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Financial Distress As A Selection Mechanism: Performance and Survival From The Onset To The Resolution of Financial Distress*

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Abstract:

This paper analyzes financial distress as a selection mechanism. We follow the process of financial distress from its onset to its resolution for a sample of 102 firms that enter financial distress between 1979 and 1983. Only a little more than one-third of firms survive as independent companies. The main selection pressure comes from the acquisition market. Poor operating performance is not tolerated for long. The number of firms reporting negative operating income declines dramatically within a few years after the onset of financial distress, mainly due to the large number of firms that are acquired. A firm's short-run and long-run survival probability is positively affected by its operating performance, and the effect appears to be relatively strong. The only other factor systematically increasing a firm's survival probability is the willingness of creditors to take an equity stake in the firm. The roughly one-third of firms that survive financial distress as independent companies appear to be economically viable. They perform about as well as the industry median firm after emerging from financial distress and have overcome their financial difficulties within a median time of less than 3 years. Overall, the evidence suggests that the financial distress process in the U.S. leads to more asset reallocation away from poorly performing firms and hence is more efficient than suggested by much of the existing literature, which claims that the U.S. financial distress environment allows inefficient firms to survive for a very long time.

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I. Introduction

Financial distress occurs when a firm cannot meet its debt obligations or has to restructure its debt to avoid a default. Because the inability to make debt payments may lead to the acquisition or liquidation of a firm, financial distress is an important selection mechanism. One of the central questions debated about financial distress is the efficiency of this selection process. Do the “good” firms survive while the “bad” firms do not? This question is of importance for several reasons. First, one goal in the design of a bankruptcy regime should be to make this selection process during financial distress efficient. If it is not efficient, bankruptcy reform may be called for. One important, perhaps dominant, view in the literature is that in the U.S., due to Chapter 11 reorganization law, financial distress is an inefficient selection mechanism. In particular, it is claimed that Chapter 11 allows the excessive continuation of inefficient firms (e.g., Baird (1986), White (1989), Bradley and Rosenzweig (1992), Hotchkiss (1995)). As a consequence of this view, several authors have suggested a reform of U.S. bankruptcy law that moves the reorganization law closer to a liquidation code (Bebchuck (1988), Aghion, Hart, and Moore (1992)) or even abolishes Chapter 11 altogether (Bradley and Rosenzweig (1992)). The efficiency of the financial distress process is also an important determinant of the costs and benefits of financial distress. If the selection process is efficient, the intervention process triggered by financial distress leads to a more efficient asset allocation and hence increases firm value. The costs and benefits of financial distress are often seen as an important determinant of firms’ capital structure choices, as in the classic trade-off theory that balances the tax advantage of debt with the costs of financial distress.

Despite the importance of the selection process during financial distress, there is surprisingly little evidence on it. To our knowledge, there is not a single study that analyzes this selection process in detail. This paper fills this gap in the literature. To make inferences about the efficiency of the financial distress process, one needs to follow the survival of firms from the onset to the resolution of financial distress. Analyzing only part of the survival process, for example, studying only selection during Chapter 11, may not give a representative picture of the overall efficiency of the selection process during financial

distress, because many firms may not even enter Chapter 11 before being acquired or liquidated. To avoid such sample selection problems, this paper analyzes the selection process from the onset to the resolution of financial distress. As such our paper is, to our knowledge, the first paper analyzing the whole financial distress process for a cohort of firms.

To investigate the selection process triggered by financial distress, we follow 102 firms that become financially distressed between 1979 and 1983 from the onset to the resolution of financial distress. This sample period is chosen because it is subsequent to the Bankruptcy Reform Act of 1978, but at the same time is early enough to allow the analysis of the entire financial distress process from its onset to its resolution and the analysis of five years of post-distress performance for all sample firms. The onset of financial distress is the first time that a firm defaults or violates a debt covenant, avoids this by negotiating to restructure its debt with its creditors, or files for Chapter 11. One possible resolution of financial distress is an acquisition or liquidation. Both induce the end of the firm as independent entity and the reallocation of its assets to a different user. In that sense, they are similar to what would occur under a liquidation code. The other possibility is that the firm survives the entire process of financial distress and emerges from it as independent entity, having overcome its difficulties in making debt payments.

Our main findings are as follows. There is substantial selection pressure, in particular from the acquisition market. Only a little more than one-third of all firms survive financial distress as independent firms; the remainder is acquired or liquidated. This happens relatively quickly. By the end of the second full year after the onset of financial distress, 26 firms are acquired and 6 more liquidated. By the end of the third full year after the onset of financial distress, 31 firms are acquired and 11 more liquidated, and by the end of the fifth year, 40 are acquired and 14 more liquidated. Surviving firms improve their operating performance while they are still in financial distress. Not surprisingly, they still clearly underperform their industry median as long as they remain financially distressed – that is, have difficulties making their debt payments. However, only very few firms with poor operating performance survive for long. While there are 50 firms with negative operating performance in the year of the onset of financial distress (among the 93 firms with data available),

there are only 17 in the second year after the onset of financial distress, 8 in the fourth, and 6 in the fifth year. This suggests that poor performance leads to a relatively quick acquisition or liquidation, in contrast to suggestions in some of the existing literature (e.g., Hotchkiss (1995)).

Both short-run and long-run survival is positively related to operating performance. While it is difficult to judge what would constitute an “efficient” performance sensitivity of survival, the effect of performance on survival in our sample appears to be relatively strong. For example, we estimate that a one standard deviation improvement in a firm’s average return on assets during financial distress increases the survival probability from 0.27 to 0.56. The firm’s leverage ratio at the onset of financial distress has no statistically significant effect on survival, as it should not in an efficient selection process.¹ However, there is some weak evidence that size has a positive effect on short-term survival (to the end of the second year after the onset of financial distress). Having filed for Chapter 11 does not increase a firm’s survival probability. In contrast, at least according to some regression specifications, it reduces a firm’s long-run survival probability, even if one controls for its operating performance and other variables. One interpretation of this finding is that Chapter 11 does not interfere substantially with the efficiency of the selection mechanism by allowing poor performers to survive for very long. In addition to operating performance, only one factor systematically increases a firm’s long-run survival probability: Firms in which creditors take equity stakes (typically in exchange for partial debt forgiveness) have a higher chance of survival. This should not be surprising because a debt reduction, for given performance, increases a firm’s chance to make its debt payments and overcome financial distress.

Our last main finding concerns post-distress operating performance. The roughly one-third of the firms that survive the financial distress process as independent firms seem to be economically viable firms. Their post-distress performance is almost identical to the industry median. Moreover, they overcome financial distress relatively quickly, within a median time of 34 months.

¹ The finding on leverage is in contrast to Zingales (1998), who analyzes the survival process triggered by the deregulation of the trucking industry and finds a significant negative effect of leverage on survival.

Overall, our results suggest that there is more asset reallocation away from poorly performing firms than implied by much of the literature (e.g., Baird (1986), White (1989), Bradley and Rosenzweig (1992), Hotchkiss (1995)). Hence, the selection process during financial distress seems to be more efficient than suggested in this literature. The small number of firms that perform poorly for a long time indicates that poor performance is not tolerated for long. The good post-distress operating performance of the firms that overcome financial distress suggests that they are viable (in fact, as viable as the median firm in their industry). Moreover, the fact that survival is fairly sensitive to performance but not much else suggests also a more efficient asset reallocation process than implied by the existing literature.

Our paper is related to a number of other studies. Our post-distress performance results are much better than the post-Chapter 11 performance reported in Hotchkiss (1995). She finds that in each of the first five years after emerging from Chapter 11, between 35% and 41% of all firms have negative operating income.² The difference between post-distress and post-Chapter 11 performance may arise for various reasons. Firms that never file for Chapter 11 but overcome financial distress may perform substantially better than firms that enter Chapter 11 at some point during the financial distress process. Moreover, firms that emerge from Chapter 11 have not necessarily overcome financial distress. Consistent with these conjectures, we find that the post-Chapter 11 performance in our sample is worse than the post-distress performance of all firms that overcome financial distress. This suggests that post-Chapter 11 performance may not be representative of the performance of all firms emerging from financial distress.³

Our paper is not the first paper that argues that the financial distress environment in the US is not as inefficient as suggested by much of the literature. Alderson and Betker (1995) show that firms with high liquidation costs reduce their leverage substantially during Chapter 11. This suggests that Chapter 11 allows firms to adjust their capital structure when they need it most. Andrade and Kaplan (1998) analyze financial distress for firms that are in financial, but not in economic distress. In particular, they estimate relatively

² However, post-Chapter 11 performance is much better in Hotchkiss and Mooradian (1997) than in Hotchkiss (1995).

low costs of financial distress for a sample of leveraged buyouts and leveraged recapitalizations. In contrast to their paper, our paper focuses on a set of economically and financially distressed firms. Maksimovic and Phillips (1998) show that plant productivity, asset sales, and plant closure decisions are not strongly affected by a firm's Chapter 11 status. They interpret these findings as suggesting that Chapter 11 does not lead to large economic costs.

The remainder of the paper is structured as follows. In section II, we describe our sample selection procedure and some characteristics of the sample firms in the year that they became financially distressed. In section III, we give an overview of the financial distress process and its resolution. Section IV describes the survival of firms throughout the process of financial distress. Section V documents the firm's pre- and in-distress operating performance. Section VI analyzes the factors that affect the probability that a firm survives the entire process of financial distress. Section VII looks at the determinants of survival over different time horizons. Section VIII describes the post-distress operating performance of surviving firms. Section IX concludes.

II. Sample Selection and Descriptive Statistics

A. Sample Selection

This study analyzes the process of financial distress from its beginning to the end for 102 firms that enter financial distress between 1979 and 1983. To be included in the sample, firms must satisfy several criteria. First, they must have, according to *Compustat*, an interest coverage ratio of below 1 in at least one year between 1980 and 1983.⁴ The interest coverage ratio is calculated from *Compustat* by dividing operating performance *before* interest expense, income taxes, depreciation and amortization (EBITDA) by interest expense. We restrict the sample to firms that have a book value of total assets of at least \$10 million in at least one year between 1980 and 1983 in which they had an interest coverage ratio below one. 1346 firms meet this criterion. Most of these firms had negative operating

³ This result should be interpreted with extreme caution since there are only at most 14 firms in our sample that have post-Chapter 11 performance data available.

income in the critical year(s). An interest coverage ratio below one does not mean that a firm will necessarily become financially distressed, that is, have difficulties in making debt payments or complying with the covenants in its debt contracts. Debt payments can be made from other sources than operating income. However, a low interest coverage ratio seems to be a necessary condition for financial distress.

Second, the *Wall Street Journal* Index must indicate that the firm has defaulted or negotiates with its creditors to restructure its debt in order to avoid a default, or that it has filed for Chapter 11 between 1980 and 1983. The *Wall Street Journal* Index was searched for all articles covering the firms that pass the interest coverage filter. Following Gilson (1990), a debt restructuring is defined as an exchange of financial claims that a firm makes to avoid defaulting on its debt or filing for bankruptcy (including implicit exchanges such as maturity extensions). A default, a debt restructuring that avoids a default, or a Chapter 11 filing indicate that the potential financial difficulties indicated by a low interest coverage ratio are indeed severe enough to make the firm financially distressed - that is, cause it to violate covenants in its debt contracts or miss a debt payment in the absence of a debt restructuring. 151 firms pass this additional filter. We define the first year in which there was a default, there were negotiations of a debt restructuring to avoid a default, or there was a Chapter 11 filing as the year of the onset of financial distress.

To avoid the inclusion of firms whose financial distress process may be affected by the bankruptcy environment prior to the Bankruptcy Reform Act of 1978, all 14 firms that entered financial distress earlier than 1979 are excluded. We check for all firms in our sample on *Dow Jones Interactive* and *Lexis/Nexis* whether they were in financial distress for 5 years prior to the year we defined as the onset of financial distress. Then we eliminate the 14 firms that were in financial distress before our onset date, which is between 1980 and 1983.

However, we leave four firms that began to be financially distressed during 1979 in the sample. We also exclude two Canadian and two Philippine firms because their bankruptcy environment is substantially different from the U.S. system. Three firms are excluded because they are subsidiaries of other firms. For 28 firms we cannot establish com-

⁴ Asquith, Gertner, and Scharfstein (1994) discuss advantages of the interest coverage filter over other indi-

pletely what happened to them in financial distress. Hence, we exclude them from the sample. This is likely to introduce a bias against finding acquisitions and liquidations since many of these firms probably could not be found on *Dow Jones Interactive* and *Lexis/Nexis* anymore because they were acquired or liquidated. This leaves us with 102 firms.

B. Descriptive Statistics At Onset Of Financial Distress

Four of the firms became financially distressed in 1979, 14 in 1980, and 14 in 1981. However, the bulk of the firms became distressed in 1982 (43 firms) and 1983 (27 firms). Panel A of Table 1 describes some characteristics of the sample firms at the onset of financial distress (which, as discussed above, differs across firms). All tables and figures are in the Appendix.

With a median book value of assets of \$57.3 million (the mean is \$240.3 million), the firms are comparable to Gilson's (1990) sample (median: \$74.8 million), substantially smaller than James' (1995) firms (median: \$135.95), and substantially larger than Hotchkiss' (1995) firms (median: \$21.1 million). The median and mean assets hide substantial heterogeneity across firms. As Panel B of Table 1 shows, about 12% of firms have a book value of assets less than \$20 million while 7.5% have more than \$1 billion in assets. Median net sales are \$71.7 million (mean: \$339.4 million).

The median firm has negative operating income so that its interest coverage ratio is negative (-0.07). Median book leverage (short-term debt plus long term debt, divided by the same expression plus the book value of common equity) is 77.9% (the mean is 84.7%).

Panel C of Table 1 describes the industry distribution of the sample firms (in 2-digit SIC codes). While the sample firms stem from 34 different 2-digit SIC codes, about half of all firms come from six industries: oil and gas extraction (13), primary metals (9), transportation by air (8), real estate (8), durable goods-wholesale (7), and industrial, commercial machinery and computer equipment (7).

cators of financial distress used in the literature, in particular stock prices.

III. Overview: Duration and Resolution of Financial Distress

In this section, we give an overview of the financial distress process that we analyze in this paper. We describe how many firms survived the entire process as independent companies, the duration of financial distress, and the role of Chapter 11 in it. We will also use this information below in the regression analysis.

The sample firms are followed from the onset of financial distress until the time of its resolution. We have already defined the onset of financial distress above. We also need to define a date at which a firm exits financial distress. From this date on, the firm does not have difficulties making its debt payments anymore. The definition of an exit year allows us to isolate the effect of financial distress on survival. Once a firm has emerged from financial distress, it can still be acquired. Any such post-distress acquisition should not and will not be recorded in our study, because it is not caused by financial distress. Hence, our exit year definition allows us to restrict our survival analysis to the period of financial distress.

For firms that remain independent, we construct the exit year (or, first post-distress year) as follows: A necessary condition for a year to be considered the exit year is that the firm is not in Chapter 11, is not in default, and is not negotiating to restructure its debt to avoid a default. To qualify as the exit year, one of two additional criteria has to be satisfied. First, we look for any sign in the newspaper articles in *Dow Jones Interactive* and *Lexis/Nexis* that indicates that the firm is clearly out of financial distress. We consider this to be the case if the firm resumes paying a dividend on its common stock or raises substantial funds in the debt or equity market. If we cannot find such clear evidence that the firm is out of financial distress, we use a formal criterion to determine whether the firm is still in financial distress or not. A firm is considered out of financial distress if it has at least one year of an interest coverage above one and in addition it satisfies one of the following two criteria: Either it has reduced its book leverage ratio by at least 15 basispoints relative to the onset of financial distress or it has a lower leverage ratio than the median firm in its 2-digit SIC industry code. The leverage criterion is employed to rule out situations in which the firm has overcome difficulties in making debt payments only for a very

short time (for example, through a short-term maturity extension). If leverage has not gone down by much, then the firm has not eliminated the reason behind its difficulties making debt payments and is likely to have difficulties with it in the near future. However, if a firm has lower leverage than its industry median, the firm's debt burden might not be considered excessive and difficult to service. Hence, we assume that such a firm has overcome its financial distress. Note that the formal interest coverage and leverage criterion is only used if there are no clear signs of emerging from financial distress in the newspaper articles.

An example might help to illustrate our procedure. Assume that a firm has the last incident of financial distress (is in default, in Chapter 11, or negotiates a debt restructuring) that we can find in 1980. Then, 1981 is the earliest possible exit date. If we can find clear signs of emerging from financial distress (for instance, resuming dividend payments on the common stock or a large equity or debt offering) in 1981 and there is no mention of incidents related to financial distress for this firm for 1981, 1981 is the exit year. If we cannot find a clear sign of recovery from financial distress for 1981, we check the interest coverage ratio for 1981. If it is above 1, we check whether the book leverage in 1981 is at least 15 basispoints lower than at the onset of financial distress or below the 2-digit SIC code industry median leverage ratio. If one of these two is satisfied, 1981 is treated as the exit year. Otherwise, it is not. We repeat the procedure for 1982 and the subsequent years until we find (or do not find) an exit year.

A. Duration of Financial Distress

Table 2 describes the duration of the process of financial distress for the sample firms. For firms that do not survive the process of financial distress as independent firms, it is measured as the number of months between the onset of financial distress and the month in which an acquisition of the firm or a liquidation is announced. If the announcement date is not available, we use the completion date. For firms that emerge from financial distress as independent firms, the duration of financial distress is the number of months between the onset of distress and the January of the first post-distress (or exit) year, as defined above.

Table 2 shows the duration of financial distress for all of the sample firms. The median time spent in financial distress is 33 months. Sixty (58.8%) of the firms are in financial distress between 13 and 48 months. For 14 firms, financial distress is resolved within 1 year. On the other hand, for 28 firms, financial distress lasts longer than 4 years and for 3 firms longer than 9 years.

Table 2 also shows separately the duration of financial distress for surviving firms and firms that do not survive. Only a bit more than one-third of all sample firms survive financial distress as independent companies: 35 firms (34.3%) exit from financial distress as independent companies, 67 do not. These 67 firms were either acquired or liquidated. For firms that emerged from financial distress as independent companies, the median time in financial distress was 34 month. For 23 out of the 35 firms (65.7%), it takes between one and four years. For 3 firms (8.6%) financial distress lasts at least 5 years. The median time in financial distress for firms that are acquired or liquidated is 32 months, with 23 firms (34.3%) taking less than 2 years, 23 firms taking between 2 and 4 years, and 21 firms (31.3%) more than 4 years.

B. The Role of Chapter 11

Panel A of Table 3 illustrates the timing of Chapter 11 filings. 56 firms (54.9%) file for Chapter 11 at least once (none files twice⁵) and 46 firms do not. Most firms that file for Chapter 11 file early on in the process of financial distress. 23 firms file in the year of the onset of financial distress and 14 more in the first year after the onset. However, 5 firms file in year 7 or later. Panel B of Table 3 shows the length of time the firms spent in Chapter 11. For most firms, Chapter 11 takes less than 2 years (35 out of 56) and for only 5 firms it takes longer than 3 years. The median time spent in Chapter 11 is 19 months.

Panel C of Table 3 shows how Chapter 11 is resolved. The majority of firms that file for Chapter 11 lose their independence and are either acquired or liquidated, as in Hotchkiss (1995). 21 firms are acquired and 16 are liquidated. 19 (33.9%) emerge from Chapter 11 as independent companies. That does not necessarily mean that they emerge from fi-

⁵ We found that a few sample firms file a second time for Chapter 11 in an unrelated, typically much later second instance of financial distress, after they had clearly overcome the episode of financial distress analyzed in our study.

nancial distress as independent companies, because they may still be in financial distress after emerging from Chapter 11. We can give a bit more details on these 19 firms beyond what is reported in the tables. Thirteen of these firms eventually exit financial distress as independent companies, but 6 remain in financial distress and are acquired (5) or liquidated (1) later outside of Chapter 11.

Panel D of Table 3 shows that the fraction of firms that emerge from financial distress as independent companies is much lower among those firms that ever file for Chapter 11 (23.2%) than among firms that never file for Chapter 11 (47.8%). Of course, this does not mean that being in Chapter 11 is the reason for being acquired or liquidated. Firms that file for Chapter 11 may have been acquired or liquidated even outside of Chapter 11, perhaps even earlier. However, our finding suggests that firms that file for Chapter 11 have a relatively small chance of avoiding an acquisition or a liquidation.

IV. Survival Over Time

In this section, we describe how many firms survived as independent firms over different time horizons. We also document how firms lost their independence, through a liquidation or an acquisition. In addition, we describe the extent of minority or majority equity stakes taken by creditors, because they can affect the probability of survival and are used below in the regression analysis. In particular, creditor equity stakes are typically acquired in a debt-equity swap, leading to a reduction in the firm's debt level. This will, for a given operating performance, increase the likelihood of survival. We do not count firms with creditor equity stakes as having lost their independence. If creditors are dispersed, corporate governance may not be much affected, and hence the control over the firm's assets not affected. For minority stakes, this is already so because there was no change in the majority control. Even if creditors take majority positions (which happens only in 6 cases), they may not have effective control of the firm since creditors may be relatively dispersed.

The information concerning liquidations, acquisitions, and creditor equity stakes covers the years from the onset of financial distress until the last year of financial distress. This information is collected from *Dow Jones Interactive* and *Lexis/Nexis*. For most firms we searched all articles in which the firm was mentioned first in the *Dow Jones Interac-*

tive. For some firms with a very large number of articles keyword searches were conducted to identify the control events. If there was not sufficient information available from *Dow Jones Interactive*, we searched on *Lexis/Nexis*.

It was already mentioned above that for 28 firms, it could not be completely established what happened to them in financial distress and how it was resolved. They were eliminated from the sample. It seems most likely that a large fraction of these firms were actually liquidated or acquired. This would explain why they cease to be mentioned in any of the data sources. Overall, the lack of information about these firms probably leads to an underestimation of liquidation and acquisition events in the sample, and hence an overestimation of survival.

Liquidations include the liquidation of almost all the assets of the firm. In several instances, firms were continued without almost any operating business (at least for a while). One reason is that many financially distressed firms accumulate a large amount of net operating loss carryforwards (NOLs). Roughly speaking, if these firms remain independent and satisfy a "continuation of business" test (for details see Gilson (1997)), they retain these NOLs which then are in many cases by far their most valuable asset. For these firms it makes sense to continue in business even without operating while looking to acquire firms with the potential for high earnings that can be shielded from income taxes through the NOLs. However, from the perspective of asset reallocation away from financially distressed firms, almost all of their productive assets are sold and hence we count these events as liquidations.

Control of a firm can be gained even without acquiring at least 50% of the voting shares. Often, small shareholders do not vote their shares so that a substantial minority stake can give effective control to an investor. Following Hotchkiss and Mooradian (1997) we include these events in our analysis. If a stake of larger than 40% but less than 50% is acquired and at the same time the investor assumes control of the board of directors (his representatives gain a majority of the board seats) or assumes the CEO position, we count this event as an acquisition since it constitutes a control change.

A. Survival Status of Firms Over Time

Table 4 and Figure 1 show the evolution of the number of firms that are still in financial distress, that have been acquired or liquidated, and that have overcome financial distress and remained independent. In the following, all years are measured relative to the year of the onset of financial distress. For instance, year - 1 is the year before the year of the onset of financial distress, year 0 is the year of the onset of financial distress, and year 1 is the first year after the year of the onset of financial distress.

By the end of the second year after the year of the onset of financial distress (in the following called year 2), 32 (31.4%) of the 102 firms lost their independence (were acquired or liquidated). By the end of year 3, this number has grown to 42 (41.2%) and by the end of year 5 to 54 (52.9%). Overall, 67 firms (65.7%) do not survive financial distress as independent companies. Most firms lost their independence because they were acquired (48) rather than liquidated (19).

Most (28 of the 35) firms that emerged from financial distress as independent companies did so by the end of year 4. This suggests that firms that spend a long time in financial distress are unlikely to emerge as independent companies.

Overall, financial distress seems to be resolved relatively quickly. While by the end of year 2 60 firms (58.8%) are still in financial distress, this number shrinks to 25 (24.5%) by the end of year 4 and 16 (15.7%) by the end of year 5. For all other firms, financial distress has been resolved – with the minority surviving as independent entities and overcoming financial distress.

B. Acquisitions, Liquidations, and Creditor Equity Stakes

Table 5 gives a little more detail on how firms lost their independence (through an acquisition or a liquidation, in or out of Chapter 11) and also documents the incidence of creditor equity stakes, which can affect the firm's probability of survival, as explained above. Figure 2 illustrates the same information in graphical form.

As mentioned above, almost half (48) of the sample firms were acquired and 19 firms were liquidated. In addition, there were 40 instances in which creditors took an equity stake in a total of 34 firms (for some firms, creditors took equity stakes more than once).

As can be seen from Table 5 and Figure 2, most control events happened within a few years after the onset of financial distress. Creditors took equity stakes within a few years after the onset of financial distress: 24 of the 40 (60.0%) instances in which this occurred happened by the end of year 2. 26 (54.2%) of the acquisitions occurred by the end of year 2 and 37 (77.1%) by the end of year 4. Not surprisingly, liquidations came later. Six of the liquidations (31.6%) occurred by the end of year 2 and 12 (63.2%) by the end of year 4. Liquidations also end the two longest histories of financial distress after more than 9 years.

Table 5 also shows the fraction of control events and liquidations in and out of Chapter 11. 57 (53.3%) occurred outside of Chapter 11. There were more acquisitions outside of Chapter 11 (27) than in Chapter 11 (21). On the other hand, liquidations occurred much more often (17 out of 19 times) in Chapter 11 (this includes conversions to Chapter 7).⁶ Creditors took equity stakes in 28 instances outside of Chapter 11 and in 12 instances inside of Chapter 11. There were 24 creditor equity stakes below 20%⁷, 10 stakes between 20% and 50%, and 6 majority stakes received by the creditors. All but one of the majority stakes are obtained by creditors in Chapter 11 while almost all stakes below 20% are obtained outside of Chapter 11.

The most important point emerging from the more detailed data on the control events is the importance of acquisitions in the resolution of financial distress. The main selection pressure during financial distress seems to come from the acquisition market.

V. Pre- and In-Distress Operating Performance

A. Raw Operating Performance

In this section, the operating performance of the sample firms is described in detail. We look at operating performance because it is a measure of the firm's viability. We do not look at stock performance in this paper because this has little to do with the efficiency of the selection process in financial distress. Abnormal stock performance, instead, meas-

⁶ One firm was liquidated in Chapter 7 without ever filing for Chapter 11, but to avoid another separate category, we have included it among the Chapter 11 liquidations.

ures the ability of the market to forecast cash flows accruing to equityholders. This is important to evaluate the efficiency of the stock market, but not the efficiency of the selection process in financial distress.⁸

All data are calculated from *Compustat*. The number of firms for which performance data are available declines as more firms disappear because they are acquired or liquidated. For some firms, performance data are missing on *Compustat* because of delisting or because they did not file with the SEC, although they were still independent. We want to distinguish between the performance of firms still in financial distress and those that have recovered from financial distress. As a consequence, the in-distress performance data are only for those firms that remain in financial distress. Once a firm has exited from financial distress, it is removed from the in-distress sample followed here. Below we will report the post-distress performance of those firms that emerged from financial distress as independent companies.

The performance is again measured by the operating income *before* interest, taxes, depreciation and amortization (EBITDA). Performance is reported as a return on assets (ROA), EBITDA/ASSETS, or an operating margin (EBITDA/SALES). Table 6a describes the evolution of the *median* ROA and operating margin. The return on assets is in principle the better of the two performance measures. It is the product of the operating margin and capital turnover. Hence, a change in the operating margin is only one way to change performance; the other way is a change in capital turnover. We initially also report operating margins because the measurement of assets may be affected by write-offs and other accounting changes. We will see that both performance measures present a similar picture and subsequently focus only on the return on assets. The number of observations declines mainly because many firms are acquired or liquidated.

The median return on assets deteriorates from the third full year before the onset of financial distress on until it becomes negative in the year of the onset of financial distress. In the first year after the onset the performance is almost identical. The year of the onset and the first year after the onset of financial distress are the worst years in terms of median

⁷ This includes 3 cases in which we know that creditors received equity but we could not find out how much. In these cases, we assumed that the stake was below 20%.

⁸ Kahl and Torous (2001) analyze the stock performance of the firms in this sample.

operating performance and at the same time the only years during which the median firm suffers operating losses (but for year 9 when only one firm has data available). The median return on assets increases already in the second year after the onset (in the following, year 2) by almost 6 percentage points. While afterwards there is overall some improvement in the operating performance as compared to the year of the onset of financial distress, the operating performance does not reach the level of two years prior to entering financial distress. The results using the operating margin as performance measure are similar to the ones just discussed for the return on assets.

To summarize, the performance of the still financially distressed firms that have not been acquired or liquidated improves to some extent after the onset of financial distress. It is not surprising that these firms do not achieve their pre-distress performance because they are still in financial distress (and a “normal” performance might have let them emerge from financial distress).

Table 6a describes the evolution of the number (also shown in Figure 3) and percentage of firms with negative return on assets. The fraction of firms with negative return on assets was calculated by dividing the number of observations with negative return on assets by the number of firms with performance data available. Note that the same measures are not reported for operating margins because they are, of course, almost identical (the only difference is that one less firm has sales data available in some of the years). Starting three years before the onset of financial distress, the fraction of firms that experience operating losses increases until it reaches its peak (53.8%) in the year of the onset of financial distress. After the onset of financial distress, the fraction of firms with operating losses declines relatively slowly. It reaches 40.0% in year 5. Later it increases again but there are only very few firms still in financial distress.

While the fraction of firms with negative operating performance remains relatively high during financial distress, the number of firms experiencing negative operating performance declines dramatically. It reaches its peak in the year in which the firms become financially distressed (50). However, already two years later, this number is cut to 17. In no year after year 4 there are more than 6 firms experiencing operating losses. The dramatic and quick decline of the number of firms that report operating losses is due to both

an improvement in the distribution of performance among the surviving firms (as suggested by the fraction of firms reporting losses) and, much more importantly, the reduction in firms that survive without being acquired or liquidated.

To summarize, the fraction of firms with operating losses declines only slowly after the onset of financial distress. However, the number of firms with operating losses declines dramatically because so many firms are acquired relatively quickly (and some liquidated) during financial distress.

B. Industry-Adjusted Performance

While the previous subsection described the raw performance of the sample firms, this subsection describes their industry-adjusted performance. Industry-adjusted performance was calculated as follows: First, the median return on assets of all firms on *Compustat* with the same 2-digit SIC code and the same 4-digit SIC code was calculated for each year for each firm in the sample. Then this number was subtracted from each firm's return on assets. Table 6b illustrates the evolution of the median industry-adjusted return on assets of the sample firms. Industry-adjusted operating margins present a similar picture but are not reported here.

Starting five years before the onset of financial distress, the median 2-digit SIC-code adjusted return on assets of the sample firms deteriorates until it reaches its low in the year of the onset of financial distress with -10.2% . Then it improves until year 3 when the median industry adjusted return on assets is still negative but substantially improved (-4.6%). Later, it deteriorates again, but there are very few firms still in financial distress. The table also shows that if one compares the sample firms' performance to the median firm in the same 4-digit SIC-code, their performance looks a little bit better than when compared to the median firm in the same 2-digit SIC code.

Finally, Table 6b also shows the number and percentage of financially distressed firms that underperform the industry median. For the 2-digit SIC-code adjusted return on assets, the fraction of firms underperforming the industry median increases in the five years before the onset of financial distress until it reaches its high at 84% during the first year after the onset of financial distress. Then the fraction of underperformers declines

somewhat but still is 80% in year 5. The number of firms underperforming their industry median declines dramatically from 81 in the year before and 78 in the year of the onset of financial distress, reaching 31 in year 3, 17 in year 4, and 12 in year 5. After that this number is at most 6. The 4-digit SIC-code adjusted return on assets presents a similar picture, except that there are typically slightly fewer firms underperforming the industry median.

The industry-adjusted performance data reinforce the main findings on in-distress operating performance already pointed out earlier. The sample firms improve their operating performance in the years after the onset of financial distress but, not surprisingly, do not recover fully to the median performance in their industry. The number of firms underperforming their industry median becomes small relatively quickly because so many firms are taken over and, to a lesser extent, liquidated. This suggests that poor performance is not tolerated for long and survival requires substantial performance improvement.

VI. Determinants of Survival

In this section, we will relate the findings on survival in section IV and performance in section V. In particular, we will investigate the determinants of survival, i.e., the factors that affect the probability that a firm emerges from financial distress as independent company. If the financial distress process is an efficient selection mechanism, firms with good prospects (viable firms) should survive while firms with bad prospects (not viable firms) should not survive. Other factors, such as size, leverage at the onset of financial distress, and Chapter 11 status, should have no impact on the firm's survival.

The firm's prospects or viability cannot be directly measured. However, there are several proxies. The firm's performance and performance improvement during financial distress is presumably the best measure of its prospects. A viable firm is likely to recover relatively quickly from its poor economic performance while a not viable is not. If financial distress is an efficient selection mechanism, we should expect a statistically significant positive relationship between measures of the firm's in-distress performance and its survival probability. Moreover, this relationship should be economically significant as

well. We measure the firm's in-distress performance with three variables: AVERPERF measures the average return on assets for the firm during financial distress, starting with the year of the onset to the last year in financial distress (years with missing performance data are ignored). ONSETPERF measures the return on assets in the year of the onset of financial distress. Finally, PERFIMPROV is the difference between the return on assets in the last year of financial distress and the return on assets in the year of the onset of financial distress. If the performance is not available in the last year of financial distress, we use the latest available return on assets before the last year of financial distress.

One might argue that in an efficient selection process the average performance or performance improvement should not be the only variables affecting a firm's survival probability. In particular, perhaps the length of financial distress should affect the probability of survival. If a firm is longer in distress, this is, for given operating performance, worse news, and hence the firm should be less likely to survive. We measure the firm's length of financial distress by the months the firm spends in financial distress. The variable is denoted by LENGTH.

We use one other measure of the firm's prospects, a measure of the firm's growth opportunities in the year of the onset of financial distress. In particular, we use the measure of growth opportunities suggested by James (1995), the ratio of the market value of assets to its book value. It is defined as the book value of assets minus the book value of equity plus the market value of equity, divided by the book value of assets. We use the assets and not just equity for two reasons. First, the equity is only a very small part of the financially distressed firm's value. And second, this avoids negative ratios in case that the book value of equity is negative. This variable is called GROWTH.

Factors that do not affect the firm's expected viability should not affect its survival probability in an efficient selection process. One might conjecture a number of factors that may in reality have an impact on the firm's survival although they should not in a perfectly efficient world. First, the institutional features of Chapter 11 may affect a firm's ability to survive. In particular, it has been suggested that Chapter 11 allows firms to survive or survive for longer even if they are not viable and should be liquidated (Bradley and Rosenzweig (1992) and Hotchkiss (1995)). Hence, we use a dummy variable that takes the

value of one if the firm ever files for Chapter 11 and zero otherwise. This variable is called CH11.

The leverage ratio with which a firm enters financial distress might also affect its survival probability. In particular, the higher its leverage ratio, the more severe its financial difficulties. Zingales (1998) finds that in the deregulation of the trucking industry, the likelihood of a firm's survival is not only affected by its pre-deregulation efficiency but also by its leverage, with higher leverage reducing the survival probability. Hence, we include the firm's book leverage ratio as defined previously as an independent variable, denoted by LEV. It is measured at the onset of financial distress.

The firm's size may also affect its survival. One might expect that larger firms have a higher likelihood for survival. One reason for this conjecture is that larger firms are less likely to be acquired (Hasbrouck (1985)). We measure size by the logarithm of the book value of assets in the year of the onset of financial distress, denoted by SIZE.

Finally, there is one other variable that we include in the regressions. The creditors' willingness to take an equity stake in the financially distressed firm is likely to affect the probability of a firm's survival. If creditors take equity stakes, they almost always do so in exchange for a debt reduction. This will increase the chance of the firm overcoming its financial difficulties and surviving as independent entity for a given performance level. Hence, we include a dummy variable that takes the value of one if creditors ever take an equity stake in the firm during financial distress and zero otherwise. The dummy variable is called STAKE.

A. Regression Results

Tables 7a and 7b show the regression results. The regressions are probit regressions. The dependent variable is a dummy variable taking on the value of one if the firm emerges from financial distress as independent entity and zero otherwise. Recall that 35 firms survive the process of financial distress and 67 do not. Hence, the overall survival probability in the sample is 0.343. However, for some firms not all of the variables included in the regressions are available. Hence, we have 84 observations for the specifications in Table 7a and 67 observations in Table 7b. Both tables show various specifications of the regres-

sions. We report the coefficients, the associated z-statistics, and the marginal effects. In these probit regressions, the coefficients cannot be interpreted as the marginal effect of a unit change of the independent variable on the probability of survival. However, one can calculate these marginal effects, and they are reported in the table. We calculate them at the means of the independent variables, as is standard in the literature. Note that for dummy independent variables, these marginal effects are not appropriate. Instead, we calculate the effect of a change from the dummy variable taking on the value zero to its taking on the value one, evaluating all other variables at their mean.

While we report 8 different specifications for the regressions, the results are overall very similar. In particular, all performance variables are statistically significant, often at the 1% significance level and always at least at the 5% level, and positive. This suggests that firms that perform better have a higher likelihood of survival, as should be the case in an efficient selection process. This is true both for the average performance during financial distress (Table 7a) and the combination of performance in the onset year and improvement until the last year of financial distress (Table 7b).

First, let us consider regression (1) in Table 7a. This regression includes all independent variables and measures performance as average ROA during financial distress. The coefficient on AVERPERF is positive and statistically significant at the 1% level. The only other variables that are statistically significant at conventional levels are STAKE (significant at the 1% level), which enters positively, and LENGTH (significant at the 5% level), which enters negatively. This conforms to our expectations.

The positive and significant relationship between AVERPERF and survival probability is consistent with an efficient selection mechanism, but arguably this rules out only an entirely inefficient process. The economic significance of the variable gives us an idea about the effect of performance on survival in the sample. From the regression results, we can calculate the effect of an increase of average ROA by one standard deviation from its mean value (-0.014) to 0.101. All other variables are held at their means. Such a one standard deviation increase in AVERPERF leads to an increase in the survival probability from 0.27 to 0.56. Of course, the one standard deviation increase in ROA is rather large (almost 12 percentage points). We can also consider a smaller increase in AVERPERF

from its mean of -0.014 by 5 percentage points. This increases the survival probability from 0.27 to 0.39. We lack a benchmark to evaluate how high this performance sensitivity of survival should be in an “efficient” world. All we can say is that the effect of performance on survival seems economically significant and relatively strong.

The variables SIZE and LEV are entirely insignificant, suggesting that the selection process is not biased towards larger and less highly levered firms. GROWTH enters unexpectedly with a negative sign, but it is also not significant.

One can also calculate that if the duration of financial distress increases from its mean value of 39.3 (for the 84 observations) by 12 months, the survival probability is reduced from 0.27 to 0.20, if all other variables are evaluated at their means. This effect may arise because longer distress may be worse news about a firm’s prospects. Finally, if creditors take an equity stake in the financially distressed firm, this increases its survival probability from 0.14 to 0.61.⁹

Table 7a offers three additional regression specifications, (2), (3), and (4). Regression 2 shows that once LENGTH is left out of the regression, CH11 becomes statistically significant. It can be calculated that having ever filed for Chapter 11 during the process of financial distress reduces a firm’s survival probability from 0.46 to 0.15. But this result should be interpreted with caution. First, whether a firm files for Chapter 11 or not is endogenous. And second, as seen in regression 1, once LENGTH is included, CH11 becomes insignificant.

One issue with the specification in regression 1 is that two of the variables, CH11 and STAKE, are arguably endogenous. While they are predetermined and hence there is no possibility of a simultaneous equation bias, they may be a function of some of the other regressors. In particular, it is plausible to assume that whether a firm files for Chapter 11 is affected by its operating performance up to that point, with the worse firms having a higher likelihood of filing for Chapter 11. Moreover, one might think that a firm’s operating performance as well as its growth opportunities affect creditors’ willingness to take an equity stake in them in exchange for debt forgiveness. Under these circumstances, the inclusion of CH11 and STAKE may substantially affect the coefficients and significance

of the other regressors and hence make their interpretation more difficult. For this reason, we also present regression 3, which excludes both CH11 and STAKE, and regression 4, which excludes just STAKE. The results with these specifications are similar to regression 1. In particular, AVERPERF is always statistically significant at the 1% level and its economic significance is of similar magnitude to what we calculated for regression 1. This can already be seen from the marginal effects, which turn out to approximate the economic significance as calculated from the regression outcomes quite well, as is typical for probit regressions. One difference is that LENGTH loses its statistical significance in regression 4.

Table 7b presents the same specifications as Table 7a, but uses a different set of variables to measure in-distress operating performance. In particular, instead of AVERPERF we use the ROA in the year of the onset of financial distress, ONSETPERF, and the improvement of the ROA from the first year to the last year in financial distress, PERFIMPROV. The overall results are similar to the previous regressions. In particular, both performance measures enter positively and are statistically significant, at least at the 5% significance level. The only other variable consistently significant is STAKE, as before, which is always positive and significant at the 1% level. LENGTH and CH11 are statistically significant for some regression specifications and not significant for others, as in Table 7a.

We close by evaluating the economic significance of the two new performance variables. We calculate the effects from regression (5), which has all variables included. An increase of ONSETPERF from its mean (for the 67 observations) of -0.014 by one standard deviation (0.107) increases the survival probability from 0.25 to 0.52 . An increase by 0.05 increases the survival probability from 0.25 to 0.37 . An increase of PERFIMPROV from its mean (for the 67 observations) of -0.007 by one standard deviation (0.245) increases the survival probability from 0.25 to 0.66 . An increase by 0.05 increases the survival probability from 0.25 to 0.33 . Note that the regressions show that both a better performance in the year of the onset of financial distress and a larger degree of performance improvement during financial distress increase the chance of a firm's survival.

⁹ The survival probability, evaluated at the means of all other variables, is 0.14 if STAKE takes on the value

The results on the statistical and economic significance of the other variables are similar to the results in Table 7a that were discussed before. Regressions 6, 7, and 8 in Table 7b are included for the same reasons as regressions 2, 3, and 4 in Table 7a. Again, the main results seem robust to alternative regression specifications.

To summarize, operating performance has a statistically and economically significant and positive effect on survival. Equity stakes taken by creditors also have a positive and important effect on survival. There is some evidence that having been in Chapter 11 at any point and a longer duration of financial distress may reduce a firm's chances of survival. Firm size, growth opportunities, and the leverage at the onset of financial distress seem to have no effect on a firm's likelihood of survival.

VII. Survival Horizon

In the previous subsection, we have analyzed the factors that affect the likelihood that a firm survives the entire process of financial distress and emerges from it as independent company. Once a firm has emerged as independent company from financial distress, it, by definition, cannot lose its independence anymore due to this incident of financial distress. The definition of the exit year makes sure that any later loss of independence is ignored, because it has nothing to do with the previous financial distress. Because financial distress is resolved for all firms by the end of year 11, the regressions in section VI are formally equivalent to survival until the end of year 11. In this subsection, we analyze the determinants of survival over a varying time horizon. The determinants of short-run survival may be very different from the determinants of long-run survival. We report separate regressions for three horizons: survival at least until the end of the second, fourth, and sixth year after the year of the onset of financial distress. We will also refer to these different time horizons as the short-run, medium-run, and long-run, respectively. The dependent variable is the dummy variable for survival over the relevant horizon. The independent variables are similar to the ones used in the previous section, but there are a few adjustments. First, the relevant variables are defined only over the horizon captured by the dependent variable. In particular, the average performance is measured up to and including the second,

of zero and 0.61 if it takes on the value of 1.

fourth, and sixth year after the onset of financial distress, respectively. The same is true for the performance improvement. The Chapter 11 dummy indicates whether the firm ever was in Chapter 11 between the onset of financial distress and the end of the second, fourth, and sixth year after the onset of financial distress, respectively. The equity stake variable indicates whether creditors had taken an equity stake by that date. The other independent variables are defined exactly as previously: size, leverage, and growth opportunities are measured at the onset of financial distress. We do not include a variable measuring the length of financial distress, because it measures to an important extent the same as the dependent variable. For instance, if a firm is in financial distress for six years, it surely has survived at least until the end of year 2 and 4.

The results of the regression analysis can be found in Tables 8a and 8b. Overall, the results are similar to the survival regressions reported previously. In particular, the performance measures always have a positive and significant impact on the survival probability, regardless of the survival horizon (however, PERFIMPROV is significant only at the 10% level). Note that it appears that the economic significance of the performance variables is lower in the short-run.

There are also some differences to the regressions reported in Tables 7a and 7b. The equity stake dummy is insignificant for short-run survival (until the end of year 2). It is statistically significant at the 5% or 10% level for medium-run survival. For long-run survival (survival until the end of year 6) the equity stake variable is statistically significant at the 1% significance level, as it was in the previous survival regressions. Having ever been in Chapter 11 has only a statistically significantly negative impact on survival in the very long-run (see Tables 7a and 7b). Even for survival until the end of year 6, its coefficient is never statistically significant. Finally, there is weak evidence that size may matter for survival in the short-run: in the 2-year regressions, it comes in positive and statistically significant at the 10% level in one of the two regressions and close to it in the other one. Hence, there is some evidence that larger firms have a higher chance of short-run survival. However, this is not true for medium-run and long-run survival when the coefficient on the size variable is insignificant. The other differences to the survival regressions in section VI seem unimportant.

To summarize, operating performance has a statistically and economically significant and positive effect on a firm's short-run, medium-run, and long-run survival probability. Creditor equity stakes have a positive effect on a firm's medium and long-run survival probability but not on its short-run survival probability. Having ever been in Chapter 11 has a negative effect on a firm's chances to survive in the very long-run only. And finally, there is weak evidence that larger firms have a higher chance of surviving in the short-run, but not in the medium- and long-run.

VIII. Post-Distress Performance

Finally, we turn to the subsample that has recovered from financial distress and remained independent. An important question to ask is whether the firms that emerge from financial distress are viable or whether the financial distress process allows firms to survive that are not viable and continue to perform poorly. We can observe the viability of the firms that survived the process of financial distress directly by looking at their post-distress operating performance. Here we are looking at the performance of the surviving firms after the relatively short time (median 34 months) it takes them to overcome financial distress.

Table 9 describes the operating performance of the 35 firms that emerge from financial distress as independent companies. Year 1 is the exit year (the first post-distress year), year 2 is the first year after the exit year, and so on. The median sample firm has strongly positive post-distress operating performance. The operating margins are in general (perhaps with the exception of year 5) comparable to the operating margins reported for the whole sample in Table 6a 3 or 4 years before the onset of financial distress. It seems that these firms are performing quite well and appear to be economically viable. There are very few firms with post-distress operating losses.

Table 9 also shows industry-adjusted performance. The sample firms seem to perform roughly as well as their 2-digit SIC code industry median, and never more than 1.2 percentage points worse. The industry-adjusted return on assets is never statistically significantly different from zero at any conventional significance level. In only one year (year 5) a fraction substantially larger than 50% of the firms underperform the industry median,

and in year 3 almost two thirds outperform it. If one uses the 4-digit SIC code as benchmark, the operating performance looks typically even a little bit better (with the exception of year 4).

To summarize, the industry-adjusted operating performance reinforces the impression that the post-distress performance of firms emerging from financial distress is reasonably good. This is difficult to reconcile with the argument that a large fraction of firms surviving the financial distress process as independent companies are economically not viable and instead should have been liquidated.

The post-distress performance results obtained for our sample are much better than the post-Chapter 11 operating results in Hotchkiss (1995), who finds that in each of the first five years after emerging from Chapter 11, between 35% and 41% of all firms have negative operating performance. The difference may be caused by the different sample design in both studies. In particular, this paper focuses on the overall efficiency of the selection process in financial distress, not just Chapter 11. Hotchkiss (1995) focuses on the outcome of the selection process in Chapter 11.

Table 10 summarizes the post-Chapter 11 performance for the only 19 firms in our sample that emerge from Chapter 11 at some point. Year 1 is the first full fiscal year after emerging from Chapter 11, year 2 is the second year, and years 3 to 5 are defined analogously. Data are available at most for 14 firms and hence this evidence should be interpreted with extreme caution. The median post-Chapter 11 return on assets in our sample is comparable to the results in Hotchkiss (1995) in year 1 and substantially worse than in Hotchkiss (1995) in year 5. However, in years 2,3, and 4 our results indicate a substantially better operating performance than reported in Hotchkiss (1995). On the other hand, our results show a substantially worse operating performance than found in Hotchkiss and Mooradian (1997), who report post-Chapter 11 performance for the first two years only. The median industry-adjusted performance (using 2-digit SIC codes) is very similar to the results in Hotchkiss (1995) and substantially worse than in Hotchkiss and Mooradian (1997).

The most important conclusion from Table 10 is that the post-Chapter 11 operating performance is worse than the post-distress performance reported previously. As a conse-

quence, it appears that there would be a sample selection bias if one looked at post-Chapter 11 performance alone but wanted to judge the viability of firms emerging from financial distress in general. In our sample, firms emerging from Chapter 11 are worse performers than firms that overcome financial distress and emerge as independent companies. There are two reasons for the discrepancy in operating performance. First, firms that never file for Chapter 11 have a substantially better post-distress operating performance than firms that file for Chapter 11 during the process of financial distress. Second, a number of firms that emerge from Chapter 11 are still financially distressed (and some of them are acquired or liquidated while they are still financially distressed). However, one should interpret these findings with caution due to the very small sample size for post-Chapter 11 performance.

IX. Conclusion

This paper has described and analyzed the selection process during financial distress. We have followed the financial distress process from its onset to its resolution for 102 firms that entered financial distress between 1979 and 1983. Our main findings are the following. There is substantial selection pressure, in particular from the acquisition market. Only about one-third of the firms survive financial distress as independent firms. By the end of the second full year after the onset of financial distress, almost one third of the firms are acquired or liquidated, and by the end of the fifth year, more than half. The operating performance of surviving firms improves but remains clearly below industry median as long as they are still in financial distress. However, poor performance is not tolerated for long. The number of firms that report negative operating income becomes very small within only a few years after the onset of financial distress due to the large number of acquisitions and liquidations. The probability of a firm's short-run and long-run survival is positively related to its operating performance. The effect seems economically relatively strong. The only other factors that improve the likelihood of survival are the willingness of creditors to take an equity stake in the firm (which improves a firm's medium- and long-run survival probability) and firm size (which may improve a firm's short-run survival

probability). Initial leverage does not matter for firm survival, and there is some evidence that having ever filed for Chapter 11 may reduce a firm's survival likelihood in the very long-run. Last not least, firms that emerge from financial distress as independent companies seem to have fully overcome their financial difficulties within a median time of less than 3 years and perform about as well as the industry median firm. This suggests that they are economically viable.

Overall, the findings in this paper suggest that the selection mechanism during financial distress is more efficient than previously thought. There seems to be more asset reallocation away from poorly performing firms than suggested by much of the literature, which claims that there is a strong bias against efficient asset reallocation in the U.S. financial distress environment, allowing inefficient firms to survive for a very long time (Baird (1986), White (1989), Bradley and Rosenzweig (1992), Hotchkiss (1995)).

The paper raises several questions for future research. It is difficult to judge the efficiency of the selection process due to the absence of a clear benchmark for efficient asset reallocation and its relationship to performance. This paper provides a first step towards an evaluation of this process by describing the selection process. Future work could compare it with the selection process in countries with a different bankruptcy environment, such as the UK.

Moreover, poorly performing firms can also be acquired if they have little debt and hence are not financially distressed. It would be helpful to establish a control sample of similar economically but not financially distressed firms and compare the survival process for these firms to the one for the financially distressed sample described here. This would highlight the particular role of financial as opposed to economic distress and of debt in the reallocation of assets away from poorly performing firms.

Table 1: Selected Sample Characteristics At The Onset Of Financial Distress

Summary statistics are presented for 102 firms that enter financial distress between 1979 and 1983. The characteristics are measured in the year of the onset of financial distress. Not all variables are available for all firms. N denotes the number of observations. The data are from *Compustat*. Interest coverage is defined as the ratio of EBITDA and interest expense. Book leverage is defined as short-term debt plus long-term debt, divided by the same expression plus the book value of common equity.

Panel A: Sample Description at the Onset of Financial Distress

Variable		N
Median (mean) book value of assets (\$ million)	57.3 (240.3)	93
Median (mean) net sales (\$ million)	71.7 (339.4)	93
Median (mean) Interest Coverage Ratio	-0.07 (-0.83)	93
Median (mean) EBITDA/Assets	-0.004 (-0.033)	93
Median (mean) EBITDA/Net Sales	-0.009 (-0.015)	93
Median (mean) book leverage	77.9% (84.7%)	85

Panel B: Assets at the Onset of Financial Distress

Assets (\$ million)	Number of Firms
Smaller than 20	11
Between 20 and 50	31
Between 50 and 100	14
Between 100 and 500	27
Between 500 and 1000	3
Larger than 1000	7

Panel C: Industry Classification

Industry Classification	Number of Firms
Oil and Gas Extraction	13
Primary Metal	9
Transportation by Air	8
Real Estate	8
Durable Goods - Wholesale	7
Industrial, Commerc. Machinery, Computer Equip.	7
Transportation Equipment	5
Other	45

Table 2: Duration of Financial Distress

The duration of financial distress is measured as the number of months between the first incidence of financial distress and the month in which the firm exits financial distress. The first incidence of financial distress is the first default, the first time the firm negotiates with its creditors to restructure its debt in order to avoid a default, or the first time the firm is in Chapter 11. For firms that emerge from financial distress as independent entities (surviving firms), the month in which they exit financial distress is the January after the last year in which they are in default, are negotiating with their creditors to restructure their debt in order to avoid a default, or are in Chapter 11. A more detailed definition is in section III. For firms that are acquired or liquidated, the month in which they exit financial distress is defined to be the month of the announcement of the acquisition or liquidation. If this is not available, it is the month of the completion of the acquisition or the liquidation.

Number of Months in Financial Distress	Surviving Firms	Firms That Are Ac- quired or Liquidated	Sum
0-12	5	9	14
13-24	5	14	19
25-36	9	16	25
37-48	9	7	16
49-60	4	5	9
61-72	2	5	7
73-84	0	3	3
85-96	1	5	6
97-108	0	0	0
109-120	0	2	2
121-132	0	1	1
>132	0	0	0

Table 3: Chapter 11

This table provides information on the incidence of Chapter 11 filings, the time spent in Chapter 11, and its resolution. All information is from *Dow Jones Interactive* and *Lexis/Nexis*. Panel A describes how many sample firms filed for Chapter 11 in the year of the onset of financial distress (year 0), the first full year after the onset of financial distress (year 1), and all other years. Panel B shows how much time the sample firms spent in Chapter 11. It is measured as the number of months between the filing for Chapter 11 and the confirmation of the reorganization plan or plan of liquidation. Panel C describes the resolution of Chapter 11. Panel D shows survival rates of firms that file for Chapter 11 at least once during financial distress and those that never do.

Panel A: Chapter 11 Filings

Year	0	1	2	3	4	5	6	7	8	9	10	11	Sum
Number of firms filing for Ch. 11	23	14	5	5	2	2	0	3	0	1	1	0	56

Panel B: Duration of Chapter 11

Months spent in Chapter 11	0-12	13-24	25-36	37-48	49-60	61-72	73-84	>84	Sum
Number of firms	14	21	16	4	0	0	1	0	56

Panel C: Resolution of Chapter 11

Status upon exit from Chapter 11	Number of firms
Acquired	21
Liquidated	16
Creditor majority	5
Creditor minority >20%	5
Creditor minority <20%	3
No creditor stake	6
Sum	56

Panel D: Chapter 11 and Survival

	Emerge as independent companies	Acquired or liquidated	Sum
Firms that ever file for Chapter 11	13 (23.2%)	43 (76.8%)	56
Firms that never file for Chapter 11	22 (47.8%)	24 (52.2%)	46
Sum	35	67	102

Table 4: Status of Firms By Year

This table describes the status of the sample firms by the end of each full year after the onset of financial distress. Year 0 is the year of the onset of financial distress, year 1 is the first full year after the onset of financial distress, etc. The category "lost independence" encompasses both firms that were acquired and firms that were liquidated. Acquisitions include the acquisition of a minority stake in a firm's equity if it is at least 40% and at the same time the acquirer assumes control of the board of directors (his representatives gain a majority of board seats) or assumes the CEO position. Liquidations include instances in which the firm sells all or almost all of its operating assets and emerges from Chapter 11 without any or almost any operating assets in order to take advantage of its net operating loss carry-forwards. All information is from *Dow Jones Interactive* and *Lexis/Nexis*.

Year	0	1	2	3	4	5	6	7	8	9	10	11
Still in financial distress	96	83	60	41	25	16	10	7	3	2	1	0
<i>Acquired</i>	5	12	26	31	37	40	43	45	47	48	48	48
<i>Liquidated</i>	1	2	6	11	12	14	15	16	17	17	18	19
Lost independence	6	14	32	42	49	54	58	61	64	65	66	67
Exited financial distress as independent companies	0	5	10	19	28	32	34	34	35	35	35	35

Table 5: Acquisitions, Liquidations, and Creditor Equity Stakes

This table shows the number of liquidations, acquisitions, and instances in which creditors take equity stakes in the sample firms for each year during financial distress. Year 0 is the year of the onset of financial distress, year 1 is the first full year after the onset of financial distress, etc. The control events are counted only for firms that were still in financial distress. The table also shows how many of these control events occurred in and how many out of Chapter 11. Acquisitions include the acquisition of a minority stake in a firm's equity if it is at least 40% and at the same time the acquirer assumes control of the board of directors (his representatives gain a majority of board seats) or assumes the CEO position. Liquidations include instances in which the firm sells all or almost all of its operating assets and emerges from Chapter 11 without any or almost any operating assets in order to take advantage of its net operating loss carry-forwards. In three cases, it is known that creditors took an equity stake in the firm but not exactly how large it was. These cases were treated as creditor minority equity stakes of less than 20%. In a few firms, creditors take equity stakes at several points of time, and these instances are counted separately.

Year	0	1	2	3	4	5	6	7	8	9	10	11	Sum
Event													
Liquidation outs. Ch.11	0	0	1	0	0	0	0	0	0	0	1	0	2
Liquidation in Ch.11	1	1	3	5	1	2	1	1	1	0	0	1	17
Acquisition outs. Ch.11	4	5	7	1	4	2	2	2	0	0	0	0	27
Acquisition in Ch.11	1	2	7	4	2	1	1	0	2	1	0	0	21
Creditor majority outs. Ch.11	0	0	0	0	0	1	0	0	0	0	0	0	1
Creditor majority in Ch.11	0	1	0	2	0	0	1	1	0	0	0	0	5
Creditor minority >20% outs. Ch.11	1	3	1	0	1	0	0	0	0	0	0	0	6
Creditor minority >20% in Ch.11	1	0	1	2	0	0	0	0	0	0	0	0	4
Creditor minority <20% outs. Ch.11	7	2	5	3	3	1	0	0	0	0	0	0	21
Creditor minority <20% in Ch.11	0	0	2	1	0	0	0	0	0	0	0	0	3
Sum	15	14	27	18	11	7	5	4	3	1	1	1	107

Table 6a: Median Pre- and In-Distress Raw Operating Performance

This table describes the sample firms' operating performance before and during financial distress. Year 0 is the year of the onset of financial distress, year -1 is the first full year before the onset of financial distress, and year +1 the first full year after the onset of financial distress, etc. Not all firms have their performance data available in all years. N denotes the number of observations. For the in-distress performance, only firms are considered that are still in financial distress. The performance data are not industry-adjusted. All data are from *Compustat*.

Year	Median EBITDA/ Assets	N	Median EBITDA/ Net Sales	N	Number of firms		Percentage of firms with negative EBITDA/Assets
					With negative EBITDA/Assets	with negative EBITDA/Assets	
-5	0.119***	86	0.083***	86	6	6	7.0
-4	0.122***	88	0.080***	88	5	5	5.7
-3	0.103***	94	0.075***	94	11	11	11.7
-2	0.080***	98	0.066***	98	12	12	12.2
-1	0.041***	100	0.029***	100	29	29	29.0
0	-0.004	93	-0.009	93	50	50	53.8
1	-0.007	75	-0.003	74	39	39	52.0
2	0.052**	55	0.043***	54	17	17	30.9
3	0.027	40	0.023	39	17	17	42.5
4	0.037	21	0.043	20	8	8	38.1
5	0.008	15	0.021	14	6	6	40.0
6	0.061	11	0.029	10	3	3	27.3
7	0.051	7	0.031	7	3	3	42.9
8	0.018	2	0.031	2	1	1	50.0
9	-0.097	1	-0.052	1	1	1	100.0

*** statistically significantly different from zero at the 1% significance level

** statistically significantly different from zero at the 5% significance level

* statistically significantly different from zero at the 10% significance level

Table 6b: Median Industry-Adjusted Pre- and In-Distress Operating Performance

This table describes the sample firms' industry-adjusted operating performance before and during financial distress. Year 0 is the year of the onset of financial distress, year -1 is the first full year before the onset of financial distress, and year +1 the first full year after the onset of financial distress, etc. Not all firms have their performance data available in all years. N denotes the number of observations. For the in-distress performance, only firms are considered that are still in financial distress. ROA is the return on assets, EBITDA/Assets. The median industry-adjusted return on assets is calculated as follows. For the SIC2 (SIC4)-adjusted return on assets, the median return on assets of all firms in the same 2-digit (4-digit) SIC code as the sample firm is subtracted from each firm's return on assets. The median of this industry-adjusted performance measure for the sample firms is reported in the table. All data are from *Compustat*.

Year	N	Median ind.- adj. ROA (SIC2)	Median ind.- adj. ROA (SIC4)	< ind. median (SIC2)	< ind. median percentage	< ind. median (SIC4)	< ind. median percentage
-5	86	-0.004	0.000	47	54.7	41	47.7
-4	88	-0.018*	-0.006	53	60.2	47	53.4
-3	94	-0.023***	-0.012***	60	63.8	54	57.4
-2	98	-0.042***	-0.032***	69	70.4	67	68.4
-1	100	-0.074***	-0.070***	81	81.0	78	78.0
0	93	-0.102***	-0.075***	78	83.9	77	82.8
1	75	-0.100***	-0.074***	63	84.0	60	80.0
2	55	-0.052***	-0.030***	44	80.0	36	65.5
3	40	-0.046***	-0.041***	31	77.5	31	77.5
4	21	-0.075***	-0.044***	17	81.0	14	66.7
5	15	-0.039**	-0.029**	12	80.0	11	73.3
6	11	-0.000	0.000	6	54.5	5	45.5
7	7	-0.070	-0.021	5	71.4	4	57.1
8	2	-0.091	-0.081	2	100.0	2	100.0
9	1	-0.160	-0.137	1	100.0	1	100.0

*** statistically significantly different from zero at the 1% significance level

** statistically significantly different from zero at the 5% significance level

* statistically significantly different from zero at the 10% significance level

Table 7a: Survival Regressions I

This table shows several specifications of probit regressions estimating the probability of emerging from financial distress as an independent company (survival). The dependent variable is a dummy variable that takes on the value of one if the firm survives and zero otherwise. Not all variables are available for all firms. N denotes the number of observations. AVERPERF denotes the average EBITDA/Assets during financial distress. SIZE, GROWTH, and LEV are measured in the year of the onset of financial distress. SIZE is the logarithm of assets. GROWTH denotes the ratio of the market value of assets to its book value. LEV is the ratio of short-term debt plus long term debt, divided by the same expression plus the book value of common equity. CH11 is a dummy variable that takes on the value of one if a firm was ever in Chapter 11 during its period of financial distress and zero otherwise. LENGTH is the number of months spent in financial distress. STAKE is a dummy variable that takes on the value of one if creditors take an equity stake in the firm during financial distress and zero otherwise. There are four regression specifications, denoted by (1), (2), (3), and (4). The coefficient of an independent variable is to the left of the number of the regression specification, with the z-statistic in parentheses. The number to the right of the regression coefficient is the marginal effect of the relevant independent variable. For dummy variables, it was calculated by estimating the difference between the survival probability if the dummy variable takes on the value of one and if it takes on the value of zero, evaluating all other variables at their mean.

Variable	(1)	(2)	(3)	(4)		
Constant	0.539 (0.544)	0.181	0.422 (0.447)	0.144 0.348 (0.387)	0.124 0.513 (0.559)	0.182
AVERPERF	6.491*** (3.001)	2.176	5.456*** (2.751)	1.867 7.295*** (3.576)	2.602 6.886*** (3.396)	2.449
SIZE	0.013 (0.093)	0.004	-0.062 (-0.474)	-0.021 0.070 (0.538)	0.025 0.040 (0.301)	0.014
GROWTH	-0.403 (-0.762)	-0.135	-0.490 (-0.939)	-0.168 -0.373 (-0.756)	-0.133 -0.404 (-0.802)	-0.144
LEV	-0.036 (-0.168)	-0.012	0.042 (0.201)	-0.014 -0.005 (-0.029)	-0.002 0.042 (0.212)	0.015
CH11	-0.507 (-1.246)	-0.167	- 0.934*** (-2.622)	-0.310	-0.394 (-1.089)	-0.138
LENGTH	-0.021** (-2.289)	-0.007		-0.015** (-2.293)	-0.005 -0.012 (-1.551)	-0.004
STAKE	1.341*** (3.397)	0.466	1.058*** (2.994)	0.376		
LogLikelihood	-36.265		-39.276	-43.390	-42.798	
McFadden R^2	0.344		0.290	0.216	0.226	
Observations	84		84	84	84	

*** statistically significantly different from zero at the 1% significance level

** statistically significantly different from zero at the 5% significance level

* statistically significantly different from zero at the 10% significance level

Table 7b: Survival Regressions II

This table shows several specifications of probit regressions estimating the probability of emerging from financial distress as an independent company (survival). The dependent variable is a dummy variable that takes on the value of one if the firm survives and zero otherwise. Not all variables are available for all firms. N denotes the number of observations. ONSETPERF denotes the EBITDA/Assets in the year of the onset of financial distress. PERFIMPROV is the difference between EBITDA/Assets in the last year of financial distress and EBITDA/Assets in the year of the onset of financial distress. SIZE, GROWTH, and LEV are measured in the year of the onset of financial distress. SIZE is the logarithm of assets. GROWTH denotes the ratio of the market value of assets to its book value. LEV is the ratio of short-term debt plus long term debt, divided by the same expression plus the book value of common equity. CH11 is a dummy variable that takes on the value of one if a firm was ever in Chapter 11 during its period of financial distress and zero otherwise. LENGTH is the number of months spent in financial distress. STAKE is a dummy variable that takes on the value of one if creditors take an equity stake in the firm during financial distress and zero otherwise. There are four regression specifications, denoted by (5), (6), (7), and (8). The coefficient of an independent variable is to the left of the number of the regression specification, with the z-statistic in parentheses. The number to the right of the regression coefficient is the marginal effect of the relevant independent variable. For dummy variables, it was calculated by estimating the difference between the survival probability if the dummy variable takes on the value of one and if it takes on the value of zero, evaluating all other variables at their mean.

Variable	(5)		(6)		(7)		(8)	
Constant	1.669 (1.246)	0.538	1.217 (0.984)	0.415	0.723 (0.693)	0.262	1.011 (0.923)	0.365
ONSETPERF	6.822*** (2.691)	2.199	5.954** (2.480)	2.028	5.253** (2.428)	1.903	5.219** (2.369)	1.885
PERFIMPROV	4.460** (2.303)	1.438	4.473** (2.426)	1.524	3.688** (2.413)	1.336	3.645** (2.276)	1.316
SIZE	-0.120 (-0.600)	-0.039	-0.207 (-1.113)	-0.070	0.042 (0.260)	0.015	-0.004 (-0.022)	-0.001
GROWTH	-0.599 (-0.984)	-0.193	-0.597 (-1.019)	-0.203	-0.417 (-0.802)	-0.151	-0.488 (-0.901)	-0.176
LEV	-0.166 (-0.648)	-0.053	-0.083 (-0.319)	-0.028	-0.042 (-0.200)	-0.015	0.017 (0.077)	0.006
CH11	-0.680 (-1.524)	-0.217	-0.985** (-2.431)	-0.330			-0.543 (-1.441)	-0.196
LENGTH	-0.025** (-2.032)	-0.008			-0.016* (-1.877)	-0.006	-0.011 (-1.211)	-0.004
STAKE	1.726*** (3.663)	0.555	1.416*** (3.485)	0.483				
LogLikelihood	-27.326		-29.665		-36.884		-35.836	
McFadden R ²	0.389		0.337		0.176		0.199	
Observations	67		67		67		67	

*** statistically significantly different from zero at the 1% significance level

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* statistically significantly different from zero at the 10% significance level

Table 8a: Estimating Survival Probability Over Different Time Horizons I

This table shows several specifications of probit regressions estimating the probability of survival over different time horizons. The dependent variable of the first (second, third) regression is a dummy variable that takes on the value of one if the firm survives as independent entity (is not acquired or liquidated) until at least the end of the second (fourth, sixth) full year after the onset of financial distress and zero otherwise: SURV2 (SURV4, SURV6). Not all variables are available for all firms. N denotes the number of observations. AVERPERF denotes the average EBITDA/Assets during financial distress up to and including the second (fourth, seventh) full year after the onset of financial distress. SIZE, GROWTH, and LEV are measured in the year of the onset of financial distress. SIZE is the logarithm of assets. GROWTH denotes the ratio of the market value of assets to its book value. LEV is the ratio of short-term debt plus long term debt, divided by the same expression plus the book value of common equity. CH11 is a dummy variable that takes on the value of one if a firm was ever in Chapter 11 up to and including the second (fourth, sixth) full year after the onset of financial distress and zero otherwise. STAKE is a dummy variable that takes on the value of one if creditors take an equity stake in the firm up to and including the second (fourth, sixth) full year after the onset of financial distress and zero otherwise. There are three regression specifications, denoted by the dependent variable, SURV2, SURV4, and SURV6. The coefficient of an independent variable is to the left of the name of the dependent variable, with the z-statistic in parentheses. The number to the right of the regression coefficient is the marginal effect of the relevant independent variable. For dummy variables, it was calculated by estimating the difference between the survival probability if the dummy variable takes on the value of one and if it takes on the value of zero, evaluating all other variables at their mean.

Variable	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Dependent Variable	SURV2		SURV4		SURV6	
Constant	-0.614 (-0.664)	-0.192	-0.475 (-0.558)	-0.187	-0.610 (-0.723)	-0.240
AVERPERF	4.703*** (3.073)	1.473	6.835*** (3.407)	2.688	6.083*** (3.040)	2.392
SIZE	0.264* (1.817)	0.083	0.115 (0.889)	0.045	0.068 (0.540)	0.027
GROWTH	0.027 (0.067)	0.008	0.137 (0.352)	0.054	0.152 (0.397)	0.060
LEV	0.066 (0.273)	0.021	-0.071 (-0.354)	-0.028	-0.142 (-0.840)	-0.056
CH11	0.131 (0.361)	0.040	-0.197 (-0.600)	-0.078	-0.385 (-1.166)	-0.150
STAKE	0.298 (0.677)	0.088	0.668* (1.958)	0.252	0.962*** (2.836)	0.369
LogLikelihood	-40.534		-42.733		-42.030	
McFadden R^2	0.193		0.255		0.275	
Observations	84		84		84	

** statistically significantly different from zero at the 1% significance level

** statistically significantly different from zero at the 5% significance level

* statistically significantly different from zero at the 10% significance level

Table 8b: Estimating Survival Probability Over Different Time Horizons II

This table shows several specifications of probit regressions estimating the probability of survival over different time horizons. The dependent variable of the first (second, third) regression is a dummy variable that takes on the value of one if the firm survives as independent entity (is not acquired or liquidated) at least until the end of the second (fourth, sixth) full year after the onset of financial distress and zero otherwise: SURV2 (SURV4, SURV6). Not all variables are available for all firms. N denotes the number of observations. ONSETPERF denotes EBITDA/Assets in the year of the onset of financial distress. PERFIMPROV denotes the difference between EBITDA/Assets in the second (fourth, sixth) full year after the onset of financial distress and EBITDA/Assets during the year of the onset of financial distress. SIZE, GROWTH, and LEV are measured in the year of the onset of financial distress. SIZE is the logarithm of assets. GROWTH denotes the ratio of the market value of assets to its book value. LEV is the ratio of short-term debt plus long term debt, divided by the same expression plus the book value of common equity. CH11 is a dummy variable that takes on the value of one if a firm was ever in Chapter 11 up to and including the second (fourth, sixth) full year after the onset of financial distress and zero otherwise. STAKE is a dummy variable that takes on the value of one if creditors take an equity stake in the firm up to and including the second (fourth, sixth) full year after the onset of financial distress and zero otherwise. There are three regression specifications, denoted by the dependent variable, SURV2, SURV4, and SURV6. The coefficient of an independent variable is to the left of the name of the dependent variable, with the z-statistic in parentheses. The number to the right of the regression coefficient is the marginal effect of the relevant independent variable. For dummy variables, it was calculated by estimating the difference between the survival probability if the dummy variable takes on the value of one and if it takes on the value of zero, evaluating all other variables at their mean.

Variable	SURV2		SURV4		SURV6	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Constant	-0.569 (-0.484)	-0.132	-0.282 (-0.290)	-0.103	-0.465 (-0.472)	-0.185
ONSETPERF	6.405*** (2.826)	1.489	5.458** (2.495)	1.984	4.877** (2.258)	1.934
PERFIMPROV	2.248* (1.653)	0.523	2.515* (1.679)	0.914	2.944* (1.930)	1.167
SIZE	0.319 (1.604)	0.074	0.108 (0.731)	0.039	0.056 (0.374)	0.022
GROWTH	0.199 (0.412)	0.046	0.161 (0.383)	0.058	0.126 (0.313)	0.050
LEV	-0.109 (-0.470)	-0.025	-0.097 (-0.447)	-0.035	-0.191 (-1.003)	-0.076
CH11	-0.305 (-0.707)	-0.075	-0.358 (-1.010)	-0.131	-0.434 (-1.217)	-0.171
STAKE	0.501 (0.876)	0.102	0.787** (2.107)	0.269	1.159*** (3.132)	0.426
LogLikelihood	-25.876		-35.518		-34.580	
McFadden R^2	0.247		0.187		0.255	
Observations	67		67		67	

** statistically significantly different from zero at the 1% significance level

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Table 9: Post-Distress Operating Performance

This table describes the operating performance of firms that emerge from financial distress as independent companies. Year 1 is the first post-distress year, year 2 the second post-distress year, etc. Performance data are not available for all firms in all years. N denotes the number of observations. The median industry-adjusted return on assets is calculated as follows. For the SIC2 (SIC4)-adjusted return on assets, the median return on assets of all firms in the same 2-digit (4-digit) SIC code as the sample firm is subtracted from each firm's return on assets. The median of this industry-adjusted performance measure for the sample firms is reported in the table. All data are from *Compustat*.

Year	Median EBITDA/Assets	N	Number (percentage) with negative operating income	Median industry-adjusted EBITDA/Assets (SIC2)	Number (percentage) with negative industry-adjusted operating income (SIC2)	Median industry-adjusted EBITDA/Assets (SIC4)	Number (percentage) with negative industry-adjusted operating income (SIC4)
1	0.099***	34	4 (11.8%)	-0.006	18 (52.9%)	0.001	13 (38.2%)
2	0.095***	32	6 (18.8%)	-0.012	17 (53.1%)	0.000	14 (43.8%)
3	0.114***	29	2 (6.9%)	0.013	11 (37.9%)	0.029*	6 (20.7%)
4	0.116***	26	3 (11.5%)	0.016	12 (46.2%)	0.006	12 (46.2%)
5	0.088***	26	5 (19.2%)	-0.008	16 (61.5%)	-0.000	13 (50.0%)

*** statistically significantly different from zero at the 1% significance level

** statistically significantly different from zero at the 5% significance level

* statistically significantly different from zero at the 10% significance level

Table 10: Post-Chapter 11 Operating Performance

This table describes the operating performance of firms that emerge from Chapter 11 as independent companies. Year 1 is the first full fiscal year after the firm emerges from Chapter 11, year 2 the second full year, etc. Performance data are not available for all firms in all years. N denotes the number of observations. The median industry-adjusted return on assets is calculated as follows. For the SIC2 (SIC4)-adjusted return on assets, the median return on assets of all firms in the same 2-digit (4-digit) SIC code as the sample firm is subtracted from each firm's return on assets. The median of this industry-adjusted performance measure for the sample firms is reported in the table. All data are from *Compustat*.

Year	Median EBITDA/Assets	N	Number (percentage) with negative operating income	Median industry-adjusted EBITDA/Assets (SIC2)	Number (percentage) with negative industry-adjusted operating income (SIC2)	Median industry-adjusted EBITDA/Assets (SIC4)	Number (percentage) with negative industry-adjusted operating income (SIC4)
1	0.031	14	6 (42.9%)	-0.033**	11 (78.6%)	-0.062*	10 (71.4%)
2	0.062	13	4 (30.8%)	-0.055**	10 (76.9%)	-0.039**	9 (69.2%)
3	0.083	10	3 (30.0%)	-0.032	7 (70.0%)	-0.039	6 (60.0%)
4	0.096	11	4 (36.4%)	-0.031	6 (54.5%)	-0.057	6 (54.5%)
5	0.021	10	3 (30.0%)	-0.062	7 (70.0%)	-0.027	6 (60.0%)

*** statistically significantly different from zero at the 1% significance level

** statistically significantly different from zero at the 5% significance level

* statistically significantly different from zero at the 10% significance level

Figure 1: Status of Firms By Year

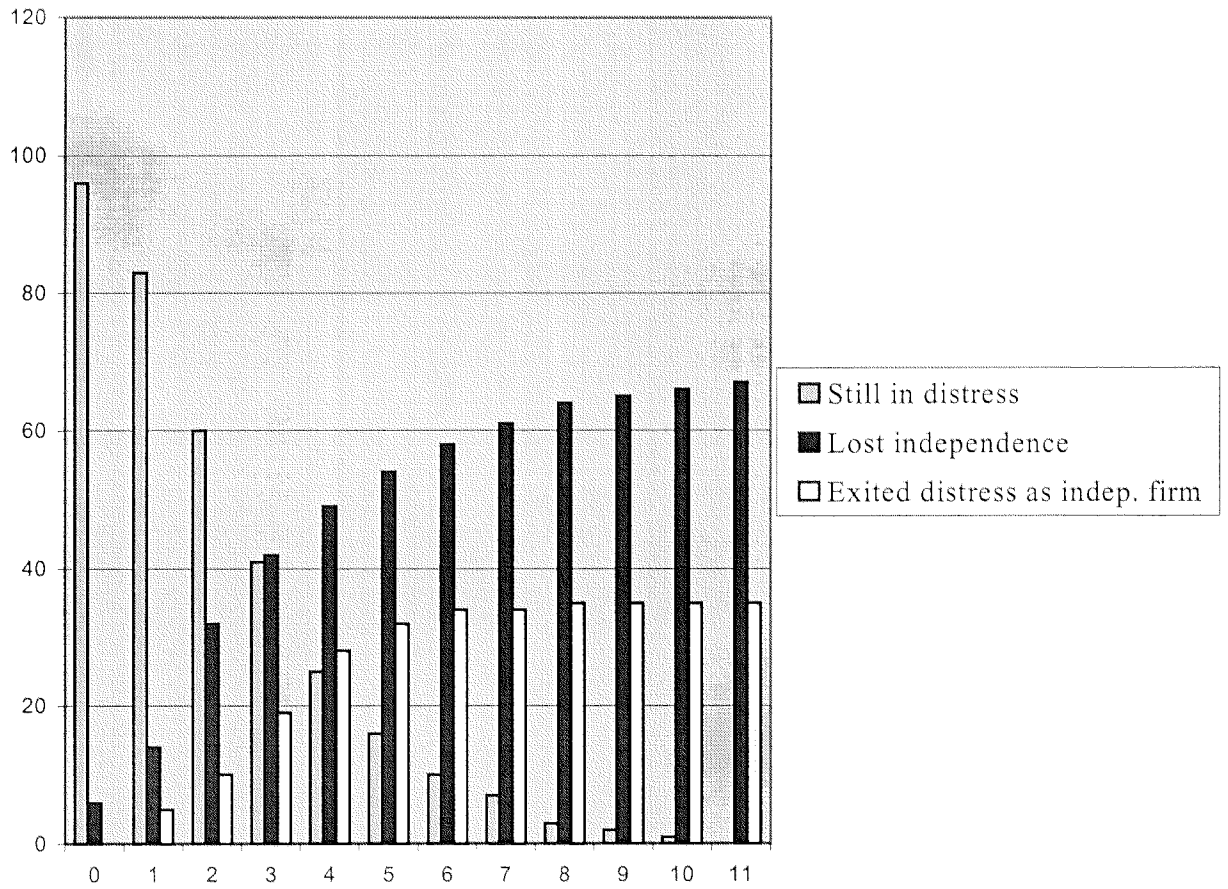


Figure 2: Acquisitions, Liquidations, and Creditor Equity Stakes

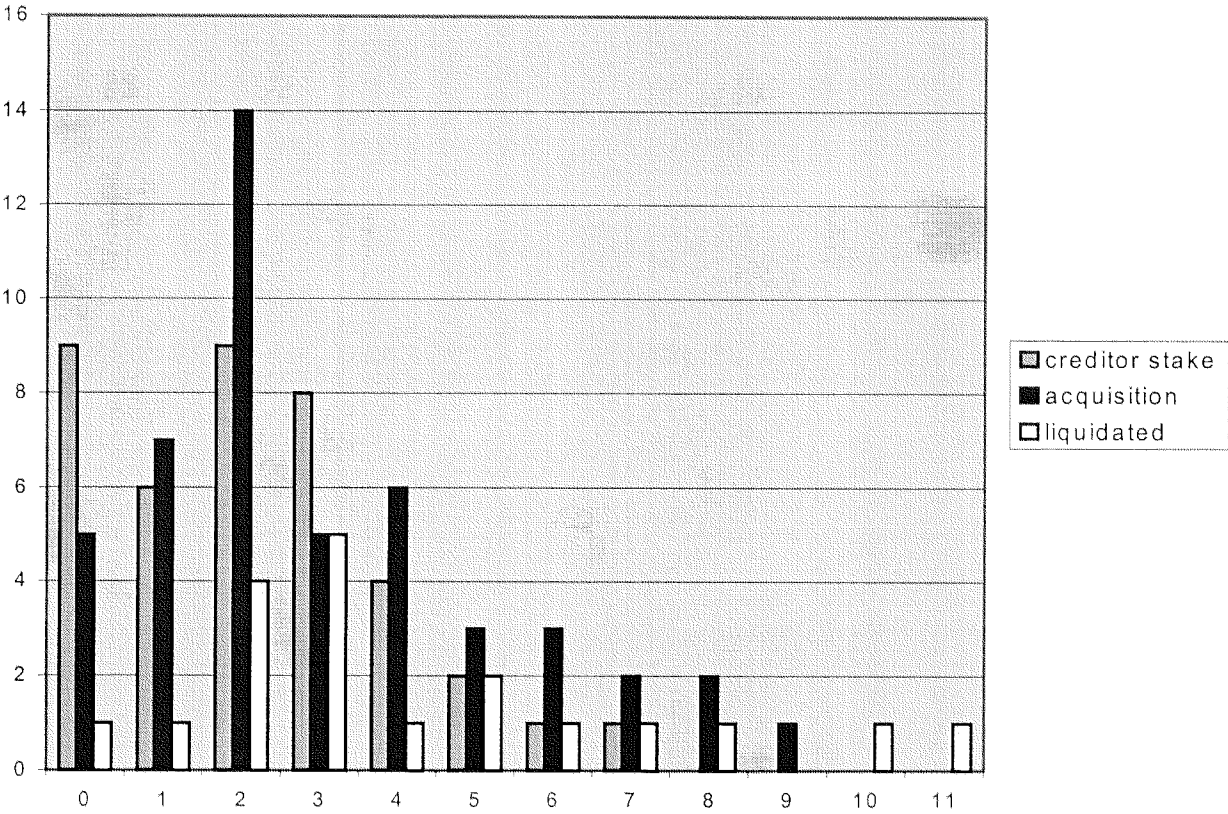
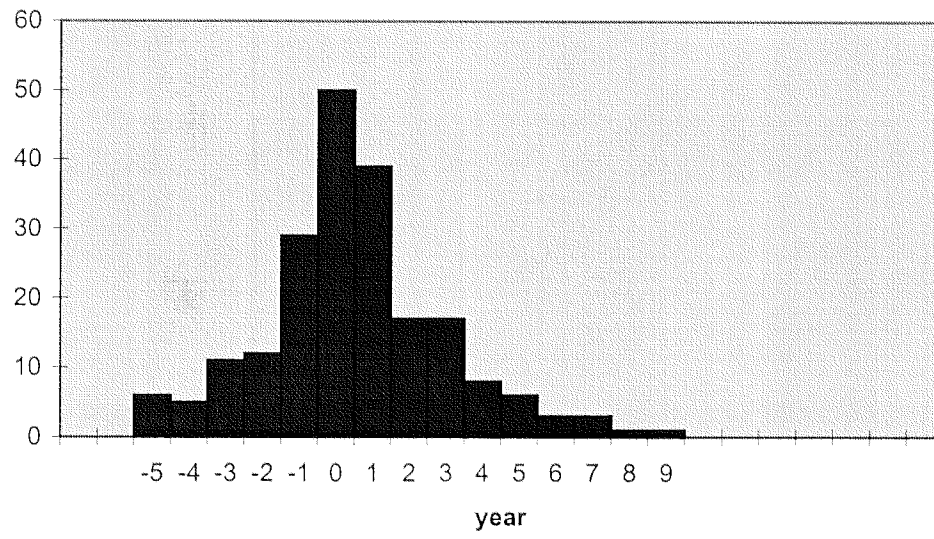


Figure 3: Number of Firms with Pre- and In-Distress Operating Losses



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