



NEW YORK UNIVERSITY
STERN SCHOOL OF BUSINESS
FINANCE DEPARTMENT

Working Paper Series, 1996

The Equity Performance of Firms Emerging from Bankruptcy

Altman, Edward I., Allan C. Eberhart and Reena Aggarwal

FIN-96-2

The Equity Performance of Firms Emerging from Bankruptcy

by

**Edward I. Altman
Stern School of Business
New York University
New York, NY 10012
(212) 998-0709**

**Allan C. Eberhart
School of Business
Georgetown University
Washington, DC 20057
(202) 687-4584**

**Reena Aggarwal
School of Business
Georgetown University
Washington, DC 20057
(202) 687-3784**

April 1996

We received helpful comments from seminar participants at the University of North Carolina at Chapel Hill and the 1994 Financial Management Association meetings. We would like to thank the Georgetown University Center for Business-Government Relations for providing support. Eberhart received support from Georgetown University (and School of Business) Summer Research Grant and worked on parts of this paper as a visiting assistant professor at the New York University Stern School of Business. Aggarwal received support from a Georgetown University School of Business Summer Research Grant. We thank Edie Hotchkiss for generously supplying the data on management changes.

The Equity Performance of Firms Emerging from Bankruptcy

Abstract

This study assesses the stock return performance of 131 firms emerging from Chapter 11 between 1980 and 1993. Though there are some important differences, a firm issuing stocks upon emergence from bankruptcy is analogous to an initial public offering (IPO). Many studies have documented significant abnormal short-term positive returns accruing to IPO investors but more recent evidence suggests that IPOs are overpriced in the 1 to 3 years following issuance. We uncover some evidence that stocks of firms emerging from bankruptcy are underpriced in the short term; the average cumulative abnormal return (ACAR) is, depending on how expected returns are estimated, between 2.8% and 2.9% for the first 2 days following emergence (the medians, though, range from 0.1% to 0.3%). In the first 200 trading days following emergence, the ACARs vary from 22.8% to 29.6% and the medians range from 16.8% to 22.2%.

Our results are of broad interest for three main reasons. First, they cast doubt on the informational efficiency of this market. This is of particular interest to investors, primarily bondholders, in formerly bankrupt firms that liquidate their equity position in the newly emerged firms or to investors who specialize in the purchase of post Chapter 11 equities. Second, the results are in stark contrast to the long-term underperformance observed in the IPO market. Finally, the results provide an interesting comparison with the operating performance of firms emerging from bankruptcy between 1979 and 1988 as documented by Hotchkiss (1995). The poor average operating performance she reports suggests that the Chapter 11 process does not efficiently screen out economically inefficient firms. Our results suggest that, although these firms may not achieve strong operating performance, they appear to do better than the market expected at the time they emerged from Chapter 11.

The Equity Performance of Firms Emerging from Bankruptcy

With large corporate bankruptcies becoming commonplace during the late 1980s and early 1990s, there has been a notable increase in the number of firms emerging from bankruptcy. When public firms emerge from bankruptcy, they often cancel the old stock and distribute an entirely new issue of common stock. In addition, the "new" firm's capital structure and, often, its asset structure, is different from that of the prior bankrupt firm. In this sense, the emergence of a firm from Chapter 11 of the Bankruptcy Code is analogous to a firm undergoing an initial public offering (IPO).

Many papers have documented systematic underpricing of traditional IPOs in the short term. Investors who purchase the stocks at the offer price and sell them at the close of the first trading date typically earn abnormally high returns, (Ritter, 1991). Long term, however, these stocks appear to be overpriced with negative excess returns (Ritter, 1991 and Aggarwal and Rivoli, 1990). Though the performance of IPO stocks has been extensively studied, there is a dearth of work on the stock performance of firms emerging from bankruptcy. (Wagner and Vander Voorde (1995) do conduct a cursory examination of 30 stocks emerging from bankruptcy).

For the past few years, there have been reports in the popular press about excellent returns in the post Chapter 11 equity market, e.g., as Sandler (1991, p. C1) states:

While initial public offerings have been grabbing all the glory, there's a shadow market for new stocks that is doing nicely too. It's where people trade shares of companies coming out of bankruptcy or reorganization.

In recent months, some investors have made 50% to 100% on their money by trading the new shares of Republic Health, Southland Corp. and Maxicare Health Plans after those companies finished reorganizing their business.

The primary purpose of this paper is to examine if stocks of firms emerging from bankruptcy are efficiently priced at the time of emergence. Following the tradition of the IPO literature, we examine the short-term and longer-term performance of these stocks. We define the short term as the first two days of returns after emergence from bankruptcy and the long term as the first 100 days and 200 days of returns after emergence.

For the short term, there is an important difference between IPOs and firms emerging from bankruptcy. When firms emerge from bankruptcy there is no formal offer price for the stocks. In fact, there may not be an issue of new stock; the firm may issue additional stock or even just maintain its current amount of common stock. Our starting point is thus from the closing price on the first day of trading after the firm has emerged from Chapter 11. Despite the different starting point, we find positive excess returns over the first two return days. Though the sign of the excess returns is consistent with the IPO findings, the magnitude is smaller; the excess return average, depending on how the benchmark portfolio is measured, is between 2.8% and 2.9% (the medians are smaller with a range of 0.1% to 0.3%).

For the long term, the starting point is the same as for the IPO literature and yet the results are dramatically different. Over the 200-day period following Chapter 11 emergence, we find average cumulative abnormal returns (ACARs) that range from 22.8%

to 29.6% (the median excess return range is from 16.8% to 22.2%).

Our results are of broad interest for three main reasons. First, they cast doubt on the informational efficiency of this market. This is of particular interest to investors, both bondholders in formerly bankrupt firms that are given an equity position in the newly emerged firms and to investors who specialize in the purchase of post-Chapter 11 equities. Second, the results are in stark contrast to the long-term underperformance observed in the IPO market. Finally, the results provide an interesting contrast to the poor (industry-adjusted) operating performance of firms emerging from bankruptcy between 1979 and 1988 as documented by Hotchkiss (1995). Her results suggest that the Chapter 11 process does not efficiently screen out economically inefficient firms. Our results indicate that, although these firms may not achieve strong operating performance, they appear to do better than the market expected at the time they emerged from Chapter 11.

We investigate several explanations for these findings. First, we may have mismeasured the riskiness of these stocks. The robustness of the results with respect to different ways of estimating expected returns (i.e., benchmarks) casts doubt on this explanation, however. The second is related to risk measurement factors based on differential information; ones that the traditional risk measures employed in this study do not explicitly incorporate. We examine two different proxies for differential information: First, a dummy variable that equals one if the firm's stock trades continuously throughout the bankruptcy process, zero

otherwise. Firms with continuous trading might be expected to have less estimation risk, *ceteris paribus*. Second, a dummy variable that equals one if the firm switches stock exchanges from just before filing for Chapter 11 to just after it emerges. Firms that switch exchanges might have greater estimation risk, *ceteris paribus*. Our empirical tests reveal that neither variable offers a consistently significant explanation for cross-sectional differences in the returns.

We also examine whether a change in management affects the stock returns. Hotchkiss (1995) finds that management changes positively affect the operating performance of firms emerging from bankruptcy. For the subsample of firms for which we have data on management changes, however, we find this variable insignificantly affects returns.

When firms emerge from bankruptcy, many investors may wish to liquidate their position in the firm on the first trading day. It is possible that this large selling volume causes the short term returns to be diminished for some stocks. This price pressure effect could make subsequent returns look abnormally high. If this is true, then we should observe a negative relationship between the short-term and the longer term excess returns. The short-term returns are estimated over the first 2, 5, 10, 15, 20 and 25 return days. We find some evidence of a price pressure effect for the 2, 5 and 10 return days.

The most important variable in explaining cross-sectional differences in returns is the level of the closing price on the

first day of trading following emergence. We find a significant negative relationship between price and the subsequent performance. Because price and size are positively correlated, this can be at least partly attributed to a small firm effect. Additionally, because small price stocks tend to have higher transaction costs, this result suggests that at least some excess returns can be attributed to transaction costs that have not been explicitly accounted for in the return computation. We find evidence of underpricing, however, even after accounting for this price effect.

Finally, we investigate how the time spent in bankruptcy affects returns. Firms that take a long time to reorganize may not be expected to do well. The results show that longer periods in Chapter 11 are associated with lower excess returns after emergence from bankruptcy, *ceteris paribus*. This suggests that the market may have been too pessimistic in valuing firms upon emergence from a brief bankruptcy.

I. The IPO and Bankruptcy Literature Connection

A. The Chapter 11 Bankruptcy Process

The Chapter 11 bankruptcy process is a unique type of corporate restructuring. Its formal, legalistic process gives the ailing firm a moratorium of payments, primarily to its non-operating debt claimants, and time to propose a reorganized asset, liability and ownership structure. Important asset restructuring is overseen by the bankruptcy court and can take place throughout the reorganization process. Liability and ownership restructuring is proposed, debated and, if confirmed, the firm then often emerges

with a new ownership and capital structure.

Often when the firm emerges as a public company, a new class of common shareholders replaces the old owners. The latter's equity is worthless if the value of the debt claims exceeds the value of the firm and the absolute priority rule (APR) is followed. In approximately 75% of corporate bankruptcy cases, however, the APR is violated, e.g., see Eberhart, et al (1990) and Weiss (1990). Nevertheless, Altman and Eberhart (1994) show that, on average, higher seniority still implies higher payoffs upon emergence from bankruptcy. Creditors usually receive part of their payoff as new stock in the firm and this often gives them a majority ownership in the firm's stock.

During the bankruptcy process, the estimate of the firm's going concern value that will be used to set the payoffs to each class of claimants is frequently hotly debated. Depending on its priority, each class of claimants has an incentive to present a biased estimate of the firm value. It is in the interest of junior claimants to argue for upwardly biased estimates of firm value. This will increase the proportion of the firm value they receive. Conversely, senior claimants will tend to push for a lower estimate of firm value so that they can retain a greater portion of the firm and reap the rewards if the firm's value blips up. Perhaps most important is the management bias; they have an incentive to value the firm above its liquidation value to maintain their jobs but below its true value, assuming its true value is above the estimate of its liquidation value. If the market is persuaded by the

manager's forecast, then post-emergence stock performance of the firm will seem superior relative to the equilibrium expected returns. Hotchkiss (1995) finds some support for this hypothesis in that her evidence suggests many firms emerging from bankruptcy would have been more highly valued in liquidation. However, for a subsample of her firms, the operating performance was below management's forecasts.

B. Studies Examining the Performance of Firms Emerging from Bankruptcy

In an extensive study, Hotchkiss (1995) documents the operating performance of firms emerging from bankruptcy that filed for Chapter 11 between October 1979 and September 1988. Overall, she finds the median operating performance to be positive. However, more than 40% of the firms continue to experience operating losses in the three years after emergence and 32% subsequently file for bankruptcy again or restructure their debt. Moreover, the median operating performance relative to industry averages is negative. Gilson (1997) conducts a study of firms emerging from Chapter 11 with a focus on their capital structure. He reports that firms emerging from bankruptcy remain overleveraged, on average.

Hotchkiss's and Gilson's studies focus on how their accounting-based results provide evidence on the efficiency of the bankruptcy code. Both studies' results suggest that the bankruptcy code is biased toward letting many economically inefficient, or poorly restructured, firms reorganize, (instead of liquidating). In contrast, the focus of this study is on the efficiency of the

financial markets.

C. Similarities and Differences Between IPOs and Firms Emerging from Chapter 11

IPOs and firms emerging from Chapter 11 share two important characteristics. First, in Chapter 11, as mentioned earlier, firms typically restructure their assets and capital structure. The old stock is often canceled, and new stock is issued. In this sense, the firm emerging from bankruptcy may be considered a new publicly traded firm. The second common characteristic is relevant only for a subsample of our firms. For 55 (out of 131) cases, the stock of the firm stopped trading during the bankruptcy process. Thus, the firm was private before it emerged from bankruptcy (as with an IPO).

Though IPOs and firms emerging from Chapter 11 are similar, they also have important differences. In some, but certainly not all cases, something analogous to an offer price is mentioned in the reorganization plan. The lack of an offer price necessitates that our efficiency tests are entirely concentrated in the after-market performance of the stock (i.e., the first return is for the second day of trading). This suggests that any mispricing we detect is more likely to be exploitable (compared with the IPO underpricing) because investors do not face the typical barriers that exist in the purchase at the issue price of "hot" IPOs.

A very recent innovation in the post Chapter 11 "market" does provide a firm "offer price." On April 19, 1996, an investment firm, Questor Corporation, offered \$7.75 per share of Anacomp Corporation (up to 44% of outstanding shares) for the "when issued"

issued" shares of this firm after the Chapter 11 confirmation. This unprecedented tender offer provides an unambiguous opening price for the new stock. The offer price was approximately the value used for the equity in Anacomp's reorganization plan.

The other key difference is that there is no investment bank involved as the underwriter for firms emerging from Chapter 11. Investment bankers play an important role in the due diligence process of a new issue. The IPO literature has related the aftermarket performance of new issues to the support and reputation of the investment banker (e.g., Carter and Manaster, 1990 and Rudd, 1993). It has also been suggested that in "firm-commitment IPOs," the underwriters may continue to provide price support/stabilization in the aftermarket for several weeks after the offering. Without the involvement of an investment banker, there is no such support for the equity of firms emerging from Chapter 11.

II. Data

The first source in our data gathering is from a list of firms, from our own data base and one provided by **New Generation Research** (Boston, MA) that filed and completed a Chapter 11 bankruptcy between January 1980 and December 1989. We supplement this list with a search on the *Dow Jones News Retrieval Service* using the key words bankruptcy and emerge. A total of 350 firms are in this sample. For the second phase we use another, more comprehensive, list provided by New Generation. This list contains 196 firms that emerged from Chapter 11 between January 1990 and

December 1993.

Of the total of 546 firms, 131 emerge with equity trading on the NYSE, ASE or NASDAQ. When the firms emerge from bankruptcy, 71 begin trading on the NASDAQ, 37 on the NYSE and 23 on the AMEX; 76 of the stocks trade throughout the bankruptcy process, including a 5-trading day period preceding the emergence date. Though we cannot rule out the possibility that our sample is less than the population, we are confident that we have assembled the vast majority of emerging, publicly traded firms.

Table 1 provides some descriptive statistics on the sample. The average closing price on the first day of trading (event day 0) following emergence from Chapter 11 is \$6.32 whereas the median is \$3.75. Similar to other studies, (e.g., Altman, 1993), we find that the average time spent in bankruptcy is close to two years (22.39 months) and a median of 20.17 months.

For our sample, we estimate the alpha and beta coefficients from a simple market model regression for each stock with the NASDAQ value weighted index as a proxy for the market. The market model parameters are estimated over three periods [(2, 274), (101, 274), (201, 274)]. In every period, the average beta coefficients are significantly less than unity and range from 0.530 to 0.605. Despite the low beta estimates, we assume a beta of unity for most of our tests. Because the market was rising throughout much of the period of analysis, this biases our results against finding positive excess returns. The alpha coefficients are positive in every estimation period. This is consistent with the positive

excess returns that we report below. To avoid further biasing the excess returns downward, we use a zero alpha in estimating expected returns.

Because the emergence procedure varies across firms, so does the appropriate starting point for our performance and efficiency tests. For example, as mentioned earlier, 76 of the sample firms' stocks traded continuously before the emergence date. The stock may trade up to the day the new stock is issued and the old stock is then canceled. Alternatively, additional shares may or may not be issued and the "new" stock will often trade under the old name. If no new stock was issued, then the first trading date is defined as the emergence date for the firm. Our initial source for the emergence date is the Bankruptcy Datasource. To confirm the accuracy of the date, we then check the **Capital Changes Reporter**, **Wall Street Journal Index** (if we did not have information from the **Dow Jones News Retrieval**), and from the **Bloomberg** machine (when **Bloomberg's** historical information covers the emergence date period).

The post Chapter 11 price movement is derived primarily from the CRSP stock price tapes. If additional stock is issued, the CRSP tapes do not indicate the first date the stock begins trading with the newly issued shares. Therefore, we checked the **Standard and Poor's Daily Stock Price Record (SPDSPR)**; this source denotes the first trading date for the "new" stock.

If the old stock is canceled and an entirely new issue of common stock is distributed, the first trading date for the new

stock is then the appropriate starting point. Since the CRSP tapes do not always pick up the firm when it first begins trading, we hand collected data from the SPDSPR for the 28 firms where the first trading date in the SPDSPR precedes the first trading date on the CRSP tapes. The difference in first trading days is not trivial as the average is 36 days and the median is 27 days.

One potential explanation for the failure of CRSP to always pick up the first trading date is the "when-issued" trading that occurs with some of these stocks. Though there can be some liquidity and settlement day differences between when-issued and "regular" stock trading, the when-issued trading is the appropriate starting date of the stock. Therefore, the first trading date can be for when-issued or regular trading; whichever comes first. There are 13 firms that we know begin trading on a when-issued basis. To check if the use of when-issued prices was correlated with any difference in returns, we computed the abnormal return for each firm using the NASDAQ index with the assumption that alpha equals zero and beta equals unity. We then averaged these abnormal returns and compared them to the average abnormal returns for the other 118 firms; they were insignificantly different.

III. Methodology

The first efficiency test we conduct is the well-known test of whether the average cumulative abnormal return (ACAR) is significantly different from zero. The ACAR tests whether the average actual return ($\sum R_i$) equals the average expected rate of return ($\sum R'_i$).

$$ACAR = \left(\frac{1}{N} \right) \sum_{i=1}^N \sum_{t=1}^T R_{it} - \left(\frac{1}{N} \right) \sum_{i=1}^N \sum_{t=1}^T R'_{it}$$

where

R_{it} = actual rate of return for security i on day t ,

R'_{it} = expected rate of return for security i on day t ,

T = number of days in event period,

N = number of securities

CAR_i = cumulative abnormal return for security i .

A potentially more powerful test of efficiency is the price-unbiasedness test (e.g., Eberhart and Sweeney (1992)); it asks whether $a = 0$ and $b = 1$ in the following cross-sectional regression:

$$\sum_{t=1}^T R_{it} = a + b \sum_{t=1}^T R'_{it} + e_i$$

where the error e_i is the CAR_i . Under the null of efficiency, the true intercept a equals zero and the slope b equals unity.

To test the efficiency of stocks across different dimensions, we employ a variant of the ACAR. First, we rank the firms based on the following criteria: (1) closing price on event day 0, (2) the time spent in bankruptcy, and (3) the exchange (i.e., where the stock is traded) upon emergence from bankruptcy. For the first two criteria, the sample is split into 10 portfolios.

The GPU test listed below uses five pieces of information

clearly known at the close of the first trading day upon emergence from Chapter 11.

$$\sum_{t=1}^T R_{it} = \beta_0 + \beta_1 \sum_{t=1}^T R'_{it} + \beta_2 P_{i0} + \beta_3 CONT_i + \beta_4 TIME_i + \beta_5 CHEX_i + \beta_6 MGTCH_i + \epsilon_i$$

where

- P_{i0} = price of security i at the close of the first trading day upon emergence from Chapter 11 (event period 0),
- $CONT_i$ = dummy variable equal to 1 if firm traded continuously throughout Chapter 11, zero otherwise.
- $TIME_i$ = number of months firm i spent in Chapter 11,
- $CHEXCH_i$ = dummy variable equal to 1 if firm changed exchange from before Chapter 11 filing to emergence from Chapter 11, 0 otherwise,
- $MGTCH_i$ = dummy variable equal to 1 if there was a management change, zero otherwise.

The null under the efficient market hypothesis is $\beta_1=1$ and $\beta_0 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$. That is, the hypothesis is that none of those five variables affects the performance of our emerged equities and the actual performance equals the expected. More broadly, any information known as of the close of the first trading day should be reflected in the expected rate of return. Therefore, each piece of information should have an insignificant marginal effect on returns. For the 200 day event period, we also compute an alternative measure of abnormal performance that accounts for continuous compounding.

Market Model Parameter Estimation

Because there is no trading for 55 of these stocks during the bankruptcy process (and even where there is trading, the business and financial risk of the firm changes dramatically after bankruptcy), we use a benchmark period after the event period. We have 274 days' worth of returns after emergence for all but 5 of the firms. An additional complication is the shifting of risk that can occur after emergence. We do not find a statistically significant decline in the betas of our sample firms. Therefore, we feel comfortable to estimate them for day 201 through day 274.

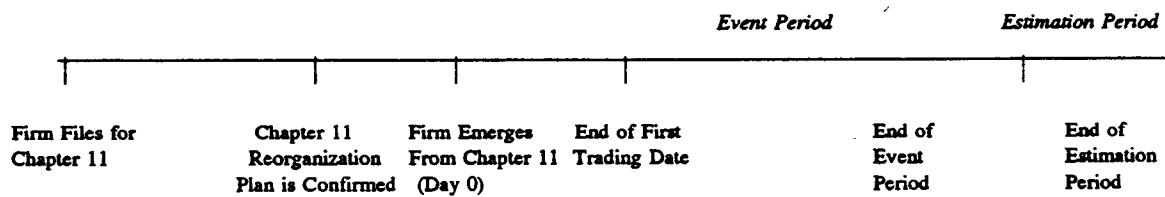
To avoid any potential survivorship bias, we include the performance of the 5 firms that drop out of the sample in the ACAR tests for every period. Because these firms do not trade during the benchmark estimation period of day 201 through day 274, we cannot standardize the returns. We can, however, compute their CARs in the case where the benchmark portfolio is simply the market return (i.e., the alpha is presumed to equal zero and the beta equals unity). Figure 1 summarizes the sequence of events.

IV. Empirical Results

A. Raw Return Results

Table 1 lists the average price as well as the standard deviation and median price at emergence. The average price was \$6.32 with a median of only \$3.75. In addition, the arithmetic, cumulative returns for various periods are listed. The raw return

Figure 1
Typical Time Line for Sample Firms



for two, 100, and 200 days subsequent to emergence was 2.9%, 10.7% and 33.5% compared to raw returns of 0.0%, 6.0% and 10.8% for the NASDAQ Index. The median prices rise, but less so, in the post-Chapter 11 periods with raw returns of 0.0%, 7.7% and 27.8%. Note, these are not buy and hold returns from period 0 to the end of the event period.

Figure 2 provides a graphical illustration over the 200-day period of the arithmetic, cumulative average returns on the portfolio (equally weighted) of emerged equities comparing them with the NASDAQ and NYSE/ASE Index returns. Note that the emerged equities do fairly well relative to the exchange indexes for the first two days and again around the tenth day. Following the tenth day, the cumulative return differential narrows somewhat until around the sixtieth day (two months), and then starts its consistent outperformance compared to the stock exchange indexes. This excess return performance continues until the end of our 200-day sample period. The reduction in the differential in the 10-60 day period perhaps reflects selling pressure from the old creditors and some profit taking from investors who bought at or near the "opening."

B. ACAR Results

The ACAR results are presented in Table 2. The ACARs are computed for all three major event periods under differing assumptions about the market model parameters and the market index. The alphas are presumed to equal zero and the betas equal to unity. For the first two days of returns following emergence--event period

(1, 2)--the ACAR ranges from 2.8% to 2.9% and is statistically significant under every method of estimating the conditional expected return/benchmark portfolio. The median CARs are also positive but not statistically significant. Therefore, there is some underpricing in the short term but the statistical significance is driven by outliers.

When the event period is lengthened to the first 100 days following emergence from bankruptcy, the ACARs continue to rise with a range from 4.7% to 8.6%. The statistical significance, however, of the results is mixed. When the NYSE/ASE index is used to estimate the expected returns, the ACARs are significant but they are insignificant when the NASDAQ is used. The median CARs are also positive but insignificant every time.

The results become decidedly unambiguous when the event period is extended to day 200. The lowest ACAR is 22.8% when betas of unity are used and the NASDAQ is employed as the market proxy. With benchmark betas and the NYSE/ASE index, the ACAR is 29.6%. Moreover, the Z-statistics are all statistically different from zero. The median CARs are also large and significant with a range from 16.8% to 22.2%. The wealth relatives (not reported in the table), though lower, are all greater than unity. They range from 1.06 for the NASDAQ index with $\alpha = 0$ and $\beta = 1$ to 1.14 with the NYSE/ASE index with $\alpha = 0$ and $\beta = \text{benchmark estimate}$.

Both the price-unbiasedness test results, referred to earlier, and a variation on this approach called the generalized priced

unbiasedness test (Eberhart and Sweeney, 1994), reject pricing efficiency for the 200-day event period. The price and time in Chapter 11 still have significant effects on the stock returns but the dummy variables for the continuous trading and change in exchange are insignificantly different from zero. The generalized test also rejects efficiency for the 100-day period. Neither test comfortably rejects efficiency for the two-day period.

C. Portfolio ACARs

To investigate possible explanations for the observed underpricing over the 2, 100 and 200 day period following emergence from Chapter 11, we segment the sample into 10 portfolios. The portfolios are formed based on three separate criteria; (1) the price at the close of the first trading day, (2) the time spent in Chapter 11 and (3) the exchange the stock trades on after emergence.

Table 3 shows the portfolio results for the first two return days (1,2). The CARs are computed with the NASDAQ index used as a proxy for the market. The market model alpha is presumed to equal zero and the beta to equal unity. For the price-sorted portfolios, the two largest ACARs are for the two smallest price portfolios. The largest ACAR of 20.4% is with the second smallest price portfolio (range from \$0.69 to \$1.13). A 20.4% return on a stock with a price of \$0.69 equals an excess return of \$0.14; large enough to cover the minimum bid/ask spread of \$0.125. Of course, the bid/ask spread could be larger and commission costs could eliminate the remaining excess return. Moreover, the median excess

return is a smaller 7.5%. On the other hand, the ACAR for the portfolio with prices that range from \$5.5 to \$6.88 is 4.8% and this implies an excess return of approximately \$0.30 for a stock price of \$6; more than enough to cover a bid/ask spread of two one-eighth ticks. The median CAR, however, is a smaller, 1.3%.

These results suggest that the short-term underpricing is concentrated in low priced stocks and the relative size of the bid/ask spread for these stocks casts doubt on how easily the apparent mispricing is to exploit. On other hand, investors that receive these stocks in exchange for their old claims on the formerly bankrupt firm will incur these transaction costs anyway if they liquidate their position. At the very least, our results suggest that they should delay the sale of these stocks.

There is an inverse relationship between the time spent in Chapter 11 and the ACARs. The largest ACARs are concentrated among firms that completed the Chapter 11 process within a year. For firms that spend between 4.2 months and 8.28 months in Chapter 11, the ACAR is 17.1%. Again, though, the median CARs tend to be lower. Here, the median CAR is negative (-0.002%).

With the sample sorted by exchange, the 71 firms listed in NASDAQ have the largest ACAR of 4.9%, consistent with the small price effect discussed above. The ASE firms have a larger median CAR of 1.3%, confirming that the bulk of the large outliers is concentrated among the NASDAQ firms. The NYSE firms drop slightly with an ACAR of -1.9% (median CAR of -1.3%).

With the event period extended to the first 100 days in **Table**

4, the portfolio performance is qualitatively similar to the first two days. The low-priced stocks tend to have larger ACARs whereas the negative ACARs associated with the higher priced stocks rise in magnitude. A comparable pattern appears in the portfolios sorted by time in Chapter 11. The ACARs of the firms with a shorter duration in Chapter 11 tend to increase while the longer duration bankruptcies tend to have negative ACARs that grow in size. With the exchange sorted portfolios, however, all of the ACARs are positive (though the median CAR for the NYSE firms is negative).

For the 200-day performance shown in Table 5, the ACARs generally increase across all portfolios. An exception is for the highest price stocks; the two largest price portfolios still have negative ACARs (the median CARs are also negative in these portfolios but of lower magnitude). All the other ACARs are positive except the third smallest price portfolio and here, the median CAR is positive.

The inverse relationship between the time spent in Chapter 11 and subsequent stock performance weakens when the performance window is extended to 200 days. The larger ACARs are concentrated in the firms with shorter time spent in Chapter 11 but the longer duration bankruptcies also have large positive excess returns.

The superior performance the NASDAQ stocks exhibited in the shorter windows has also disappeared. Though the NASDAQ firms have an ACAR of 24.3%, the NYSE and ASE firms have similar ACARs of 21.2% and 20.7%. Moreover, the ASE firms have the highest median CARs.

VI. Summary and Conclusions

The fallout from the record number of bankruptcies during the late 1980s and early 1990s has created a growing market for stocks of firms emerging from bankruptcy. The large returns some stocks have earned has heightened interest in this market. We investigate the extent to which these stocks are efficiently priced in the initial aftermarket. We find evidence of underpricing in the short-term, consistent with the IPO literature. In contrast to the IPO literature, though, we report striking evidence of underpricing in the long term. Specifically, over the first 200 days of returns after emergence, the ACAR varies from 22.8% to 29.6% (depending on how the benchmark portfolio is estimated).

We investigate several explanations for the underpricing. The most important variable in explaining cross-sectional differences in returns is the stock price at the close of the first day of trading following emergence from Chapter 11. Specifically, low-priced stocks have the highest subsequent returns. This suggests that at least some excess returns we observe can be attributed to the higher transaction costs and potentially higher risks associated with low-priced stocks. However, we continue to find evidence of underpricing even after controlling for the small price effect.

Our results cast doubt on the informational efficiency of this market. This is of particular interest to investors in formerly bankrupt firms who receive equity in the newly emerged firm in exchange for their old claims. The results also present an

interesting contrast to the reported poor operating results of firms emerging from bankruptcy. Our results suggest that, although these firms may not do well in their accounting performance, they appear to do better than the market expected at the time of emergence from Chapter 11.

REFERENCES

- Aggarwal, Reena and Pietra Rivoli (1990) "Fads in the Initial Public Offering Market?" Financial Management, 19, 58-67.
- Altman, Edward I. (1991) Distressed Securities. Probus Publishing Company, Chicago, Illinois.
- _____, (1993), Corporate Financial Distress and Bankruptcy, John Wiley and Sons, New York.
- _____ and Allan C. Eberhart, (1994), Do seniority provisions protect bondholders' investments?, Journal of Portfolio Management, 20, 67-75.
- Carter, Richard and Steven Manaster (1990), "Initial public offerings and underwriter reputation," Journal of Finance, 45, 1045-1067.
- Eberhart, Allan C., William T. Moore and Rodney L. Roenfeldt, 1990, Security pricing and deviations from the absolute priority rule in bankruptcy proceedings, Journal of Finance, 45, 1457-1469.
- _____ and Richard Sweeney, 1992, "Does the bond market predict bankruptcy settlements?" Journal of Finance, 47, 943-980.
- Gilson, Stuart, (1997), "Debt reduction, optimal capital structure, and renegotiation of claims during financial distress," Journal of Finance forthcoming.
- Hotchkiss, Edith S., 1993, Investment decisions under chapter 11 bankruptcy, Doctoral Dissertation, New York University Stern School of Business.
- _____, 1995, The post-emergence performance of firms emerging from chapter 11, Journal of Finance, 50, 3-21.
- Ritter, Jay R., 1991, The Long-Run Performance of Initial Public Offerings, Journal of Finance, 46, 3-48.
- Rudd, Judith S., 1993, Underwriter price support and the IPO underpricing puzzle, Journal of Financial Economics, 34, 135-151.
- Sandler, Linda, 1991, Post-bankruptcy shares: Next big play?, Wall Street Journal, May 16.
- Wagner, Herbert and Mark Van De Voorde, 1995, Post-bankruptcy performance of new equity securities issued in exchange for pre-petition debt, Journal of Fixed Income, 49-59.
- Weiss, Lawrence A., 1990, Bankruptcy costs and violation of claims priority, Journal of Financial Economics, 27, 2, 285-314.

Table 1

Stock Price Performance of Firms Emerging From Chapter 11*

	Average	Median	Standard Deviation
Emergence Price	\$6.32	\$3.75	\$3.92
Raw Return (0, 2)	0.029	0	0.203
NYSE Return (0, 2)	-0.0005	-0.0003	0.013
Nasdaq Return (0, 2)	-0.0001	-0.0003	0.015
Raw Return (0, 100)	0.107	0.077	0.506
NYSE Return (0,100)	0.045	0.045	0.076
Nasdaq Return (0, 100)	0.060	0.061	0.119
Raw Return (0, 200)	0.335	0.278	0.742
NYSE Return (0, 200)	0.091	0.092	0.090
Nasdaq Return (0, 200)	0.108	0.110	0.131

*Source: Based on a sample of 131 industrial firms that emerged from Chapter 11 Bankruptcy Reorganization, 1980-1993. Excerpted from A. Eberhart, E. Altman, R. Aggarwal, "The Equity Performance of Firms Emerging from Bankruptcy," NYU Salomon Center and Georgetown School of Business Working Papers, May 1996.

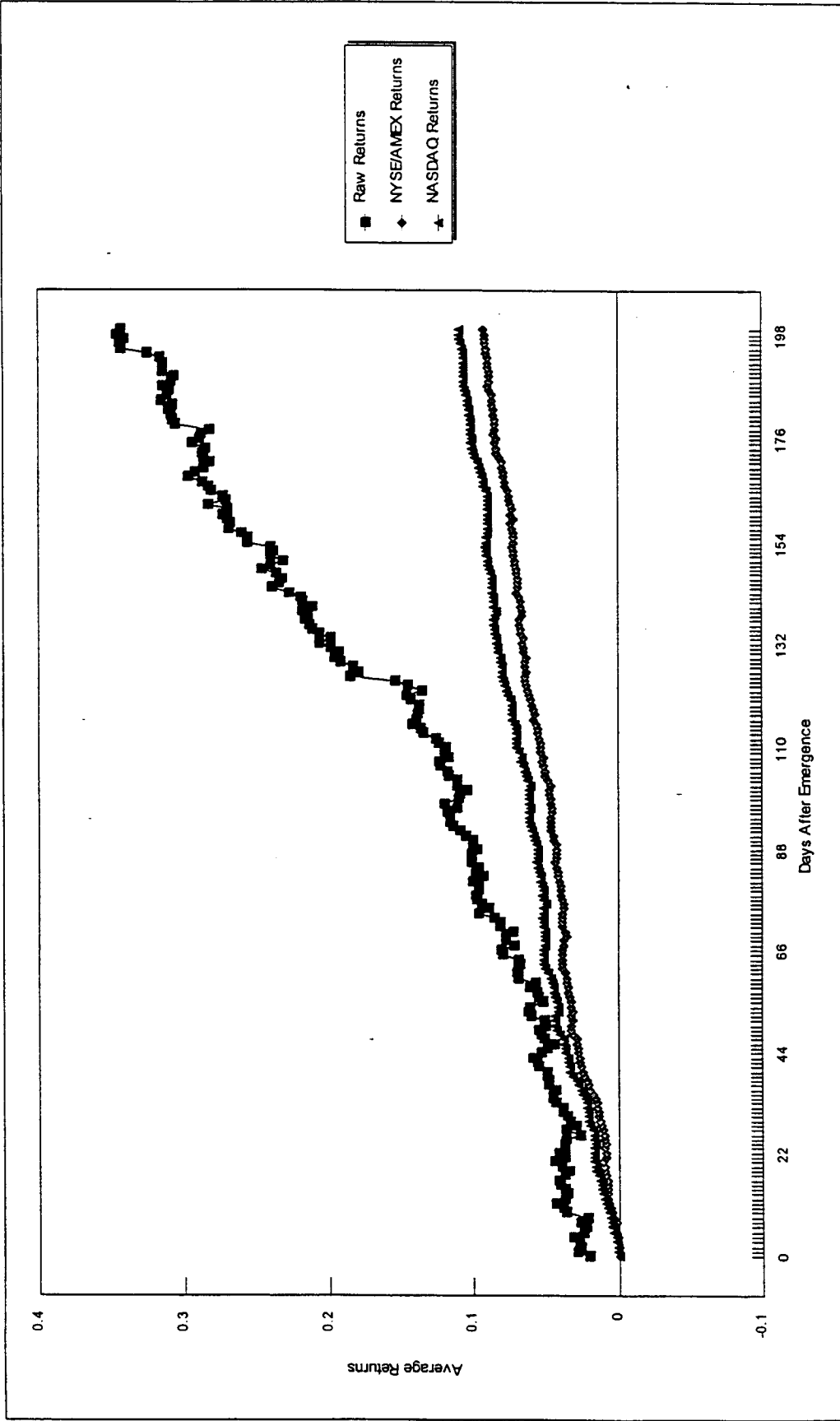


Figure 2. Equally weighted average cumulative returns for 200 days following emergence from bankruptcy. The raw returns are for an equally weighted portfolio of the sample firms with daily rebalancing. The NYSE/AMEX and NASDAQ returns are for the value weighted indices.

Table 2

Average Cumulative Abnormal Returns

Average cumulative abnormal returns (ACARs) are computed for the sample of 131 firms emerging from Chapter 11 from 1980 through 1993. Event day 0 is defined as the first trading day upon emergence from Chapter 11. The benchmark period for the market model parameters is event days 3 through 274. The Z-Statistic is calculated as $Z = (1/\sqrt{N}) \sum_{i=1}^N CAR_i / SE'_i$, where SE'_i is the standard error estimate.

Market Model Parameters						
Event Period	α	β	Market Index	ACAR	Z-Stat	Median CAR
(1, 2)	Zero	Unity	NASDAQ	0.028	4.360*	0.002
(1, 2)	Zero	Unity	NYSE/ASE	0.028	4.205*	0.001
(1, 2)	Zero	Benchmark	NASDAQ	0.028	4.364*	0.003
(1, 2)	Zero	Benchmark	NYSE/ASE	0.029	4.548*	0.002
(1, 100)	Zero	Unity	NASDAQ	0.047	0.980	0.000
(1, 100)	Zero	Unity	NYSE/ASE	0.079	1.753***	0.057
(1, 100)	Zero	Benchmark	NASDAQ	0.062	1.414	0.020
(1, 100)	Zero	Benchmark	NYSE/ASE	0.086	2.021**	0.058
(1, 200)	Zero	Unity	NASDAQ	0.228	2.518**	0.168*
(1, 200)	Zero	Unity	NYSE/ASE	0.284	3.519*	0.206*
(1, 200)	Zero	Benchmark	NASDAQ	0.245	2.852*	0.182*
(1, 200)	Zero	Benchmark	NYSE/ASE	0.296	3.778*	0.222*

*Significant at the 1 percent level using a two-tailed test.

**Significant at the 5 percent level using a two-tailed test.

***Significant at the 10 percent level using a two-tailed test.

Table 3

Abnormal Returns for Event Period (1,2) Sorted by Initial Price, Time in Bankruptcy and Exchange

This table shows the performance of 131 firms emerging from bankruptcy between 1980 and 1993 for the first two return days following emergence from bankruptcy (event days 1 and 2). In Panel A, the sample is sorted by the closing price on the first trading date after emergence (event day 0). Panel B shows the performance sorted by the number of months spent in Chapter 11. Finally, the sample is sorted by the exchange listing after emergence. The average cumulative abnormal return (ACAR) is computed with the value weighted NASDAQ index and the presumption that the true $\alpha = 0$ and true $\beta = 1$. The Z-Statistic is calculated as $Z = (1/N) \sum_{i=1}^N \text{CAR}_i / \text{SE}'_i$, where SE'_i is the standard error estimate.

<u>Price</u>	<u>ACAR</u>	<u>Z-Stat</u>	<u>Median CAR</u>	<u>Sample Size</u>	<u>Time in Chapter 11</u>	<u>ACAR</u>	<u>Z-Stat</u>	<u>Median CAR</u>	<u>Sample Size</u>
0-0.69	0.080	5.779	0.007	13	1.23-3.73	0.039	1.204	0.019	13
0.69-1.13	0.204	14.094	0.075	13	4.2-8.28	0.171	12.551	-0.002	13
1.13-1.63	-0.026	-0.784	-0.000	13	8.4-11.93	0.061	5.565	0.029	13
1.63-2.75	0.021	-1.313	0.002	13	12.03-15.53	-0.006	0.720	-0.013	13
2.75-3.75	-0.026	-0.706	-0.002	13	16.1-19.87	-0.018	-1.704	-0.009	13
3.75-5.25	-0.007	-0.492	-0.002	13	20.17-23.27	0.057	4.322	0.002	13
5.5-6.88	0.048	2.712	0.013	13	23.67-26.47	0.016	-0.030	0.002	13
7.06-9.63	-0.004	-0.718	0.002	13	26.53-32.63	-0.011	-0.705	-0.001	13
10-14	0.009	0.956	-0.011	13	32.9-37.6	0.009	0.880	0.016	13
14.25-62.88	-0.012	-1.310	-0.018	14	38.13-132.8	-0.030	-4.465	0.005	14

<u>Exchange</u>	<u>ACAR</u>	<u>Z-Stat</u>	<u>Median CAR</u>	<u>Sample Size</u>
AMEX	0.041	2.158	0.013	23
NASDAQ	0.049	9.571	0.010	71
NYSE	-0.019	-4.190	-0.013	37

Table 4

Abnormal Returns for Event Period (1,100) Sorted by Initial Price, Time in Bankruptcy and Exchange

This table shows the performance of 131 firms emerging from bankruptcy between 1980 and 1993 for the first 100 return days following emergence from bankruptcy (event days 1 through 100). In Panel A, the sample is sorted by the closing price on the first trading date after emergence (event day 0). Panel B shows the performance sorted by the number of months spent in Chapter 11. Finally, the sample is sorted by the exchange listing after emergence. The average cumulative abnormal return (ACAR) is computed with the value weighted NASDAQ index and the presumption that the true $\alpha = 0$ and true $\beta = 1$. The Z-Statistic is calculated as $Z = (1/N) \sum_{i=1}^N (CAR_i / SE_i)$, where SE_i is the standard error estimate.

Price	ACAR	Z-Stat	Median CAR	Sample Size	Time in Chapter 11	ACAR	Z-Stat	Median CAR	Sample Size
0.09-0.69	0.328	2.813	0.171	13	1.23-3.73	0.120	0.678	0.262	13
0.69-1.13	0.244	3.856	0.355	13	4.2-8.27	0.078	1.045	-0.030	13
1.13-1.63	0.058	-0.099	0.088	13	8.4-11.93	-0.033	0.096	-0.152	13
1.63-2.75	-0.063	-0.781	-0.044	13	12.03-15.33	0.256	1.863	0.119	13
2.75-3.75	0.142	1.557	0.166	13	16.1-19.87	-0.068	-0.330	-0.044	13
3.75-5.25	0.002	0.334	0.005	13	20.17-23.27	0.025	0.777	0.152	13
5.5-6.88	0.143	2.075	0.235	13	23.67-26.47	-0.003	0.691	-0.023	13
7.06-9.63	-0.114	-1.066	-0.066	13	26.53-32.63	0.093	1.194	0.081	13
10-14	-0.176	-1.389	-0.280	13	32.9-37.6	0.135	1.547	0.054	13
14.25-62.88	-0.081	-1.143	-0.065	14	38.13-132.8	-0.119	-1.395	-0.058	14

Exchange	ACAR	Z-Stat	Median CAR	Sample Size
AMEX	0.031	-0.021	0.081	23
NASDAQ	0.066	2.778	0.005	71
NYSE	0.021	-0.207	-0.052	37

Table 5

Abnormal Returns for Event Period (1, 200) Sorted by Initial Price, Time in Bankruptcy and Exchange

This table shows the performance of 131 firms emerging from bankruptcy between 1980 and 1993 for the first 200 return days following emergence from bankruptcy (event days 1 through 200). In Panel A, the sample is sorted by the closing price on the first trading date after emergence (event day 0). Panel B shows the performance sorted by the number of months spent in Chapter 11. Finally, the sample is sorted by the exchange listing after emergence. The average cumulative abnormal return (ACAR) is computed with the value weighted NASDAQ index and the presumption that the true $\alpha = 0$ and true $\beta = 1$. The Z-Statistic is calculated as $Z = (1/\sqrt{N}) \sum_{i=1}^N \text{CAR}_i / \text{SE}_i$, where SE_i is the standard error estimate.

Price	ACAR	Z-Stat	Median CAR	Sample Size	Time in Chapter 11	ACAR	Z-Stat	Median CAR	Sample Size
0.09-0.69	0.719	3.131	0.605	13	1.23-3.73	0.379	2.199	0.508	13
0.69-1.13	0.790	2.974	0.512	13	4.2-8.28	0.531	1.930	0.460	13
1.13-1.63	-0.129	-1.176	0.131	13	8.4-11.93	0.164	1.098	0.262	13
1.63-2.75	0.479	2.156	0.500	13	12.03-15.33	0.270	1.727	0.048	13
2.75-3.75	0.242	1.696	0.373	13	16.1-19.87	0.173	1.443	0.151	13
3.75-5.25	0.157	0.760	0.088	13	20.17-23.27	0.142	0.780	0.173	13
5.5-6.88	0.143	1.817	0.173	13	23.67-26.47	0.115	-0.168	0.032	13
7.06-9.63	0.198	1.811	0.199	13	26.53-32.63	-0.015	0.085	-0.026	13
10-14	-0.146	-0.454	-0.123	13	32.9-37.6	0.364	3.430	0.173	13
14.25-62.88	-0.144	-0.982	-0.044	14	38.13-132.8	0.162	-0.797	0.049	14

Exchange	ACAR	Z-Stat	Median CAR	Sample Size
AMEX	0.207	1.505	0.217	23
NASDAQ	0.243	2.987	0.151	71
NYSE	0.212	1.610	0.113	37