

REALIZED RETURNS AND DEFAULTS ON  
LOWER-GRADE BONDS:THE COHORT  
OF 1977 AND 1978

by

Marshall E. Blume  
Donald B. Keim

31-89

RODNEY L. WHITE CENTER FOR FINANCIAL RESEARCH  
The Wharton School  
University of Pennsylvania  
Philadelphia, PA 19104-6367

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Comments welcome.

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## 1. Introduction

The market for lower-grade bonds has grown dramatically in the past decade. According to Drexel Burnham Lambert, new issues of lower-grade bonds have increased from \$1.1 billion in 1977 (4.6 percent of total of new publicly-issued debt by U.S. corporations) to \$37.1 billion in 1988. Drexel estimates the size of the market to be \$183 billion at year-end 1988, of which 75 percent are original-issue lower-grade bonds in contrast to "fallen angels" that were originally issued at investment grade. Much of the existing research on lower-grade bonds focuses on the incidence of default and concludes that the average annual default rate is about one to three percent (e.g., Altman and Nammacher (1985, 1987), Altman (1987)). These studies compute unconditional default rates that do not account for the "age" of the bond; they thereby fail to account for the prospect that default rates may change as the relatively young lower-grade bond market matures and the average age of the lower-grade bond universe increases.

Altman (1988) recognizes this deficiency and uses an aging concept, "cumulative bond mortality", to measure default rates conditional on the age of the bond. Altman finds that this cumulative bond mortality increases with the age of the bond; for example, the ten-year cumulative mortality rate for B-rated bonds is nearly 32 percent.

More recently, Asquith, Mullins and Wolff (1989) use an aging concept similar to Altman's technique to measure default rates on lower-grade bonds and expand the definition of default to include all exchange offers. They find (page 6) that "a buy-and-hold investor who purchased a portfolio of all [lower-grade] bonds issued in 1977 and 1978 would, by December 31, 1988, experience a default rate of 34 percent." Asquith et al point out that this rate is substantially higher than the default rates implied in earlier work, although it should be emphasized that this rate is similar to the rate reported by Altman (1988). They also hint that the lower-grade bond market may be riskier than previous work would lead one to conclude.

The Asquith, Mullins and Wolff study can be extended in several ways. First, their analysis of default rates does not account for the fact that default rates for all bonds, irrespective of age, depend critically on prevailing economic conditions. As a result, the default rates for all bonds, regardless of issue date, will tend to vary together as economic conditions change. In recessionary periods, the default rates of all bonds will increase although it may well be that the older bonds have the greatest default rates. An analysis of aged defaults should control for this systematic variation in default rates.

Second, while such studies of defaults do provide quantitative measures of the risk of default for lower-grade bonds, they fail to measure the actual risk of capital loss and the returns of lower-grade bonds--variables of utmost importance in an investment

decision. Given the increasing size and diversity of the lower-grade bond market, detailed information on both the risks and the returns of these securities is warranted so that market participants can make informed investment decisions.

In this paper we address these two issues. In section 2 we analyze the returns that an investor would have realized by buying all the newly-issued lower-grade bonds in the 1977-1978 cohort examined by Asquith et al. In comparison to the average 11.12 percent yield promised on issuance of these bonds during 1977 and 1978, we compute a realized yield of 8.51 percent for these bonds, based on the best available information on the redemption values for those bonds that defaulted, were called, or were exchanged for other securities.

In section 3 we reexamine the relation between the age of a lower-grade bond and the incidence of default. We find that the statistically significant relation between bond age and default rate is greatly diminished when we control for the overall average default rate in the year in which the default occurs. Put another way, the relation between bond age and average default rates, adjusted for systematic variation in default rates, is not strong.

## **2. Returns for the 1977-78 lower-grade bond cohort**

We first identify all bonds issued in 1977 and 1978 that were initially rated below Baa or BBB.<sup>1</sup> These bonds are listed in

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<sup>1</sup>These bonds were identified from the calendar of new offerings in the S&P Bond Guide and the new rating section of Moody's Bond Record.

Appendix Table 1A (1977) and Appendix Table 1B (1978) along with the coupon and payment dates, maturity and first call dates, the dollar amount issued, and the issue price. There are 26 bonds issued in 1977 totalling slightly more than \$900 million , and 52 bonds issued in 1978 totalling almost \$1.5 billion.

For each of these bonds, we determine a final price that represents either: (1) the value at which the bond could have been liquidated on the occurrence of default or exchange offer during the 1977-1988 period; (2) the actual call price or (3) the price at the end of 1988. Final prices are reported in Appendix tables 2A and 2B. These tables also report the disposition of the bond at the time of the final price and the source of the information. Of the 78 bonds issued during 1977-78, 15 defaulted, 22 were called, and 13 were exchanged during the 1977-88 period; 23 were still outstanding at the end of 1988.

On the assumption that the bond survives to maturity, we calculate the promised yield to maturity, which can be greater than the coupon rate if the bond is issued at a discount.<sup>2</sup> We report individual bond yields in Appendix tables 3A and 3B. We also calculate the promised yield for the entire portfolio of bonds. To do this, we first sum within each month the cash flows of all the bonds outstanding, weighting the cash flows by the size of issue. We use the time series of aggregate cash flows to calculate a yield to maturity. Table 1 reports this "average" promised yield

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<sup>2</sup>The yields calculated in this study follow the conventional method for determining stated yield -- six-month effective yields are multiplied by 2 to obtain an annual nominal yield.

for lower-grade bonds issued in 1977, 1978 and both years combined. The promised yield on all lower-grade bonds issued in both 1977 and 1978 was 11.12 percent.

The actual return on an investment in a portfolio of bonds hinges on: (a) actual calls, exchanges and redemptions, or the value of the bond at default or at the end of 1988, if still outstanding; and (b) the rate at which the coupons and other cash flows can be reinvested. We use the final prices reported in Appendix tables 2A and 2B to compute the actual returns for the 1977 and 1978 cohort of lower-grade bonds. We first calculate returns for a portfolio strategy that reinvests the coupons and cash flows at rates provided by various investment indexes, out to two different terminal dates. In the first case we assume that all cash flows are reinvested until the bond is redeemed. Thus, there will be an initial outflow for the purchase of the bond and a final lump sum payment at the date of the final price. In the second case, we assume that all cash flows, including liquidating or redemption values, are reinvested until December 1988 when there is a final lump sum payment.

Panels B and C in Table 1 report the results. If the cash flows are reinvested in the Blume-Keim junk bond index, the total return, for the combined sample of bonds issued in 1977 and 1978 and computed to the final price, is 10.37 percent.<sup>3</sup> If reinvested

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<sup>3</sup>For an individual bond, this return is computed by comparing the final lump-sum proceeds, which result from monthly compounding of the reinvested cash flows at the lower-grade index rate of return, to the initial investment at the issue price; that is, a normal price relative. The aggregate return is computed by first



in high-grade corporates, the return is 10.45 percent. If reinvested in long-term Treasury bonds, the return is 10.31 percent. The computed portfolio returns are not very sensitive to the choice of the termination date.

These returns are ex post and reflect the actual returns earned on reinvested coupons and other cash flows in the period following 1977 and 1978. As an alternative, we also compute the (traditional) realized yield assuming a constant reinvestment rate. For this, we calculate the yield to final price using the actual cash flows for each bond and also for cash flows aggregated over all bonds. The realized yield for all junk bonds issued in 1977 and 1978 is 8.51 percent<sup>4</sup>, in comparison to the promised yield of 11.12 percent. Thus, defaults, calls, and exchanges reduce the promised yield by 2.61 percent.<sup>5</sup> For comparison purposes, the (promised) yield on intermediate-term Treasury bonds averaged 7.60 percent over the 1977-78 period. The yield on long-term Treasury bonds in these years averaged 8.08 percent. The yield on the composite AAA corporate index averaged 8.43 percent. Since the

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summing all cash flows within each month and reinvesting them at the lower-grade rate of return, compounded monthly to arrive at a lump-sum final amount. The internal rate of return computed using this final cash flow and the series of (negative) initial investments made in each bond during 1977 and 1978 provides an estimate of the return.

<sup>4</sup>As with the promised yield, the cash flows of all the bonds are summed within each month, and an internal rate of return is computed using the time series of aggregate cash flows.

<sup>5</sup>Although this difference of 2.61 percent happens to be similar to average annual default rates reported in previous studies, we hasten to point out that this difference is not an estimate of annual default rates.

high coupons of a junk bond shorten its duration relative to other bonds, the intermediate-term Treasury bond yield of 7.60 percent is probably the most appropriate benchmark to use in evaluating the actual yield of the junk bonds issued in 1977 and 1978.<sup>6</sup>

### 3. The relation between default rates and bond age

Table 3 of Asquith, Mullins and Wolff (1989) contains a matrix of default rates organized according to cohort of bonds issued in the same year (rows) and age of the issue (columns). The table illustrates that for a given year of issue, the annual default rate rises as the age of the cohort increases. What the table also demonstrates, although Asquith et al do not point this out, is that many of the higher default rates are concentrated within two or three years, as evidenced along the diagonals of the table.

To aid in illustrating this relation between default rates and the year of their occurrence, we display the default rates from Table 3 in Asquith et al in our Table 2 with a different format. Table 2 reports the matrix of Asquith et al default rates organized according to calendar years (rows) and age of bond (columns). At

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<sup>6</sup>The realized yield for the 1977-78 cohort is heavily influenced by two bonds that defaulted soon after they were issued. Both Inforex and Itel defaulted within two years of issue. The realized yields on these bonds are respectively -55.6 percent and -54.5 percent. In contrast, the Buttes Gas & Oil bond issued in 1977 defaulted in 1985 with a final price of \$25.375. Yet because Buttes paid coupons every six months for eight years before default, the realized yield on the bond is a positive 1.87 percent. The realized yield for the 1977-78 cohort, excluding Inforex and Itel, is 9.14 percent, in comparison with a promised yield of 11.20 percent. A major component of default risk for a junk bond is that it defaults soon after issue.

the bottom of each "age" column in the top panel of Table 2 (see also Figure 1A), we report the average default rate for that age category. These average default rates are significantly correlated with the age of the bond ( $t = 4.58$ )<sup>7</sup> and demonstrate the relation between default rate and age pointed out by Asquith et al.

The top panel of table 2 illustrates, however, that in several years, most notably 1985 and 1987, the default rates were uniformly high across all age groups. In contrast, in 1988 the default rates were uniformly low across all age groups. This finding is not very surprising since general economic conditions are important in determining the likelihood of default.

The bottom panel of Table 2 reports mean-adjusted default rates, organized by year of default and age group, where the mean default rate for the year in which the bonds defaulted (see the rightmost column in the top panel) is subtracted from the default rates reported in the top panel. The averages of these mean-adjusted default rates, reported at the bottom of each column (see

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<sup>7</sup>We test the null hypothesis that the rank correlation between bond age and default rate is equal to zero. To do this, we first determine the age of the bonds and the ranking of default rates for each year within each cohort. For example, in the 1977 cohort there are twelve age categories -- one year old (i.e., 1977) through twelve years old (1988) -- and twelve rankings for the magnitude of default rate in each year -- one for the lowest default rate (0.0%) and twelve for the highest (19.27%). We pool these values for each of the ten cohorts examined by Asquith et al, resulting in a sample of 75 observations. Our computed Spearman rank correlation is .49 and we use the Fisher z-transform to compute the test statistic.

also Figure 1B), are not significantly related to the age of the bond at the .05 level ( $t = 1.91$ ).<sup>8</sup>

#### 4. Concluding remarks

This paper examines several issues regarding reported default rates for lower-grade bonds. Recognizing the importance of returns in addition to default risk in bond investment decisions, we measure the returns that an investor would have realized by buying all the newly-issued lower-grade bonds issued in 1977-78. We find that, in comparison to the average 11.2 percent promised yield for the bonds issued in 1977 and 1978, the realized yield for these bonds is 8.51 percent. We also note that default rates for all bonds, regardless of issue date or age, will tend to vary together as economic conditions change. When we control for this systematic variation in defaults, we find that the statistically significant relation between bond age and default rate found by others is greatly diminished.

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<sup>8</sup>The details of this test are the same as those described in footnote 7, except that the default rankings are now based on the mean-adjusted default rates. The resulting rank correlation is 0.22.

**Table 1**  
**Promised and Actual Performance on All Lower-Grade Bonds**  
**Issued in 1977 and 1978**

	Yield		Return to Final Price With Coupons Reinvested at:			Return to December 1988 with Coupons and Repayments Reinvested at:		
	Promised	Actual	Lower- Grade Return	High-Grade Corporate Return	T-Bond Return	Lower- Grade Return	High-Grade Corporate Return	T-Bond Return
1977	10.71%	8.90%	10.41%	10.42%	10.27%	10.70%	10.78%	10.56%
1978	11.40%	8.22%	10.33%	10.46%	10.32%	10.50%	10.52%	10.27%
Both Years	11.12%	8.51%	10.37%	10.45%	10.31%	10.58%	10.63%	10.39%

Table 2A  
 "Aged Defaults" (%) for Lower-Grade Bonds Grouped by Year of Default

	Age of Bond												Mean	
	1	2	3	4	5	6	7	8	9	10	11	12		
(1977)	1	0.00												0.00
	2	0.00	0.00											0.00
	3	0.00	8.32	0.00										2.77
	4	0.00	0.00	0.00	0.00									0.00
Year of Default	5	0.00	0.57	5.54	1.39	0.00								1.50
	6	1.00	6.05	2.45	1.11	0.00	0.00							1.77
	7	0.00	2.41	0.00	0.00	2.38	7.91	0.00						1.81
	8	2.29	0.00	1.61	8.06	0.00	6.73	4.85	7.71					3.91
	9	0.00	1.99	6.08	11.49	6.85	13.90	1.98	3.12	3.63				5.45
	10	2.73	0.80	2.03	7.83	0.00	0.00	6.30	0.00	5.55	19.27			4.45
	11		3.84	2.28	3.06	9.44	9.44	0.00	1.88	5.78	1.39	3.30		4.04
(1988)	12			1.57	0.45	0.00	0.50	0.00	0.00	2.45	1.19	1.73	0.00	0.79
Mean		0.60	2.40	2.16	3.71	2.33	5.50	2.19	2.54	4.35	7.28	2.52	0.00	

**Table 2B**  
**"Aged Defaults" (%) for Lower-Grade Bonds Grouped by Year of Default\***

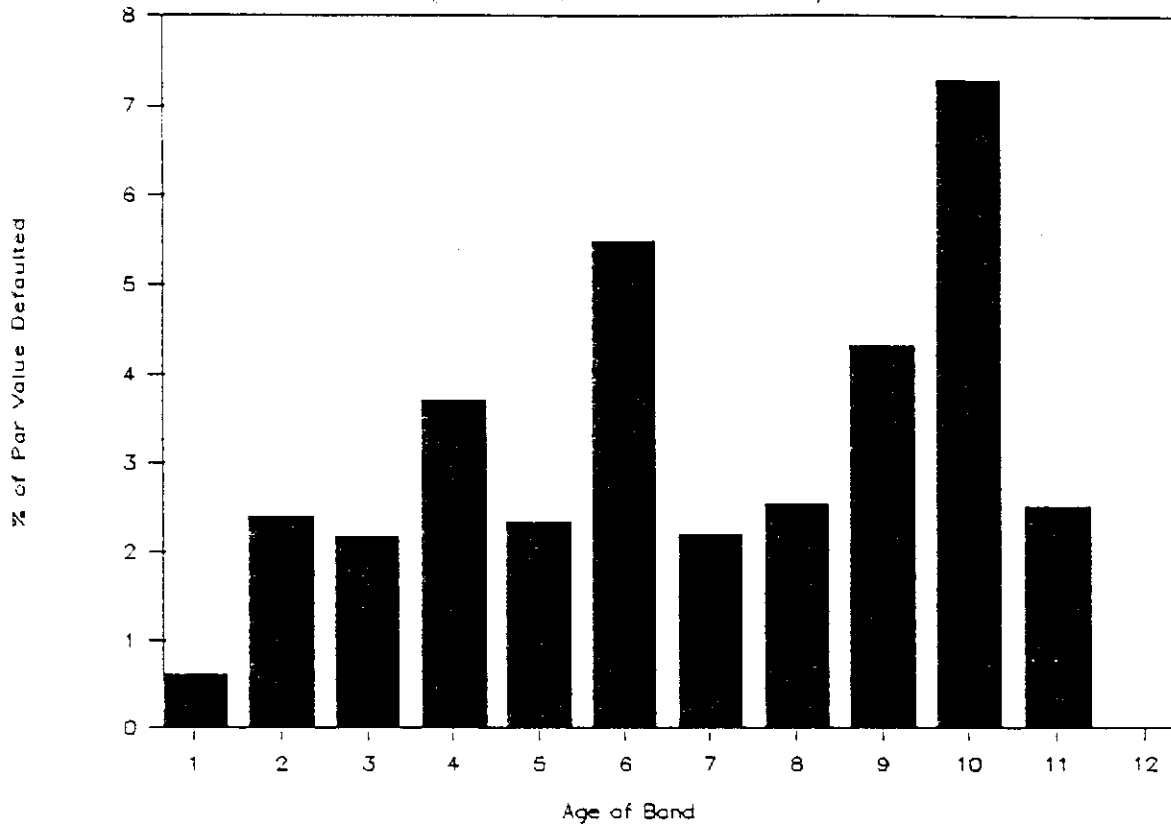
	Age of Bond												
	1	2	3	4	5	6	7	8	9	10	11	12	
(1977) 1	0.00												
2	0.00	0.00											
3	-2.77	5.55	-2.77										
4	0.00	0.00	0.00	0.00									
5	-1.50	-0.93	4.04	-0.11	-1.50								
Year of Default													
6	-0.77	4.28	0.68	-0.66	-1.77	-1.77							
7	-1.81	0.60	-1.81	-1.81	0.57	6.10	-1.81						
8	-1.62	-3.91	-2.30	4.15	-3.91	2.82	0.94	3.80					
9	-5.45	-3.46	0.63	6.04	1.40	8.45	-3.47	-2.33	-1.82				
10	-1.72	-3.65	-2.42	3.38	-4.45	-4.45	1.85	-4.45	1.10	14.82			
11		-0.20	-1.76	-0.98	5.40	5.40	-4.04	-2.16	1.74	-2.65	-0.74		
(1988) 12			0.78	-0.34	-0.79	-0.29	-0.79	-0.79	1.66	0.40	0.94	-0.79	
Mean	-1.56	-0.17	-0.49	1.07	-0.63	2.32	-1.22	-1.19	0.67	4.19	0.10	-0.79	

\*Default rates are adjusted for the mean default rate in the year in which they occurred.

Figure 1

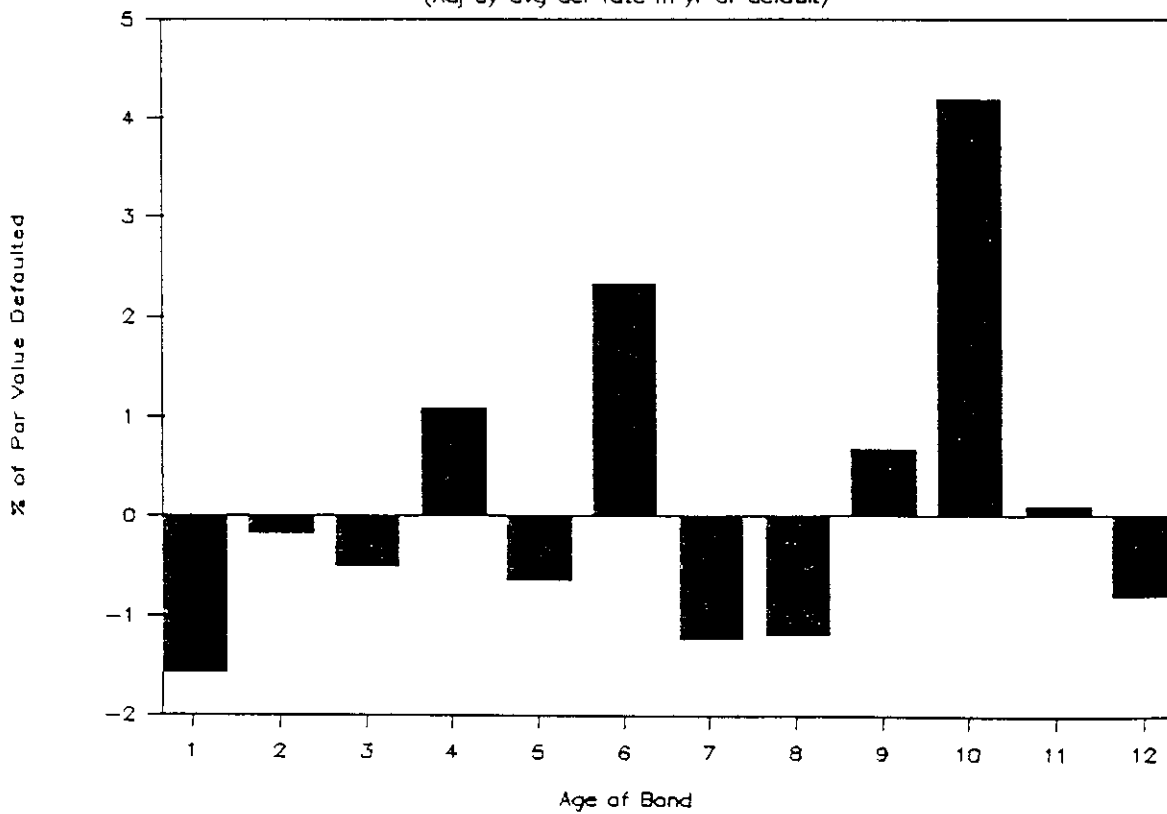
### DEFAULT RATES CLASSIFIED BY BOND AGE

(Source: Asquith et al default study)



### MEAN-ADJUSTED DEFAULT RATES

(Adj by avg def rate in yr of default)





Appendix Table 1A  
Description of Junk Bonds Issued in 1977

Issuer of Bond	Maturity Date	Type	Coupon	Int. Pay.	First Refund Date	Amt. Issued (in mil)	Initial Price
Action Industries, Inc.	1992	Sr Sub Deb	11a	mar/Sep 15	9/15/83	12	100
APL Corp.	1997	Sub Deb	10.75	feb/Aug 1	8/1/87	35	100
Buttes Gas & Oil Co.	1997	Sub Deb	10.25	feb/Aug 15	8/15/87	70	93.23*
Caesars World	1997	Sr SF Deb	11.25	jun/Dec 1	12/1/87	25	92.30*
Cascade Nat. Gas Corp.	1992	Sr Sub Deb	10.5	jun/Dec 1	12/1/78	10	100
Chrysler Financial	1987	Sub Notes	9.375	mar/Sep 1	9/1/82	75	99.84
City Investing	1997	SF Deb	9.125	mar/Sep 1	9/1/87	100	89.09*
Comdisco, Inc.	1993	Sub Deb	11.5	jun/Dec 1	12/1/82	15	100
Emerson Radio Corp.	1992	Sr SF Deb	11	apr/Oct 15	10/5/82	7.5	96.42*
Gulf Res. & Chem. Corp.	1997	Sub Deb	10.875	apr/Oct 15	10/15/87	50	100
Lear Petroleum	1992	Deb	11.5	jun/Dec 1	11/30/83	13	100
Loral Corp.	1997	Sub SF Deb	10.75	mar/Sep 15	9/15/87	20	100
LTV Corp.	1997	Deb	9.25	Feb/aug 1	2/1/82	75	83.90*
Michigan General	1992	Sr SF Deb	10.875	jan/Jul 15	1/15/81	27.5	100
Pan. Amer. World Airw.	1994	Eq Ctfs A	11.5	May/nov 1	11/15/78	26.5	100
Pan. Amer. World Airw.	1994	Eq Ctfs B	11.5	May/nov 1	11/15/78	26.5	100
Polychrome Corp.	1997	SF Deb	10.5	may/Nov 1	11/1/87	20	100
Smith's Transfer	1987	Sub Deb	8.75	may/Nov 1	None	10	99.25
Tannetics	1992	Sr SF Deb	10.5	jun/Dec 1	12/1/83	12.5	100
Texas Int'l Co.	1997	Sub Deb	11.5	Apr/oct 1	4/1/87	30	100
UV Ind.	1987	Sr Sub Deb	9.25	Apr/oct 15	None	25	100
U.S. Home	1987	Notes	10	feb/Aug 15	None	50	100
Western Co. of N. A.	1997	Sub Deb	10.875	mar/Sep 15	9/14/87	35	96.75#
Western Pacific RR	2002	Mtge B	9.125	Jun/dec 15	6/15/83	20	99.5
World Airways	1993	Sec Eq Ctfs	10	jun/Dec 15	12/15/78	65	100
Zapata Corp.	1997	Sub Deb	10.25	Mar/sep 15	3/15/87	75	91.75*

Month of maturity is capitalized

a 11.25% as of 5/15/82

\* Issued as part of unit  
Values from Capital Changes Reporter

# Unit offering; price from Moody's  
Bond Guide 10/77 at first listing

Appendix Table 1B  
Description of Junk Bonds Issued in 1978

Issuer of Bond	Maturity Date	Type	Coupon	Int. Pay	First Refund Date	Amt. Issued (in mil.)	Issue Price
Anglo Co.	1998	Sub Deb	11.875	jan/Jul 15	7/15/88	17.5	99.75
Arrow Electronics	1998	Sub Deb	12	Jun/dec 1	6/1/88	17	99*
A-T-O, Inc.	1998	Sub Deb	10.375	Apr/oct 1	4/1/88	20	100
Bangor Punta	1998	Sub Deb	11.25	apr/Oct 1	10/1/89	40	100
Bangor Punta	1998	Sub Deb	11.5	jan/Jul 1	7/1/89	50	100
Budget Capital	1998	Sr Sub SF Deb	11.875	Jun/dec 1	6/1/88	25	99
California Life	1998	SF Deb	11	Mar/sep 15	3/14/88	20	100
CCI Corp.	1998	Sub Deb	12.75	jun/Dec 15	12/15/88	25	99.625
Champion Parts Reb.	1993	Sub Deb	13.25	jun/Dec 1	12/1/83	15	99
Charter Co.	1998	Sub Deb	10.625	mar/Sep 1	9/1/88	50	100
Charter Medical	1993	SF Deb	11	Feb/aug 1	2/1/84	12	100
Columbia Gen'l	1993	Sr Sub Deb	11.25	May/nov 1	5/1/79	6	100
Crown Industries	1993	Sub Deb	12	Sep 1 #	9/1/81	6	100
Crystal Oil	1990	Sub Deb	12.625	Jun/dec 15	6/15/81 ^	30	100
Documation	1998	Sub Deb	11.5	May/nov 1	5/1/88	15	100
Early Calif. Ind.	1993	SF Deb	12.5	jun/Dec 1	12/1/84	20	93.5*
Essex Chemical	1998	Sub Deb	11.375	mar/Sep 1	9/1/88	25	100
Filmways, Inc.	1998	Sub SF Deb	11	jan/Jul 1	7/1/88	35	100
Foothill Group	1998	Sub SF Deb	12.5	apr/Oct 15	10/15/88	10	100
Global Marine	1998	Sr Sub Deb	12.375	feb/Aug 1	8/1/88	25	99.75
Inforex, Inc.	1998	Sub Deb	10.625	May/nov 1	5/1/88	20	100
Intel Corp.	1998	Sub Deb	9.625	Apr/oct 15	4/15/88	100	100
Kay Corp.	1998	Sub SF Deb	13.5	jun/Dec 1	12/1/88	10	100
Kenai Corp.	1998	Sub SF Dev	10.5	feb/Aug 15	8/15/88	27.5	88.625*
Medenco	1998	Sub Deb	11	Apr/oct 1	10/1/88	10	95.94*
Midland Glass	1998	SF Deb	10.75	Feb/aug 15	2/15/88	25	100
Moran Bros.	1998	Sub Deb	11.5	May/nov 1	5/1/88	15	99
Norin Corp.	1998	Sub SF Deb	11	Dec 31 #	1/31/83	26	100
Oak Industries	1998	Sub Deb	11.875	May/nov 15	5/15/88	30	100
Petro-Lewis Corp.	1998	Sub Deb	12.25	feb/Aug 1	8/1/88	35	95.5*
Petro-Lewis Corp.	1997	Sub Deb	11	jun/Dec 31	1/1/88	25	93.95*
Pneumo Corp.	1993	Sub SF Deb	9.625	feb/Aug 1	8/1/88	25	87.825*
Ramada Inns	1993	Sub Deb	10	mar/Sep 1	9/1/83	100	89
Realty Refund Trust	1998	Sub SF Deb	12	May/nov 15	5/15/88	15	100
Risdon Manufacturing	1998	Sub Deb	11.75	apr/Oct 1	10/1/88	20	99.5
Savin Corp.	1998	Sub Deb	11.375	apr/Oct 1	10/1/88	60	99.5
Sea Containers	1998	Sub Deb	10.25	mar/Sep 1	9/1/88	40	100
Sun Chemical	1996	Sub Deb	11.5	jun/Dec 1	12/1/88	40	100
Sys. Eng. Labs	1993	Sub Deb	12.5	Jun/dec 1	6/1/86	12	96.75
Telemed Corp.	1993	Sub Deb	12.25	jan/Jul 15	7/15/85	15	100
Telex	1996	Sr Sub Deb	11.75	feb/Aug 15	8/15/88	35	100
Texas Int'l Airlines	1998	Sub Deb	10.875	Apr/oct 15	4/15/88	18	94.5*
Texas Int'l Co.	1997	Sub Deb	11.5	Apr/oct 1	4/1/87	20	100
Tipperary Corp.	1998	Sub Deb	11.5	mar/Sep 15	9/15/88	35	90*
Transcontinental Oil	1998	Sub Deb	12.875	Jun/dec 15	6/15/83	30	96
20th Century-Fox Film	1998	Sub Deb	10.25	Apr/oct 1	4/1/85	50	99.25
Tyler Corp.	1998	Sub Deb	10.5	Jun/dec 1	6/1/88	30	100
UNC Resources	1998	Sub Deb	12	jun/Dec 1	12/1/88	35	100
Wainoco Oil	1998	Sub Deb	10.75	apr/Oct 1	10/1/88	30	100
Western Co. of N. A.	1998	Sub Deb	10.7	Apr/oct 1	4/1/88	30	100
Wetterau Finance	1993	Sub Notes	9	Sep 1 @	9/1/83	6	100
World Airways	1994	Eq Tr Cdfs	11.25	Apr/oct 15	4/15/79	67.9	100

Month of maturity is capitalized

# Int. paid monthly @ Int. paid quarterly

^ Moody's Industrials puts date as 6/15/81, but this date matches actual refunding, as in S&P.

\* Issued as part of unit. Values from Capital Changes Reporter.

Appendix Table 2A  
Last Prices for Junk Bonds Issued in 1977

Issuer of Bond	Maturity Date	Last Price		Disposition of Bond		
		*Month End	Moody's	S&P	Explanation	Source
Action Industries, Inc.	1992	Dec 88	92	88	Outstanding as of 12/88	S&P Bond Guide, 1/89
APL Corp.	1997	Dec 88	44.25	44.25	Outstanding as of 12/88	S&P Bond Guide, 1/89
Buttes Gas & Oil Co.	1997	Aug 85		25.375	Defaulted on 8/15/85 payment	S&P Bond Guide, 9/85
Caesars World	1997	Jul 83	89.5	89.5	Exchange offer expires 8/17/83	Capital Changes Reporter
Cascade Nat. Gas Corp.	1992				Called 12/1/88 at 101.62	S&P Bond Guide, 12/88
Chrysler Financial	1987				Matured September 1, 1987	Maturity date of bond
City Investing	1997				Called 9/1/85 at 105.28	S&P Bond Guide, 9/85
Comdisco, Inc.	1993	Dec 88	93	93	Outstanding as of 12/88	S&P Bond Guide, 1/89
Emerson Radio Corp.	1992				Called 9/26/86 at 100	S&P Called Bond Record
Gulf Res. & Chem. Corp.	1997	Dec 88	91.5	90	Outstanding as of 12/88	S&P Bond Guide, 1/89
Lear Petroleum	1992				Called 12/1/88 at 100	S&P Bond Guide, 12/88
Loral Corp.	1997	Dec 88	100.5	100	Outstanding as of 12/88	S&P Bond Guide, 1/89
LTV Corp.	1997	Apr 86	76	76	Exchange offer of 4/20/86	First Boston
Michigan General	1992	Dec 81	66.25	66.5	Exchange offer first noted	S&P Bond Guide, 1/82
Pan. Amer. World Airw.	1994				Called 12/20/88 at 100	S&P Bond Guide, 12/88
Pan. Amer. World Airw.	1994	Dec 88		100	Outstanding as of 12/88	S&P Bond Guide, 1/89
Polychrome Corp.	1997				Called on 7/11/88 at 102.042	S&P Called Bond Record
Smith's Transfer	1987				Matured November 1, 1987	Maturity date of bond
Tannetics	1992	Nov 83	92.125	92.25	Prop called	S&P Bond Guide, 12/83
Texas Int'l Co.	1997	Jun 85	48.5	49.5	Exchange offer of 6/6/85	First Boston
UV Ind.	1987				Matured April 15, 1987	Maturity date of bond
U.S. Home	1987	Sep 85	93.125	93.125	Exchange offer of 9/5/85	First Boston
Western Co. of N. A.	1997	Sep 85	57	57	Exchange offer of 9/10/85	First Boston
Western Pacific RR	2002				Called on 3/2/87 at 105.39	S&P Called Bond Record
World Airways	1993	May 84	71.125	71.125	Exchange offer first noted	S&P Bond Guide, 6/84
Zapata Corp.	1997	Sep 86		29.125	Defaulted on 9/15/86 payment	S&P Bond Guide, 10/86

\* Month end prices taken from next month's S&P Bond Guide and Moody's Bond Record: Month end May 86 figures taken from June 86 issue of S&P and Moody's

Appendix Table 28  
Last Prices for Junk Bonds Issued in 1978

Issuer of Bond	Maturity Date	Last Price		Disposition of Bond	Source
		Month End*	Moody's S&P		
Anglo Co.	1998	Nov 83	71	First rated as defaulted	S&P Bond Guide, 12/83
Arrow Electronics	1998	Dec 88	89	Outstanding as of 12/88	S&P Bond Guide, 1/89
A-T-O, Inc.	1998	Dec 88	92	Outstanding as of 12/88	S&P Bond Guide, 1/89
Bangor Punta	1998			Called on 3/18/87 at 105.25	S&P Called Bond Record
Bangor Punta	1998			Called on 3/18/87 at 105.367	S&P Called Bond Record
Budget Capital	1998	Sep 88	14.5	First rated as defaulted	S&P Bond Guide, 10/88
California Life	1998	Apr 82	30	First rated as defaulted	S&P Bond Guide, 5/82
CCI Corp.	1998	Dec 88	86	Outstanding as of 12/88	Moody's Bond Record, 1/89
Champion Parts Reb.	1993	Dec 88	92.5	Outstanding as of 12/88	Moody's Bond Record, 1/89
Charter Co.	1998	Apr 84	35.75	First rated as defaulted	S&P Bond Guide, 5/84
Charter Medical	1993			Called on 4/10/87 at 101.1	S&P Called Bond Record
Columbia Gen'l	1993			Outstanding as of 1/1/89 at 97	National Bond Summary
Crown Industries	1993			Called on 12/14/86 at 104.5	S&P Called Bond Record
Crystal Oil	1990	Apr 86		First rated as defaulted	S&P Bond Guide, 5/86
Documation	1998	Oct 84	65	First rated as defaulted	S&P Bond Guide, 11/84
Early Calif. Ind.	1993	Dec 88		Outstanding as of 12/88	S&P Bond Guide, 1/89
Essex Chemical	1998			Called on 6/1/87 at 102.275	S&P Called Bond Record
Filmways, Inc.	1998	Dec 88	87.75	Outstanding as of 12/88	S&P Bond Guide, 1/89
Foothill Group	1998	Dec 88	99	Outstanding as of 12/88	S&P Bond Guide, 1/89
Global Marine	1998	Aug 85	35	First rated as defaulted	S&P Bond Guide, 9/85
Inforex, Inc.	1998	Oct 79		First rated as defaulted	S&P Bond Guide, 11/87
Itel Corp.	1998	Mar 80	20.125	Last price before rated in default	by S&P Bond Guide, 8/80
Kay Corp.	1998	Dec 88	94	Outstanding as of 12/88	S&P Bond Guide, 1/89
Kenai Corp.	1998	Oct 84	46	First rated as defaulted	S&P Bond Guide, 11/84
Medenco	1998	Dec 88	99.5	Outstanding as of 12/88	S&P Bond Guide, 1/89
Midland Glass	1998	Dec 87	68.75	Last available price in either	Moody's or S&P
Moran Bros.	1998	Jan 87		First rated as defaulted	S&P Bond Guide, 2/87
Norin Corp.	1998			Called on 1/1/88 at 101.5	S&P Bond Guide, 1/88
Oak Industries	1998	Feb 85	57	Exchange offer of 2/7/85	First Boston
Petro-Lewis Corp.	1998	Nov 85	66.625	Exchange offer of 11/6/85	First Boston
Petro-Lewis Corp.	1997	Nov 85	61.25	Exchange offer of 11/6/85	First Boston
Pneumo Corp.	1993	Dec 88	96	Outstanding as of 12/88	S&P Bond Guide, 1/89
Ramada Inns	1993	Dec 88	89.5	Outstanding as of 12/88	S&P Bond Guide, 1/89
Realty Refund Trust	1998			Called on 10/16/86 at 101	S&P Bond Guide, 9/86
Risdon Manufacturing	1998			Called on 10/1/86 at 107.48	S&P Called Bond Record
Savin Corp.	1998	Feb 86	49	First rated as defaulted	S&P Bond Guide, 3/86
Sea Containers	1998	Dec 88		Outstanding as of 12/88	S&P Bond Guide, 1/89
Sun Chemical	1996			Called 12/1/88 at 100	S&P Bond Guide, 12/88
Sys. Eng. Labs	1993			Called on 3/3/86 at 100.375	S&P Called Bond Record
Telemed Corp.	1993			Called on 7/15/86 at 102.45	S&P Called Bond Record
Telex	1996			Called on 3/23/87 at 102.35	S&P Called Bond Record
Texas Int'l Airlines	1998	Sep 83	47.5	Defaulted on 10/15/83 payment	S&P Bond Guide, 10/83
Texas Int'l Co.	1997	Jun 85	48.5	Exchange offer of 6/6/85	First Boston
Tipperary Corp.	1998	Mar 85	30	Exchange offer of 3/31/85	First Boston
Transcontinental Oil	1998	Nov 83	54	Exchange offer first noted	S&P Bond Guide, 12/83
20th Century-Fox Film	1998	Dec 88	86.75	Outstanding as of 12/88	S&P Bond Guide, 1/89
Tyler Corp.	1998	Dec 88	88	Outstanding as of 12/88	S&P Bond Guide, 1/89
UNC Resources	1998			Called on 7/14/86 at 103.6	S&P Called Bond Record
Wainoco Oil	1998	Dec 88	87	Outstanding as of 12/88	S&P Bond Guide, 1/89
Western Co. of N. A.	1998	Sep 85	61.375	Exchange offer of 9/10/85	First Boston
Wetterau Finance	1993			Outstanding as of 1/1/89 at 94.75	National Bond Summary
World Airways	1994			Called on 5/1/87 at 101.125	S&P Bond Guide, 5/87

\* Month end prices taken from next month's S&P Bond Guide and Moody's Bond Record: Month end May 86 figures taken from June 86 issue of S&P and Moody's

Appendix Table 3A  
 Promised and Actual Performance on Individual Junk Bonds Issued in 1977

Bond	Issue Date	Redemption Date	Promised Yield	Actual Yield	Return to Final Price With Coupons Reinvested at:			Return to December 1988 with coupons and repayments reinvested at:		
					Junk Yield	High-Grade Corporates Yield	T-Bonds Yield	Junk Yield	High-Grade Corporates Yield	T-Bonds Yield
Action Ind.	Sep 77	Dec 88	10.89%	10.49%	11.36%	11.42%	11.22%	11.36%	11.42%	11.22%
Apl Corp.	Jul 77	Dec 88	10.73%	7.50%	9.85%	9.87%	9.65%	9.85%	9.87%	9.65%
Buttes Gas & Oil	Aug 77	Aug 85	11.10%	11.87%	6.84%	6.81%	6.33%	8.23%	8.36%	8.14%
Caesars World	Dec 77	Jul 83	12.29%	11.80%	12.17%	11.20%	10.88%	12.39%	12.72%	12.53%
Cascade Nat. Gas	Dec 77	Dec 88	10.50%	10.58%	11.36%	11.29%	11.06%	11.31%	11.24%	11.08%
Chrysler Fin'l	Aug 77	Sep 87	9.40%	9.28%	10.60%	10.64%	10.48%	10.58%	10.67%	10.47%
City Investing	Aug 77	Sep 85	10.43%	11.51%	12.27%	12.24%	11.93%	12.08%	12.22%	12.12%
Comdisco	Dec 77	Dec 88	11.37%	11.02%	11.76%	11.69%	11.50%	11.76%	11.69%	11.50%
Emerson Radio	Oct 77	Sep 85	11.38%	11.52%	12.43%	13.00%	13.53%	11.83%	11.63%	11.29%
Gulf Res. & Chem.	Oct 77	Dec 88	10.77%	10.23%	12.26%	12.01%	11.77%	11.26%	11.27%	11.07%
Lear Petroleum	Dec 77	Dec 88	11.50%	11.50%	12.07%	12.01%	11.07%	12.02%	11.95%	11.78%
loral Corp.	Sep 77	Dec 88	10.75%	10.74%	11.49%	11.55%	11.36%	11.49%	11.55%	11.36%
LTV Corp.	Feb 77	Apr 81	11.30%	10.40%	11.79%	12.22%	12.48%	11.07%	10.97%	10.61%
Michigan General	Aug 77	Dec 81	11.00%	3.96%	3.25%	2.72%	3.00%	10.93%	11.06%	10.55%
Pan Am Ser. A	Apr 77	Dec 88	11.50%	11.36%	11.92%	11.87%	11.62%	11.87%	11.81%	11.64%
Pan Am Ser. B	Oct 77	Jul 88	10.50%	10.38%	11.38%	11.81%	11.62%	11.38%	11.81%	11.62%
Polychrome	Nov 77	Nov 87	8.86%	8.86%	9.84%	10.25%	10.20%	10.69%	11.33%	11.15%
Smith's Transfer	Nov 77	Nov 87	8.86%	8.86%	9.84%	10.25%	10.20%	10.69%	11.33%	11.15%
Tennetics	Dec 77	Nov 87	10.50%	9.50%	10.55%	9.68%	9.38%	11.34%	11.69%	11.52%
Texas Int'l Co.	Apr 77	Jun 85	11.50%	5.82%	8.83%	8.73%	8.39%	9.65%	9.37%	9.52%
U.S. Home	Aug 77	Sep 85	10.00%	9.43%	10.61%	10.34%	10.20%	10.93%	11.10%	10.99%
UV Ind.	Apr 77	Apr 87	9.25%	7.66%	9.13%	9.30%	9.35%	9.16%	9.13%	8.89%
Western Co. of N.A.	Sep 77	Mar 87	11.18%	6.45%	8.96%	8.89%	8.50%	9.75%	9.92%	9.77%
Western Pacific RR	Jun 77	Mar 84	10.21%	6.87%	11.14%	11.47%	11.61%	10.46%	10.27%	9.99%
World Airways	Aug 77	May 84	10.21%	6.87%	7.72%	6.64%	6.35%	10.52%	10.77%	10.77%
Zapata Corp.	Mar 77	Sep 86	11.30%	4.99%	8.99%	9.51%	9.61%	9.06%	9.06%	8.78%

Appendix Table 3B  
 Promised and Actual Performance on Individual Junk Bonds  
 Issued in 1978

Bond	Issue Date	Redemption Date	Yield		Return to Final Price with Coupons Reinvested at:			Return to December 1988 with coupons and repayments reinvested at:		
			Promised	Actual	Junk Yield	High-Grade Corporates Yield	T-Bonds Yield	Junk Yield	High-Grade Corporates Yield	T-Bonds Yield
Anglo Co.	Jul 78	Nov 83	11.91%	6.62%	8.95%	8.00%	7.59%	10.56%	10.92%	10.70%
Arrow Electronics	Jun 78	Dec 88	12.13%	11.61%	12.24%	12.18%	11.98%	12.24%	12.18%	11.98%
A-1-0, Inc.	Mar 78	Dec 88	9.82%	9.82%	11.09%	11.16%	10.96%	11.09%	11.16%	10.96%
Bangor Punta, 11.5	Jun 78	Mar 87	11.38%	11.73%	13.06%	13.46%	13.57%	11.98%	11.79%	11.45%
Bangor Punta, 11.25	Oct 78	Mar 87	11.25%	11.67%	13.16%	13.71%	13.84%	12.02%	11.94%	11.59%
Budget Capital	Jul 78	Sep 88	12.14%	5.53%	9.62%	9.59%	9.24%	12.02%	11.94%	11.59%
California Life	Mar 78	Apr 82	11.00%	-13.31%	-9.01%	-8.89%	-8.27%	6.22%	6.18%	5.69%
CCI Corp.	Dec 78	Dec 88	12.80%	12.04%	12.58%	13.18%	12.33%	12.58%	12.56%	12.33%
Champion Parts Reb.	Dec 78	Dec 88	13.41%	13.03%	13.18%	13.15%	12.93%	13.18%	13.15%	12.93%
Charter Co.	Sep 78	Apr 84	10.63%	-2.84%	2.59%	1.33%	0.97%	7.41%	7.90%	7.61%
Charter Medical	Feb 78	Apr 87	11.00%	11.09%	12.43%	12.82%	12.81%	11.56%	11.49%	11.20%
Columbia General	Apr 78	Dec 88	12.41%	10.95%	12.43%	11.84%	11.64%	11.86%	11.84%	11.64%
Crown Industries	Sep 78	Dec 86	12.30%	12.63%	13.41%	14.18%	14.21%	12.64%	12.38%	12.05%
Crystal Oil	Jun 78	Apr 86	12.63%	12.63%	8.03%	8.62%	9.03%	8.17%	8.14%	7.81%
Documation	May 78	Oct 84	11.50%	6.34%	8.75%	8.30%	7.90%	10.39%	10.53%	10.36%
Early California Ind.	Dec 78	Dec 88	13.52%	10.69%	11.91%	11.87%	11.63%	10.39%	10.53%	10.36%
Essex Chemical	Aug 78	May 87	11.26%	11.37%	12.39%	12.67%	12.63%	11.95%	11.92%	11.67%
Filmways, Inc.	Jul 78	Dec 88	11.00%	10.29%	11.46%	11.42%	11.19%	12.03%	12.09%	11.78%
Foothill Group.	Oct 78	Dec 88	12.50%	12.40%	12.81%	12.85%	12.63%	11.46%	11.42%	11.19%
Global Marine	Jul 78	Aug 85	12.27%	3.21%	12.81%	12.85%	12.63%	12.81%	12.85%	12.63%
Inforex, Inc.	May 78	Oct 79	10.63%	-55.64%	7.90%	7.91%	7.38%	9.07%	9.02%	8.52%
Itel Corp.	Apr 78	Mar 80	9.62%	-49.46%	-51.17%	-51.40%	-51.28%	1.98%	1.82%	1.58%
Kay Corp.	Dec 78	Dec 80	12.01%	13.20%	-49.46%	-49.82%	-49.55%	0.70%	0.68%	0.36%
Kenai Corp.	Aug 78	Oct 84	12.01%	13.20%	7.02%	13.24%	13.03%	13.28%	13.24%	13.03%
Medenco	Jun 78	Dec 88	11.77%	3.53%	12.42%	6.72%	6.26%	9.38%	9.65%	9.42%
Midland Glass	Feb 78	Dec 87	10.75%	9.97%	12.42%	12.69%	12.28%	12.42%	12.69%	12.28%
Moran Bros.	May 78	Dec 87	11.63%	8.67%	10.50%	10.50%	10.35%	10.62%	10.49%	10.26%
Morin Corp.	Jan 87	Jan 88	10.81%	6.59%	10.06%	10.92%	10.95%	10.62%	9.95%	9.49%
Oak Industries	May 78	Nov 85	11.88%	10.58%	11.30%	11.80%	11.64%	11.85%	11.67%	11.43%
Petro-Lewis, 11	Jan 78	Nov 85	11.79%	6.77%	9.20%	8.33%	7.86%	10.42%	10.70%	10.54%
Petro-Lewis, 12.25	Jul 78	Nov 85	12.74%	9.76%	10.55%	10.70%	10.31%	10.42%	10.54%	10.54%
Pneumo Corp.	Aug 78	Dec 88	11.33%	11.35%	11.51%	11.88%	11.47%	10.81%	10.74%	10.56%
Ramada Inns	Sep 78	Dec 88	11.56%	11.24%	12.06%	12.12%	11.93%	11.50%	11.57%	11.39%
Realty Refind Trust	May 78	Oct 86	12.00%	12.07%	12.10%	12.22%	11.95%	12.10%	12.12%	11.93%
Risdon Mfg.	Oct 78	Oct 86	11.82%	12.42%	13.04%	13.47%	13.64%	12.10%	12.22%	11.95%
Savin Corp.	Oct 78	Feb 86	11.44%	5.20%	13.49%	14.00%	14.08%	12.26%	12.12%	11.86%
Sea Containers	Sep 78	Feb 86	11.44%	5.20%	9.40%	10.37%	10.31%	12.57%	12.48%	12.12%
Sun Chemical	Sep 78	Dec 88	10.25%	9.36%	10.88%	11.00%	10.79%	9.53%	9.51%	9.21%
Sys. Engineering Labs	Nov 78	Dec 88	11.38%	11.34%	12.18%	12.15%	11.90%	10.88%	11.00%	10.79%
Telex	May 78	Mar 86	12.84%	13.00%	13.79%	14.38%	14.34%	12.12%	12.09%	11.91%
Texas Int'l Airlines	Aug 78	Jul 86	12.40%	12.64%	13.85%	14.13%	14.66%	12.75%	12.47%	12.19%
Telecom	Jul 87	Mar 87	11.75%	11.92%	13.20%	13.80%	14.66%	12.11%	12.58%	11.95%
Texas Int'l Airlines	Apr 78	Sep 83	11.59%	1.89%	5.87%	4.95%	4.55%	12.08%	12.04%	11.73%
Texas Int'l Co.	Jul 78	Sep 83	11.88%	6.01%	7.13%	6.53%	6.94%	9.01%	9.22%	8.97%
Tipperary Corp.	Jun 78	Jun 85	12.91%	2.28%	9.31%	9.31%	8.94%	10.07%	10.07%	10.02%
Transcontinental Oil	Apr 78	Nov 83	12.85%	5.96%	8.65%	7.48%	7.04%	10.12%	10.23%	10.02%
20th-Century Fox	Jun 78	Dec 88	10.34%	9.63%	11.00%	11.07%	10.87%	10.39%	10.62%	10.38%
Tyler Corp.	Dec 78	Dec 88	12.00%	12.00%	11.13%	11.07%	10.88%	11.00%	11.07%	10.87%
UNC Resources	Jul 86	Jul 86	10.50%	9.83%	11.13%	11.07%	10.88%	11.00%	11.07%	10.87%
Valinco Oil	Dec 78	Dec 88	12.00%	12.34%	13.71%	14.01%	14.33%	11.35%	11.07%	10.88%
Western Co. of N.A.	Sep 78	Sep 85	10.75%	10.03%	11.38%	11.46%	11.24%	12.36%	12.23%	11.78%
Western Finance	Mar 78	Sep 85	10.60%	6.27%	9.03%	8.97%	8.56%	11.38%	11.46%	11.24%
World Airways	Sep 78	Dec 88	9.10%	8.78%	10.38%	10.41%	10.22%	9.84%	10.03%	9.87%
	May 78	Apr 87	11.38%	11.46%	12.48%	12.67%	12.68%	10.38%	10.41%	10.22%