JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS Vol. 42, No. 1, March 2007, pp. 101–118
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https://doi.org/10.1017/S0022109000002209 Published online by Cambridge University Press

Chapter 11: Duration, Outcome, and Post-Reorganization Performance

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Abstract

We find that among firms that file Chapter 11 those that are smaller have better operating performance, and are in higher operating margin industries spend less time in Chapter 11. Firms are more likely to emerge as going concerns and to achieve positive post-reorganization profitability if they significantly reduce assets and liabilities while in Chapter 11. Higher pre-bankruptcy industry-adjusted operating margins and improvements in margin are associated with post-reorganization profitability but do not impact the decision to reorganize. These results reveal characteristics and actions associated with successful reorganizations and, furthermore, suggest that Chapter 11 allows promising firms to successfully reorganize.

I. Introduction

The Chapter 11 reorganization process is controversial. Critics contend that Chapter 11 is overly concerned with preventing the premature liquidation of viable firms, and thereby creates a system in which firms that are clearly not economically viable fail to be liquidated in a timely manner.[1] This problem could manifest itself in the duration or the outcome of Chapter 11. In particular, firms may be allowed to remain in Chapter 11, largely shielded from market forces, for an excessive amount of time or they may be allowed to reorganize and emerge from Chapter 11 as independent operating concerns when they should instead be sold or liquidated.[2]

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[1]See, for example, Baird (1986), Bradley and Rosenzweig (1995), Jensen (1991), Wruck (1990), and Weiss and Wruck (1998).

[2]Not all financial economists believe that the Chapter 11 process is flawed. Kahl (2002), for example, argues that information about the long-run economic viability of distressed firms becomes

A number of studies provide evidence consistent with the hypothesis that some firms that are not economically viable are nevertheless allowed to reorganize and emerge from Chapter 11. These studies generally focus either on the decision to file Chapter 11 or on the experience of firms following their emergence from Chapter 11. Chatterjee, Dhillon, and Ramirez (1996), for example, conclude that economically viable firms generally restructure privately, implying that firms that file Chapter 11 are likely not economically viable. Hotchkiss (1995) examines a large sample of public firms that emerge from Chapter 11 and reports that 40% of reorganized firms continue to experience operating losses following reorganization and 32% of reorganized firms refile bankruptcy or subsequently restructure out of court.[3]

In this paper, we follow Chapter 11 firms through the entire reorganization process and document factors that influence the length of time a firm is in Chapter 11, the initial outcome of Chapter 11, and the ex post operating performance of firms that reorganize and emerge from Chapter 11 as independent publicly traded firms. Firms that are in financial distress typically suffer from some combination of poor operating performance (firm-specific or industry-related) and suboptimal financial structure. Thus, we analyze firm and industry operating profitability and firm asset and liability structure for a sample of 224 Chapter 11 filings that first appear in the Securities and Exchange Commission's (SEC) reports during the 1985–1994 period and for which we are able to establish that the initial outcome of Chapter 11 is that the filing firm is acquired, converts to a Chapter 7 liquidation, or emerges from Chapter 11 as a reorganized independent entity.

We find that firms spend less time in Chapter 11 the smaller they are and the better their pre-filing industry-adjusted operating performance, though the latter result does not hold among firms that are in the weakest industries, i.e., those industries that have experienced a decline in the median operating margin of greater than 40% over the three prior years. Firms also spend less time in Chapter 11 the higher the median operating margin is within their industry. Among firms that are acquired while in Chapter 11, only firm size has a significant impact on the time spent in Chapter 11: smaller firms spend less time in Chapter 11 before being acquired. Firms that reorganize and emerge from Chapter 11 do so more quickly the higher are the median operating margins in their industries.

Our most significant results concern the initial outcome of Chapter 11 and the post-emergence operating performance of those firms that reorganize and emerge as independent firms. We find some evidence that the median industry operating margin plays a role in the initial outcome of Chapter 11 filings and in the post-Chapter 11 operating performance of reorganized firms. The median pre-filing industry operating margin is positively related to the likelihood that a firm is reorganized, rather than acquired; thus, Chapter 11 firms are more likely to

available only over time; he views Chapter 11 as a potentially important part of the process by which it is revealed. Alderson and Betker (1999) hypothesize that Chapter 11 allows firms to wait to liquidate until liquidation values have increased. Mooradian (1994) presents a model in which Chapter 11, by offering inefficient firms a higher likelihood of continuation, encourages them to reveal themselves as inefficient. He argues that this better enables efficient firms to continue when they might otherwise be liquidated.

[3]Other studies that document operating performance following reorganization include Gilson (1997) and LoPucki and Whitford (1993).

https://doi.org/10.1017/S0022109000002209 Published online by Cambridge University Press

be reorganized if they are in higher margin industries. This result does not hold, however, for the weakest firms, defined as firms that have a negative operating margin and are in the bottom operating margin quartile for their industries.

Firms significantly restructure both their assets and the debt on their balance sheets while they are in Chapter 11. Reductions in assets or debt increase the likelihood that a firm reorganizes and emerges as an independent firm and, conditional on reorganizing, increase the likelihood that the firm achieves positive industry-adjusted operating performance in the three years following emergence. Pre-filing firm operating profitability and changes in firm profitability while in Chapter 11 are positively related to several measures of post-emergence profitability for reorganized firms; however, they do not have a significant effect on whether firms are sold or reorganized. Finally, firms that are larger or that have higher book value debt ratios prior to filing Chapter 11 are more likely to reorganize than to liquidate or be acquired; these characteristics, however, are largely unrelated to post-Chapter 11 operating profitability.

We also analyze the likelihood that a reorganized firm encounters subsequent financial distress in the post-reorganization period and find that it is significantly negatively related to the change in the firm operating margin and to the number of months spent in Chapter 11 and significantly positively related to a dummy variable indicating a weak industry. Thus, firms that fail to achieve improvements in operating profitability while in Chapter 11, that reorganize and emerge from Chapter 11 too quickly, or that operate in weak industries are more likely to end up financially distressed again during the three full years following their reorganization.

Taken together, these results shed further light on the role of Chapter 11 in facilitating the redeployment of assets and the reorganization of firms. We find that higher quality firms and those in higher margin industries spend less time in Chapter 11. If these firms also undertake significant restructuring of their assets and liabilities while in Chapter 11, they are more likely to reorganize and emerge from Chapter 11 as independent public firms and to achieve post-reorganization profitability and avoid further financial distress. Thus, Chapter 11 does allow promising firms the opportunity to reorganize successfully.

Our paper is most similar to Hotchkiss (1995) and Maksimovic and Phillips (1998). Like Hotchkiss, we examine operating performance around Chapter 11 filings and find that many of these firms continue to experience poor operating performance and/or undergo further distressed restructurings following reorganization. Contrary to her results, we find that pre-filing firm operating profitability is significantly positively related to post-Chapter 11 operating performance. In addition, we document restructuring in Chapter 11 and find that these changes are important for post-Chapter 11 profitability. Maksimovic and Phillips also document significant restructuring activities in Chapter 11. They examine the factors that influence whether individual plants of bankrupt firms are sold or closed. They also examine whether plant productivity and industry growth conditions influence firms' decisions to convert to Chapter 7 liquidation and conclude that they do. This runs counter to our findings in this paper. However, we examine firm and industry operating margin, as opposed to plant productivity and industry growth.

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In addition, Maksimovic and Phillips examine this question in a univariate framework while we perform both univariate and multivariate analyses.

We proceed as follows. Section II describes our sample and Section III details our analysis of the relation between Chapter 11 duration and firm and industry characteristics. In Section IV, we relate these characteristics to the outcomes of the sample Chapter 11 filings and in Section V we relate them to measures of post-reorganization survival and profitability. We discuss our results and conclude the paper in Section VI.

II. Data and Sample

We focus in this paper on the extent to which fundamental measures of operational and financial structure and performance are related to the duration and outcome of Chapter 11 filings. We utilize a number of measures related to firm and industry operating profitability. These measures are straightforward and easily gauged, and there is prior support in the literature for their use in examining distressed firms. Hotchkiss (1995) uses the pre-filing firm operating margin as a potential determinant of reorganization failure. Andrade and Kaplan (1998) rely on the pre-filing operating margin and industry-adjusted operating margin as evidence that firms in their sample are financially distressed but not economically distressed. Maksimovic and Phillips (1998) provide evidence that industry health is an important determinant of the fate of individual plants in distressed firms. We define the operating margin as operating income before depreciation during the year scaled by the book value of total assets at the end of the year and make industry adjustments by subtracting from the sample firm's operating margin the contemporaneous median operating margin for all firms in that firm's industry as defined by Standard Industrial Classification (SIC) code.[4] We measure financial structure using the ratio of total liabilities to assets. Like Hotchkiss (1995), we use a liability ratio rather than a long-term debt ratio on the assumption that all claimants are important in a bankrupt firm.

We obtain a preliminary sample of 412 bankruptcy filings that appear for the first time in the annual report of the SEC over the period 1985–1994. We do not include in this number any new filing made by a firm that resolved a previous filing within the previous three years. We discard 133 filings because they are made by firms that are not covered by Compustat, our source for all accounting data, or because we could not confirm Chapter 11 petition filing dates. This leaves us with 279 filings.

We identify initial outcomes and subsequent refilings and restructurings by searching the Dow Jones New Retrieval service (now Factiva) and the Commerce Clearing House's Capital Changes Reporter. Throughout the analysis, year F refers to the year in which the Chapter 11 petition is filed and year R refers to the year of the initial Chapter 11 resolution. We follow the sample firms from the end of year $F - 1$ through the end of year $R + 3$.

[4]We use firms in the same 4-digit SIC code industry as long as there are at least five such firms. If there are not, we use firms in the same 3-digit SIC code industry. If this still does not produce five firms, we move to the 2-digit SIC code level.

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Panel A of Table 1 details the initial outcome of the bankruptcies in the sample by year. The number of filings per year ranges from 18 to 38. We eliminate from further consideration the two cases that are dismissed, the 44 cases for which we are unable to determine the outcome of the Chapter 11 process, and the nine cases in which the firm is reorganized as a private concern.[5] The latter firms are eliminated due to data limitations. Our final sample consists of 224 firms: 141 firms that are reorganized and emerge from Chapter 11 as public going concerns, 51 firms that are liquidated in the Chapter 11 process, and 32 firms that are acquired while in Chapter 11.

TABLE 1

Chapter 11 Outcome and Duration

Years correspond to the year of the first SEC annual report identifying the firm as bankrupt. Outcomes are determined by searching the Dow Jones New Retrieval service (now Factiva) and Commerce Clearing House's Capital Changes Reporter. Duration is months spent in Chapter 11. *p*-values are as follows: acquired vs. liquidated, 0.0561; acquired vs. reorganized, 0.0735; and liquidated vs. reorganized, 0.0004.

Panel A. Initial Chapter 11 Outcomes by Year

Year	Dismissed	Private	Acquired	Liquidate	Reorganize	Unknown	Total
1985	0	1	4	7	13	8	33
1986	0	0	4	3	19	12	38
1987	0	1	2	5	10	4	22
1988	0	0	5	3	15	5	28
1989	1	1	6	13	10	6	37
1990	1	0	2	3	13	2	21
1991	0	3	3	5	25	2	38
1992	0	1	3	4	15	1	24
1993	0	0	2	2	11	3	18
1994	0	2	1	6	10	1	20
Total	2	9	32	51	141	44	279
%	0.7%	3.2%	11.5%	18.3%	50.5%	15.8%	

Panel B. Chapter 11 Duration by Initial Outcome

Months in Court	All	Acquired	Liquidate	Reorganize
Mean	21.95	19.75	18.69	23.34
Median[a]	17.81	16.72	9.20	19.88
Std. Dev.	17.11	15.09	22.11	15.91
Min	0.69	0.69	0.79	1.61
5%	3.45	2.04	2.40	4.76
Max	96.00	65.34	96.00	83.38
95%	56.96	51.81	71.52	55.22
N	203	31	37	135

[a]Differences in medians are based on Wilcoxon normal approximations.

In Panel B of Table 1, we document the duration of Chapter 11 in months for those firms that were acquired, liquidated, or reorganized for which we have that data. The median firm spends approximately 17 months in court. The median firm that is liquidated spends 9.2 months in court; this is significantly less time in court than the median firm that is either acquired (median = 16.9 months) or reorganized (median = 19.9 months.)

[5]We examine the 55 dismissed/unknown/private firms to determine whether they differ systematically from the 224 firms that remain in the sample. Mean and median descriptive statistics at year $F-1$ reveal that the eliminated firms are significantly smaller than the remaining firms. This is the only statistically significant difference across the two groups.

https://doi.org/10.1017/S0022109000002209 Published online by Cambridge University Press

III. Duration in Chapter 11

A. Univariate Duration Comparisons

We are interested in knowing whether operating and financial characteristics influence the duration of Chapter 11 court-sponsored restructurings. Table 2 presents descriptive statistics for the sample firms and their industries as of year $F - 1$, the year immediately preceding the year of petition filing. The measures relate to firm asset and liability structure, firm and industry profitability, and measures of industry growth potential. We focus on median values of the variables in question.

TABLE 2

Comparison of Firm and Industry Characteristics by Duration

Long (short) bankruptcies take more (less) time to resolve than the overall sample median, which is 17.01 months. Measures are as of the year preceding the year in which Chapter 11 is filed. Operating margin is operating income before depreciation scaled by the book value of total assets. Industry adjustments are made by subtracting the contemporaneous median operating margin of the portfolio of Compustat firms with the same SIC code. Market-to-book is total assets less book value of equity plus year-end market value of equity, all scaled by total assets. Firms with negative operating margins in the lowest quartile of their industry are classified as weak firms. Industries that experience a decline of greater than 40% in operating margin in the three years preceding the measurement date are classified as weak industries. Reported *p*-values for significance of differences are based on binomial normal approximations for % Weak firm and % Weak industry and on Wilcoxon two-sample tests (normal approximations) for all other variables.

	Long	Short	*p*-Value for Difference
Firm Characteristics			
Total assets	284.713	66.630	0.0003
Total liabilities/total assets	0.9503	0.8293	0.0420
Operating income/total assets	0.0053	0.0219	0.4040
Industry-adjusted operating margin	−0.0901	−0.0770	0.9069
% Weak firm	41.38%	37.50%	0.5380
Industry Characteristics			
Industry median operating margin	0.0931	0.1115	0.0562
Industry median market-to-book	1.1534	1.1870	0.0634
% Weak industry	19.81%	15.69%	0.3530

We divide the sample firms into those that are above and those that are below the median duration of 17 months for the sample as a whole and compare the two groups. Measuring characteristics at $F - 1$ we find that the firm characteristics that differ significantly between the above median and below median duration groups are firm size, measured by the book value of total assets, and firm financial structure, measured as the ratio of the book value of total liabilities to the book value of total assets. These differences imply that larger firms and firms with higher liability ratios spend more time in Chapter 11, consistent with bankruptcies being more complex for firms that are larger or that have more debt. Pre-filing firm operating performance, however, does not appear to influence the amount of time spent in Chapter 11. There are no significant differences in firm operating margin, whether raw or industry-adjusted, or in the percentage of weak firms, where a weak firm is one whose operating margin is negative and in the lowest quartile of its industry.

Comparisons of industry characteristics across the two duration groups indicate that firms in higher margin industries and in industries with higher market-to-book ratios spend less time in Chapter 11. Thus, industry operating performance appears to be a significant determinant of time spent in Chapter 11, while firm

https://doi.org/10.1017/S0022109000002209 Published online by Cambridge University Press

operating performance appears not to be. Firms in higher margin industries may have greater potential for recovery, thereby allowing them to reorganize more quickly. In addition, if assets must be sold, whether in part for a reorganization or in total in an acquisition or liquidation, higher margin industries may provide more potential buyers more quickly. We now turn to a multivariate analysis to shed further light on the univariate findings.

B. Duration Regression Analysis

In Table 3, we examine duration in a multivariate setting. The dependent variable in the Table 3 regressions is months spent in Chapter 11 and the independent variables are the firm and industry characteristics defined above. We also include two interaction terms to measure the interaction between firm and industry performance: weak industry times industry-adjusted firm operating performance and weak firm times median industry operating performance. Because our independent variable is a measure of duration, we estimate the Table 3 regressions using a duration model, specifically the Weibull model.

TABLE 3

Regressions of Duration in Chapter 11

Parameter estimates from Weibull regressions modeling duration in court, measured in months, as a function of firm and industry characteristics in the year preceding the year in which Chapter 11 is filed. Operating margin is operating income before depreciation scaled by the book value of total assets. Industry adjustments are made by subtracting the contemporaneous median operating margin of the portfolio of Compustat firms with the same SIC code. Firm size is given by log(total assets) and change in firm size is [log(R − 1 assets) − log(F − 1 assets)]. Changes in ratios are given by [(Year R − 1) − (Year F − 1)]. Firms with negative operating margins in the lowest quartile of their industry are classified as weak firms. Industries that experience a decline of greater than 40% in operating margin over the three years preceding the measurement date are classified as weak industries. p-values are in parentheses.

	All	Acquired	Liquidate	Reorganize
Intercept	2.3802 < 0.0001	−0.1219 (0.8960)	1.0743 (0.4441)	3.0592 < 0.0001
Industry-adjusted firm operating margin	−1.2004 (0.0060)	−4.4420 (0.1392)	−2.9435 (0.1152)	−0.6727 (0.1018)
Industry median operating margin	−3.3032 (0.0585)	5.5886 (0.2542)	1.4508 (0.8627)	−5.0740 (0.0039)
Firm size	0.1080 (0.0030)	0.3340 (0.0109)	0.1461 (0.4014)	0.0562 (0.1298)
Liabilities/assets	0.0949 (0.3938)	0.3528 (0.5832)	0.5238 (0.4533)	−0.0455 (0.6960)
Weak firm	0.0854 (0.7003)	−5.9006 (0.7408)	0.7961 (0.4415)	−0.0786 (0.7121)
Weak industry	0.0275 (0.9336)	0.4477 (0.6484)	−0.3833 (0.7572)	0.4299 (0.2521)
Weak firm ∗ Industry median margin	−0.03 (−0.9919)	−6.7253 (0.4324)	−0.4828 (0.9678)	−2.8533 (0.4105)
Weak industry ∗ Adj. firm operating margin	2.7878 (0.0049)	−11.9529 (0.7785)	6.5195 (0.1445)	2.4446 (0.0153)
N	167	25	31	111
Adjusted R^2	0.1138	0.1842	−0.0647	0.1543

The first column in Table 3 presents regression coefficients for the sample as a whole and the remaining columns present the results by initial outcome. Contrary to the univariate results in Table 2, the Table 3 results indicate that industry-adjusted firm operating performance is a significant determinant of the length of

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time spent in Chapter 11: firms with better relative performance spend less time in Chapter 11. Thus, the better a firm's relative performance, the more quickly it can resolve its problems. However, the significant positive coefficient on the interaction of industry-adjusted firm operating margin with the weak industry variable indicates that among firms in industries that experienced a three-year decline in operating margin of greater than 40%, industry-adjusted operating margin is not significantly related to duration. Thus, if an industry itself is in enough trouble, being relatively better than other firms in that industry no longer provides the same advantages with respect to time spent in Chapter 11.

The multivariate results indicate that firms in higher operating margin industries spend less time in Chapter 11; this result is consistent with the univariate tests. Regression results for the individual outcomes, however, indicate that this result holds only for those firms that reorganize and emerge from Chapter 11. Thus, firms that are in higher margin industries reorganize more quickly than those that are not, but industry margin does not significantly impact the amount of time it takes a firm to either liquidate or be acquired in Chapter 11.

Firm size continues to have a positive effect on the duration of Chapter 11 in a multivariate framework; this result holds overall as well for firms that are acquired. In fact, firm size is the only significant determinant of the time until a firm is acquired in Chapter 11. Larger firms do not take significantly longer to liquidate or to reorganize than do smaller firms. Finally, while the univariate results suggest that firms with higher debt ratios take longer to resolve their Chapter 11 filings, this result no longer holds in a multivariate setting. Overall, our duration results suggest that smaller firms, firms that are in higher margin industries, and firms that are of higher quality within their industries spend less time in Chapter 11.

IV. Firm and Industry Characteristics and Outcome

Firms in financial distress typically suffer some combination of poor operating performance (firm-specific and/or industry-related) and suboptimal financial structure. We assume that the magnitude of these problems and the ability of firms to improve their operating and financial condition while in Chapter 11 affect the desirability of reorganizing and emerging from Chapter 11. In this section, we analyze the extent to which they are related to the outcomes of Chapter 11 filings.[6]

A. Univariate Comparisons

Table 4 compares firm and industry characteristics by initial Chapter 11 outcome. The descriptive statistics for firm characteristics suggest that firms that liquidate or are acquired while in Chapter 11 are indistinguishable from each other based on pre-filing measures of firm operating and financial structure. Firms that

[6]There are other factors that influence the outcome of Chapter 11 filings. Dahiya, John, Puri, and Ramirez (2003), for example, find that firms that obtain secured debtor-in-possession (DIP) financing while in Chapter 11 are more likely to reorganize and emerge from Chapter 11 than are firms that do not obtain such financing. For our purposes, however, we focus on the effect of fundamental operating and financial characteristics of the firm. Like the reorganization decision itself, the availability of DIP financing might be viewed as a related outcome of these underlying characteristics.

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reorganize and emerge from Chapter 11, however, differ significantly from either acquired or liquidated firms. The median reorganized firm is more than twice as large as either the median liquidated or acquired firm, where firm size is measured as the book value of total assets. In addition, measures of firm profitability suggest that reorganized firms are performing better than acquired or liquidated firms immediately prior to entering Chapter 11. Both the raw and industry-adjusted operating margin are significantly higher for reorganized firms. In addition, we define a weak firm to be one that has a negative operating margin and is in the bottom quartile of its industry with respect to operating margin. Thirty-six percent of reorganized firms are classified as weak firms, as compared to 56% of acquired firms; this difference is significant at the 0.10 level. Almost 49% of liquidated firms are classified as weak firms; this does not differ significantly from the percentage for either acquired or reorganized firms. Finally, we find that reorganized firms' debt, as measured by the ratio of book value of total liabilities to book value of total assets, is significantly greater than that of acquired firms but does not differ significantly from that of liquidated firms.

TABLE 4

Comparison of Firm and Industry Characteristics by Initial Outcome

Descriptive statistics for firms that file Chapter 11 bankruptcy. Measures are as of the year preceding the year in which Chapter 11 is filed. Operating margin is operating income before depreciation scaled by the book value of total assets. Industry adjustments are made by subtracting the contemporaneous median operating margin of the portfolio of Compustat firms with the same SIC code. Market-to-book is total assets less book value of equity plus year-end market value of equity, all scaled by total assets. Firms with negative operating margins in the lowest quartile of their industry are classified as weak firms. Industries that experience a decline of greater than 40% in operating margin in the three years preceding the measurement date are classified as weak industries. Reported *p*-values for significance of differences are based on binomial normal approximations for % Weak firm and % Weak industry and on Wilcoxon two-sample tests (normal approximations) for all other variables.

	Acquired	Liquidated	Reorganized	Acquired vs. Liquidated *p*-Values	Acquired vs. Reorganized *p*-Values	Liquidated vs. Reorganized *p*-Values
Firm Characteristics						
Total assets	58.648	65.341	159.46	0.3882	0.0423	0.0292
Total liabilities/total assets	0.7716	0.9014	0.9414	0.1822	0.0143	0.1456
Operating income/total assets	−0.0312	−0.0047	0.0317	0.5178	0.0614	0.0890
Industry-adjusted operating margin	−0.1558	−0.1005	−0.0675	0.5633	0.0701	0.0253
% Weak firm	56.00%	48.72%	36.21%	0.5700	0.0670	0.1670
Industry Characteristics						
Industry median operating margin	0.1125	0.1067	0.0973	0.7933	0.5050	0.5754
Industry median market-to-book	1.2143	1.1645	1.1676	0.1973	0.2154	0.3355
% Weak industry	9.38%	21.57%	19.86%	0.1490	0.1630	0.7950

Table 4 also presents median values of characteristics related to operating performance for the sample firms' industries. We examine the median industry operating margin and median market-to-book ratios of firm value and equity value, as well as a dummy variable equal to one for firms that are in a weak industry. None of these variables differ significantly across the outcomes, suggesting that these indicators of industry health have little influence on the outcome of Chapter 11.

The Table 4 results address operating and financial characteristics measured prior to filing for Chapter 11. The outcome of Chapter 11 may also be influenced by changes in these characteristics that occur while firms are in Chapter 11. We address these changes in a univariate framework in Section IV.B and examine both

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pre-Chapter 11 measures and changes during Chapter 11 in a multivariate setting in the Section IV.C.

B. Changes in Firm and Industry Characteristics

We measure changes during Chapter 11 as the differences between operating and financial characteristics from year $F-1$ to year $R-1$, where year F is the year that Chapter 11 is filed and year R is the year of resolution. For those firms for which we do not have data for year $R-1$, we use data from the last year prior to $R-1$, provided it is after year $F-1$. Those firms for which year $F-1$ is the last year prior to year R for which we have data are not included in the measured changes.

Table 5 presents median changes separately for acquired, liquidated, and reorganized firms and presents p-values for comparisons across the three groups. Regardless of which category of initial outcome we consider, the median sample firm significantly reduces its assets while in Chapter 11. Only the difference between acquired and liquidated firms is statistically significant. Firms that transfer to Chapter 7 reduce their assets prior thereto by a significantly greater percentage than do firms that are acquired in Chapter 11; this difference is significant at the 10% level.

TABLE 5

Changes in Firm and Industry Characteristics by Initial Outcome

Changes in variables from year $F-1$ to year $R-1$, where F is the year Chapter 11 is filed and R is the year it is resolved. If year $R-1$ data is not available, we use the last year prior to $R-1$ for which data is available, as long as it is not earlier than year F. Changes in assets and liabilities are computed as log(new/old); all others are changes in ratios computed as (new ratio − old ratio). Operating margin is operating income before depreciation scaled by the book value of total assets. Industry adjustments are made by subtracting the contemporaneous median operating margin of the portfolio of Compustat firms with the same SIC code. Market-to-book is total assets less book value of equity plus year-end market value of equity, all scaled by total assets. Firms with negative operating margins in the lowest quartile of their industries are classified as weak firms. Industries that experience a decline of greater than 40% in operating margin in the three years preceding the measurement date are classified as weak industries. Reported p-values for significance of differences are based on Wilcoxon two-sample tests (normal approximations). ***,**,* indicate significantly different from zero at the 1%, 5%, and 10% levels, respectively, as determined by Wilcoxon signed rank tests.

	Acquired	Liquidated	Reorganized	Acquired vs. Liquidated p-Values	Acquired vs. Reorganized p-Values	Liquidated vs. Reorganized p-Values
Firm Characteristics						
Total assets	−0.2300***	−0.3898***	−0.2879***	0.0846	0.1285	0.3098
Total liabilities	0.0000	0.0000***	−0.0059*	0.7996	0.0708	0.0157
Total liabilities/total assets	0.3276***	0.6193***	0.2601***	0.0846	0.2212	0.0253
Operating income/total assets	−0.0249	−0.0902*	−0.0056	0.1148	0.3932	0.0445
Industry-adjusted operating margin	0.0265	−0.0713*	−0.0155	0.0494	0.3205	0.0486
Industry Characteristics						
Industry median operating margin	−0.0046	0.0053	−0.0003	0.0853	0.1547	0.1325
Industry median market-to-book	0.0262	0.0130	0.0548**	0.2278	0.4443	0.1678

We present changes in total liabilities and in the ratio of total liabilities to assets. The median firms that are acquired or liquidated do not experience any change in total liabilities from the year-end prior to filing through the year-end prior to being acquired or liquidated. The median reorganized firm experiences a small but significant decline in total liabilities from the year-end prior to filing through the year-end prior to emerging from Chapter 11 as a public firm. Given the significant decreases in total assets that occur over these same periods, all

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three groups of firms experience a median increase in the ratio of liabilities to assets. This increase is significantly larger for those firms that liquidate than for either acquired or reorganized firms, consistent with the greater asset reductions made by these firms prior to their conversion to Chapter 7.

The restructuring of firm assets while in Chapter 11 does not immediately translate to improved operating performance. Neither the median raw nor the industry-adjusted operating margin improves while the firms are in Chapter 11. Reorganized and acquired firms experience no significant changes in these margins. This is consistent with Maksimovic and Phillips (1998) who find that productivity does not decline for individual plants while in Chapter 11. The median firm that liquidates, however, does experience a significant (at the 10% level) decline in both operating performance measures while in Chapter 11. The median changes in both measures for the liquidated firms differ from those of firms that reorganize and the median change in industry-adjusted operating margin for the liquidated firms differs significantly from that of firms that are acquired; these differences are significant at the 5% level.

There is little evidence that industry characteristics change over the time that the sample firms spend in Chapter 11. The median industry median market-to-book ratio increases significantly for reorganized firms, suggesting that improved industry climate facilitates reorganization. However, this increase does not differ significantly from the insignificant increases observed for acquired and for liquidated firms.

C. Regression Analysis

Table 6 presents logistic regressions of initial outcomes on pre-filing operating and financial characteristics and the changes in these characteristics while in Chapter 11. We compare outcomes in pairs across the three possible outcomes and for firms that reorganize versus firms that do not reorganize; i.e., that are either acquired or liquidated while in Chapter 11.

The column one results in Table 6 indicate that none of the independent variables included in the regressions are significant determinants of the decision to liquidate rather than be acquired. This is consistent with the descriptive statistics presented in Table 4 and suggests that firms that are sold piecemeal in a liquidation are not easily distinguishable from firms that are sold intact to one buyer in an acquisition.

The second, third, and fourth regressions in Table 6 compare the decision to reorganize to the decision to sell the assets of the firm, whether piecemeal (liquidation) or as a whole (acquisition). The first thing to note is that the estimated coefficients on the industry-adjusted operating margin and its change are statistically insignificant across all three regressions. Thus, relative firm operating performance does not appear to enter into the decision about whether a firm should be sold or reorganized. The industry median operating margin has a significant impact only when comparing reorganization to acquisition: firms in more profitable industries are more likely to emerge independent than to be acquired. The significant negative coefficient on the weak firm*industry median margin in-

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TABLE 6

Logistic Regressions of Initial Outcomes

Parameter estimates from logistic regressions modeling the likelihood of reorganizing and emerging from Chapter 11. Operating margin is operating income before depreciation scaled by the book value of total assets. Industry adjustments are made by subtracting the contemporaneous median operating margin of the portfolio of Compustat firms with the same SIC code. Firm size is measured as log(total assets). Firms with negative operating margins in the lowest quartile of their industry are classified as weak firms. Industries that experience a decline of greater than 40% in operating margin over the three years preceding the measurement date are classified as weak industries. Variables are measured at year $F-1$ and changes are measured over the period from $F-1$ to $R-1$, where $F-1$ is the year preceding the year in which Chapter 11 is filed and $R-1$ is the year preceding the year in which the firm emerges from Chapter 11. Change in firm size is [log($R-1$ assets) − log($F-1$ assets)]. Changes in ratios are given by [(Year $R-1$) − (Year $F-1$)]. *p*-values are in parentheses.

	Acquired vs. Liquidated Liquidated = 1	Acquired vs. Reorganized Reorganized = 1	Liquidated vs. Reorganized Reorganized = 1	(Acquired or Liquidated) vs. Reorganized Reorganized = 1
Intercept	−23.2171	−6.0779	0.6225	−2.4009
	(0.3890)	(0.0094)	(0.7626)	(0.0727)
Industry-adjusted operating margin	−6.6965	−6.9150	−0.4173	−2.0370
	(0.4383)	(0.1932)	(0.8659)	(0.3613)
Change in adjusted operating margin	−10.1082	1.1382	1.6259	1.8958
	(0.2382)	(0.7894)	(0.4484)	(0.3239)
Industry median operating margin	202.1000	34.0562	−8.8962	4.1757
	(0.3491)	(0.0322)	(0.3833)	(0.5341)
Change in industry operating margin	323.5000	7.7458	−12.3895	−3.0861
	(0.3598)	(0.6254)	(0.2884)	(0.7415)
Firm size	−0.1837	0.5221	0.2364	0.3401
	(0.7772)	(0.0919)	(0.3248)	(0.0627)
Change in firm size	19.4016	−6.4351	−4.9955	−4.8717
	(0.4392)	(0.0075)	(0.0043)	(0.0004)
Liabilities/assets	0.3382	2.3421	1.7444	1.7740
	(0.8772)	(0.0442)	(0.0893)	(0.0204)
Change in liabilities/assets	7.9692	−2.5539	−2.3619	−2.1282
	(0.4396)	(0.1063)	(0.0054)	(0.0028)
Weak industry indicator	19.3832	17.1680	−0.9135	0.4756
	(0.9263)	(0.9242)	(0.4175)	(0.6615)
Weak firm indicator	23.1141	0.3177	−2.1215	−1.2905
	(0.3882)	(0.8940)	(0.2382)	(0.3314)
Weak industry ∗ Adjusted firm margin	22.1478	15.9626	0.9407	3.1556
	(0.9842)	(0.9858)	(0.8048)	(0.4049)
Weak firm ∗ Industry margin	−209.6000	−36.8261	3.8994	−6.2592
	(0.3385)	(0.0913)	(0.7886)	(0.5636)
N	32	116	120	134
χ^2	25.3902	36.8273	30.0432	41.7795
p-value	0.0131	0.0002	0.0028	< 0.0001

teraction term in this regression indicates that this result does not hold for firms that meet our definition of a weak firm.

There is some evidence that larger firms are more likely to survive the Chapter 11 process and emerge as independent firms. The coefficient on firm size is positive and significant at the 10% level when reorganization is compared to acquisition and to acquisition and liquidation combined. This may be because larger firms are deemed too big to fail or because they are more likely to have sufficient resources to survive the Chapter 11 process. Alternatively, larger firms may be more likely to reorganize because they are more likely to be economically viable. More important than the relation between firm size and outcome, however, is the relation between the change in firm size while a firm is in Chapter 11 and outcome. The significant negative coefficients in all three regressions indicate that

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firms are more likely to reorganize and emerge from Chapter 11 as independent firms if they reduce the size of their firms while in Chapter 11.

The Table 6 results also indicate that financial structure plays an important role in the outcome of Chapter 11 filings. The positive coefficients on the liabilities/assets variable in the regressions that include reorganized firms indicate that firms that have greater liability ratios prior to filing Chapter 11 are more likely to reorganize than to liquidate or be acquired. Firms become bankrupt due to some combination of financial distress resulting from a suboptimal capital structure and/or economic distress associated with unprofitable operations. To the extent that higher leverage leads firms to become bankrupt more quickly, firms with higher pre-bankruptcy leverage may be less economically distressed and, therefore, more likely to be able to reorganize and emerge than lower leverage firms that may have funded years of operating losses without the discipline of debt payments before finally being forced to file bankruptcy. We also find that emergence is more likely when a firm's liabilities/assets ratio is reduced while in Chapter 11; the coefficients on this change variable are negative and significant at the 0.01 level in the latter two regressions. Taken together, the significant coefficients on the changes in firm size and liability ratio suggest that the ability to restructure the firm both operationally and financially increase the likelihood that a firm survives to emerge from Chapter 11 as an independent reorganized firm.

As a robustness test, we estimate a multinomial logistic regression in which all three outcomes, acquisition, liquidation, and reorganization, are compared in one regression. Table 7 presents the marginal effects of a unit change in each independent variable on the probability of each outcome for a firm with average characteristics. The conclusions that can be drawn from Table 7 are largely equivalent to those drawn from Table 6. Firms with higher pre-bankruptcy liabilities ratios are significantly more likely to reorganize as are firms that reduce their assets and their liability ratios. The most important difference in the Table 7 results is that the industry median operating margin does not significantly affect the probability of any of the three outcomes; the Table 6 regressions suggest that firms in higher margin industries are significantly more likely to reorganize than to be acquired in Chapter 11. In addition, the Table 7 results suggest that firms in weak industries, as we define them, are less likely to be acquired.

V. Post-Reorganization Performance

Our final question of interest is the extent to which operating and financial characteristics at year $F - 1$ and changes in those characteristics predict post-reorganization firm survival and operating performance. We are unable to measure post-Chapter 11 performance for those firms that are either liquidated or acquired in the Chapter 11 process; thus, we examine only those firms that reorganize and emerge from Chapter 11 as independent publicly traded firms. It is these firms that reorganize, in particular the extent to which their reorganizations are viewed as successes or failures, that drive much of the controversy that surrounds the Chapter 11 process.

It is difficult to precisely define reorganization success or failure. Hotchkiss (1995) considers continued poor operating performance or further restructuring

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TABLE 7

Multinomial Logistic Regressions of Initial Outcomes—Marginal Effects

Marginal effects computed from logistic regressions modeling the likelihood of three alternative outcomes: liquidation, acquisition, and emergence from court as an independent reorganized firm. Operating margin is operating income before depreciation scaled by the book value of total assets. Industry adjustments are made by subtracting the contemporaneous median operating margin of the portfolio of Compustat firms with the same SIC code. Firm size is measured as log(total assets). Firms with negative operating margins in the lowest quartile of their industry are classified as weak firms. Industries that experience a decline of greater than 40% in operating margin over the three years preceding the measurement date are classified as weak industries. Variables are measured at year $F-1$ and changes are measured over the period from $F-1$ to $R-1$, where $F-1$ is the year preceding the year in which Chapter 11 is filed and $R-1$ is the year preceding the year in which the firm emerges from Chapter 11. Change in firm size is [log($R-1$ assets) − log($F-1$ assets)]. Changes in ratios are given by [(Year $R-1$) − (Year $F-1$)].

	Marginal Effects on Pr(liquidation)		Marginal Effects on Pr(acquisition)		Marginal Effects on Pr(emergence)	
	dy / dx	*p*-Value	*dy / dx*	*p*-Value	*dy / dx*	*p*-Value
Industry-adjusted operating margin	0.0286	0.831	0.0019	0.2760	−0.0304	0.8200
Change in adjusted operating margin	−0.0975	0.3970	−0.0001	0.9340	0.0976	0.3970
Industry median operating margin	0.5293	0.3170	−0.0131	0.1070	−0.5163	0.3280
Change in industry operating margin	0.8786	0.1440	−0.0051	0.3510	−0.8735	0.1470
Firm size	−0.0134	0.3390	−0.0001	0.2450	0.0136	0.3340
Change in firm size	0.2784	0.0040	0.0019	0.0640	−0.2802	0.0040
Liabilities/assets	−0.0960	0.0700	−0.0008	0.1060	0.0968	0.0680
Change in liabilities/assets	0.1302	0.0080	0.0007	0.1230	−0.1309	0.0080
Weak industry indicator	0.0564	0.5440	−0.0640	0.0890	0.0076	0.9390
Weak firm indicator	0.1671	0.3180	−0.0004	0.5770	−0.1667	0.3190
Weak industry * Adjusted firm margin	−0.0597	0.7700	−0.0055	0.1290	0.0652	0.7480
Weak firm * Industry margin	−0.2456	0.7290	0.0140	0.1220	0.2316	0.7440

following reorganization to be evidence of reorganization failure. She further implies that firms whose reorganizations fail should not have been allowed to reorganize. Kahl (2002), on the other hand, hypothesizes that it takes time to understand whether a firm is economically viable and that even multiple subsequent restructurings are not necessarily evidence that a reorganization was a bad idea ex ante. We take no position on what constitutes reorganization success or failure. Rather, we follow our sample reorganized firms through the end of the third full year following reorganization (year $R+3$) and examine a number of different measures of post-reorganization survival and operating performance, defining each as a dummy variable. The measures we present here are perhaps most appropriately viewed simply as desirable outcomes and we are ultimately interested only in examining the extent to which operating and financial characteristics affect the likelihood of achieving these outcomes. Table 8 presents the incidence of each measure within the subsample of reorganized firms.

Our first measure is simply whether the firm survives through year $R+3$ as an independent publicly traded firm that is listed on Compustat. Fifty-eight percent of emerging firms meet this definition. We measure four dummy variables based on firm operating performance subsequent to reorganization. We find that 61% of reorganized firms achieve a positive operating margin in at least one of the three fiscal years following their emergence from Chapter 11, while 52.5% do so in at least two of the three years. A more stringent operating performance requirement is positive industry-adjusted operating performance; we find that 44.0% of reorganized firms achieve this in at least one of the three fiscal years following emergence and 28.4% achieve it in at least two of those years.

We measure the incidence of several events during the three fiscal years subsequent to the emergence of our reorganized firms: distressed restructuring,

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TABLE 8

Post-Reorganization Survival and Profitability

Incidence of post-resolution events for 141 firms that reorganize and emerge from Chapter 11 as public going concerns. The year of initial emergence from court as a reorganized firm is year *R*; firms are followed through the end of year *R* + 3. Operating margin is operating income before depreciation scaled by the book value of total assets. Industry adjustments are made by subtracting the contemporaneous median operating margin of the portfolio of Compustat firms with the same SIC code. The Combined measure is a dummy variable that takes the value one if the firm exists as an independent going concern at the end of year *R* + 3, does not require subsequent reorganization over that period, and exhibits positive operating margin in at least two of the three full years following reorganization.

	No. of Firms	Percentage of Reorganized
Listed on Compustat in year *R* + 3	82	58.2%
Positive operating margin in at least one year	86	61.0%
Positive operating margin in at least two years	74	52.5%
Positive industry-adjusted operating margin in at least one year	62	44.0%
Positive industry-adjusted operating margin in at least two years	40	28.4%
Subsequent distressed restructuring	7	5.0%
Subsequently refile	17	12.1%
Subsequently liquidate	4	2.8%
Subsequently restructure, refile, liquidate	25	17.7%
Combined	61	43.3%

Chapter 11 filing, and liquidation. We find that 5.0% of the firms undergo a distressed restructuring, 12.1% again file for Chapter 11, and 2.8% ultimately liquidate. Twenty-five firms (17.7%) experience at least one of these events by the end of year $R + 3$.[7] Finally, we combine a number of the above measures and define a dummy variable called "Combined" that takes the value one if a firm still survives as an independent, publicly traded firm at year $R + 3$, does not undergo any distressed restructuring or reorganization over the three-year post-emergence period, and experiences at least two years of positive operating performance over that period. Just over 43% of our sample reorganizations meet this definition.

We examine the impact of pre-Chapter 11 operating and financial characteristics on post-reorganization survival and performance by estimating logistic regressions of the above measures on these characteristics. These results are presented in Table 9. The dependent variable in column 1 is a dummy variable that equals one if the firm still exists on Compustat as an independent firm at the end of year +3. The only estimated coefficient that is statistically significant is firm size at the end of year $F - 1$. Larger firms are more likely to survive than are smaller firms.

Columns 2–5 of Table 9 present the results for each of the four operating performance dummy variables: positive operating performance in at least one year and in at least two years and positive industry-adjusted operating performance in at least one year and at least two years. The results indicate that all four measures are significantly positively related to the industry-adjusted operating margin in year $F - 1$ and to the change in that margin while the firm is in Chapter 11. These results are particularly interesting in light of the results presented in Table 6, which indicate that pre-filing industry-adjusted operating margins and the changes in those margins do not significantly impact the likelihood of firms reorganizing and emerging as independent firms.

The coefficients on industry median operating margin and on its change during Chapter 11 are statistically insignificant in all four operating performance

[7]The comparable statistic as documented by Hotchkiss (1995) is 32%.

https://doi.org/10.1017/S0022109000002209 Published online by Cambridge University Press

TABLE 9

Post-Reorganization Logistic Regressions

Parameter estimates from regressions modeling the likelihood of various outcomes following reorganization. Firms with negative operating margins in the lowest quartile of their industry are classified as weak firms. Industries that experience a decline of greater than 40% in operating margin over the three years preceding the measurement date are classified as weak industries. Variables are measured at year $F - 1$ and changes are measured over the period from $F - 1$ to $R - 1$, where $F - 1$ is the year preceding the year in which Chapter 11 is filed and $R - 1$ is the year preceding the year in which the firm emerges from Chapter 11. Change in firm size is [log($R - 1$ assets) − log($F - 1$ assets)]. Changes in ratios are given by [(Year $R - 1$) − (Year $F - 1$)]. *p*-values are in parentheses. Dependent variables:

(1) Survive as public firm (listed on Compustat) in year $R + 3$
(2) Positive operating margin in at least 1 of years $R + 1$ through $R + 3$
(3) Positive operating margin in at least 2 of years $R + 1$ through $R + 3$
(4) Positive industry-adjusted operating margin in at least 1 of years $R + 1$ through $R + 3$
(5) Positive industry-adjusted margin in at least 2 of years $R + 1$ through $R + 3$
(6) Undergoes a distressed restructuring, refiles Chapter 11, and/or liquidates in years $R + 1$ through $R + 3$
(7) Firm exists as an independent going concern at the end of year $R + 3$, does not require subsequent reorganization over that period, and exhibits positive operating margin in at least two of the three years following reorganization

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Survives	+Margin, 1 Year	+Margin, 2 Years	+Adjusted, 1 Year	+Adjusted, 2 Years	Future Distress	Combined
Intercept	−1.1946	0.7169	−1.7700	1.3942	1.0505	−4.4694	−1.1278
	(0.3899)	(0.6874)	(0.3118)	(0.3938)	(0.4675)	(0.0520)	(0.4520)
Industry-adjusted operating margin	0.1694	6.2657	7.8454	9.8172	5.4618	−6.8746	9.8112
	(0.9506)	(0.0653)	(0.0250)	(0.0051)	(0.0489)	(0.1420)	(0.0019)
Change in industry-adjusted margin	2.3083	7.2030	5.0025	10.5947	6.6998	−5.1232	6.4897
	(0.2356)	(0.0059)	(0.0369)	(0.0004)	(0.0148)	(0.0667)	(0.0105)
Industry median operating margin	−3.3557	10.3516	11.0451	9.4778	−5.3925	12.7116	6.8158
	(0.6427)	(0.2414)	(0.2303)	(0.2907)	(0.4506)	(0.2879)	(0.3718)
Change in industry med. operating margin	−6.4623	−4.1684	1.7800	−3.4060	3.8444	0.5896	2.2932
	(0.4699)	(0.7007)	(0.8617)	(0.7245)	(0.6805)	(0.9624)	(0.8213)
Firm size	0.3737	0.0927	0.3580	0.1233	0.0501	0.3237	0.0303
	(0.0300)	(0.6540)	(0.0667)	(0.4762)	(0.7378)	(0.1296)	(0.8515)
Change in firm size	−0.3407	−0.4292	−0.3574	−1.7422	−1.8781	−0.5772	−1.2375
	(0.6651)	(0.6524)	(0.7001)	(0.0384)	(0.0139)	(0.5819)	(0.1642)
Liabilities/assets	0.6169	−0.2538	0.3947	−1.4075	−0.8054	−0.3348	0.4028
	(0.2847)	(0.7152)	(0.5441)	(0.0220)	(0.1538)	(0.7087)	(0.5196)
Change in liabilities/assets	−0.4808	−1.2366	−0.7950	−1.6742	−1.7751	−0.2934	−1.5580
	(0.4185)	(0.1117)	(0.2827)	(0.0124)	(0.0053)	(0.7542)	(0.0415)
Weak firm	−0.1425	−0.3830	0.5845	1.8998	−0.5725	−1.6949	1.2747
	(0.9291)	(0.8473)	(0.7670)	(0.3477)	(0.7609)	(0.5616)	(0.5194)
Weak industry	0.2529	−0.2607	−1.6807	−0.8456	−0.6995	1.9875	−1.0962
	(0.7796)	(0.8048)	(0.0687)	(0.3297)	(0.4069)	(0.0781)	(0.1945)
Weak firm ∗ Industry med. margin	1.2099	−3.2511	−7.6715	−19.8598	5.5871	18.1887	−4.9926
	(0.9317)	(0.8472)	(0.6523)	(0.2560)	(0.7396)	(0.4355)	(0.7654)
Weak industry ∗ Adj. firm margin	4.7066	−1.9312	−5.7276	−2.2622	−1.9555	17.4944	−5.6065
	(0.2550)	(0.6698)	(0.2097)	(0.6574)	(0.7055)	(0.3108)	(0.1821)
Duration	−0.0007	0.0347	0.0259	−0.0211	−0.0099	−0.0582	0.0486
	(0.9763)	(0.2807)	(0.3882)	(0.3267)	(0.6171)	(0.0946)	(0.0396)
N	100	100	100	100	100	100	100
χ^2	17.8698	33.3821	38.9006	39.6988	21.3757	24.8602	33.9472
p-value	0.1626	0.0015	0.0002	0.0002	0.0658	0.0241	0.0012

regressions. Thus, conditional on a firm reorganizing, its future operating performance does not appear to be influenced by industry operating conditions. Rather, it is those firms whose operating performance relative to their industry was stronger prior to entering Chapter 11 and who succeeded in improving that performance while in Chapter 11 that are most likely to achieve future positive operating performance. However, the coefficient on the weak industry dummy variable indicates that those firms that are in the weakest industries, i.e., industries that experience a decline of greater than 40% in operating margin over the prior three years, are significantly less likely to experience a positive operating margin in two of the three post-bankruptcy years. Table 9 also indicates that the likelihood

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of achieving positive industry-adjusted operating performance is greater for firms that restructure financially and operationally while in Chapter 11. The coefficients on change in firm size and change in liability ratio are negative and significant in columns 4 and 5 of Table 9.

The dependent variable in column 6 takes on a value of one for a firm that undergoes a distressed restructuring, refiles Chapter 11, or is liquidated over the three post-emergence years. Thus, unlike the other measures presented in Table 9, this measure is better viewed as a negative outcome. The significant negative coefficients on change in industry-adjusted operating margin and duration indicate that firms that spend less time in Chapter 11 and that fail to improve their operating performance during that time are more likely to require further restructuring after emerging from Chapter 11. This evidence suggests that there is some benefit to allowing adequate time to restructure once the bankruptcy petition is filed. In addition, firms in weak industries are significantly more likely to encounter further financial distress in the future.

Finally, the combined measure employed in column 7 combines those in columns 1, 3, and 6 to produce a broader measure of post-reorganization survival and performance; i.e., combined takes on a value of one for a firm that survives through year $R + 3$, achieves a positive operating margin in at least two of those three years, and does not encounter further financial distress over that period. The results in Table 9 indicate that a reorganized firm is more likely to both survive and prosper following emergence from Chapter 11 the greater is its pre-filing operating performance, the greater the improvement in that performance while in Chapter 11, the more the firm succeeds in restructuring both its assets and its liability ratio, and the longer it spends in Chapter 11.

Taken together, the results in Sections IV and V suggest that when higher quality firms in higher margin industries undertake significant restructuring of their assets and liabilities while in Chapter 11, they are more likely to reorganize and emerge from Chapter 11 as independent public firms and to achieve post-reorganization profitability and avoid further financial distress. Thus, Chapter 11 does allow promising firms the opportunity to reorganize successfully.

VI. Conclusion

We track a sample of firms that file Chapter 11 from before they file through the Chapter 11 process and for three years following the resolution of their filings. Prior evidence on such firms focuses on the decision to file Chapter 11 or on the post-reorganization experiences of firms that emerge from Chapter 11 as independent operating entities. We focus instead on what happens during the Chapter 11 process and how it relates to Chapter 11 outcomes and to post-reorganization survival and operating performance. Specifically, we analyze how the duration and outcome of Chapter 11 filings are related to operating and financial characteristics of the filing firms and how the outcome is related to changes in those characteristics that occur while the firms are in Chapter 11. For those firms that reorganize and emerge from Chapter 11 as independent public firms, we analyze whether these same pre-filing characteristics and the changes in them predict survival and operating performance following reorganization.

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Our results shed further light on the role of Chapter 11 in facilitating the redeployment of assets and the reorganization of firms. We find that firms spend less time in Chapter 11 the smaller they are, the higher the median operating margins in their industries are, and the better their own operating margins are relative to those industry median margins. We also find that Chapter 11 firms significantly reduce their assets and liabilities while in Chapter 11. Such reductions increase the likelihood that a firm reorganizes and emerges as an independent firm and, conditional on reorganizing, reductions in assets and liabilities also increase the likelihood that a firm achieves a positive operating margin and a positive industry-adjusted operating margin during the three years following reorganization. Measures of the incidence of post-reorganization profitability are also greater for firms that have a higher pre-filing industry-adjusted operating margin and that experience greater improvements in that margin during Chapter 11. Finally, the incidence of future distress is significantly higher for firms that fail to achieve improvements in operating margin while in Chapter 11 and that emerge from Chapter 11 too quickly are more likely to encounter subsequent financial distress. Overall, these results reveal characteristics and actions that are associated with successful reorganizations. Furthermore, they suggest that Chapter 11 does allow promising firms to successfully reorganize.

References

Alderson, M., and B. Betker. "Assessing Postbankruptcy Performance: An Analysis of Reorganized Firms' Cash Flows." *Financial Management,* 28 (1999), 68–82.

Andrade, G., and S. N. Kaplan. "How Costly is Financial (Not Economic) Distress? Evidence from Highly Leveraged Transactions that Became Distressed." *Journal of Finance,* 53 (1998), 1443–1494.

Baird, D. G. "The Uneasy Case for Corporate Reorganizations." *Journal of Legal Studies,* 15 (1986), 127–147.

Bradley, M., and M. Rosenzweig. "In Defense of Abolishing Chapter 11." Working Paper, Duke University (1995).

Chatterjee, S.; U. S. Dhillon; and G. G. Ramirez. "Resolution of Financial Distress: Debt Restructurings Via Chapter 11, Prepackaged Bankruptcies, and Workouts." *Financial Management,* 25 (1996), 5–18.

Dahiya, S.; K. John; M. Puri; and G. Ramirez. "Debtor-in-Possession Financing and Bankruptcy Resolution: Empirical Evidence." *Journal of Financial Economics,* 69 (2003), 259–280.

Gilson, S. C. "Transactions Costs and Capital Structure Choice: Evidence from Financially Distressed Firms." *Journal of Finance,* 52 (1997), 161–196.

Hotchkiss, E. S. "Postbankruptcy Performance and Management Turnover." *Journal of Finance,* 50 (1995), 3–21.

Jensen, M. C. "Corporate Control and the Politics of Finance." *Journal of Applied Corporate Finance,* 4 (1991), 13–33.

Kahl, M. "Economic Distress, Financial Distress, and Dynamic Liquidation." *Journal of Finance,* 57 (2002), 135–168.

LoPucki, L. M., and W. C. Whitford. "Patterns in the Bankruptcy Reorganization of Large, Publicly Held Companies." *Cornell Law Review,* 78 (1993), 597–618.

Maksimovic, V., and G. Phillips. "Asset Efficiency and Reallocation Decisions of Bankrupt Firms." *Journal of Finance,* 53 (1998), 1495–1532.

Mooradian, R. M. "The Effect of Bankruptcy Protection on Investment: Chapter 11 as a Screening Device." *Journal of Finance,* 49 (1994), 1403–1430.

Weiss, L. A., and K. H. Wruck. "Information Problems, Conflicts of Interest and Asset Stripping: Chapter 11's Failure in the Case of Eastern Airlines." *Journal of Financial Economics,* 48 (1998), 55–97.

Wruck, K. H. "Financial Distress, Reorganization, and Organizational Efficiency." *Journal of Financial Economics,* 27 (1990), 419–446.

https://doi.org/10.1017/S0022109000002209 Published online by Cambridge University Press