Seasonality in the Returns of Defaulted Bonds: The January and October Effects

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This paper addresses the issue of seasonality in the returns of defaulted corporate bonds. We find evidence of seasonality in monthly returns for January and October from 1970 to 1991. We find that returns in January are abnormally high, following the typical January effect found in small company stocks. We also find that returns in October are abnormally low. The results of our work are of direct interest and application to institutional managers who are investing in defaulted securities.

INTRODUCTION

In a recent article in the *Financial Analysts Journal* Altman (1993) raises the issue of seasonality in returns on investments in publicly traded defaulted corporate bonds. Altman suggests that preliminary evidence of seasonality based on six years of monthly returns invites further study. In this paper we investigate monthly returns of defaulted bonds over a period of 22 years, thus providing a significant insight into the question of seasonality.

BACKGROUND AND LITERATURE REVIEW

The number of published studies on returns of defaulted securities is small. Until recently Hickman (1958) was the most comprehensive study of the investment characteristics of defaulted bond returns. Hickman's findings, summarized in Table 1, are based on annual returns for defaults from 1900 to 1943. The size of these returns, especially those from 1930 to 1943, was a primary motivation in the establishment of specialized hedge funds in the 1980s that invested in defaulted debt.

More recent studies by Altman (1993), Hradsky and Long (1989), Warner (1977), Keim and Stambaugh (1986), and Ward and Griepentrog (1993) provide information about returns on recent defaults. Altman (1993) reports that annual returns on defaulted corporate debt from 1987 to 1992 averaged 10.7 percent on a compounded annual basis. Hradsky

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Table 1—Average Holding Period Return on Defaulted Bonds From Default to Extinguishment

Category*	1900-1943	1900-1929	1930-1943
All Issues	20.0%	6.4%	26.4%
Railroads	18.6%	6.4%	24.4%
Public Utilities	17.0%	6.2%	22.7%
Industrials	25.8%	6.7%	33.6%

* For issues with par values of $5 million or more
Source: *Corporate Bonds Quality and Investor Experience*, by W. Braddock Hickman (1958)

and Long (1989) examine the returns on 384 defaults from 1977 to 1989 and find that buying defaulted bonds five months after default and selling them 24 months after default results in cumulative excess returns. Warner (1977) studies 73 railroad bond defaults from 1930 to 1955 and reports that buying postdefault securities could make significant profits and that the risk of this strategy is about the same as holding common stocks. Ward and Griepentrog (1993) study risk and return characteristics of defaulted corporate bonds from 1972 to 1991. They report that defaulted bonds show a mean annual return of 16.6 percent and risk characteristics that resemble stocks in the Standard & Poor's 500.

The general literature on seasonal anomalies in returns on stocks and bonds is replete with interesting findings suggesting seasonality in stock market returns. Rozeff and Kinney (1976) and Keim (1983) examine the January effect in common stocks and find abnormal returns for stocks in the January holding period. Numerous other articles examine this issue, with some, such as Gultekin and Gultekin (1983), extending the analysis to international stocks. Haugen and Lakonishok (1988) provide an extensive review of the literature concerning the January effect. Lakonishok and Smidt (1988) analyze 90 years of stock market data and find a January effect the in stocks of small firms.

The literature on seasonality in bonds is far less extensive. Keim and Stambaugh (1986) find a January effect in low grade bonds and private issuer instruments. Chang and Pinegar (1988) find that the monthly risk premiums for corporate bonds are not different from zero in non-January months. Cooper and Shulman (1994) find evidence of seasonality in the returns of speculative grade bonds. They claim that the observed end-of-the-year return pattern is consistent with the conjectured window dressing of institutional portfolios. Fridson and Lunat (1994) also find similar end-of-the-year results; however, they also find negative returns for the month of September that window dressing cannot explain.

Based upon six years of data Altman (1993) also suggests seasonality may be present in the returns on defaulted bonds. He reports that the best performing quarter for defaults is in the first half of the year, while the worst performing month and quarter are in the last half of the year. He suggests that these results invite further study of seasonality.

This study is the first comprehensive study that investigates hypotheses related to contemporary returns of defaulted bonds. We address the following empirical questions:

- Are the monthly returns of the defaulted bonds the same for each month?
- Is serial correlation present in the monthly defaulted bond returns?
- Is there any evidence of seasonality of defaulted bond returns?

Table 2—Descriptive Statistics of Monthly Return Series for Stocks and Bonds[a] (January 1970 to 1991)

	Defaulted Bonds	S & P 500	Small Cap Stocks	Corporate Bonds	T-Bonds	T-Bills
Median	0.7009%	1.0050%	1.2550%	0.6250%	0.5550%	0.5700%
Mean	1.1503%	1.0316%	1.2408%	0.8345%	0.7976%	0.6058%
Standard Deviation	5.3662%	4.7002%	6.5891%	3.0352%	3.2721%	0.2179%
Skewness	0.2025	-0.2773	-0.2856	0.5532	0.6323	1.1308
Kurtosis	4.9914	2.1004	3.5707	2.5882	2.1480	1.3285
Coefficient of Variation	4.6649	4.5561	5.3105	3.6368	4.1026	0.3596

[a] Return data for the Standard & Poor's 500, Small Capitalization Stocks, Corporate bonds, Treasury Bonds and Treasury Bills is obtained from *Stocks, Bonds, Bills and Inflation, 1992 Yearbook* published by Ibbotson Associates

DATA AND TIME FRAME

Tests for seasonality of returns of defaulted bonds cover the period from 1970 to 1991.[1] We identify defaulted bond issues by researching *Moody's Bond Record, Standard & Poor's Bond Guide*, and *The Wall Street Journal*. We also obtain the monthly price quotes for each issue from these sources. We obtain comparative return data for Treasury bills, long-term government bonds, corporate bonds, Standard & Poor's 500 and small-company stocks from *Stocks, Bonds, Bills and Inflation 1992 Yearbook* published by Ibbotson Associates.[2]

The monthly bond returns represent the market value-weighted return for all bond issues with a price quote at the beginning and the end of the month. We calculate the monthly holding period return as the change in the portfolio's aggregate value during each month divided by the portfolio's aggregate value at the beginning of the month.[3] Over the period reported in this paper, we compute monthly returns on an average of 150 defaulted issues. The total market value of all the defaults ranges from a low of $1 billion in the early 1970s to a high of $35 billion in the early 1990s.

HYPOTHESES TESTED AND METHODS EMPLOYED

Many researchers have found stock returns to produce abnormal returns in January; e.g., Keim (1983). We employ an analysis of variances to determine if differences in the mean monthly returns on defaulted bonds exist. Thus, the null hypothesis is that the means across months are equal. We employ a test of mean differences to determine if the mean return in January is different from the mean return in other months. Finally, we employ regression analysis and nonparametric tests to validate our results.

We analyze the monthly returns for stocks, bonds and defaulted bonds to determine the return distribution characteristics. Comparisons of the mean, median, variance, skewness, and kurtosis provide insights about the characteristics of defaulted bond returns. We

[1] The low volume of defaults from 1944 to 1969 does not provide meaningful return data for the period.

[2] We obtain the total monthly return data from the appendix of *Stocks, Bonds, Bills and Inflation 1992 Yearbook*, common stock from exhibit A-1, small company stocks from exhibit A-4, long-term corporate bonds from exhibit A-5, long-term government bonds from exhibit A-6, and U.S. treasury bills from exhibit A-14.

[3] Because all bonds in portfolio are in default, none of the bonds provides current income in the form of interest payments.

Table 3—Pearson Product-Moment Correlation Coefficients Between Asset Returns (January 1971 to December 1991)

	Defaulted Bonds	S & P 500	Small Cap Stocks	Corporate Bonds	T-Bonds	T-Bills
Defaulted Bonds	1.0000	0.3197	0.4747	0.0810	0.1065	0.0362
S&P 500		1.0000	0.8052	0.3710	0.3370	-0.0866
Small Capitalized			1.0000	0.2476	0.2189	-0.0519
Corporate Bonds				1.0000	0.9152	0.0519
Treasury Bonds					1.0000	0.0788
Treasury Bills						1.0000

also examine serial correlation to determine if monthly defaulted bond returns are independent. The seminal work in Fama (1965) indicates that the returns of common stocks are consistent with a random walk model. Tests of serial correlation involve analyzing the Pearson product-moment correlation coefficients for lagged periods up to 12 months.[4]

RESULTS

In Table 2 we report the descriptive statistics of the monthly return series from 1970 to 1991 for each of the six return series. Although the defaulted bond series has a high degree of volatility, the standard deviation measure of the defaulted bond series is less than that of the small capitalization stock return series. This observation is also true when comparing the relative risk measures of each series, i.e., coefficient of variation.

Table 3 provides Pearson product-moment correlation coefficients for the defaulted bond returns compared with other types of securities. The defaulted bond returns are highly correlated with the small capitalization stock series. Results reported in Tables 2 and Table 3 suggest that the returns from a portfolio of defaulted bonds act more like the returns from a portfolio of small capitalized stocks than that of government bonds, corporate bonds, or large capitalized stocks.

Panel A of Table 4 reports results that indicate that the monthly series of defaulted bond returns contains a high degree of serial correlation. In tests similar to those conducted in Fama (1965), we use the Pearson product-moment correlation to determine the degree of dependence between return observations. Our results indicate that the defaulted bond returns are positively correlated with the prior month's return.[5] No significant serial correlation is found for other lagged series. We present the results of regression analysis

[4] We calculate the Pearson product-moment correlation coefficient, r, using the following formula:

$$r = \frac{\text{Covariance } (\text{lag}_t, \text{Lag}_{t-1})}{\text{Variance } (\text{Lag}_t)}$$

where Lag_t is the monthly return for the defaulted bond return series in period t. We calculate the test statistic for the correlation coefficient using the following formula:

$$t = \sqrt{\frac{n - 2}{1 - r^2}}$$

where n is the number of observations.

[5] Similar results are found when we use nonparametric statistics. We find test statistics for the Spearman rank correlation coefficient and Kendall's tau that are significant for the returns lagged by one month and insignificant for other lagged periods.

Table 4—Tests of Dependence of the Returns Series

Panel A: Serial Correlation of Returns

1970 to 1991	Lag 1 Month	Lag 2 Months	Lag 3 Months	Lag 12 Months
Pearson Correlation Coefficient	26.822 %*	11.479 %	4.012 %	5.901 %
	(5.00)	(1.86)	(0.646)	(0.93)

Panel B: Regression of Lagged Returns

Constant	b1 Lag1 +	b2 Lag2 +	b3 Lag12	F-Value	R-Square
0.0085*	0.2681*			20.23*	.0719
(2.61)	(4.50)				
0.0104*		0.1149		3.47	.0132
(3.09)		(1.86)			
0.0098*			0.0640	0.87	.0035
(2.77)			(0.93)		
0.0075*	0.2642*		0.0232	9.64*	.0719
(2.18)	(4.28)		(0.35)		

* Significant at the .05 level of confidence. t-statistics in parentheses

Lag_1 = The defaulted bond series' return one month prior to the current month
Lag_2 = The defaulted bond series' return two months prior to the current month
Lag_{12} = The defaulted bond series' return t12 months prior to the current month

in Panel B of Table 4 that confirm the one month serial correlation lag. Figure 1 illustrates the monthly returns for the defaulted bond series of monthly returns.

Our results of analysis of variances (ANOVA) for the monthly returns from the defaulted bond series produce a significant F-value of 2.14 at the 5 percent level of confidence. Thus, results indicate that the monthly returns are different for the defaulted bond series from 1970 to 1991. This finding and the results presented in Table 4 indicate that seasonality in the returns series is highly probable.

Table 5 reports the result of several analyses for various subgroups. A test of mean differences indicates that the month of January has a significantly larger mean than the mean of the non-January months. Nonparametric statistical tests confirm this finding. Figure 2 illustrates the January effect for the six return series and demonstrates that the defaulted bond January effect is large but not as large as the small capitalization return series returns.

Table 5 also reports the results of October returns versus non-October returns. The mean returns of defaulted bonds in October are significantly lower than non-October months. Thus, a possible October anomaly is found. Our results from nonparametric statistical tests presented in Table 5 confirm the October effect. Figure 3 illustrates the positive returns in January and the negative returns in October.

CONCLUSIONS

Defaulted bonds present an interesting test of seasonality and the reasons for seasonality in returns. The results of our study seem to support the presence of a January and an October effect in defaulted bond returns. Both effects, the abnormal positive returns in January and the abnormal negative returns in October, follow the pattern of seasonality in small company stocks.

Other articles on seasonality grapple with the issue of what causes the seasonal return effect, especially the January effect. Frequently cited causes include a late year portfolio

Figure 1—Defaulted Bonds, Monthly Returns 1970 to 1991

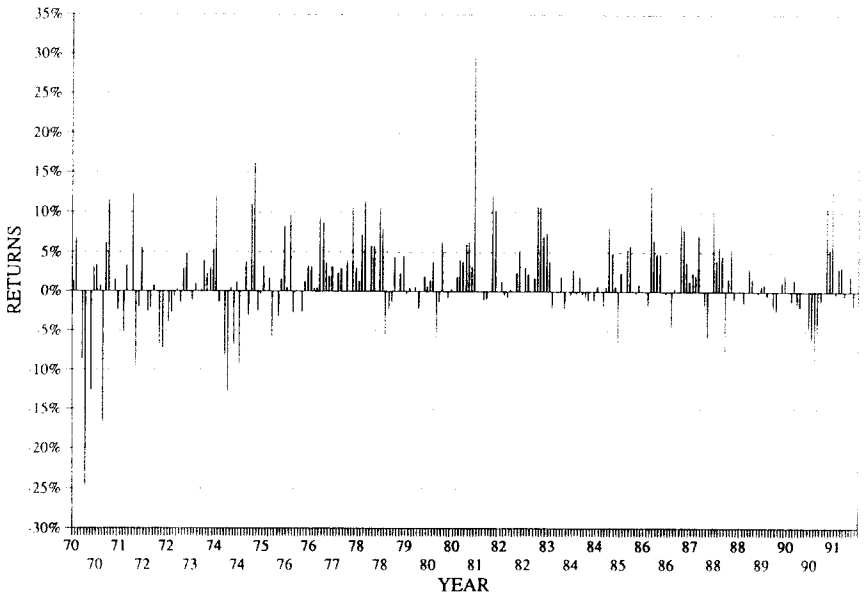


Figure 2—Monthly Returns 1970 to 1991 for Stocks and Bonds

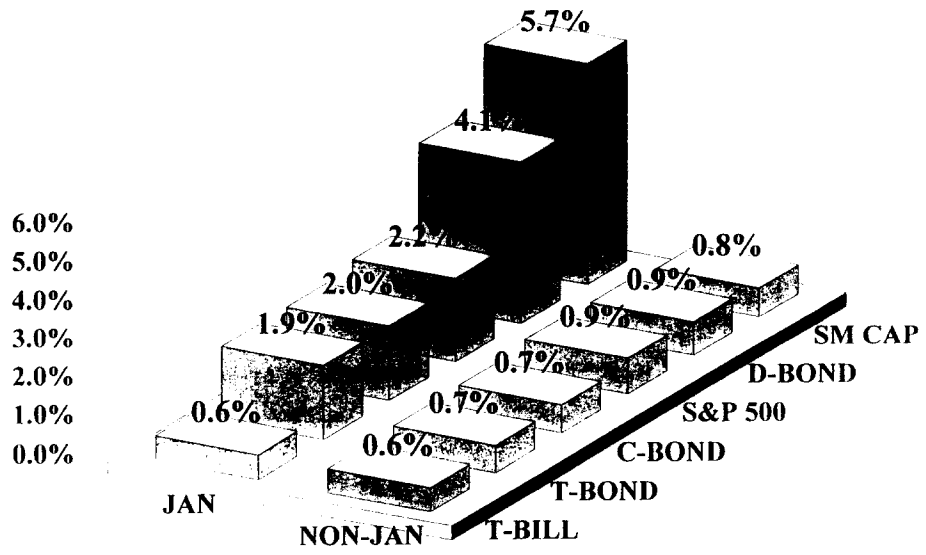
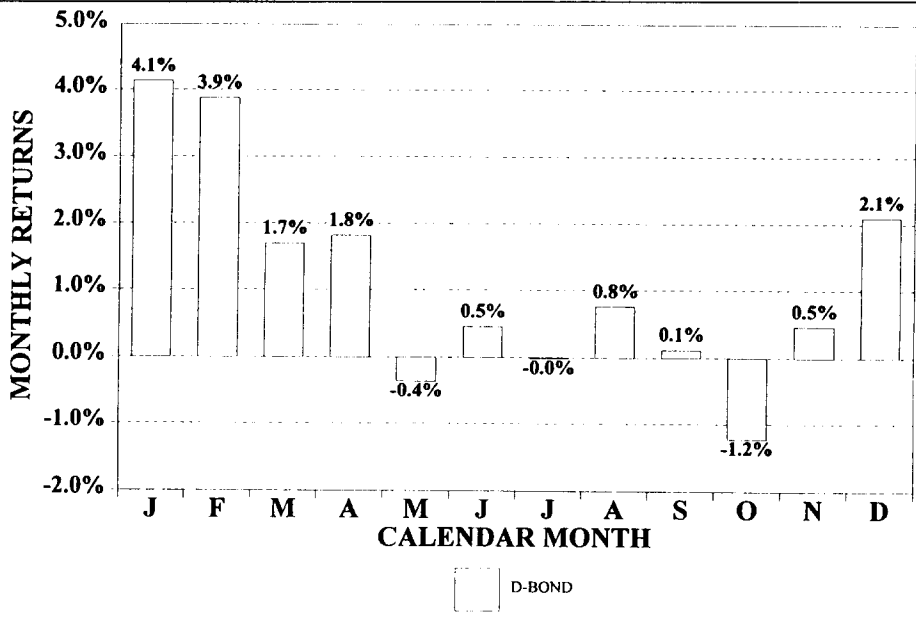


Table 5—Statistical Tests of Monthly Effect for Defaulted Bonds 1970 to 1991

Subgroups	N	Mean	Standard Deviation	Mean Difference t-Statistic*	Wilcoxon Rank Sign Normal Approximation Z-Score
Panel A: January Effect					
Non-January	242	0.8791%	5.3412%	-2.7580*	-2.8625*
January	22	4.1341%	4.8021%		
Panel B: October Effect					
Non-October	242	1.3660%	5.379%	2.1810*	2.5854*
October	22	-1.2218%	4.701%		

* Significant at the .05 level of confidence
* Tests the difference in the mean returns between various groups. (Non-January less January returns and non-October less October returns)

Figure 3—Default Returns by Month 1970 to 1991



clean-up in which portfolio managers dump poor performers and lock in returns near the end of the year. This depresses stock and bond prices and sets the stage for a new round of investing, thus triggering a surge of buying and resulting in higher stock and bond prices early in the year.

We can explain the presence of the January and October seasonality in defaulted bond returns, however, in another way. In the settlement of bankruptcies, defaulted bondholders

most often receive a substantial portion, if not all, of the reorganized firm's equity. Thus, defaulted bonds may represent an option on equity as suggested by Merton (1973). This may explain the similarity in risk and return characteristics between defaults and stocks. If one accepts this premise, then the January and October effects in defaults would and should follow the return behavior (seasonality) of small cap stock returns. What explains the seasonality of those returns, however, remains an open issue.

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