0.03	0.05	0.19	0.13	0.02	0.05	0.15	0.12	0.00
	Cumulative	0.00	0.03	0.08	0.27	0.40	0.42	0.47	0.62	0.74	0.74
BBB	Yearly	0.07	0.61	0.24	0.36	0.21	0.11	0.84	0.00	0.07	0.50
	Cumulative	0.07	0.68	0.92	1.27	1.48	1.59	2.41	2.41	2.48	2.98
BB	Yearly	0.00	0.61	2.95	1.48	1.85	0.84	4.08	0.00	0.00	2.10
	Cumulative	0.00	0.61	3.54	4.97	6.73	7.51	11.29	11.29	11.29	13.15
B	Yearly	0.79	2.81	7.50	4.12	5.59	2.06	3.21	2.20	3.01	2.55
	Cumulative	0.79	3.58	10.81	14.48	19.26	20.92	23.46	25.15	27.40	29.25
CCC	Yearly	1.24	13.67	9.60	7.57	3.01	2.88	1.38	N.A.	N.A.	N.A.
	Cumulative	1.24	14.74	22.92	28.76	30.90	32.89	33.82	N.A.	N.A.	N.A.

After considering the net effect of losses from defaults, studies such as Altman [3], Blume and Keim [18], and Goodman [29] all concluded that high-yield bonds provided superior returns compared to risk-free Governments.

Given this reasonable amount of scholarly agreement about the historical cumulative default rates on junk bonds, what do these numbers really have to tell us about future expected default rates? Asquith, et al interpret their findings as clear evidence that the probability of junk bond defaults increases with the age of the bonds. And, as mentioned earlier, to the extent that this "aging" interpretation is correct, then a slowdown in the rate of new issuance must lead inevitably to a sharp rise in annual default rates.

My interpretation of the new evidence, however, is considerably more cautious. As I cautioned in my initial working paper, the "modern" junk bond market is still quite new, having gotten its real start only as recently as 1977. For this reason, the mortality results for the relatively long (say seven- to ten-year) horizons are based on relatively few years of original issuance data. For example, at the time of my original study, ten-year mortality rates could be calculated only for the group of high-yield bonds issued in 1977 and 1978, nine-year mortality rates only for bonds issued in 1977-1979, and so forth. For results through 1991, ten-year rates cover bonds issued from 1977 to 1981. And making generalizations from a sample this small is, needless to say, a questionable practice.

One cannot deny that, as you increase the horizon on any investment in risky bonds, the cumulative default rate will rise over time. But that is not the same thing as saying that a six-year bond with a BB rating has a higher probability of default in the next four years than a younger bond in the same risk category.

Having said this, though, I am somewhat sympathetic to the "intuition" behind an aging process for corporate bonds. That argument, as mentioned earlier, holds that because the probability of call increases with a bond's age, and because creditworthy companies are more likely to call than their weaker counterparts, then the remaining group of bonds will have a greater probability of future default than the original population. The same is true for firms that directly repurchase their debt in the open market when the bonds' prices become attractive.

The intuitive aging argument has been vigorously disputed by Moody's and S&P, whose livelihoods come from assigning bonds to their proper risk categories. The representatives of such agencies, in fact, argue that the age of a bond has no systematic effect on its creditworthiness provided the bond's current rating is the same as its initial rating, and provided the current rating remains an unbiased estimate of the future rating — that is, neither too high nor too low on average. For example, a BB bond at issuance should have the same probability of default in years 1 and 2 as a five-year-old BB bond in years 6 and 7. Only if BB bonds in the aggregate have a higher probability of slipping to a lower rating after, say, five years than rising to a higher rating will the expected default rate rise systematically over time.

Bond Rating Drift and Aging

As stated earlier, such a propensity for bond ratings to drift lower had neither been tested nor demonstrated by scholarly research. Since that time, Altman and Kao [11] analyzed the ten-year junk bond rating drift propensity over the period 1971 to 1989 and found that, while investment-grade bonds had a much greater likelihood of being downgraded vis-a-vis being upgraded, the same tendency did not exist for junk bonds. Actually, only the A-level grades had a propensity for more downgrades, while the triple-B bonds were the only rating class where subsequent upgrades clearly dominated downgrades.

Upon reviewing the Moody's default study (i.e., [23]), and comparing it with my mortality rates (Altman [7]), there does seem to be a pattern that attests to the aging effect. Recall that Moody's assessed the default rate by issuer and not by dollar amount of issues, as we use in our mortality rates. Moody's calculates their default rates by examining the total amount of issuers that are in a certain rating class as of January 1st of each year and then aggregating the amount of these issues that default over the next 12 months to calculate the one-year default rate, and over 24 months to calculate the two-year rate, etc. Mortality rates, however, are only calculated by the number of years after the "birth" of the new issue.

To compare these methods, consider the one- to five-year cumulative results for single-B rated defaults from 1970 to 1991 as indicated below:

	Cumulative Default Rates Years				
Single-B Results	1	2	3	4	5
Moody's [23]	8.8%	14.8%	19.9%	23.9%	26.9%
Altman (Exhibit 10)	1.7%	6.3%	14.9%	19.7%	25.0%

Note that one-, two- and three-year results are far higher for Moody's, but the rates essentially converge by year 5. This implies that the probability of default in the first few years after issuance is much less than for seasoned single-B issues. Recall that Moody's blends all B-rated issues regardless of their age and concludes that the one-year rate is a relatively high 8.8% compared to just 1.7% for B-rated bonds in their first year after issuance. Hence, this implies an aging effect, at least for the first few years. One can then legitimately ask, is a single-B bond the same credit risk regardless of age?

Evidence contrary to an aging effect can be found by looking closely at the year-to-year default rates reported in Asquith, et al's [15] study. I am hard-pressed to discern a clear pattern of aging. For example, the first seven years of the 1977 cohort group all had 0.00% default rates; 1978's cohort had an 8.32% second-year rate that proved to be higher than the default rate in any subsequent year; and 1979's cohort had a relatively high third-year rate — one which was about equal to the default rates in years 6 and 9.

Evidence of an aging pattern is even less convincing in my own mortality results. As shown in Exhibit 10, the yearly (marginal) mortality rates for single-Bs are relatively constant from the second to the fifth year after issuance (except higher for rates in the third year). Most of the other years (1, 6, 8 and 10 in particular) are considerably lower. BB marginal rates, which were fairly constant in earlier studies, are now quite variable with no indication of an aging influence.

New results from our mortality analysis challenge the aging effect, at least for bonds that survive more than three

Exhibit 13. Annualized Cumulative Default Rates and Annualized Cumulative Mortality Loss Rates, 1971-1991

Annualized Cumulative Default Rates

Original Rating	1 (in %)	2 (in %)	3 (in %)	4 (in %)	5 (in %)	6 (in %)	7 (in %)	8 (in %)	9 (in %)	10 (in %)
AAA	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02
AA	0.00	0.00	0.37	0.36	0.31	0.26	0.25	0.22	0.20	0.19
A	0.00	0.09	0.15	0.19	0.19	0.16	0.16	0.17	0.17	0.15
BBB	0.10	0.55	0.51	0.51	0.55	0.49	0.58	0.50	0.46	0.49
BB	0.00	0.46	1.53	1.63	1.86	1.76	2.14	1.87	1.66	1.76
B	1.72	3.21	5.23	5.33	5.59	5.11	4.98	4.72	4.76	4.64
CCC	1.55	8.44	9.55	9.47	8.37	7.63	6.79	N.A.	N.A.	N.A.

Annualized Cumulative Mortality Loss Rates

Original Rating	1 (in %)	2 (in %)	3 (in %)	4 (in %)	5 (in %)	6 (in %)	7 (in %)	8 (in %)	9 (in %)	10 (in %)
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00
AA	0.00	0.00	0.07	0.08	0.07	0.06	0.06	0.05	0.05	0.05
A	0.00	0.02	0.03	0.07	0.08	0.07	0.07	0.08	0.08	0.07
BBB	0.07	0.34	0.31	0.32	0.30	0.27	0.35	0.30	0.28	0.30
BB	0.00	0.31	1.19	1.27	1.38	1.29	1.70	1.49	1.32	1.40
B	0.79	1.81	3.74	3.84	4.19	3.84	3.75	3.56	3.49	3.40
CCC	1.24	7.66	8.31	8.13	7.13	6.43	5.73	N.A.	N.A.	N.A.

Notes:

Annualized cumulative default rate = $1 - (1 - \text{Cumulative Default Rate})^{1/\text{Time}}$.

Annualized cumulative mortality loss rate = $1 - (1 - \text{Cumulative Mortality Loss Rate})^{1/\text{Time}}$.

years. Exhibits 13, 14 and 15 show the *annualized* mortality and mortality losses from one to ten years after issuance. These results are derived from Exhibits 10 and 12. As the table and graphs clearly illustrate, the annualized defaults and losses from them increase for the first three years and then level off. Our data include defaults through 1991, so they incorporate the demise of many of the ill-conceived, highly leveraged restructurings of 1987 to 1989.

One implication of these results is that the aging effect, at least on defaults from 1971 to 1991, is only a factor for the first few years after issuance. With respect to defaults beyond 1991, the aging results imply that the annual default rate (Exhibits 4 and 5) will fall as the system is cleansed of the one- to three-year post-issuance defaults and mortality rates might also fall.

Furthermore, as pointed out by Blume, Keim and Patel [19], none of the new "mortality" studies cited above attempts to account for the possibility that default rates depend significantly on prevailing economic conditions. They argue that a proper analysis of default rates — one that would be useful for projecting long-run expected default rates on junk bonds — must control for general economic effects.

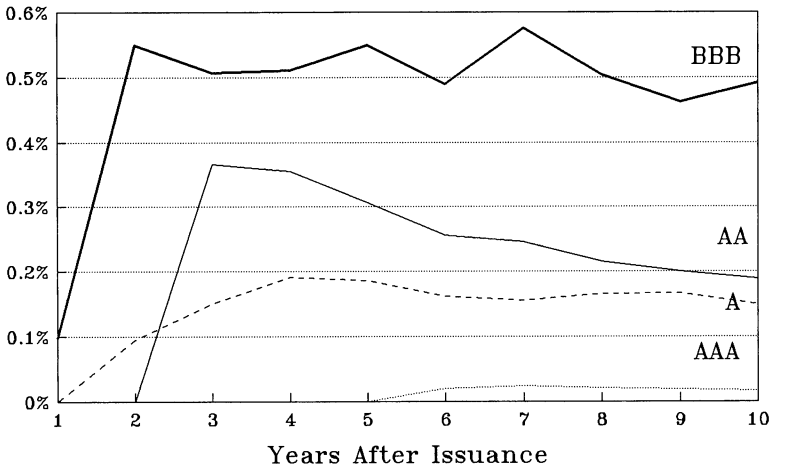
In summary, then, while there does appear to be some evidence of an aging effect, it is not very consistent across or within rating classes and only in evidence for three years after issuance. Also, although there may be some bias inherent in the traditional approach to default measurement, the bias is probably not sufficient to undermine its use, at least as a short-term forecaster of default rates. And, finally, although calls of the most creditworthy junk issues may reduce the overall credit quality of the outstanding portfolio, the premiums paid by corporations to investors for that call option, in the form of higher yields when first issued, should compensate investors for granting that option. Moreover, the fact that companies typically pay premiums to retire the bonds also compensates investors for calls.

How Can We Explain 1991's Returns?

How can we explain the paradox of exceptionally high default rates combined with record high total returns in 1991? The most common explanations for 1991's strong performance include the following: (*i*) prices on a broad cross-section of high-yield bonds were beaten down so much in 1990 that many represented bargains; (*ii*) the limited supply of new high-yield debt, especially at the beginning of 1991, caused prices to rise sharply in response to increasing demand as the year progressed; and (*iii*) interest rates dropped significantly.

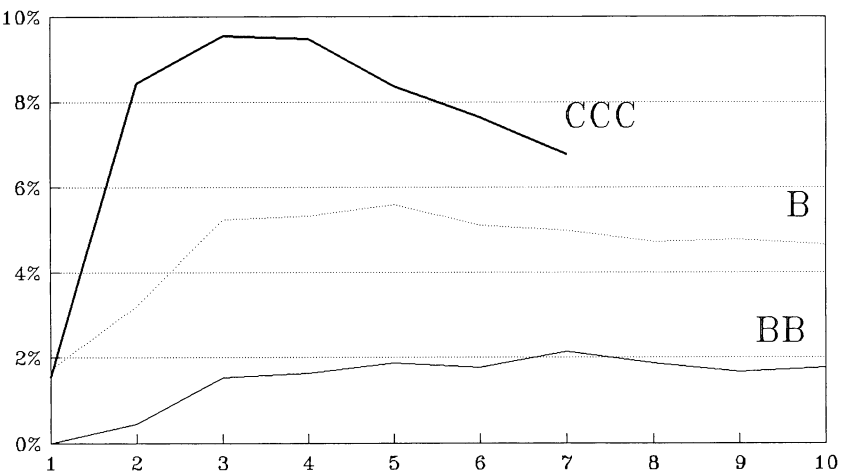
As we stated earlier, yield spreads over U.S. Treasury bonds rose to around 1,200 basis points at the end of 1990, reflecting concern for the overall market as well as for

Exhibit 14. Annualized Cumulative Default Rates for Investment Grade Bonds



Source: E. Altman and Exhibit 10.

Exhibit 15. Annualized Cumulative Default Rates for Speculative Grade Bonds



Source: E. Altman, NYU and Exhibit 10.

many of the more risky firms. The market was clearly anticipating a very high default loss rate for 1991 and beyond.

Perhaps we can add another reason for the excellent returns in 1991 by referring to the default loss expectation. Exhibit 16 illustrates a rather simplistic but instructive analysis for linking expected default rates, and the consequent default losses, with required yields on high-yield bond portfolios. As discussed earlier, the default rate expectation is modified to arrive at a default loss by considering expected recovery rates just after default and the loss of 1/2 annual coupon on the high-yield bonds. Since the break-even yield is earned only on that part of the portfolio which does not default (1 - D_f), the formula for calculating break-even yields (*BEY*) is:

$$BEY = \left[R_f + D_f(1 - Rec) + D_f \times HYC/2\right] / (1 - D_f) .$$

BEY = Break-even yield-to-maturity on portfolio of high-yield bonds.
R_f = Risk-free yield.
D_f = Expected default rate on high-yield bonds.

Exhibit 16. Break-Even Conditions for Total Returns on High-Yield Bonds*

	Default Loss Recovery Rates			Required Yield on High-Yield Debt** Recovery Rates		
Default Rate (%)	20%	30%	40%	20%	30%	40%
2.0	1.72	1.52	1.32	9.9	9.7	9.5
4.0	3.44	3.04	2.64	11.9	11.5	11.1
6.0	5.16	4.56	3.96	14.0	13.4	12.7
8.0	6.88	6.08	5.28	16.2	15.3	14.4
10.0	8.60	7.60	6.60	18.4	17.3	16.2
12.0	10.32	9.12	7.96	20.8	19.5	18.1
14.0	12.04	10.64	9.24	23.3	21.7	20.0

Notes:

*Assuming a 12% high-yield coupon, 8% risk-free rate and various default and recovery rates.

**$BEY = \left[R_f + D_f(1 - Rec) + D_f \times HYC/2\right] / (1 - D_f)$.

Rec = Expected recovery rate on high-yield bond defaults.

HYC = High-yield coupon rate.

So, at the start of 1991, the risk-free rate on ten-year U.S. Treasury bonds was about eight percent. Assuming an expected default rate in 1991 of 10% and a 30% recovery rate (both reasonable assumptions) and a coupon rate of 12% on high-yield bonds, the break-even yield would have been 17.33% (Exhibit 16). Note that the break-even yield is only earned on that proportion of the market that does not default (1 - D_f). But, average yields on high-yield bonds were 20%, i.e., a 12% yield spread. Hence, prices were exceptionally low (spread high) and although the actual default rate was about 10% in 1991, returns on high-yield bonds soared to record levels.

The Future of Junk Bonds

Having weathered the turmoil and disarray in 1990, the high-yield debt market once again displayed its resiliency. We are now entering a new phase in this market's evolution — one where low-grade companies attempt to reduce debt levels via calls, debt for debt and equity for debt swaps. General purpose financings once again were manifest in late 1991, and early 1992, but only for the most creditworthy of the noninvestment grade companies, e.g., BB-rated securities. These trends should continue into 1992 and beyond, especially if interest rates remain relatively low.

New net financings will add only a small amount to the existing supply of securities. It is likely, however, that defaults in 1992 and increased redemptions will shrink the market to a greater extent than new issue expansion. Finally, a net increase of fallen angels over upgrades may add to the market. On balance, therefore, the size of the market will not likely grow in the near future. The only way for the market to record a meaningful expansion is for a return to sizeable general purpose investment new issues. This will, in my opinion, take a minimum of two years based on how long the market takes to flush out much of the remaining defaults and reestablish itself as a legitimate financing mechanism.

One factor which should enhance bullish growth in 1994 and beyond, perhaps even starting earlier, is the enormous purchasing power and new issue appetite of investors, particularly high current yield mutual funds. There were about 85 such funds at the end of 1991 with over $25 billion of net assets. The peak amount of high current yield mutual fund net assets was about $33 billion in early 1989 and the recent trough was $18.4 billion in 1990 [35]. Assuming a current yield in the neighborhood of 10% to 12% per year, plus cash from existing bonds that are retired, this amounts to a sizeable base for new investments, not to mention new capital from investors seeking higher yield in low interest rate periods. Other traditional sources such as insurance companies and pension funds will add to the demand force.

Since high-yield bond returns have equitylike features, they will continue to be volatile as the fortunes and outlook of both individual companies and the market as a whole fluctuate over time. This volatility, however, will not be nearly as great as what we have seen in the last two years.

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