Bob Bannon
Senior Bond Strategist
(212) 571-4332

March 28, 1994

I. D. E. A.

TRADING THE "HOLIDAY EFFECT" IN BONDS

Traders who have traded around the time of a holiday will generally report that the trading activity is different from non-holiday periods. We sought to quantify this "holiday effect," to establish a trading rule, and to backtest that rule for the U.S. bond market.

We began with a database of the daily settle prices of the U.S. Treasury Bond Futures Nearby Contract, traded on the CBOT, from 8/22/77 to 3/28/94. Log returns were calculated for each trading day, and represented the rate of return from one trading day to the next, without regard to whether a weekend or holiday intervened. As an example: the return for a Tuesday that follows a Monday holiday was calculated by taking the logarithm of the ratio of Tuesday's closing price over the prior Friday's closing price.

Each return was then sorted and identified as to its possible holiday connection. For each of the five days of the week, the return was categorized by whether that day was a day prior to a holiday closure of the CBOT, a day following a holiday closure of the CBOT, or just a normal trading day. Summary statistics for the 4,191 trading days that were analyzed are presented in Table 2.

The data in Table 2 can be used to derive insights about the impact of weekdays and holidays on the bond market. We use the category "Neither," meaning the day was neither preceding nor preceded by a holiday, to identify the pure impact of a given weekday on the bond market. Using the definition of "Neither" as our tool for stripping out the influence of holidays, the following statements appear valid:

Mondays are the most volatile trading day of the week, and also incur the heaviest losses of any weekday not affected by a holiday. The closure of the markets on Saturdays and Sundays helps explain why the volatility is high on Mondays, although the volatility is clearly not significantly higher than the other days of the week, and is certainly not three times higher, as theory might suggest over a three-day period. The explanation for why Mondays tend to sell off may have to do with risk aversion - traders are more likely to be made nervous by weekend events that they were not able to react to, even those that they might otherwise have viewed as mildly bullish, and look to sell assets on Monday to reduce their risk exposure.

120 BROADWAY
NEW YORK, N.Y. 10271

TEL: 212 571 4332
FAX: 212 571 4334

NEW YORK · LONDON · TOKYO

Tuesdays have the second lowest volatility of all the weekdays, and yet evidence the strongest positive returns of any of the five weekdays. The volatilities of Tuesdays, Wednesdays, and Thursdays, though, are generally about equal. The explanation for the strength of the bond market on non-holiday-affected Tuesdays is likely a rebound effect from the bearish over-reactions on Mondays - traders realize that the selloff on Monday in response to unforeseen weekend events generally has gone too far, and the market is viewed as relatively cheap.

Wednesdays have the lowest volatility of any weekday, as befits their reputation as the "hump-day" of the week - equidistant from the discontinuity of the weekend, Wednesdays are relatively calm trading days. Wednesdays also have a tendency to show a decline in bond prices. It is interesting to note, however, that the average decline in the bond market on non-holiday-affected Wednesdays is almost identical to the median decline, a fact that cannot always be seen on other days of the week. This equality suggests a fairly consistent symmetry to Wednesday returns, implying that Wednesday returns have the most Gaussian shape of any other day's distribution.

Thursdays show medium volatility but their tendency to either decline or rise is uncertain - the median move is positive while the average move is negative. This suggests the distribution of returns on non-holiday-affected Thursdays is highly asymmetric, and thus laden with risk, particularly given that the other measures of volatility are a bit high.

Fridays show a high level of volatility, virtually identical to the levels seen on Mondays. Friday returns tend to be marginally positive, although the high degree of Friday volatility makes this an unsafe bet. The high degree of volatility is probably related to the approach of the weekend, even though these Friday returns do not actually cross the weekend, and have been separated out from Fridays that might have been influenced by Monday holidays. Traders are clearly struggling with whether they should carry positions over the weekend or reset their positions to flat and try again on Monday.

TRADING RECOMMENDATION: We chose to focus this investigation, however, not on how to trade non-holiday-affected days of the week, but specifically on how to trade those weekdays that are affected by a holiday that has just passed or is about to come to pass. The results of this hypothesis test can also be found in Table 2, under the headings labelled "Pre-Holiday" and "Post-Holiday." A close examination of these results, many of which are quite striking in their high levels of return and volatility, leads to the following set of trading rules:

(1) *Pre-Holiday Trading* - Always buy into the trading days just prior to a holiday closure of the CBOT. The gains are exceptionally large for all days except Fridays, although Fridays do show at least modestly respectable gains (and are also the most frequent case of a pre-holiday trading day, given the prevalence of Monday holidays). Trading on Thursdays just before a Friday closure is particularly strong.

(2) *Post-Holiday Trading* - Generally sell into the trading days just after holidays, particularly Tuesdays, Wednesdays, and Thursdays. Mondays have mixed results, with losses being more frequent but gains being larger. Fridays show solid gains in a post-holiday environment.

BACKTESTING RESULTS: The following graph and table show the results of trading the above two trading rules over the entire period from 1977 to 1994. It is assumed that one bond contract is bought or sold in accordance with the trading rules mentioned above, that the trade is reversed the next trading day, and that transactions costs are zero.

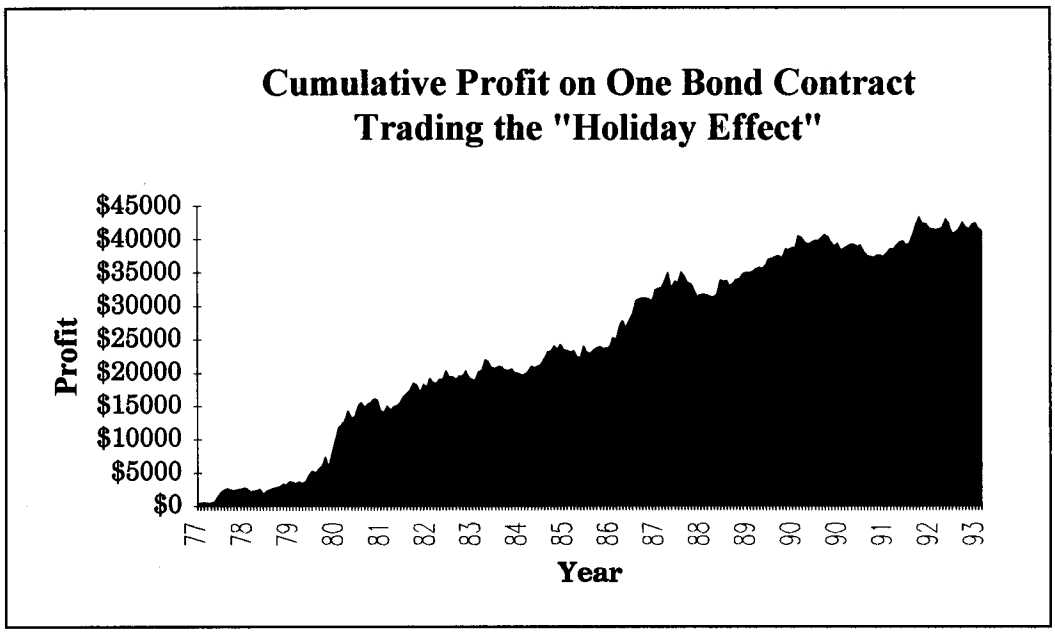

TABLE 1: BACKTESTING RESULTS	
Summary Statistics:	
Total Number of Trades	241
Winning Trades	146
Losing Trades	92
Breakeven Trades	3
Analysis of Losses	
Average Loss	($483.26)
Median Loss	($310.00)
SD of Losses	$422.08
MAD of Losses	$338.32
Largest Loss	($2,310.00)
Least Loss	($30.00)
Analysis of Gains	
Average Gain	$587.05
Median Gain	$410.00
SD of Gains	$530.56
MAD of Gains	$418.58
Largest Gain	$2,190.00
Least Gain	$30.00
Total Profit/Loss Analysis	
Average P/L	$171.16
Median P/L	$160.00
SD of P/L	$712.30
MAD of P/L	$524.53

TABLE 2: DAILY BOND CONTRACT RETURNS					
	Count	Mean	Median	SD	MAD
Mondays					
Pre-Holiday	11	0.2039%	0.1795%	0.6560%	0.4524%
Post-Holiday	31	0.0917%	-0.0258%	1.1155%	0.8156%
Both	42	0.1211%	0.0987%	1.0090%	0.7264%
Neither	758	-0.0850%	-0.0339%	0.8910%	0.6158%
TOTAL	800	-0.0742%	-0.0325%	0.8981%	0.6220%
Tuesdays					
Pre-Holiday	7	0.3161%	0.2331%	0.5027%	0.3412%
Post-Holiday	64	-0.1059%	-0.1661%	1.0614%	0.7618%
Both	71	-0.0643%	-0.0952%	1.0255%	0.7314%
Neither	783	0.0587%	0.0338%	0.7471%	0.5311%
TOTAL	854	0.0484%	0.0321%	0.7740%	0.5483%
Wednesdays					
Pre-Holiday	23	0.2265%	0.2110%	0.5056%	0.3911%
Post-Holiday	12	-0.4123%	-0.4363%	1.0372%	0.8072%
Both	35	0.0075%	0.0681%	0.7798%	0.5796%
Neither	824	-0.0361%	-0.0340%	0.6764%	0.4889%
TOTAL	859	-0.0343%	-0.0340%	0.6805%	0.4927%
Thursdays					
Pre-Holiday	30	0.4802%	0.2368%	0.9044%	0.7565%
Post-Holiday	7	-0.0954%	-0.2283%	0.3579%	0.3045%
Both	37	0.3713%	0.2063%	0.8559%	0.6899%
Neither	806	-0.0096%	0.0336%	0.7567%	0.5495%
TOTAL	843	0.0072%	0.0349%	0.7648%	0.5542%
Fridays					
Pre-Holiday	65	0.1544%	0.0806%	0.8209%	0.5787%
Post-Holiday	22	0.1466%	0.0652%	0.8949%	0.7059%
Both	87	0.1524%	0.0806%	0.8349%	0.6108%
Neither	748	0.0443%	0.0000%	0.8875%	0.6606%
TOTAL	835	0.0556%	0.0000%	0.8823%	0.6555%