Anatomy of Financial Distress: An Examination of Junk-Bond Issuers

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This paper analyzes the ways in which financially distressed firms try to avoid bankruptcy through public and private debt restructurings, asset sales, mergers, and capital expenditure reductions. Our main finding is that a firm's debt structure affects the way financially distressed firms restructure. The combination of secured private debt and numerous public debt issues seems to impede out-of-court restructurings and increases the probability of a Chapter 11 filing. In addition, we find that, while asset sales are a way of avoiding Chapter 11, they are limited by industry factors: firms in distressed and highly leveraged industries are less prone to sell assets.

When companies are in financial distress, they try to avoid bankruptcy by restructuring their assets and liabilities. Asset sales, mergers, capital expenditure reductions, and layoffs (on the asset side), and restructurings of bank debt and public debt (on the liability side) are all common responses to distress. Absent a quick turnaround in a company's business, a failure to restructure typically results in a Chapter 11 bankruptcy filing.

During the past several years there have been a number of studies that analyze these responses to financial distress. Notable contributions include Gilson [1990] on restructurings of bank claims; Gilson, John, and Lang [1990] on debt restructurings versus bankruptcy; Brown, James, and Mooradian [1993] on public debt restructurings versus bank debt restructurings; Brown, James, and Mooradian [1994] on asset sales; and Franks and Torous [1989] and Hotchkiss [1994] on the Chapter 11 process.

This paper tries to put these elements together in a more comprehensive study of how firms respond to financial distress.

This approach also allows us to look at interactions among different kinds of restructurings. Our study is based on a sample of 102 companies that issued high-yield "junk" bonds during the 1970s and 1980s and subsequently got into financial trouble. Of these 102 companies, 76 took visible steps to restructure their companies in response to distress. We have several principal findings.

1. *Bank debt restructurings.* Banks respond to financial distress in a number of ways. They "loosen" financial constraints on firms by deferring principal and interest, providing new financing, and waiving covenants; they "tighten" financial constraints by accelerating principal and interest payments, reducing lines of credit, and increasing collateral; they do both; and they do nothing. They almost never (there is one exception) loosen by forgiving principal on their loans. Banks are more prone to loosen when they have collateral, perhaps because they are well protected in bankruptcy. Loosening, however, does not reduce the probability of bankruptcy. Fifty-nine percent of the firms whose banks loosen still go bankrupt, compared with the 68 percent of the firms whose banks tighten. If banks loosen, however, distressed firms ultimately file for Chapter 11 after a longer restructuring period than firms whose banks tighten.

2. *Public debt restructurings.* Restructuring public debt through an exchange offer, in which companies exchange a package of securities and cash for their outstanding public debt, is an important means of avoiding bankruptcy. Indeed, in our sample of 76 restructuring companies, all of the companies that did not restructure their public debt, or did not sell off large portions of their assets went bankrupt. In theory, exchanges are made difficult by free-rider problems among public debt-holders. Small debt-holders have no incentive to tender in an exchange because they will have little effect on the outcome of the exchange and, by not tendering, they can avoid bearing any of the costs of debt relief.

3. *Asset sales.* Asset sales are also an important way of avoiding bankruptcy for the restructuring companies. In the sample of 76 restructuring companies, only 3 out of 18 companies that sell over 20 percent of their assets go bankrupt, while 39 out of the 58 companies that sell less than 20 percent of their assets go bankrupt. However, asset sales are limited by industry factors. Companies in poorly performing or highly leveraged industries are less likely to sell assets. This is consistent with Shleifer and Vishny's [1992] model in which distressed companies are reluctant

to sell assets because potential industry buyers are cash constrained and cannot pay full value for the assets.

4. *Debt structure.* The structure of a company's liabilities affects the likelihood that it goes bankrupt. In particular, companies with more secured private debt as well as companies with more complex public debt structures are more prone to seek bankruptcy protection. Interestingly, the collateral that protects banks in Chapter 11 seems to make them more accommodating early in the restructuring process, but more prone to force bankruptcy.

5. *Performance.* There is no evidence that better performing companies in our sample are more successful in dealing with financial distress. Once in distress, firms with higher operating income, lower book-to-market equity ratios, and higher cash flow coverage ratios are as likely to go bankrupt, sell assets, or cut capital expenditures as other firms.

6. *Capital expenditures.* There are large reductions in capital expenditures by firms in financial distress. Eighty-three percent of the firms reduce capital expenditures from the year before the onset of distress to the year after. Industry factors and company downsizing account for much, but not all, of the reduction.

One of our main conclusions from these findings is that there is an important link between the structure of a company's liabilities and the way in which financial distress is resolved. When there are many public creditors, each has an incentive to free ride and not offer debt relief. This, in turn, limits the extent to which banks are willing to make concessions. Public creditors are likely to receive some of the gains from a restructuring between the bank and the firm, and thus, banks will be reluctant to bear the full cost of such relief. These problems seem to be exacerbated by the presence of secured bank debt.

It is interesting, however, that even if a firm restructures its public debt, banks only make modest concessions. One explanation for this is that the banks, as senior and sometimes secured creditors, would be well protected in a bankruptcy and would have no incentive to offer relief. But, it could also be that banks are reluctant to offer much relief because the public debt restructurings are often limited in scope. While the exchanges might be successful, free-rider problems constrain the amount of relief that can be obtained.

The remainder of the paper is organized as follows. Section I describes our sample selection procedure and data sources, and provides summary statistics on our sample firms and on the actions

they take in response to financial distress. Sections II analyzes the sources of financial distress for the sample firms. Section III describes the debt structure of the sample firms. Sections IV and V analyze how firms restructure their liabilities and their assets. Section VI discusses the determinants of Chapter 11, and Section VII contains a brief conclusion.

I. SAMPLE SELECTION AND DATA DESCRIPTION

One of the difficulties with studying the effects of financial distress is that firms may simultaneously be in economic distress. In principle, this problem should be reduced by examining highly leveraged firms because such firms will trigger financial distress with only small declines in profitability.[1]

Our sample selection procedure was designed to identify highly leveraged firms that also had a significant amount of public debt. Thus, we examined all firms that issued high-yield bonds ("junk" bonds) over the period 1976–1989 and then (as was common) became financially distressed. One disadvantage of restricting attention to these firms is that our results may apply only to firms with this type of public debt. This caveat should be kept in mind throughout the paper.

Our definition of financial distress is based on interest coverage ratios. A firm is classified as financially distressed if in any two consecutive years—beginning in the year following its junk bond issue—the firm's earnings before interest, taxes, depreciation, and amortization (EBITDA) is less than its reported interest expense; or, if in any one year, EBITDA is less than 80 percent of its interest expense. The first year in which a firm meets the coverage shortfall criterion is denoted year 0. Year $-t$ $(+t)$ is t years before (after) year 0.[2]

We do not include a firm if it has an interest coverage ratio between 0.8 and 1.0 in only one year. Most of the firms satisfying this condition took no discernible actions in response to distress: they had sufficient liquid funds to meet that year's interest

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1. This point has been made by Jensen [1989]. We discuss it in more detail later.
2. We do not select distressed firms on the basis of stock market performance, because such a measure could, in theory, include some information about the ability of a firm to rebound from financial distress. For example, if the stock market perceives that a company will be able to resolve its financial difficulties at low cost, then the stock price reaction to distress may not be as negative as for companies where distress is perceived to be costly. Therefore, a sample based on poor stock market returns could be biased to firms with relatively costly financial distress.

TABLE I

SUMMARY STATISTICS FOR SAMPLE OF 102 FINANCIALLY DISTRESSED
JUNK-BOND ISSUERS

(All summary statistics are for year 0, the first year of the coverage shortfall.)

	Median	Mean	Standard deviation	Number of observations
Assets (in $ millions)	234.86	525.04	1057.60	102
Sales (in $ millions)	162.36	380.02	673.44	101
Market value equity (in $ millions)	42.55	86.80	152.28	99
Book value debt/assets	0.56	0.59	0.26	102
Book equity/market equity	0.90	0.32	3.40	94
Coverage	0.09	−0.30	1.25	102

Note. Coverage is defined as EBITDA (earnings before interest taxes, depreciation, and amortization) divided by interest expense.

payments. We are therefore restricting attention to firms with a serious or sustained bout of financial difficulty.

In addition, we eliminate firms that list a financial industry as their primary SIC code.[3] We also exclude firms with coverage shortfalls in the year of a junk-bond issue because in that year issuing fees may be included in interest expense and some of the proceeds may be used to pay interest. Finally, we require that firms have publicly traded equity in order to have access to full financial data. Thus, there are no firms in the sample that issued junk bonds as part of a leveraged buyout.[4]

The resulting sample consists of 102 firms. Table I provides summary statistics on the sample. The mean book value of assets in year 0, our first year of the coverage shortfall, is $525.0 million, and the median is $234.9 million. The average firm in our sample is somewhat larger than in Gilson, John, and Lang's [1990] study of debt restructurings and somewhat smaller than in Brown, James, and Mooradian's [1993] study. Leverage, measured by the ratio of the book value of debt to the book value of assets, is nearly 60 percent. This is roughly the same as in Gilson, John, and Lang [1990] and considerably less than in Brown, James, and Mooradian [1993]. Finally, the median coverage ratio in year 0 is 0.09, while the mean is −0.30. Thus, the median firm in our sample was not

3. This does not eliminate all firms with significant financial components; there are a few home builders in the sample that have finance subsidiaries.
4. For information on the incidence of financial distress among leveraged buyouts, see Kaplan and Stein [1993].

close to generating enough cash flow to meet interest payments in year 0.

For each firm in our sample, we collected financial accounting data from Compustat and from the company's 10-K filings with the Securities and Exchange Commission. Stock market return data come from the Center for Research in Security Prices (CRSP) at the University of Chicago. We also retrieved news accounts on the sample companies from the NEXIS database which includes *Wall Street Journal* abstracts, the *New York Times,* other newspapers, trade journals, business journals, and press releases. We obtain all of this information through 1990.

We collected data on operating performance, capital structure, asset sales, and financial restructurings. Our basic measure of operating performance is EBITDA, although we also collect data from Compustat and 10-K's on sales, book value of assets, cash holdings, book value of equity, and capital expenditures.

Industry performance controls, capital structure, and size comparisons are collected by first matching the sample firm's principal four-digit SIC code from Dun and Bradstreet's *Million Dollar Directory* with other public firms with the same principal SIC code for the same year.[5] Comparison data for these firms are then collected from Compustat.

Capital structure information on Compustat is insufficiently detailed for our analysis, so we collect this information from 10-K's. In particular, for private debt we collect information on the number of lines of credit, whether the debt is secured by the firm's assets, and whether the debt is bank debt. We collect similar information on the public issues, paying close attention to the number of different issues and the levels of subordination of the public debt. These aspects of debt structure are needed because they may affect the incentives and abilities of creditors to renegotiate their claims outside of bankruptcy.

The main source of information on asset sales is the notes to the 10-K's and the news accounts obtained from NEXIS. Although firms consistently report major asset sales, the level of detail they provide varies.[6] When available, we record the cash component of

TABLE II
SUMMARY DESCRIPTION OF RESTRUCTURING OUTCOMES FOR SAMPLE OF 76
FINANCIALLY DISTRESSED RESTRUCTURING JUNK-BOND ISSUERS

Panel A: means and frequencies of outcomes			
	Number	Observations	Mean
Bank loosening	29	76	0.38
Bank tightening	26	76	0.34
Public debt restructuring	35	76	0.46
Large asset sale	18	76	0.24
Capital expenditure reduction relative to industry	41	57	0.72
Chapter 11	42	76	0.55

Panel B: correlation matrix of outcomes					
	Bank loosening	Bank tightening	Public debt restructuring	Large asset sale	Capital expenditure reduction	Chapter 11 filing
Bank loosening	1.00					
Bank tightening	−0.16	1.00				
Public debt restructuring	0.03	−0.22	1.00			
Large asset sale	−0.10	0.05	0.30	1.00		
Capital expenditure reduction	0.15	0.18	−0.21	−0.01	1.00	
Chapter 11	−0.04	−0.01	−0.47	−0.45	0.28	1.00

the sale as well as the stated value of securities or other considerations.

Information about financial restructurings—including private debt restructurings, public debt exchange offers, and bankruptcies—are taken from the 10-K's and NEXIS. Of the 102 firms in our sample, 76 engage in some kind financial restructuring or asset sale, which are visible signs that they are truly in financial trouble and responding in some way. In some of the analysis we focus on this subsample of firms.

Panel A of Table II provides summary statistics on how the companies in our sample cope with financial distress. We divide the sample into six nonmutually exclusive categories: bank loosening, bank tightening, public debt restructuring, large asset sales, large capital expenditure reductions relative to the firm's industry, and

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collecting information on asset sales from 10-K's and from NEXIS, we checked 8-K's for our sample firms. We found no asset sale that we had missed with our original procedure.

Chapter 11 filings. One can see that each of these outcomes is quite common. Panel B of Table II presents a correlation matrix of these outcomes.

II. SOURCES OF FINANCIAL DISTRESS

Firms can become financially distressed for three distinct reasons: (1) high interest expense, (2) poor operating performance relative to other companies in the industry, and (3) an industry downturn. In this section we discuss the relative importance of these three factors in triggering financial difficulties.

Panel A of Table III indicates that the sample firms have approximately twice the interest expense/asset ratio of the median firm in their industry in year $t = 0$. This is not surprising since junk-bond issuers are often highly leveraged. In addition, the median firm in the sample barely has positive EBITDA in the first year of financial distress, and on average, the ratio of EBITDA to assets is 0.128 less than the industry median. In fact, only five firms outperform the industry median firm in year 0. Moreover, during the first year of financial distress, industry performance is substantially worse than in the previous year. On average, the EBITDA/assets ratio of the median firm in industry falls by -0.028. Thus, not only is the firm highly leveraged and performing poorly relative to its industry, but its industry is also performing poorly.

To assess the relative importance of leverage, firm operating performance, and industry operating performance in causing financial distress, we make the following calculations.

1. *Leverage effect.* The amount that cash flow (defined as EBITDA less interest expense) would improve in year 0 if the firm had the same ratio of interest expense to assets as the median firm in its industry.

2. *Firm operating performance effect.* The amount that cash flow would improve in year 0 if the firm did as well as the median firm in its industry.

3. *Industry operating performance effect.* The amount that cash flow would improve in year 0 if the firm had the same performance relative to its industry, but the industry did as well as it did in the previous year.

The sum of all of these cash flow changes would, by definition, take our sample firms' cash flows to those of the average firm in an

TABLE III
SOURCES OF COVERAGE SHORTFALL FOR SAMPLE OF 102 DISTRESSED
JUNK-BOND ISSUERS

Panel A: Sources of coverage shortfall in first year of financial distress ($t = 0$)			
	Mean	Median	Standard deviation
Interest expense/assets			
Sample firms	0.075	0.067	0.040
Industry median	0.039	0.036	0.019
Deviation from industry median	0.036	0.028	0.041
EBITDA/assets			
Sample firms	−0.031	0.005	0.143
Industry median	0.097	0.109	0.073
Deviation from industry mean	−0.128	−0.105	0.158
Industry median change in EBITDA/assets			
$t = -1$ to $t = 0$	−0.028	−0.017	0.045

Panel B: Normalized sources of coverage shortfall in first year of financial distress ($t = 0$)				
Factor	Mean	Median	Standard deviation	Number of firms with primary cause
Leverage	0.214	0.181	0.302	9
Firm operating performance	0.564	0.691	0.414	69
Industry operating performance	0.222	0.104	0.419	24

Note. The procedure for measuring the source of the coverage shortfall is described in Section II.

average industry. To calculate the portion of the cash shortfall caused by each factor, we divide the cash flow change attributable to each factor by the total cash flow change. That is, the portion of distress caused by leverage is calculated as (1) divided by the sum of (1) − (3), the portion caused by poor firm-specific operating performance is calculated as (2) divided by the sum of (1) − (3), and the portion caused by an industry downturn is calculated as (3) divided by the sum of (1) − (3).

Panel B of Table III shows that poor firm-specific performance is the most important factor in causing financial distress; it accounts for 56.4 percent of this cash flow shortfall. Poor industry performance accounts for 22.2 percent of the shortfall, and leverage accounts for 21.4 percent. Poor firm-specific performance is the primary cause of distress for 69 firms; poor industry performance is the primary causes for 24 firms; and leverage is the primary

TABLE IV
STRUCTURE OF DEBT OBLIGATIONS FOR SAMPLE OF 102 DISTRESSED
JUNK-BOND ISSUERS
(All debt summary statistics are for year −1, the fiscal year-end prior to a
company's first coverage shortfall.)

	Mean	Standard deviation	Number of companies
Public debt/total debt	0.515	0.262	100
Secured public debt/public debt	0.105	0.267	95
Number of public issues	2.45	2.267	100
Tiers	1.460	0.881	100
Private debt/total debt	0.485	0.262	100
Nonbank private debt/private debt	0.399	0.320	100
Bank debt/private debt	0.601	0.320	100
Secured private debt/private debt	0.555	0.370	98
Main facility/private debt	0.438	0.350	99

cause for 9 firms. These results are similar for the 76 firms that restructure.

The implication is that these junk-bond issuers suffer principally from *economic* distress, both at the firm level and at the industry level; high leverage explains less than a quarter of their cash-flow difficulties. Thus, there are relatively few firms that are in financial distress for solely financial reasons. Even our approach of examining highly leveraged firms generated a sample of firms with significant economic problems.

III. DEBT STRUCTURE

Table IV provides summary statistics on the debt structure of the sample companies in year −1. In almost all cases, companies have not yet begun any financial restructuring at this time. As the table indicates, total debt is divided about evenly between public and private sources: 51.5 percent is publicly held, while 48.5 percent is privately held by banks and other financial institutions.[7] The public debt is typically subordinate to the private debt.

Of the public debt, only a small percentage (10.5 percent) is secured. This number probably overstates the degree to which this debt is secured because, in some instances, the secured public debt

7. Thus, our sample contrasts with other samples of distressed firms in the importance of public debt in the capital structure. For example, in Gilson, John, and Lang's [1990] and Brown, James and Mooradian's [1993] samples, public debt comprises roughly 10 percent of the companies' debt.

has only a second or third lien on the firm's assets, behind that of private lenders.

On average, the sample companies have more than two public debt issues outstanding. Although these issues are subordinate to the senior private debt, they may have different rankings relative to each other. Most companies only have one tier of subordinated debt, but there are 37 companies with at least two tiers.[8]

Of the private debt, 60.1 percent is held by banks; the remainder is usually held by insurance companies and other nonbank financial institutions. In almost all cases, the company has a main credit facility with a bank from which it draws funds on a revolving basis. This facility typically comprises a large portion of the bank debt. In addition, 55.5 percent of the private debt is secured.

IV. DEBT RESTRUCTURINGS

When firms have insufficient cash flow to meet their debt payments, they typically try to restructure both their private and public debt. Private debt restructurings, however, take a very different form than public debt restructurings. We discuss each type in turn.

Private Debt Restructurings

Table V shows that, of the 76 companies in our sample that react to financial distress by restructuring their assets or liabilities, 60 (79 percent) restructure their private debt in some way. Private debt restructurings are triggered either by a covenant violation, an omitted debt payment, or the recognition that either will soon occur. There are 45 covenant violations in the sample and 21 instances in which the company fails to make a payment to a private creditor. For simplicity, we shall refer to these creditors as "banks" since on average, they hold more of the private debt than the other types of private creditors.

Usually, covenants are written so that if the borrower violates a covenant or misses a debt payment, the bank can call the loan.[9]

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8. We determine the number of tiers based on the priority suggested by the names of the securities, e.g., senior subordinated debt is considered to have higher priority than junior subordinated debt. It is possible that his method understates the number of tiers because two debentures with the same title may have unequal rankings.
9. There are some instances in which covenant violations trigger a contractual increase in the interest rate.

TABLE V
SUMMARY OF TYPES OF DEFAULT AND METHODS OF FINANCIAL RESTRUCTURING FOR
76 JUNK-BOND ISSUERS WHO DO SOME FORM OF RESTRUCTURING

Outcome	Number of firms	Fraction of 76 firms	Number later filing Ch. 11	Fraction later filing Ch. 11
Default:	60	0.79	36	0.61
Technical covenant violation	45	0.55	27	0.60
Miss principal or interest or both	40	0.53	25	0.63
Miss principal or interest on public debt only	19	0.25	12	0.63
Miss principal or interest on bank debt only	4	0.05	1	0.25
Miss principal or interest on both	17	0.36	12	0.71
Private debt restructuring:	59	0.78	33	0.56
Covenant waiver	37	0.49	20	0.54
Maturity extension	28	0.37	16	0.57
New loan from existing private creditor	7	0.09	4	0.57
Reduction in main credit facility	21	0.28	14	0.67
Increase in collateral	11	0.14	6	0.55
No private debt restructuring	17	0.22	9	0.53
Public debt restructuring:	34	0.45	10	0.29
Successful exchange offer	34	0.45	10	0.29
Failed exchange offer	13	0.17	12	0.92
Do not attempt exchange	31	0.41	22	0.71

Note. The Fraction later filing Ch. 11 column represents the fraction of firms that file for Chapter 11 that satisfy the criterion for inclusion in the row. It is the third column divided by the first column.

Banks often do not exercise this contractual right, choosing instead to restructure the debt. In every case in our sample in which a firm either violates a covenant or misses a debt payment there is some restructuring.

Although private debt restructurings can take many forms, one form that it rarely takes is forgiveness of principal. Zapata is the only such case in our sample. Zapata's main bank agreed to forgive principal on its $595 million unsecured note in exchange for a package of cash, debt, and equity. This forgiveness was part of a comprehensive restructuring that included an asset sale and a restructuring of the subordinated public debt. This is the sort of comprehensive restructuring commonly observed in a Chapter 11 bankruptcy reorganization.

It is clear why a bank who is typically senior and often secured would not unilaterally forgive principal. First, if the bank's claim

would not be impaired in bankruptcy, there is no incentive to forgive principal. Second, even if the bank's claim would be impaired in a bankruptcy, the bank could defer principal and interest payments instead of reducing the face value of the loan. This enables the company to stay in business, but does not compromise the bank's standing relative to other creditors. Thus, the lack of unilateral forgiveness is not, in itself, a puzzle.[10]

The more interesting question is why banks almost never forgive principal as part of a comprehensive debt restructuring that includes the subordinated public creditors. There are two possible answers. First, if the bank's claim would not be impaired in bankruptcy, it has no incentive to contribute to a comprehensive restructuring either in or out of Chapter 11. Second, even if the bank's claim would be impaired in a bankruptcy, bargaining difficulties within or across classes of creditors could prevent a comprehensive out-of-court restructuring.

James [1993] finds that banks are more likely to forgive principal and take equity when less of the debt is held by public creditors. Our result is consistent with this finding but more extreme: when firms have subordinated public debt, there is only one case when the bank takes equity and reduces principal.

Bank debt restructurings typically take one of two forms: banks "loosen the screws" by waiving covenants, delaying principal and interest, reducing the interest rate, or providing additional financing; or banks "tighten the screws" by reducing lines of credit or increasing their collateral. Often, banks simultaneously loosen the screws in one way and tighten them in another. For example, when Kenai violated a covenant in its bank loan agreement, the bank waived the covenant, but converted its unsecured line of credit into a secured line. Similarly, Digicon's bank waived the covenant violation, but forced them to pay down $7 million on their $60 million revolver.

As Section B of Table V indicates, in our sample, banks waive a covenant in 37 of the 45 technical covenant violations.[11] In many of these cases, the covenant is waived for a short period until the technical default can be cured or the debt can be restructured in

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10. Nevertheless, some have argued that one benefit of bank financing is that banks are in the best position to provide debt relief to financially distressed but economically viable firms. While such a bailout may not be in a bank's best interest ex post, if the bank develops a reputation for helping distressed firms, it will be compensated for this ex ante provided it is efficient ex ante.

11. See, Gilson [1990] and Beneish and Press [1992] who study the aftermath of technical covenant violations.

some other way. Of the eight cases in which the bank does not waive a covenant, in two cases principal payments are deferred without an explicit waiver, in five cases the line of credit is reduced, and in one other case the firm files for Chapter 11 reorganization.

In 28 cases, banks permit companies to delay debt payments by extending the maturity of the loan, often converting a revolving line of credit into a term loan. In 21 instances a bank with a revolving line of credit tightens the screws by either reducing the amount available on the line or forcing the firm to pay down outstanding balances. There are eleven cases in which a bank takes new collateral on an outstanding loan. In some of these cases the bank simultaneously increases its collateral and reduces its exposure, effectively tightening two screws. In other cases, the bank increases its collateral as compensation for allowing the company to delay its principal and interest payments, tightening one screw, but loosening another.

In addition to restructuring existing debt, banks sometimes, though not often, provide new financing. This happens in seven cases. The new money averages 20 percent of the original loan. In four of the cases the bank provides new financing in exchange for securing its previously unsecured loan. In these cases, even though no other bank may want to make a secured loan, the increased security offered on the existing bank's old debt could have made the transaction profitable by improving its relative standing in Chapter 11.

Overall, as Table VI shows, in 22 cases the bank only loosens, in 19 cases the bank only tightens, and in 7 cases the bank does both. There are 28 cases in which there is some type of restructuring but the bank does not participate.

In theory, the incentive to loosen or tighten the screws should depend on two factors: (1) the firm's economic viability, and (2) "debt overhang" problems that result from the difficulty of renegotiating with other creditors.

1. *Economic viability.* Banks may be more prone to loosen the screws on better firms. For example, extending the maturity of a loan (i.e., loosening) frees up capital for firms to invest, which is more valuable for better firms. Analogously, reducing a line of credit may eliminate wasteful capital expenditure by firms with limited investment opportunities.

2. *Debt overhang.* Bulow and Shoven [1978] and Gertner and Scharfstein [1991] show that unsecured banks will be less willing to extend the maturity on their existing loans, or to provide new

TABLE VI
PRIVATE DEBT RESTRUCTURINGS: COMPARISON OF PERFORMANCE, DEBT STRUCTURE,
AND OUTCOMES FOR THE RESTRUCTURING COMPANIES

| | Types of bank debt restructurings | | | |
	Loosen only	Tighten only	Loosen and tighten	Nothing
	mean median (std. dev.)	mean median (std. dev.)	mean median (std. dev.)	mean median (std. dev.)
EBITDA/assets at $t = 0$	−0.006 −0.104 (0.258)	−0.004 −0.060 (0.126)	0.015 0.008 (0.020)	−0.005 −0.002 (0.071)
EBITDA/assets − industry median	−0.105 −0.205 (0.281)	−0.157 −0.167 (0.119)	−0.122 −0.108 (0.061)	−0.083 −0.087 (0.092)
Book-to-market equity at $t = 0$	0.372 −1.79 (5.36)	0.567 −0.337 (3.71)	1.37 1.39 (1.32)	1.041 1.434 (1.72)
Book-to-market equity − median book-to-market equity at $t = 0$	−0.177 −2.61 (5.31)	−0.301 −1.27 (3.71)	0.685 0.574 (1.12)	0.076 0.418 (1.31)
Fraction of private debt secured at $t = -1$	0.805 0.696 (0.344)	0.464 0.460 (0.408)	0.774 0.563 (0.402)	0.757 0.624 (0.358)
Fraction of debt that is publicly held at $t = -1$	0.467 0.487 (0.186)	0.432 0.501 (0.251)	0.357 0.389 (0.227)	0.626 0.574 (0.259)
Successful exchange dummy	0 0.455 (0.510)	0 0.211 (0.419)	1 0.572 (0.535)	1 0.607 (0.497)
Chapter 11 dummy	1 0.591 (0.503)	1 0.684 (0.478)	0 0.429 (0.535)	0 0.464 (0.508)
Months from first restructuring act to Chapter 11 filing	15.6 21.1 (14.3)	9.07 15.70 (17.17)	6.84 22.3 (27.0)	14.4 17.8 (14.3)
Number of observations	22	18	8	28

Note. See subsection IV.A for definitions of "Loosen only," "Tighten only," "Loosen and Tighten," and "Nothing."

capital (i.e., loosen) when other debt-holders receive some of the benefits. This prediction is a variant of the "debt overhang" problem identified by Myers [1977]; it is difficult to raise capital when at least some of the proceeds go to pay off existing creditors. Empirically, we expect less loosening when there is more public debt outstanding, and in this case, subordinated public creditors get more of the gains from loosening.

If the bank debt is secured, the effects of a debt overhang are more difficult to predict. On the one hand, if the bank is very well secured, loosening the screws will have little or no effect on its claim in bankruptcy. However, it reduces the probability of bankruptcy and thus the costs of pursuing a claim. On the other hand, loosening the screws adds risk, and if the bank is only moderately well secured, this may benefit junior creditors and shareholders.

We examine these possibilities in Table VI which provides summary data categorized by which one of the four restructuring actions the bank takes: loosen, tighten, loosen *and* tighten, or do nothing. The first point to notice is that there appears to be no meaningful relationship between firm quality and whether the bank loosens or tightens. The means and medians of EBITDA/ assets are not statistically significantly different across the sub-samples. Moreover, there is no difference across subsamples in our crude measure of the firm's investment opportunities, the book-to-market equity ratio. A more standard measure would be the book value of assets divided by the market value of the firm, which is roughly the reciprocal of Tobin's q. We do not use this measure, however, because it is impossible to determine the market value of the firm. Much of the firm's debt, which is worth less than its face value, does not trade. Thus, we report the results for the book-to-market equity ratio, though it certainly has limitations.

Table VI indicates that when banks are secured they are more prone to loosen than to tighten. The difference in the medians of columns 1 and 2 is statistically significant at the 10 percent level (using the Wilcoxon rank sum test). This is consistent with the view discussed in (2) above that secured banks are well protected in bankruptcy and give the firm more breathing room early in the restructuring process.

It is interesting, however, that loosening does not help the firm avoid Chapter 11. When banks loosen, over 59 percent of the firms still file for Chapter 11. This is not much less than the 68 percent who file when the bank tightens. Loosening *does* seem to be associated with a longer time between the initial restructuring and

a Chapter 11 filing. The median time is 15.6 months when banks loosen and 9.1 months when banks tighten.

There is no evidence that banks are more willing to loosen when they hold a larger percentage of the debt outstanding. The means and medians are essentially the same across the sub-samples. However, it is interesting to note that banks are less prone to tighten if the firm completes an exchange. This is also evident in Table II which shows a negative correlation between bank loosening and exchanges. This may indicate that if the firm is able to get concessions from the public subordinated debt-holders, then the bank is willing to give the firm more breathing room.

In conclusion, banks are more prone to loosen the terms of their contract when they hold secured positions. While this loosening may delay the time at which the firm files for Chapter 11, it does not affect whether the firm eventually files. In fact, we shall see below that firms with more secured debt are *more* prone to go bankrupt.

Public Debt Restructurings via Exchange Offers

While bank debt is restructured through direct negotiation, public debt is restructured through an exchange offer. In an exchange offer the firm offers a package of cash and securities in exchange for some or all of its outstanding debt. The offer is usually contingent on the tender of a minimum fraction of the debt. Restructuring takes this form rather than direct renegotiation with large debt-holders or the trustee because the Trust Indenture Act of 1939 prohibits any voting mechanism (except unanimity) to alter the interest and principal payments of public debt. Thus, a firm cannot reduce the principal amount of public debt by, for example, a two-thirds vote of bondholders.[12] The only ways to restructure public debt are either through individual agreements with debt-holders or tender offers that exchange the old debt for new securities.

As Roe [1987] and Gertner and Scharfstein [1991] point out, however, there can be significant free-rider problems, associated with exchange offers. If debt-holders have small stakes, no *individual* debt-holder has an incentive to exchange his debenture for a more junior claim such as equity, or another debenture with lower

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12. They are able to change covenants, however, through such a voting mechanism. For a discussion about how this can be used as a part of an exchange offer, see Coffee and Klein [1991], Gertner and Scharfstein [1991], and Kahan and Tuckman [1993].

principal or deferred payments. As a small debt-holder, he has no effect on whether the exchange goes through. However, if the offer succeeds, others bear the cost, while he retains his full claim. If the exchange fails, his tender decision is irrelevant. So, in equilibrium, no one should tender.

Despite this holdout (or free-rider) problem, exchanges do occur: in the sample, 34 companies successfully completed exchanges, many for more than one debt issue and some at more than one time. There were a total of 93 successful exchange offers. These transactions are successful for two reasons. First, in some instances, debenture holders have large stakes and presumably take into account their effect on the outcome of the exchange offer. For example, First Executive Corporation held 82 percent of FPA's 12⅝ percent senior notes and 87 percent of its 14½ percent subordinated debentures. In reality, FPA's July 1990 exchange was more a negotiated private-debt restructuring than an arm's-length offer to repurchase debt.

Second, as pointed out in Gertner and Scharfstein [1991], exchange offers can be structured to reduce holdout problems by offering debt-holders more senior securities or cash. For example, one of the sample firms, United Merchants and Manufacturers, offered each holder of $1000 of its 15 percent subordinated debentures, $950 of 3 percent senior subordinated debentures, with a second lien on all assets of the company except accounts receivable. Consider the decision facing an individual debt-holder in this case. If everyone else tenders, he owns a junior claim that is potentially worthless in bankruptcy.[13] Thus, the prospect of being further subordinated in the debt structure may induce individual debt-holders to tender even if they are made no better off (and possibly worse off) as a group. Such potentially coercive exchanges are relatively common: of the 93 successful exchanges, at least 38 involved a more senior security as part of the exchange, and 9 additional exchanges involved only cash.[14]

Many successful exchanges may be the result of both direct negotiation and coercion. When large debt-holders negotiate directly with the firm, they may ensure that if everyone tenders, they will all be made better off. However, senior securities are also

13. Shortly after the exchange, United Merchants filed for bankruptcy. In the reorganization plan, holders of the old debentures were paid substantially less than debt-holders who tendered.
14. These numbers are roughly in line with Brown, James, and Mooradian [1993] who find that 43 percent of all exchanges are for more senior securities, while in our sample it is 41 percent (not including cash).

offered in the exchange to induce small, potentially uncooperative, debt-holders to tender. Thus, while there is a coercive element of the exchange, debt-holders who do exchange are not made worse off.[15]

As suggested by the negative correlation between exchanges and Chapter 11 shown in Table II, firms that complete an exchange are less likely to file for Chapter 11. Two more facts emphasize this point. First, of the thirteen companies that tried an exchange and failed, twelve later filed for bankruptcy protection. The only one that did not, Electro-Audio Dynamics, liquidated itself outside of Chapter 11 over several years.

Second, of the 34 companies that completed an exchange, just 9 went bankrupt. This is a much lower bankruptcy rate than that of the 42 companies that restructured without an exchange; of these firms 33 filed for Chapter 11.[16] The other 9 companies (out of the 42) that avoided Chapter 11, were either acquired (7 cases) or sold a large fraction of their assets (2 cases). Thus, all restructuring companies that either did not successfully exchange their public debt, or did not sell a large portion (or all) of the firm, filed for Chapter 11. These facts points to the necessity of public debt exchanges and asset sales for keeping these companies out of bankruptcy court.

Finally, for completed exchanges, there is an important difference between companies that avoid Chapter 11 and those that ultimately file. In the former case, most—fourteen out of twenty companies on which we have data—provide permanent financial relief by reducing principal and offering equity in the exchange. By contrast, of the ten exchanging companies that eventually go bankrupt, only three offer such relief.[17] Despite the importance of reducing principal in avoiding bankruptcy, holdout problems can make this difficult. As Gertner and Scharfstein [1991] show, the

15. Brown, James, and Mooradian [1993] present evidence that is consistent with this explanation. They find a positive share-price response to the announcement of senior exchanges and a negative response to the announcement of junior exchanges. Bond prices do not react much to the announcement. Thus, the evidence is not consistent with the strong coercion story in which bondholders are made worse off.

16. If we include companies that weather distress without any restructuring or major asset sales, the percentage of firms that do not attempt to do an exchange that go bankrupt is 55 percent, still larger than the 29 percent of firms that complete an exchange and go bankrupt. In addition, because we include as successful exchanges, any exchange in which the debtor accepts some securities, the category contains some exchanges that the debtor would label a failure.

17. Relief may come in other ways such as a reduction and deferral of interest payments, interest payments in common stock, elimination of restrictive covenants, or elimination of a sinking fund payment.

Chapter 11 process reduces holdout problems because creditors who do not vote for a restructuring plan can be compelled to accept the plan provided that enough creditors agree to the plan. Thus, one would expect that more debt relief can be offered in Chapter 11 because the firm does not have to use coercive debt exchanges. Indeed, Gilson [1993] finds that debt is reduced more in Chapter 11 reorganizations than in out-of-court public debt restructurings.[18]

Unfortunately, we are unable to identify why some firms are able to complete an exchange, while others are not. The principal determinant, according to the theory, is how widely held the debt is. However, this variable is not observable, and we are unable to examine this implication.

V. ASSET RESTRUCTURINGS

An alternative to a debt restructuring, the purpose of which is to reduce cash outflows, is an asset restructuring, the purpose of which is to increase cash inflows. Asset restructurings can take the form of an improvement in existing operations, a sale of assets, or a reduction in expenditures. In this section we focus on asset sales and capital expenditure reductions. We do not examine other operational changes because they are difficult to quantify.

Asset Sales

Asset sales are a common response to distress, but there are three potentially important barriers to their use: (1) conflicts between shareholders and creditors, (2) managerial self-interest, and (3) industry factors.

(1) *Conflicts between shareholders and creditors.* First, shareholders (and managers, if they are their agents) may be reluctant to sell assets even if doing so resolves cash-flow problems. It is well-known that the equity of a distressed firm is essentially an out-of-the-money call option on the firm's assets with debt as the strike price [Jensen and Meckling 1976]. As such, its value is increasing in the riskiness of the assets: shareholders bear little of the risk if the assets depreciate, but receive much of the gains if they appreciate. Thus, selling assets tends to reduce the value of equity if the proceeds are used to pay interest or repay debt. Indeed, Brown, James, and Mooradian [1994] find that when the proceeds

18. This result is also consistent with the fact that when debt is reduced outside of Chapter 11, firms incur a tax liability for the portion of the debt that is canceled. They do not incur this liability in Chapter 11.

of asset sales by financially distressed firms are used to repay debt, the firm's stock price falls. This is not the case when the proceeds are reinvested in the firm.

Second, as with debt renegotiation, secured creditors have conflicting incentives with regard to asset sales. If they are well secured, then they do not have a strong incentive to push for an asset sale since they will almost certainly be paid in full even in a bankruptcy. By contrast, if creditors are not well secured, they may favor an asset sale because if the asset appreciates, the secured creditor gets only part of the gain, but if it depreciates, he bears all of the cost. Senior unsecured creditors and junior creditors stand somewhere between the secured creditors and equity: they dislike asset sales if the proceeds go mainly to pay the more senior or secured debt, but they also benefit from the reduction in risk. It is important to think of asset sales, not as unilateral decisions by management, but as negotiated agreements among management, senior creditors, and junior creditors. Thus, these conflicts do not generate a set of clearly testable predictions about what types of firms should sell assets.[19]

(2) *Managerial concerns.* The concerns of managers may also limit asset sales. If Jensen [1986] is right and managers value running large organizations, they may be reluctant to sell assets. On the other hand, since in Chapter 11 both managerial turnover is high [Gilson 1989; Hotchkiss 1994] and compensation is reduced [Gilson and Vetsuypens 1993], managers may sell assets to avoid bankruptcy. The empirical implications of these explanations are also difficult to test.[20]

(3) *Industry factors.* Another limitation on asset sales has been suggested by Shleifer and Vishny [1992]. They point out that industry factors may limit the ability of companies to sell assets at a reasonable price, i.e., one close to the discounted value of its

19. Nevertheless, there is evidence of such conflicts when firms sell assets. Brown, James, and Mooradian [1993b] find that stock prices of deeply distressed companies fall at the announcement of an asset sale *when the proceeds are used to repay debt,* but do not fall when debt is not repaid. Moreover, in a small sample of 22 firms, bond prices rise at the announcement of asset sales used to repay debt, and this is particularly true when stock prices fall substantially at the announcement. Note that the returns to bondholders underestimate the extent to which creditors gain, since the principal beneficiaries of the asset sale are likely to be the senior private (nontraded) debt. Indeed, the fact that even the junior public debt-holders gain, suggests that creditors as a whole benefit substantially from asset sales at the expense of shareholders.

20. Brown, James, and Mooradian [1994] do, however, show that managers are less likely to lose their jobs if they sell assets and repay debt with the proceeds. Of course, debt repayment reduces the probability of bankruptcy, so this will tend to also lower the managerial turnover.

future cash flows. If a financially distressed company is in a financially distressed industry, other companies in the industry—most likely the highest value users of the assets—may not have enough cash to acquire the asset. And, given that debt overhang and asymmetric information problems are exacerbated during a downturn, it may be difficult for these potential buyers to finance acquisitions. Moreover, even distressed firms in profitable industries may find it difficult to sell assets if other firms in the industry are highly leveraged. This theory has clear empirical implications: we should see fewer asset sales by firms in distressed industries and in highly leveraged industries.

Measuring the extent of asset sales is made difficult by the variations in the way companies report them. Firms generally report major asset sales in the notes to their financial statements. Firms invariably report the cash component of the sale, but often give only sketchy details on other considerations, such as securities and the assumption of liabilities of the seller. In our measure, we include the *stated* value of the noncash portion of the deal when it is reported. An asset sale is usually the sale of a division of the company. Some asset sales take the form of piecemeal liquidation of capital or a shutdown of operations. Companies do not report the value of such liquidations when the net proceeds are small, so we exclude them. For those companies that go bankrupt, we only include asset sales that occur before Chapter 11.

Our measure of asset sales is the total (cash and noncash) proceeds of the sale divided by the book value of assets in year -1. Note that we normalize a market value by a book value. This has some obvious limitations. One alternative would be to use the book value of the assets sold, but we could not get such information. The other possibility would be to normalize by the market value of all assets, but it is virtually impossible to measure the market value of most debt for a distressed firm.

Overall, asset sales play an important role in restructurings. On average, companies sell 12 percent of their assets.[21] Twenty-one companies sell more than 20 percent of their assets, and the median level among these twenty-one firms is 48 percent. Although the use of proceeds from asset sales is difficult to track, much of the proceeds seem to be used to pay off senior private debt. For firms that sell at least 20 percent of their assets, the median firm

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21. This is imprecise terminology because we are measuring sale proceeds as a percentage of book value.

decreases its nonpublic debt from year -1 to year $+1$ by 61 percent; for firms that sell less than 20 percent of their assets, nonpublic debt increases by 35 percent. For public debt the median changes in nonpublic debt are -10 percent for large asset sellers and zero for small asset sellers.

Firms that sell a large portion of their assets are considerably less likely to go bankrupt: only 14 percent compared with 49 percent of the firms with small or no asset sales. This is also reflected in the strong negative correlation between asset sales and Chapter 11 reported in Panel B of Table II. In addition, firms that sell a large fraction of their assets are more likely to complete a successful exchange: 62 percent versus 28 percent for the remaining firms.

To examine the determinants of major asset sales, we estimate a probit model where the dependent variable is a dummy variable equal to one if the firm sells at least 20 percent of its assets. We include in the probit a set of debt structure variables, measures of the industry's performance and financial condition, and measures of the firm's performance and financial condition.

The results are reported in Table VII. Two implications stand out. First, the firm-specific performance variables seem to have no effect on asset sales: the coefficients of leverage, EBITDA/assets relative to industry, EBITDA relative to interest expense, and cash balances relative to interest expense are all statistically insignificant. This is true whether these variables enter together or separately. Thus, standard measures of distress do not predict which firms are more prone to sell assets.

Second, the debt structure variables also have a limited ability to explain asset sales. The coefficient of the fraction of private debt that is secured is statistically insignificant as is the coefficient of the fraction of all debt that is public. In light of the ambiguous implications of the theory, this may not be surprising. There is, however, a positive statistically significant relationship (at the 10 percent level) between the probability of an asset sale and the number of public debt issues outstanding. One interpretation of this result is that, when there are many issues outstanding, it is more difficult to restructure a firm's debt so that managers resort to asset sales. This is consistent with our finding, reported below, that firms are also more prone to file for Chapter 11 when there are many debt issues outstanding.

The coefficients of both industry variables are statistically significant and have the predicted sign, though the magnitudes are

TABLE VII
DETERMINANTS OF ASSET SALES AND MERGERS: PROBIT REGRESSIONS FOR A SAMPLE
OF 102 JUNK-BOND ISSUERS

Variable	Model 1: asset sales only coefficient (t-statistic)	Model 2: mergers only coefficient (t-statistic)	Model 3: merger or asset sales coefficient (t-statistic)	Mergers only mean of variable (std. dev.)
Debt/assets at $t = -1$	0.010 (−0.009)	−3.907 (−2.182)	−1.006 (−1.011)	0.51 (0.17)
(EBITDA/assets) − (industry median EBITDA/assets) at $t = 0$	−1.263 (−0.844)	−1.343 (−0.793)	−0.161 (−0.123)	−0.13 (0.16)
(Interest expense − EBITDA)/ interest expense at $t = 0$	−0.088 (−0.448)	−0.140 (−0.681)	−0.004 (−0.025)	1.31 (1.28)
Cash balances/interest at $t = 0$	0.0179 (0.164)	−0.499 (−1.537)	−0.095 (−0.852)	1.17 (1.52)
Fraction of bank and private debt secured at $t = -1$	−0.137 (−0.285)	−0.043 (−0.080)	−0.177 (−0.424)	0.54 (0.37)
No. of public debt issues outstanding at $t = -1$	0.140 (1.698)	0.180 (1.951)	0.131 (1.766)	2.50 (2.29)
Fraction of debt that is public at $t = -1$	−0.173 (−1.018)	−0.504 (−0.659)	−0.502 (−0.624)	0.52 (0.26)
Industry median (debt/assets)	−2.199 (−1.997)	−0.605 (−0.416)	−2.081 (−2.079)	0.35 (0.16)
Industry median (1/Tobin's q)	−0.679 (−2.181)	−0.249 (−0.714)	−0.551 (−2.032)	0.91 (0.61)
Constant	0.397 (0.472)	1.321 (1.236)	1.212 (1.483)	

The dependent variable in Model 1 is equal to one if the firm sells more than 20 percent of its assets and does not merge. The dependent variable in Model 2 is equal to one if the firm merges. The dependent variable in Model 3 is equal to one if either the firm sells more than 20 percent of its assets or it merges. The fraction of asset sales is the market value of assets sold divided by book value of assets at $t = -1$. t-statistics are in parentheses below the coefficient estimates. The final column reports the mean and standard deviations of the explanatory variables.

not particularly large. The estimates imply that a one-standard-deviation increase in industry leverage reduces the likelihood of large asset sales by 0.06 and a one-standard-deviation increase in the book-to-market equity ratio reduces the likelihood of large asset sales by 0.06. Thus, the results are consistent with Shleifer and Vishny [1992] who argue that the market for assets of

financially distressed firms may be illiquid because potential industry buyers (who value the assets most) may also be suffering from distress.

Mergers

Thirteen firms in our sample are taken over by other firms. In many respects, a merger is analogous to an asset sale of 100 percent of the company's assets. However, there are at least two differences. First, managers may have less incentive to merge than to sell a significant fraction of their assets because they are less likely to keep their jobs in a merger. Second, in a merger the acquirer almost always assumes the debt of the target and thereby reduces the default risk of the debt. A potential acquirer would like to avoid making this transfer to debt-holders. This can be done by making the merger conditional on a restructuring of the debt. However, public debt-holders have strong incentives to hold out in merger-related exchange offers. If they hold out and the acquisition goes through, their debt will be assumed by the acquirer and should be more valuable. This holdout problem makes it more difficult for the firm to restructure the public debt and then merge.[22]

The second column of Table VII reports estimates from a probit regression where the dependent variable takes the value one if the firm merges and zero otherwise. The coefficient of the number of public debt issues outstanding is positive and statistically significant. This result is consistent with our finding for asset sales, suggesting that if the public debt is difficult to restructure, firms need to sell assets or merge to avoid Chapter 11. It is not consistent with the view that mergers are more difficult to complete because public debt-holders get much of the gain from the acquisition. The only other statistically significant coefficient is the firm's leverage. This finding indicates that more leveraged firms are less likely to merge. This may be because shareholders of highly leveraged firms oppose such mergers; they receive little of the payment in the merger, while reducing their upside option value.

Finally, the third column reports estimates from a probit in which the dependent variable equals one if either the firm sells at least 20 percent of its assets or it merges. Not surprisingly, the only statistically significant coefficients are the same as the probits that focused only on asset sales.

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22. Clark and Ofek [1992] find that acquisition of distressed firms is more likely to be successful when creditors of the distressed firms restructure their debt.

TABLE VIII

CAPITAL EXPENDITURES: SUMMARY STATISTICS FOR A SAMPLE OF
102 JUNK-BOND ISSUERS

Panel A: Median capital expenditure growth					
From $t =$	To $t =$	Median growth rate	Fraction negative	Median industry-adjusted growth rate	Fraction negative
-1	0	-0.185	0.63	-0.082	0.64
0	1	-0.522	0.77	-0.196	0.74
-1	1	-0.658	0.83	-0.380	0.77

Panel B: Median capital expenditures/assets		
Year $t =$	Median capital expenditures/assets	Median industry-adjusted capital expenditures/assets
-1	0.072	0
0	0.050	0
1	0.025	-0.013

$t = 0$ is the first year of coverage shortfall. Capital expenditure growth rates are calculated as capital expenditures in the end year less capital expenditures in the start year divided by capital expenditures in the start year. Industry-adjusted growth rates are firm growth rates less median industry growth rates.

Capital Expenditures

Capital expenditure reductions are common when firms are in financial distress. This may be a firm's voluntary response to a lack of good investment opportunities. Alternatively, firms may be constrained from investing by cash shortages or by creditors. The efficiency consequences of such investment reductions are ambiguous, however. Shareholders and managers have incentives to keep investing even if it is inefficient since the risk associated with new investments increases the option value of equity. In this case, financial constraints eliminate wasteful investment. Alternatively, financial constraints may force firms to pass up positive net present value investments.

Table VIII provides data on capital expenditures. One striking fact is that capital expenditures drop dramatically when firms are distressed. Most of this impact does not appear until the year following the initial coverage shortfall. Panel A shows that the median decline in capital expenditures from the year before the initial coverage shortfall to the year after is 66 percent. Only 17 percent of the firms increase capital expenditures over this two-

year period. However, as discussed in Section II and shown in Table III, the firms in our sample are in troubled industries; part of the decline in capital expenditures may be attributable to industry-wide declines. Indeed, Table VIII shows that the industry-adjusted decline in capital expenditures is somewhat smaller. However, these declines are still very large.

Some of the decline in capital expenditures could also be attributable to the decline in the size of the company as firms sell assets. Therefore, we report in Panel B the ratio of capital expenditures to total assets. The median ratio falls from 0.072 in year −1 to 0.050 in year 0 to 0.025 in year +1, confirming that appropriately scaled capital expenditures also fall. However, after adjusting for industry, this effect is considerably smaller. The median difference between the sample firms and the industry is 0 in year −1 and year 0. In year +1, however, the difference is −0.013, and the sample firms invest 34 percent less than the median firm in the industry.

As mentioned, it is difficult to determine whether capital expenditures reductions during financial distress are efficient or inefficient. However, the effects of financial constraints on investment can be examined by looking at the relationship between debt structure and capital expenditures. For example, we argued that well-secured banks have incentives to loosen the terms of the debt contract, while undersecured banks have incentives to tighten the terms of the contract. Similarly, one could argue that a well-secured bank would allow higher capital expenditures, while an undersecured bank would force lower capital expenditures. An observed positive or negative relationship between capital expenditures and secured bank debt would suggest that financial constraints have real effects on investment.

Although we tried to explain the drop in capital expenditures in financial distress, after controlling for firm and industry performance, the debt structure variables had no explanatory power. To conserve space, we do not report the estimates.

VI. BANKRUPTCY

In our sample of 102 financially distressed firms, 42 file for bankruptcy, all under Chapter 11 of the U. S. bankruptcy code. The ostensible goal of Chapter 11 is to give firms the time to develop a consensual restructuring with creditors while preserving firm value. In Chapter 11 firms can continue operating with current

management; all debt payments are stayed; secured creditors cannot take possession of collateral; executory contracts can be rejected or assumed; and new borrowing usually has priority over all pre-bankruptcy claims. The debtor has the exclusive right to propose a reorganization plan for the first 120 days of the bankruptcy. The judge has the power, regularly used, to extend the exclusivity period. All operations of the firm are overseen by the court, and creditors are able to object to major business decisions. Creditors can try to force an end to exclusivity in order to propose their own reorganization plan, and secured creditors can attempt to lift the automatic stay in order to take possession of their collateral. Bankruptcy continues until a reorganization plan is approved or the company is liquidated.

Chapter 11 is thought to be costly because of administrative expenses (legal, consulting, accounting), the potential loss of valued customers and employees, the distraction of management, and the court's influence on operating decisions. Warner [1977], Altman [1984], and Weiss [1990] document the administrative costs of Chapter 11 bankruptcies. They estimate that these costs are significant but not large enough to explain the relatively low leverage of many companies. For example, Weiss [1990] finds that administrative costs average 3.1 percent of the book value of debt plus the market value of equity at the end of the year prior to bankruptcy. The other, more indirect costs of bankruptcy have not been measured.

If the costs of an out-of-court restructuring are low, one would expect firms to try to avoid the costs of a Chapter 11 filing by restructuring out of court. This idea, originally suggested by Haugen and Senbet [1978], is an application of the Coase Theorem. Absent bargaining costs, individuals can avoid costly legal rules by bargaining around them. In this view, Chapter 11 never occurs, but it affects bargaining outside of Chapter 11 because it determines what claimants would get if bargaining breaks down.

The high incidence of Chapter 11 filings suggests that there is more to the story. One possibility is that there are impediments to efficient bargaining outside of Chapter 11. Indeed, much of the theoretical literature on financial distress focuses on such bargaining impediments, particularly those caused by public debt and large numbers of debt-holders. Bulow and Shoven [1978] and White [1980] characterize the operating inefficiencies and bankruptcy outcomes that can result from the inability to renegotiate with large numbers of public debt-holders. Gertner and Scharfstein

[1991] extend this work by showing that operating inefficiencies and bankruptcy can persist even if firms can restructure public debt via exchange offers.[23] Indeed, Gilson, John, and Lang [1990] have shown empirically that financially distressed firms with more public debt relative to bank debt are more prone to file for Chapter 11 and less prone to restructure out of court.

Recently, Jensen [1989] has argued that, while there may be bargaining impediments, highly leveraged firms that are in financial distress should find it easier to restructure out of court. Since they are highly leveraged, they trigger financial distress even if operations have not deteriorated much. Because the firm is more valuable, claimants have more to gain by avoiding Chapter 11, and it aligns their interests.

Table IX investigates how leverage, firm performance, and debt structure affect the incidence of Chapter 11. The dependent variable in the probit regression reported there takes the value one if the firm files for Chapter 11 and zero otherwise.

The results in Table IX shed some doubt on Jensen's [1989] view that more highly leveraged and better performing firms should be more likely to restructure out of court. More highly leveraged distressed firms are not more likely to resolve their financial difficulties outside of Chapter 11. In addition, there is no strong evidence that operating performance—measured by the deviation of asset-normalized EBITDA from industry median EBITDA at $t = 0$—has a statistically significant impact on the likelihood of a Chapter 11 filing. The point estimates also suggest little economic significance. Evaluated at the means of all the variables, a one-standard-deviation increase in year-0 industry-adjusted EBITDA/assets decreases the probability of bankruptcy by less than 1 percent. None of the other measures of operating performance including book-to-market equity ratios, firm-specific EBITDA/assets, and leads and lags of EBITDA/assets are statistically significant.

The main set of results shows how debt structure—the fraction of debt that is public, the number of public debt issues, and the fraction of private debt that is secured—affects the probability of bankruptcy.

1. *Fraction of debt that is public.* We find, somewhat surprisingly, that the coefficient of the fraction of debt that is public is

23. More generally, Gertner [1990] shows how increasing the number of negotiating parties can increase bargaining inefficiencies.

TABLE IX
DETERMINANTS OF CHAPTER 11: PROBIT REGRESSIONS FOR A SAMPLE OF 102
JUNK-BOND ISSUERS WITH INTEREST COVERAGE LESS THAN 1.0 FOR TWO
CONSECUTIVE YEARS OR LESS THAN 0.8 FOR ONE YEAR

Variable	Model	Mean of variable (std. dev.)
(EBITDA/assets) − (industry median EBITDA/assets) at $t = 0$	0.528 (0.424)	−0.13 (0.16)
Cash balances/interest expense at $t = 0$	−0.295 (−2.107)	1.18 (1.50)
(Interest expense − EBITDA)/ interest expense at $t = 0$	0.059 (0.164)	1.29 (1.27)
(Debt/assets) − (industry median debt/assets) at $t = -1$	0.050 (0.062)	0.18 (0.19)
Fraction of debt that is public at $t = -1$	−0.119 (−0.210)	0.51 (0.26)
No. of public debt issues outstanding at $t = -1$	0.138 (1.894)	2.47 (2.28)
Fraction of bank and private debt secured at $t = -1$	0.741 (1.972)	0.55 (0.37)
Constant	−0.609 (−1.429)	
Dependent variable Chapter 11 dummy		0.42
Number of observations	96	
χ^2	15.68	

The dependent variable is a dummy variable equal to one if firm files Chapter 11. The probit contains all firms in the sample for which we have the necessary data. The last column reports the means and standard deviation of the variables. t-statistics are in parentheses below the coefficient estimates.

statistically insignificant. This seems at odds with the theoretical work on bankruptcy which predicts that public debt is a major impediment to out-of-court restructurings and with Gilson, John, and Lang's [1990] evidence that firms with more bank debt relative to public debt are less likely to go bankrupt.

The best way to explain the difference between the two results is to note that Gilson, John, and Lang's [1990] sample includes companies with no public debt, whereas all of the companies in our sample have a significant amount of public debt. It may be that the mere presence of public debt complicates the negotiation process

considerably, while variations in the fraction of public debt conditional on its presence has little effect. This interpretation is also consistent with the high bankruptcy rate in our sample.

2. *Number of public debt issues.* We include the number of public debt issues to proxy for the complexity of the public debt. Its coefficient is positive and statistically significant. A one-standard-deviation increase in the number of debt issues outstanding increases the probability of bankruptcy by 0.12. If there are more issues outstanding, more coordination is needed for a restructuring and the incentives for debt-holders to free ride on forgiveness of other creditors may increase. We interpret this result as being consistent with the view that cost of the bargaining process can get in the way of out-of-court restructurings. This result is also consistent with our earlier finding that asset sales and mergers are more likely when there are more public debt issues outstanding.[24]

3. *Secured debt.* Our final, and perhaps most important result, relates to the fraction of private debt (bank and nonbank) that is secured. The coefficient is positive and statistically significant. A one-standard-deviation increase in this variable increases the likelihood of bankruptcy by 0.12. A shift from none of the debt being secured to all of it being secured increases the estimated probability of bankruptcy by 0.34.

Since secured creditors are generally well protected in bankruptcy, they have strong incentives to trigger bankruptcy when they fear that their collateral is threatened or when they fear that cash will be distributed to less senior creditors.

If bargaining were costless, this would only be a threat and all claimants would restructure to avoid a costly Chapter 11 filing. The fact that bankruptcy occurs more often when more of the private debt is secured, suggests that there are impediments to costless bargaining. The finding that secured banks are more likely to trigger Chapter 11, however, is seemingly at odds with our earlier result that secured banks are more likely to loosen the terms of the debt contract. The difference, in our view, may be one of timing. Secured banks may be lax early in the restructuring process because their loans are more than fully collateralized. Loosening early costs the bank nothing, as long as its cushion is deep enough. But, if the value of its collateral falls near the level of the loan, it

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24. We have collected two other measures of debt structure complexity: the number of priority tiers in the public debt and a Herfindahl index to correct the number of public issues for variations in size. All three variables are very highly correlated and the results are not much different depending upon which one we use.

has stronger incentives and greater ability than unsecured creditors to force bankruptcy. An unsecured private creditor may be willing, at this point, to restructure in exchange for increased collateral.[25]

IX. DISCUSSION AND CONCLUSION

Our principal finding is that debt structure has real effects on the way financially distressed firms restructure. The combination of secured private debt and numerous subordinated public debt issues seems to be a particularly strong impediment to out-of-court restructurings. We also find that large asset sales, including merger, are often a means to avoiding Chapter 11, but they are limited by industry factors: firms in distressed and highly leveraged industries are less able to sell assets.

These results have implications for capital structure decisions. While the static trade-off theory of capital structure—in which firms balance the tax advantage of debt and the costs of financial distress—focuses on the *level* of debt as the key variable that effects the costs of financial distress, our analysis also points to the *composition* of debt as an important determinant of the outcome of financial distress. Thus, debt structure is also a potentially important element of the capital structure decision.

Although some debt structures are more prone to trigger a Chapter 11 filing, and thus to be inefficient ex post, these may have ex ante benefits such as disciplining managers and signaling information [Bolton and Scharfstein 1993; Diamond 1993]. Thus, debt structure may be chosen to balance ex ante benefits and ex post inefficiencies. Whether these issues drive debt structure decisions is very much an open question and one that is ripe for further analysis.

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25. One difficulty with this interpretation, however, is that it is possible that there is an exogenous factor which determines both bankruptcy and capital structure choices. In particular, it is possible that firms with more liquid assets have more secured debt because it is easier to foreclose and resell the assets. It is also possible that creditors are more likely to force a firm with a high liquidation value into bankruptcy since bankruptcy costs may be lower. If this is the case, there may be no causal link between secured debt and bankruptcy.

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