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# The Behavior of the Common Stock of Bankrupt Firms

TRUMAN A. CLARK and MARK I. WEINSTEIN\*

## I. Introduction

THE ANNOUNCEMENT that a corporation has filed a petition in federal court to attempt a reorganization under the bankruptcy laws potentially conveys important information concerning the value and risk of its common shares. A bankruptcy announcement perhaps signals changes in the probabilities of alternative future share values (e.g., once bankruptcy is declared, the probability that the shares will become worthless possibly increases). A firm's bankruptcy filing also possibly alters the market risk of its shares. What shareholders will receive in the event of reorganization or liquidation will be determined by a court. To the extent such legal decisions are insensitive to general market movements, perhaps the market risk of the firm's shares is reduced.

It could be the case that most corporate bankruptcies are so fully anticipated that little or no new information is released when bankruptcies are filed. Casual observation suggests that major corporate bankruptcies do not come as complete surprises. Trading in listed stocks usually is halted some time before bankruptcy filings. Stories that a corporation is about to file a bankruptcy petition sometimes appear in the financial press several days prior to the filing.

More conclusive evidence that the market anticipates corporate bankruptcies has been presented in previous empirical studies. The findings of Westerfield [4] and Aharony, Jones and Swary [1] demonstrated that shareholders experience abnormal losses over periods of from four to six years prior to bankruptcy. One of Westerfield's cumulative performance measures indicated that shareholders of bankrupt companies lost, on average, 76 percent of their wealth relative to returns on securities of equivalent risk during the seventy-one months preceding the announcement of bankruptcy.

Of course, large shareholder losses prior to bankruptcy do not guarantee that additional large losses will not be suffered when bankruptcy is announced. To date, only limited evidence supporting the existence of a bankruptcy announcement effect has been reported. Altman [2] found that shareholders suffered an average capital loss of approximately 26 percent during the period from one month before to one month after bankruptcy announcements. Unfortunately, a two month interval is too long to provide a clear measure of the market's reaction to bankruptcy announcements. It is possible that most or all of the shareholder losses detected by Altman occurred during the month preceding the announcements.

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Our study is intended to document the existence of a bankruptcy announcement effect. By using monthly and daily data, we are able to obtain fairly precise estimates of average shareholder losses concurrent with bankruptcy announcements. In addition, we attempt to see if there are differences between the returns behavior of certain categories of bankrupt stocks. We make such comparisons between the stocks of firms which filed under Chapter X of the Chandler Act and those of firms filing under Chapter XI. We also compare the performance of stocks which eventually became worthless during the bankruptcy process with that of stocks which retained some value.

## II. The Data

This study examines bankruptcy filings during the period June 1938–September 1979 when the Chandler Act was in force. The monthly sample includes all NYSE listed firms filing for reorganization under Chapters X and XI of the Chandler Act. The daily sample covers only the period July 1962–September 1979. It includes all NYSE and AMEX listed firms which filed under Chapters X and XI during this shorter period.<sup>1</sup> The daily and monthly samples are not independent. There were thirty-six bankruptcy filings by NYSE listed firms occurring between 1962 and 1979 which are included in both samples.

The CRSP monthly and daily returns files were used as the primary sources for our stock returns data. The CRSP daily data were also supplemented with returns computed from over-the-counter quotations in some cases. This was necessary because trading in the shares of listed firms usually was halted prior to or upon their announcements of bankruptcy. Occasionally, if the shares were delisted, trading resumed in the OTC market. Whenever possible, OTC quotes have been used to augment our daily sample.<sup>2</sup>

## III. Performance Measures

To assess the performance of the stocks of bankrupt firms, several returns indices were constructed. The indices aggregate returns across firms in event time. For each firm in the daily sample, event day 0 is the day the firm filed an initial Chapter X or XI bankruptcy petition. In the monthly sample, month 0 for each firm is the month in which it filed for bankruptcy.

Returns indices were computed using both raw returns and market adjusted returns. Performance measures of raw returns are of interest because they provide estimates of the average losses (excluding opportunity losses) suffered by the holders of the stocks of bankrupt companies. However, in using raw returns, the danger exists that the findings are distorted by general market movements. To reduce this danger, we also report performance information based upon market

<sup>1</sup> A list of corporate bankruptcies was compiled from the following sources: Prentice Hall's *Capital Adjustments*, Predicast's *F & S Index of Corporate Change*, the Moody's manuals and the *Wall Street Journal*.

<sup>2</sup> OTC quotes were collected from the *Bank and Quotation Record* and from the ISL books. When both bid and ask quotes were available, the mean of the bid and ask was used as the price. When only the bid or the ask was available, that quote was used as the price.

adjusted returns. The market adjusted return on a particular stock during a given day (or month) is defined as that stock's raw return minus the return on the CRSP value weighted market index during the same day (or month).<sup>3</sup>

To illustrate the construction of each of our performance indices, let  $R_{it}$  represent either the raw return or the market adjusted return on stock  $i$  during event day (or month)  $t$ .<sup>4</sup>  $N_t$  represents the number of bankrupt stocks with returns on event day (or month)  $t$ .  $AR_t$ , the average return on event day (or month)  $t$ , is defined as follows:

$$AR_t = \frac{1}{N_t} \sum_{i=1}^{N_t} R_{it}. \quad (1)$$

The cumulative average return on event day (or month)  $K$ ,  $CAR_K$ , is defined as the sum of the average returns from event day (or month)  $T$  through event day (or month)  $K$ :

$$CAR_K = \sum_{t=T}^K AR_t. \quad (2)$$

In the daily sample,  $T$  is set equal to  $-220$  (i.e., 220 trading days prior to the bankruptcy filing date). In the monthly sample,  $T$  equals  $-36$  (i.e., 36 months prior to the bankruptcy month).

It should be noted that the CAR has no lower bound. In studies such as this one where negative performance occurs, the CAR can attain values less than  $-1.0$  indicating cumulative losses in excess of the amount initially invested. While at first this seems to make no economic sense, it is a plausible outcome of the implicit portfolio strategy embodied in the construction of the CAR.

The CAR approximates the returns on a portfolio in which (1) a constant dollar amount is invested at the start of each holding period and (2) where the funds are distributed equally across the  $N_t$  stocks in the portfolio each holding period. It is the first of these portfolio features which enables the CAR to drop below  $-1$ . To maintain the constant dollar amount invested at the start of each

<sup>3</sup> We also computed performance measures using Market Model adjusted returns. Those findings are not reported for two reasons. First, the results with the Market Model adjusted returns are very similar to those obtained with raw returns and market adjusted returns. Second, the use of the Market Model imposes a high cost in the form of lost information during the bankruptcy announcement period. Some minimum number of returns prior to the start of the event period is required to obtain reliable estimates of the Market Model parameters for each stock. The failure of some stocks to meet these estimation requirements causes some reductions in the sizes of our daily and monthly samples. As will be seen below, our sample sizes with raw returns and market adjusted returns are already quite small near event day or month 0 without the imposition of parameter estimation requirements.

<sup>4</sup> Due to missing returns, there are occasional gaps in the CRSP returns files. Whenever such a gap occurs, the next return is a multiple day (or month) return. In this study, we report performance measures which omit all multi-period returns. This is done because multi-period returns potentially incorporate reactions to news released prior to the dates on which the returns are realized. If multi-period returns are entered into a performance index on the dates they are realized, they can distort the index by delaying its response to information which was actually available earlier in event time. We avoid this danger by omitting multi-period returns, but, in so doing, we sacrifice the information contained in those returns. Fortunately, the cost of omitting multi-period returns does not appear to be high. We also computed performance indices with multi-period returns included on the dates realized, and there were only minor differences between the indices including and excluding multi-period returns.

holding period, funds are withdrawn from the portfolio whenever it has a positive return, and funds are added to the portfolio whenever it has a negative return. With portfolios of bankrupt stocks, holding period losses predominate requiring the ongoing injection of new funds. Since the CAR implicitly assumes that more and more money is being poured into losing stocks, it is not surprising that cumulative losses in portfolios of bankrupt stocks can exceed the initial dollar amount invested.

A second cumulative performance measure used in this study is the abnormal performance index (or API). The API on event day (or month)  $K$  is defined as follows:

$$API_K = \prod_{t=T}^K (1 + AR_t) - 1. \quad (3)$$

The API has the desirable property in that it possesses a lower bound of  $-1$ . The API approximates the returns on a portfolio of stocks in which, after an initial investment at  $T$ , funds are neither added in the event of losses nor withdrawn in the event of gains. Thus, the most that can be lost is the amount initially invested at  $T$ .

Superficially, the API appears to represent the returns on a buy and hold portfolio strategy, but this is not a correct interpretation of the API. The API implicitly assumes portfolio rebalancing at the start of each holding period so that equal amounts are invested in the  $N_t$  stocks in the portfolio. Because of the implicit rebalancing, the API can deviate substantially from buy and hold results.

To obtain a better approximation to the returns on a buy and hold strategy, let  $WAR_t$  denote the weighted average return on the  $N_t$  bankrupt stocks with returns on event day (or month)  $t$ :

$$WAR_t = \sum_{i=1}^{N_t} x_{it} R_{it}. \quad (4)$$

In equation (4),  $x_{it}$  equals the "value" weight of stock  $i$  in the index during event period  $t$ . This "value" weight is computed as follows:

$$x_{it} = \frac{\prod_{j=T}^{t-1} (1 + R_{ij})}{\sum_{i=1}^{N_t} \prod_{j=T}^{t-1} (1 + R_{ij})}. \quad (5)$$

The numerator on the right hand side of equation (5) represents the value of one dollar invested in stock  $i$  at the end of event day (or month)  $T - 1$  and held, with dividends reinvested, through the end of event day (or month)  $t - 1$ .<sup>5</sup> For simplicity, the numerator of the right hand side of equation (5) can be called the "value" of stock  $i$  on event day (or month)  $t - 1$ . The denominator on the right hand side of equation (5) is the sum across the  $N_t$  stocks with returns during event period  $t$  of the "values" of those stocks on event day (or month)  $t - 1$ .

The weighted average returns as defined in equation (4) are then used to compute the weighted geometric index (WGI). The WGI on event day (or month)  $K$  is defined as follows:

$$WGI_K = \prod_{t=T}^K (1 + WAR_t) - 1. \quad (6)$$

<sup>5</sup> Stocks which did not enter a sample until after event day (or month)  $T$  entered with a value of one dollar at the start of the first event period for which there was a return.

$WGI_K$  provides an approximation to the realized rate of return on an investment of one dollar in each bankrupt stock at the start of event period  $T$  and held until the end of event period  $K$ . Like the API, the WGI has a lower bound of  $-1$ . Unlike the API, the WGI implicitly assumes that the portfolio is not periodically rebalanced.

#### IV. The Returns Behavior of Bankrupt Stocks

##### A. All Bankrupt Stocks

In Table I, performance measures for the stocks of the fifty bankruptcies in our monthly sample are reported. During event months  $-36$  through  $-1$ , all three performance measures indicate that, on average, shareholders in firms that ultimately declared bankruptcy sustained mounting losses. In terms of the raw returns over the 3-year pre-filing period, the CAR indicates a return of  $-.65$ , the API indicates a return of  $-.50$ , and the WGI indicates a return of  $-.62$ . The corresponding performance measures using market adjusted returns tell a similar story. These findings are consistent with those of Westerfield [4] and Aharony, Jones and Swary [1] which indicated ongoing negative performance over periods of from four to six years prior to bankruptcy announcements.

In the months firms file for bankruptcy, the average loss of shareholders was about 30 percent as measured by the AR of the raw returns in event month 0. This estimate is consistent with the findings of Altman [2]. Altman reported that the firms in his sample lost approximately 26 percent of their value from one month before bankruptcy to one month after bankruptcy. When we compute a similar two month announcement effect using the ARs for event months 0 and 1, we obtain an average loss estimate of about 33 percent.<sup>6</sup> However, the performance measures reported in Table I indicate that most of this two month effect occurred in event month 0.

In Table II, performance measures for the stocks of the 148 bankruptcies in our daily sample are reported. The indices show an ongoing erosion of share value during the period from event day  $-220$  through event day  $-2$  (i.e., a period of roughly 10.5 months since there are approximately 250 trading days per year). In terms of the raw returns, the CAR indicates a loss of  $.32$ , the API indicates a loss of  $.28$ , and the WGI indicates a loss of  $.51$ . The corresponding measures using market adjusted returns are almost identical.

Due to a lack of precision in identifying the exact date on which the market had its first chance to react to each bankruptcy announcement, we examine the interval spanning event days  $-1$ , 0, and 1 for a bankruptcy announcement effect in our daily sample.<sup>7</sup> The results, in terms of raw and market adjusted returns,

<sup>6</sup> Altman [2], p. 137, computed a measure of the "bankruptcy information effect" (or BIE) by taking the ratio of the average price one month after bankruptcy to the average price one month before bankruptcy (i.e., a two month price relative). Altman reported that the BIE for firms in his sample was  $.742$ . We compute a corresponding measure by multiplying  $1 + AR_0$  times  $1 + AR_1$ . The estimates of the two month losses reported above were obtained by subtracting one from both this product and Altman's BIE.

<sup>7</sup> The dates on which almost all firms in our daily sample filed bankruptcy petitions are known precisely. However, there is ambiguity about when the news of each filing was publicly released and when the market's initial reaction to that news could occur.

Presumably, the news of most bankruptcy filings by major corporations is transmitted by the

Table I  
Monthly Returns and Cumulative Returns on Bankrupt Stocks

| Event<br>Month | Raw Returns |     |       |       |        | Market Adjusted Returns |       |     |     |       |       |        |       |       |
|----------------|-------------|-----|-------|-------|--------|-------------------------|-------|-----|-----|-------|-------|--------|-------|-------|
|                | Pos         | Neg | Total | AR    | CAR    | API                     | WGI   | Pos | Neg | Total | AR    | CAR    | API   | WGI   |
| -36            | 13          | 18  | 36    | -.023 | -.023  | -.023                   | -.023 | 11  | 25  | 36    | -.036 | -.036  | -.036 | -.036 |
| -30            | 17          | 20  | 38    | -.015 | -.030  | -.032                   | -.002 | 18  | 20  | 38    | -.024 | -.051  | -.052 | -.039 |
| -24            | 18          | 20  | 39    | .016  | -.108  | -.107                   | -.144 | 18  | 21  | 39    | .006  | -.144  | -.138 | -.178 |
| -18            | 12          | 24  | 39    | -.026 | -.223  | -.207                   | -.236 | 13  | 26  | 39    | -.024 | -.235  | -.215 | -.254 |
| -12            | 13          | 18  | 35    | -.002 | -.374  | -.322                   | -.429 | 14  | 35  | 35    | -.002 | -.395  | -.335 | -.433 |
| -6             | 13          | 19  | 34    | -.022 | -.489  | -.399                   | -.476 | 14  | 20  | 34    | -.029 | -.541  | -.428 | -.513 |
| -5             | 12          | 20  | 32    | -.055 | -.544  | -.432                   | -.477 | 11  | 21  | 32    | -.043 | -.584  | -.452 | -.514 |
| -4             | 12          | 17  | 31    | .102  | -.442  | -.374                   | -.514 | 12  | 19  | 31    | .084  | -.500  | -.406 | -.549 |
| -3             | 5           | 22  | 29    | -.095 | -.536  | -.433                   | -.560 | 6   | 23  | 29    | -.100 | -.600  | -.465 | -.595 |
| -2             | 5           | 18  | 27    | -.058 | -.594  | -.466                   | -.567 | 7   | 20  | 27    | -.055 | -.654  | -.495 | -.606 |
| -1             | 5           | 18  | 25    | -.056 | -.650  | -.496                   | -.619 | 6   | 19  | 25    | -.055 | -.709  | -.522 | -.649 |
| 0              | 2           | 16  | 19    | -.299 | -.949  | -.647                   | -.752 | 2   | 17  | 19    | -.305 | -.1014 | -.668 | -.763 |
| 1              | 3           | 10  | 13    | -.049 | -.998  | -.664                   | -.756 | 3   | 10  | 13    | -.027 | -.1041 | -.677 | -.763 |
| 2              | 1           | 9   | 10    | -.167 | -.1164 | -.720                   | -.802 | 1   | 9   | 10    | -.179 | -.1221 | -.735 | -.806 |
| 3              | 2           | 5   | 10    | .040  | -.1124 | -.708                   | -.816 | 3   | 7   | 10    | .029  | -.1191 | -.727 | -.824 |
| 4              | 4           | 6   | 10    | .069  | -.1055 | -.688                   | -.822 | 4   | 6   | 10    | .066  | -.1125 | -.709 | -.830 |
| 5              | 3           | 3   | 10    | .024  | -.1031 | -.681                   | -.824 | 5   | 5   | 10    | .019  | -.1106 | -.704 | -.831 |
| 6              | 3           | 6   | 10    | -.035 | -.1066 | -.692                   | -.831 | 4   | 6   | 10    | -.010 | -.1116 | -.707 | -.834 |

**Table II**  
**Daily Returns and Cumulative Returns on Bankrupt Stocks**

| Event<br>Day | Raw Returns |     |       |       |       |       | Market Adjusted Returns |     |     |       |       |       |       |       |
|--------------|-------------|-----|-------|-------|-------|-------|-------------------------|-----|-----|-------|-------|-------|-------|-------|
|              | Pos         | Neg | Total | AR    | CAR   | API   | WGI                     | Pos | Neg | Total | AR    | CAR   | API   | WGI   |
| -220         | 33          | 41  | 106   | .000  | .000  | .000  | .000                    | 50  | 56  | 106   | .000  | .000  | .000  | .000  |
| -180         | 29          | 37  | 104   | -.006 | -.053 | -.052 | -.088                   | 49  | 55  | 104   | -.006 | -.054 | -.053 | -.093 |
| -140         | 27          | 33  | 100   | -.001 | -.062 | -.061 | -.144                   | 46  | 54  | 100   | -.001 | -.069 | -.068 | -.160 |
| -100         | 22          | 30  | 96    | -.005 | -.098 | -.095 | -.220                   | 43  | 53  | 96    | -.005 | -.101 | -.098 | -.238 |
| -60          | 15          | 30  | 83    | -.003 | -.129 | -.124 | -.302                   | 28  | 55  | 83    | -.004 | -.134 | -.128 | -.319 |
| -40          | 22          | 28  | 78    | -.001 | -.185 | -.173 | -.354                   | 40  | 38  | 78    | -.001 | -.192 | -.178 | -.374 |
| -20          | 13          | 29  | 66    | -.010 | -.210 | -.193 | -.403                   | 22  | 44  | 66    | -.011 | -.215 | -.197 | -.420 |
| -15          | 10          | 24  | 62    | -.004 | -.233 | -.212 | -.412                   | 23  | 39  | 62    | -.003 | -.240 | -.217 | -.430 |
| -10          | 15          | 24  | 59    | -.010 | -.270 | -.241 | -.448                   | 28  | 31  | 59    | -.009 | -.275 | -.245 | -.462 |
| -5           | 17          | 15  | 47    | .013  | -.279 | -.248 | -.481                   | 25  | 22  | 47    | .013  | -.290 | -.256 | -.495 |
| -4           | 10          | 17  | 45    | .003  | -.276 | -.246 | -.473                   | 17  | 28  | 45    | .004  | -.286 | -.253 | -.486 |
| -3           | 14          | 18  | 42    | -.012 | -.288 | -.255 | -.479                   | 19  | 23  | 42    | -.012 | -.298 | -.262 | -.493 |
| -2           | 6           | 11  | 31    | -.031 | -.318 | -.277 | -.505                   | 14  | 17  | 31    | -.033 | -.331 | -.286 | -.519 |
| -1           | 5           | 14  | 23    | -.082 | -.401 | -.337 | -.522                   | 7   | 16  | 23    | -.082 | -.413 | -.345 | -.538 |
| 0            | 3           | 8   | 12    | -.285 | -.686 | -.526 | -.706                   | 3   | 9   | 12    | -.285 | -.698 | -.532 | -.725 |
| 1            | 3           | 3   | 6     | -.105 | -.791 | -.576 | -.725                   | 3   | 3   | 6     | -.105 | -.804 | -.581 | -.741 |
| 2            | 3           | 2   | 8     | .074  | -.717 | -.544 | -.695                   | 4   | 4   | 8     | .071  | -.733 | -.552 | -.711 |
| 3            | 5           | 2   | 11    | .039  | -.678 | -.527 | -.683                   | 7   | 4   | 11    | .037  | -.696 | -.535 | -.700 |
| 4            | 1           | 4   | 11    | -.035 | -.713 | -.543 | -.685                   | 3   | 8   | 11    | -.040 | -.736 | -.554 | -.704 |
| 5            | 4           | 4   | 11    | .036  | -.677 | -.527 | -.681                   | 6   | 5   | 11    | .038  | -.698 | -.536 | -.697 |

are virtually identical. Over this 3-day interval in event time, the change in the CAR is  $-.47$ , and the losses indicated by the API and WGI are 41 and 44 percent, respectively.<sup>8</sup> These findings clearly indicate that the announcement of a bankruptcy filing releases new information to the market. Although shareholders have suffered losses prior to event day  $-1$ , they typically suffer additional large losses in a very short period immediately surrounding a bankruptcy filing.<sup>9</sup>

Some words of caution are in order concerning the estimated losses during the three day announcement period. First, the numbers of stocks in our sample on event days  $-1$ ,  $0$ , and  $1$  are small: 23, 12, and 6, respectively. Second, the average price change over this period is very small in arithmetic terms. There were 10 stocks in our daily sample which traded on both event days  $-220$  and  $0$ . On event day  $-220$ , the average price of these 10 stocks was \$6.39 per share. By event day  $-2$ , the average price of these stocks had dropped to \$1.81. On event days  $-1$ ,  $0$ , and  $1$ , the average prices were \$1.70, \$1.36, and \$.94, respectively. While the

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electronic media on the same days the filings occur. If the stock market is open when the announcements are made, the market can react on event day  $0$ . However, it is possible that some announcements are made after the close of trading. In these cases, the market's first chance to react to the news would not occur until event day  $1$ .

Event day  $-1$  is included in our bankruptcy announcement effect interval for two reasons. First, news leaks probably occur in some cases, and people receiving advance information can trade on the basis of that information before a bankruptcy filing occurs. Second, some bankruptcies appear to be well advertised in advance. A casual inspection of the *Wall Street Journal Index* and the *New York Times Index* uncovered several instances where stories that a particular company was about to file for bankruptcy appeared prior to or on the day the company filed. For example, Bohack filed a Chapter XI petition on 30 July 1974 after stories that the firm was about to file appeared in the *New York Times* on 27 July 1974 and in the *Wall Street Journal* on 29 July 1974. Similarly, a *Wall Street Journal* story on 3 June 1976 indicated that Western Orbis was about to file for bankruptcy, and that company filed a Chapter XI petition on 11 June 1976.

<sup>8</sup> To assess the statistical significance of the AR on each event date, approximate  $t$ -ratios were estimated. Providing that there were at least fifty daily returns, the sample standard deviation for each stock  $j$  ( $s_j$ ) was computed from the  $R_{jt}$  over the 100 trading day period prior to event day  $-220$ . Each return for stock  $j$  during the period from event day  $-220$  through event day  $5$  was standardized by dividing it by  $s_j$ . Assuming that the  $R_{jt}$  have zero mean, constant variance and no serial correlation, this produced a time series of  $N(0, 1)$  variates. If it is further assumed that there was no cross sectional correlation between the returns of different stocks, the average of the standardized returns on event day  $1$  was  $N(0, \sqrt{N_t})$  where  $N_t$  is the number of securities with standardized returns on that event day. Thus, an approximate  $t$ -statistic is

$$t(\text{AR}_t) = \frac{1}{\sqrt{N_t}} \sum_{j=1}^{N_t} \frac{R_{jt}}{s_j} \sim N(0, 1). \quad (7)$$

The " $t$ -statistics" were  $-8.88$ ,  $-14.80$ , and  $-9.34$  for the ARs of the raw returns on event days  $-1$ ,  $0$ , and  $1$ , respectively. It is also important to comment upon the degree of serial correlation present in the AR time series. Roll [3] has noted that an API will be an upward biased performance measure if it is computed from daily returns that are negatively correlated. In our sample, the first order serial correlation coefficient for the ARs of the daily raw returns is only  $-.08$  (with a standard error of  $.07$ ). It seems unlikely that this relatively small amount of serial correlation would seriously bias the API we report.

<sup>9</sup> Altman [2], p. 137, indicated that he observed a similar concentration of price declines in his sample. In his words, most of the two month average price drop he reported "... generally occurred in the days immediately preceding and slightly after bankruptcy declaration."

average price dropped approximately 48 percent over the three day announcement period, perhaps much of the \$.87 average price decline can be attributed to trades taking place across the bid-ask spreads of specialists.<sup>10</sup>

For purposes of comparisons between our daily and monthly samples, one month cumulative losses can be computed from our daily performance indices. Assuming there are twenty-one event days in a month, the cumulative losses occurring between event days -19 and 1 correspond to one event month. From the indices based upon the raw returns for event days -20 and 1, the one month losses in the daily sample are .58 in terms of the CAR, .47 in terms of the API, and .54 in terms of the WGI. These estimated losses are greater than the loss of .30 indicated by the AR for event month 0 in Table 1.

There are at least two reasons for the differences between the estimated announcement month losses from the daily and monthly samples. First, and probably most important, the composition of the daily sample differs from that of the monthly sample. There are 148 bankruptcies in our daily sample, but only thirty-six of these also appear in our monthly sample. Moreover, the thirty-six bankruptcies common to the two samples involved NYSE listed firms while the 112 bankruptcies appearing only in the daily sample involved AMEX listed firms. Since the daily sample was dominated by AMEX listed firms and since AMEX listed firms are usually smaller (in terms of asset holdings) than NYSE listed firms, the differences between the estimated announcement month losses in the daily and monthly samples suggest that bankruptcy announcements are worse news for the shareholders of smaller firms. Second, the daily data perhaps permit a more precise measurement of announcement month effects. For a bankruptcy filing on the first (or last) trading day of a calendar month, it is possible that at least some of the market's response to the announcement will occur on the last (or first) trading day of the preceding (or following) month. To the extent this occurs, the announcement month loss estimated from monthly data is likely to be smaller than that estimated from daily data.

### *B. Differences Between Chapter X and XI Filings*

From the shareholders' standpoint, there are reasons to believe that the prospects of a Chapter XI proceeding were better than those of a Chapter X proceeding. First, Chapter X proceedings usually took longer to complete. To the extent bankruptcy costs are directly related to the duration of proceedings, Chapter X reorganizations were likely to be more costly than Chapter XI reorganizations. Second, in Chapter X reorganizations, absolute priority rules had a greater impact; senior creditors had to be compensated fully before junior creditors and shareholders. By contrast, absolute priority rules did not have to be followed on Chapter XI. For this reason, shareholders perhaps stood a better chance of avoiding 100 percent losses under Chapter XI. Table III provides some support for this supposition.

The outcomes of the bankruptcy process for the shareholders of firms in our

<sup>10</sup> We are indebted to Michael Gibbons and Myron Scholes for their suggestion that we examine the changes in average share prices during the three day announcement period.

**Table III**  
**Common Stockholder Experience in Bankruptcy**

| (1)<br>Chapter | (2)<br>Retained<br>Value | (3)<br>Became<br>Worthless | (4)<br>Unresolved or<br>Uncertain | (5)<br>Total |
|----------------|--------------------------|----------------------------|-----------------------------------|--------------|
| X              | 15                       | 17                         | 2                                 | 34           |
| XI             | 68                       | 49                         | 11                                | 128          |
| Total          | 83                       | 66                         | 13                                | 162          |

combined daily and monthly samples are summarized in Table III. Column one of this table indicates the chapter under which each bankruptcy was originally filed.<sup>11</sup> The next three columns indicate the outcomes. Column two reports the number of cases in which shareholders avoided 100 percent losses.<sup>12</sup> Column three reports the number of instances in which the shareholders experienced 100 percent losses. Column four reports the cases that were unresolved as of October 1982 and several presumably completed cases for which records of the outcomes could not be found.

In Table III, it can be seen that shareholders suffered 100 percent losses with greater frequency if the initial filing was under Chapter X. Shares ultimately became worthless in 53 percent of the Chapter X cases where the outcomes are known whereas this occurred in only 42 percent of the Chapter XI cases with known outcomes.<sup>13</sup>

Given the reasons for believing that shareholders' prospects were worse under Chapter X than Chapter XI, it is of interest to see whether the market tended to react more negatively to Chapter X than to Chapter XI announcements. In addressing this matter, firms that originally filed under Chapter XI and were later switched to Chapter X by court order are treated as Chapter XI firms. The announcement of the Chapter XI filing was the start of the bankruptcy process for these firms, and a subsequent court ordered switch to Chapter X was just one of many events which could occur after a Chapter XI filing.

Table IV presents the monthly performance measures in event months -3 through 1 for Chapter X and Chapter XI filings. Interestingly, it appears that shareholders in Chapter XI firms tended to experience larger cumulative losses during the thirty-six event months preceding event month 0. In terms of the raw returns, the CAR for Chapter XI firms declined to -.74 by event month -1 while the CAR for Chapter X firms declined to -.46. Comparisons of the other performance measures for both raw returns and market adjusted returns also

<sup>11</sup> The Chapter XI category in Table III includes 9 bankruptcies which were originally filed under Chapter XI and were later switched to Chapter X by court order. In these nine cases, shareholders avoided 100 percent losses twice, shareholders suffered 100 percent losses six times, and one case was unresolved as of October 1982.

<sup>12</sup> Shares in the "retained value" category include those that received liquidating cash distributions or that received equity positions in reorganized companies.

<sup>13</sup> For all the firms in our sample, shareholders suffered 100 percent losses in 44 percent of the 149 bankruptcies with known outcomes. The proportion of 100 percent losses in our sample is somewhat lower than the corresponding ratio of 56 percent out of 90 bankruptcies reported by Altman [2], Table 6-2, p. 133.

Table IV  
Monthly Returns and Cumulative Returns on Chapter X and Chapter XI Stocks

| Event<br>Month          | Chapter X |     |       |       |       | Chapter XI |       |     |     |       |       |        |       |       |
|-------------------------|-----------|-----|-------|-------|-------|------------|-------|-----|-----|-------|-------|--------|-------|-------|
|                         | Pos       | Neg | Total | AR    | CAR   | API        | WGI   | Pos | Neg | Total | AR    | CAR    | API   | WGI   |
| Raw Returns             |           |     |       |       |       |            |       |     |     |       |       |        |       |       |
| -3                      | 3         | 9   | 12    | -.075 | -.471 | -.407      | -.560 | 2   | 13  | 17    | -.108 | -.557  | -.458 | -.559 |
| -2                      | 2         | 6   | 10    | .064  | -.407 | -.369      | -.526 | 3   | 12  | 17    | -.130 | -.687  | -.529 | -.589 |
| -1                      | 3         | 5   | 10    | -.058 | -.464 | -.405      | -.565 | 2   | 13  | 15    | -.054 | -.741  | -.554 | -.647 |
| 0                       | 1         | 8   | 10    | -.303 | -.767 | -.585      | -.686 | 1   | 8   | 9     | -.295 | -.1037 | -.686 | -.790 |
| 1                       | 2         | 8   | 10    | -.052 | -.819 | -.607      | -.695 | 1   | 2   | 3     | -.036 | -.1073 | -.697 | -.786 |
| Market Adjusted Returns |           |     |       |       |       |            |       |     |     |       |       |        |       |       |
| -3                      | 4         | 8   | 12    | -.080 | -.537 | -.439      | -.573 | 2   | 15  | 17    | -.114 | -.617  | -.486 | -.602 |
| -2                      | 3         | 7   | 10    | .048  | -.489 | -.412      | -.550 | 4   | 13  | 17    | -.115 | -.732  | -.545 | -.633 |
| -1                      | 4         | 6   | 10    | -.042 | -.531 | -.437      | -.587 | 2   | 13  | 15    | -.063 | -.795  | -.573 | -.680 |
| 0                       | 1         | 9   | 10    | -.308 | -.839 | -.610      | -.701 | 1   | 8   | 9     | -.302 | -.1097 | -.702 | -.799 |
| 1                       | 2         | 8   | 10    | -.028 | -.867 | -.621      | -.705 | 1   | 2   | 3     | -.025 | -.1123 | -.710 | -.790 |

indicate greater losses for Chapter XI firms through event month  $-1$ .<sup>14</sup> However, in event month 0, the ARs for both filing categories are approximately  $-.30$ .

Table V presents daily performance measures for the Chapter X and Chapter XI firms for event days  $-2$  through 1. Through event day  $-2$ , the cumulative losses of the two groups are roughly equal. The CARs of the raw returns of the Chapter X and XI firms declined to  $-.27$  and  $-.33$ , respectively. There are even closer correspondences between the cumulative losses of the two groups when their APIs and WGI are compared.

During the three day announcement period, it appears that Chapter X filings precipitated larger losses than Chapter XI filings. For example, based upon raw returns, the CAR of the Chapter X firms dropped by  $-.72$  during this three day interval while the CAR of the Chapter XI firms was dropping by  $-.36$ . However, it is difficult to place much confidence in such comparisons given the very small numbers of Chapter X firms with shares still trading during the three day announcement period. For the Chapter X category, there were returns for only three firms on event day  $-1$ , four firms on event day 0, and two firms on event day 1. Moreover, the apparent differences between Chapter X and Chapter XI announcements observed in the daily performance measures are not confirmed by the monthly performance measures. Thus, our findings offer only limited support for the proposition that a Chapter X filing was worse news for shareholders than a Chapter XI filing.

### *C. Differences Between Subsequently Worthless and Valuable Shares*

As indicated in Table III, the shares of many firms which filed for bankruptcy reorganization eventually became worthless during the bankruptcy process. It is interesting to see if there is any indication that the market could discriminate, *ex ante*, between firms whose shareholders would suffer 100 percent losses and those that would not. To control for any differences between Chapter X and Chapter XI filings, this analysis is confined to firms which originally filed under Chapter XI. As in the preceding section, firms which were later switched to Chapter X after an initial Chapter XI filing are classified as Chapter XI firms and are included in this analysis.

Table VI presents the monthly performance results for the subsequently worthless and retained value groups. Through event month  $-1$ , the subsequently worthless shares appear to suffer greater losses than the retained value group (e.g., the CARs for the raw returns through event month  $-1$  are  $-.99$  for the subsequently worthless group and  $-.65$  for the retained value group). In event month 0, the ARs of the two groups are approximately equal, but not much confidence can be placed in this observation since there is only one stock in the eventually worthless category during this period.

<sup>14</sup> Comparisons between the performance indices of different groups of stocks prior to bankruptcy must be cautiously interpreted. As bankruptcy approaches, the stocks of many firms stop trading. For example, the maximum numbers of Chapter X and Chapter XI stocks with returns in any event month are fourteen and twenty-seven, respectively. By event month  $-1$ , returns could be obtained for only ten Chapter X stocks and fifteen Chapter XI stocks. If returns on the stocks that stopped trading were available and included in the indices, it is possible that the relative performance of Chapter X and Chapter XI stocks during the thirty-six months prior to bankruptcy could be greatly altered. The same warning applies to other comparisons between groups of bankrupt stocks made below.

Table V  
Daily Returns and Cumulative Returns on Chapter X and Chapter XI Stocks

| Event<br>Day            | Chapter X |     |       |       |       | Chapter XI |       |     |     |       |       |       |       |       |
|-------------------------|-----------|-----|-------|-------|-------|------------|-------|-----|-----|-------|-------|-------|-------|-------|
|                         | Pos       | Neg | Total | AR    | CAR   | API        | WGI   | Pos | Neg | Total | AR    | CAR   | API   | WGI   |
| Raw Returns             |           |     |       |       |       |            |       |     |     |       |       |       |       |       |
| -2                      | 2         | 0   | 3     | .052  | -.266 | -.270      | -.509 | 4   | 11  | 28    | -.040 | -.326 | -.284 | -.503 |
| -1                      | 0         | 3   | 3     | -.113 | -.379 | -.352      | -.568 | 5   | 11  | 20    | -.078 | -.404 | -.339 | -.513 |
| 0                       | 1         | 3   | 4     | -.310 | -.689 | -.553      | -.656 | 2   | 5   | 8     | -.273 | -.677 | -.520 | -.724 |
| 1                       | 1         | 1   | 2     | -.294 | -.983 | -.684      | -.808 | 2   | 2   | 4     | -.011 | -.688 | -.525 | -.710 |
| 3-Day Cumulative        |           |     |       |       |       |            |       |     |     |       |       |       |       |       |
|                         |           |     |       |       | -.717 | -.567      | -.609 |     |     |       |       | -.362 | -.337 | -.416 |
| Market Adjusted Returns |           |     |       |       |       |            |       |     |     |       |       |       |       |       |
| -2                      | 3         | 0   | 3     | .049  | -.259 | -.264      | -.502 | 11  | 17  | 28    | -.041 | -.342 | -.295 | -.520 |
| -1                      | 0         | 3   | 3     | -.112 | -.371 | -.347      | -.560 | 7   | 13  | 20    | -.078 | -.420 | -.350 | -.533 |
| 0                       | 1         | 3   | 4     | -.307 | -.678 | -.547      | -.657 | 2   | 6   | 8     | -.274 | -.694 | -.528 | -.747 |
| 1                       | 1         | 1   | 2     | -.293 | -.971 | -.680      | -.817 | 2   | 2   | 4     | -.012 | -.705 | -.533 | -.726 |
| 3-Day Cumulative        |           |     |       |       |       |            |       |     |     |       |       |       |       |       |
|                         |           |     |       |       | -.712 | -.565      | -.633 |     |     |       |       | -.363 | -.338 | -.429 |

Table VI  
Monthly Returns and Cumulative Returns on Chapter XI Stocks that Became Worthless and Chapter XI Stocks that Retained Value

| Event<br>Month          | Retained Value |     |       |       |        | Became Worthless |       |     |     |       |       |        |       |       |
|-------------------------|----------------|-----|-------|-------|--------|------------------|-------|-----|-----|-------|-------|--------|-------|-------|
|                         | Pos            | Neg | Total | AR    | CAR    | API              | WGI   | Pos | Neg | Total | AR    | CAR    | API   | WGI   |
| Raw Returns             |                |     |       |       |        |                  |       |     |     |       |       |        |       |       |
| -3                      | 2              | 9   | 13    | -.092 | -.503  | -.439            | -.520 | 0   | 4   | 4     | -.160 | -.658  | -.557 | -.654 |
| -2                      | 3              | 8   | 13    | -.117 | -.620  | -.505            | -.538 | 0   | 4   | 4     | -.173 | -.831  | -.633 | -.716 |
| -1                      | 2              | 10  | 12    | -.027 | -.647  | -.518            | -.606 | 0   | 3   | 3     | -.164 | -.994  | -.693 | -.751 |
| 0                       | 1              | 7   | 8     | -.291 | -.937  | -.658            | -.769 | 1   | 0   | 1     | -.333 | -1.328 | -.796 | -.834 |
| 1                       | 0              | 2   | 2     | -.106 | -1.043 | -.694            | -.781 | 1   | 0   | 1     | .104  | -1.224 | -.774 | -.816 |
| Market Adjusted Returns |                |     |       |       |        |                  |       |     |     |       |       |        |       |       |
| -3                      | 2              | 11  | 13    | -.107 | -.622  | -.495            | -.599 | 0   | 4   | 4     | -.138 | -.608  | -.522 | -.601 |
| -2                      | 4              | 9   | 13    | -.099 | -.720  | -.545            | -.616 | 0   | 4   | 4     | -.168 | -.776  | -.602 | -.667 |
| -1                      | 2              | 10  | 12    | -.037 | -.758  | -.562            | -.664 | 0   | 3   | 3     | -.166 | -.942  | -.668 | -.713 |
| 0                       | 1              | 7   | 8     | -.296 | -1.054 | -.692            | -.790 | 0   | 1   | 1     | -.351 | -1.293 | -.785 | -.814 |
| 1                       | 0              | 2   | 2     | -.115 | -1.170 | -.728            | -.802 | 1   | 0   | 1     | .155  | -1.139 | -.751 | -.785 |

Table VII  
Daily Returns and Cumulative Returns on Chapter XI Stocks that Became Worthless and Chapter XI Stocks that Retained Value

| Event<br>Day            | Retained Value |     |       |       |       | Became Worthless |       |     |     |       |       |       |       |       |
|-------------------------|----------------|-----|-------|-------|-------|------------------|-------|-----|-----|-------|-------|-------|-------|-------|
|                         | Pos            | Neg | Total | AR    | CAR   | API              | WGI   | Pos | Neg | Total | AR    | CAR   | API   | WGI   |
| Raw Returns             |                |     |       |       |       |                  |       |     |     |       |       |       |       |       |
| -2                      | 2              | 7   | 18    | -.034 | -.287 | -.257            | -.486 | 1   | 5   | 9     | -.078 | -.441 | -.372 | -.570 |
| -1                      | 2              | 8   | 13    | -.073 | -.359 | -.311            | -.493 | 2   | 4   | 6     | -.118 | -.559 | -.446 | -.594 |
| 0                       | 1              | 1   | 3     | -.135 | -.494 | -.404            | -.614 | 1   | 5   | 6     | -.351 | -.910 | -.641 | -.828 |
| 1                       | 1              | 2   | 3     | -.036 | -.530 | -.425            | -.595 | 2   | 0   | 2     | .062  | -.848 | -.618 | -.817 |
| 3-Day Cumulative        |                |     |       |       |       |                  |       |     |     |       |       |       |       |       |
|                         |                |     |       |       | -.243 | -.226            | -.212 |     |     |       |       | -.407 | -.392 | -.574 |
| Market Adjusted Returns |                |     |       |       |       |                  |       |     |     |       |       |       |       |       |
| -2                      | 8              | 10  | 18    | -.034 | -.305 | -.271            | -.499 | 2   | 7   | 9     | -.083 | -.455 | -.381 | -.591 |
| -1                      | 3              | 10  | 13    | -.072 | -.378 | -.324            | -.507 | 2   | 4   | 6     | -.118 | -.573 | -.454 | -.619 |
| 0                       | 1              | 2   | 3     | -.134 | -.512 | -.414            | -.638 | 1   | 5   | 6     | -.354 | -.957 | -.647 | -.845 |
| 1                       | 1              | 2   | 3     | -.039 | -.551 | -.437            | -.607 | 2   | 0   | 2     | .060  | -.868 | -.626 | -.836 |
| 3-Day Cumulative        |                |     |       |       |       |                  |       |     |     |       |       |       |       |       |
|                         |                |     |       |       | -.246 | -.228            | -.216 |     |     |       |       | -.413 | -.396 | -.599 |

Table VII presents the daily performance measures for the two categories of Chapter XI firms. As in the monthly sample, the subsequently worthless shares appear to sustain greater losses during the pre-announcement period. Through event day  $-2$ , the worthless shares show cumulative raw returns of  $-.44$  in terms of the CAR,  $-.37$  in terms of the API, and  $-.57$  in terms of the WGI. For shares that retained value, the corresponding cumulative raw returns measures are  $-.29$ ,  $-.26$ , and  $-.49$ .

The performance indices also suggest that subsequently worthless shares sustained somewhat greater losses during the three day bankruptcy announcement period. For example, referring to the raw returns indices, the change in the CAR for the worthless group was  $-.41$ , and the change in the CAR for the retained value group was  $-.24$ . Unfortunately, the reliability of such comparisons is questionable due to the small sample sizes for each group during the three day announcement period.

From the information presented in Tables VI and VII, it does appear that the market is able to make some distinction, *ex ante*, between the survival prospects of firms which are approaching bankruptcy. Most of this discrimination apparently occurs sometime prior to the announcement of bankruptcy. Subject to the qualification about small sample sizes, there are also some indications that subsequently worthless shares suffer larger losses than shares that retain value when bankruptcies are announced.

## V. Summary and Conclusions

This paper has examined the returns behavior of the stocks of bankrupt corporations. Similar to earlier studies, we found evidence of mounting losses sustained by shareholders over long periods prior to bankruptcy.

Estimates of average shareholder losses occurring when bankruptcy is announced are the main items of new information presented by this study. Shareholders suffer large losses during the month a bankruptcy occurs, and those losses are especially concentrated into the three trading day interval surrounding a bankruptcy filing. Based upon these findings, we conclude that bankruptcy filings convey important unanticipated information to the market.

Attempts were made to see if there were profound differences between (a) Chapter X and Chapter XI bankruptcies and between (b) bankruptcies in which shares became worthless and bankruptcies in which shares retained value. Although some apparent differences were detected, the existence of these differences was not conclusively demonstrated because they were observed in very small samples.

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