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Transactions Costs and Capital Structure Choice: Evidence from Financially Distressed Firms

STUART C. GILSON*

ABSTRACT

This study provides evidence that transactions costs discourage debt reductions by financially distressed firms when they restructure their debt out of court. As a result, these firms remain highly leveraged and one-in-three subsequently experience financial distress. Transactions costs are significantly smaller, hence leverage falls by more and there is less recurrence of financial distress, when firms recontract in Chapter 11. Chapter 11 therefore gives financially distressed firms more flexibility to choose optimal capital structures.

THIS STUDY INVESTIGATES the impact of transactions costs on leverage choices by financially distressed firms. The "transaction" that I examine is the reduction in corporate debt pursuant to a Chapter 11 bankruptcy reorganization or out of court restructuring. Analysis of sample firms shows that transactions costs are much higher when debt is restructured out of court. When firms recontract this way, financial distress can be chronic: less debt is extinguished, leverage remains higher, and relatively more firms have to go back to their creditors to restructure their debt again in the future. Transactions costs are much smaller, hence debt falls significantly more, when firms recontract in Chapter 11. Chapter 11 therefore gives financially distressed firms more flexibility to choose optimal capital structures.

Transactions costs are central in the ongoing academic debate about whether firms have optimal leverage ratios. Those who believe in target

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capital structures cite transactions costs as the reason why firms do not instantaneously adjust their leverage ratios in response to changes in their target ratios. However, research is mixed on whether transactions costs are large enough to plausibly explain leverage choices by most firms (Myers (1984), Shyam-Sunder and Myers (1995)).

Transactions costs are potentially very important to financially distressed firms. The debt adjustments contemplated by these firms are quite large, and financial distress may have pushed them far away from their optimal capital structures. To get their debt levels down, financially distressed firms must either persuade creditors to write down their claims, or retire the debt by selling assets and/or new securities. However, for a number of reasons these options may be quite costly: firms cannot unilaterally force a financial settlement on all creditors, giving individual creditors an incentive to hold out; various regulations discourage institutional lenders from writing down their principal or exchanging debt for equity; income from debt forgiveness is taxed; managers have much better information than outsiders about the firm's business prospects; and financially distressed firms may be forced to sell assets at fire-sale prices (or be unable to find buyers at any price, e.g., because their whole industry is distressed). Roe (1983) and Bebchuk (1988) argue that barriers to reducing debt in a reorganization are so strong that Chapter 11 should be replaced with an alternative system that either requires or encourages firms to adopt equity-heavy capital structures.

My empirical analysis consists of three parts. First, I show that leverage remains high after both out of court restructuring and Chapter 11 reorganization, although it remains much higher after out of court restructuring. The median ratio of long-term debt (face value) to the sum of long-term debt and common shareholders' equity (market value) is 0.64 for firms that restructure their debt out of court, and 0.47 for firms that reorganize in Chapter 11. In general, sample firms end up more highly leveraged than they were before becoming financially distressed, and the increase in leverage appears to be permanent. Four out of five sample firms end up with leverage ratios that are abnormally high for their industries, and a strikingly high percentage of firms—almost 25 percent—have to file for bankruptcy or restructure their debt a second time.

I next investigate why sample firms remain highly leveraged. In cross-sectional regressions, I relate postreorganization leverage ratios to prereorganization leverage ratios (i.e., the leverage ratios firms had at the start of their bankruptcy or restructuring), and variables found to affect leverage in previous capital structure studies. This analysis shows that pre- and postreorganization leverage ratios are significantly positively related for the subsample of firms that restructure out of court. In other words, leverage is "sticky" for this group, consistent with transactions costs discouraging firms from reducing their debt. In contrast, prereorganization leverage ratios do not explain leverage choices of firms that reorganize in Chapter 11. (Leverage ratios in the

Chapter 11 subsample are, however, significantly negatively related to firms' net operating loss carryforwards). Transactions costs therefore do not appear to be a major deterrent to reducing debt in Chapter 11. Leverage of Chapter 11 firms still remains high, however, which suggests that firms' optimal target leverage ratios also increased during the recontracting period. One plausible explanation for this increase is that reorganized firms benefit from the added discipline and control that high leverage forces on management, consistent with the theoretical models of Grossman and Hart (1982), Jensen (1986), and Stulz (1990).

Finally, I directly relate debt reductions by sample firms to empirical proxies for transactions costs in cross-sectional regressions. Consistent with the previous result, I find that the transactions cost variables are significantly related to debt reductions only for the group of firms that restructure their debt out of court. There are five reasons why transactions costs are less important in Chapter 11 reorganizations than out of court restructurings:

- (1) Creditors have less power to block a bankruptcy reorganization plan because Chapter 11 allows a plan to be passed with a smaller majority of creditors, and the bankruptcy judge can refuse to confirm a plan that produces an overly-leveraged capital structure;
- (2) Institutional lenders have less discretion to time loan writedowns when a firm files for Chapter 11;
- (3) The tax penalty for reducing debt is less severe in Chapter 11;
- (4) Mandated disclosure and the right of discovery in Chapter 11 reduce the gap between what managers and outsiders know about the firm's business prospects; and
- (5) Chapter 11 facilitates asset sales by reducing the risks of buyers and encouraging multiple bids.

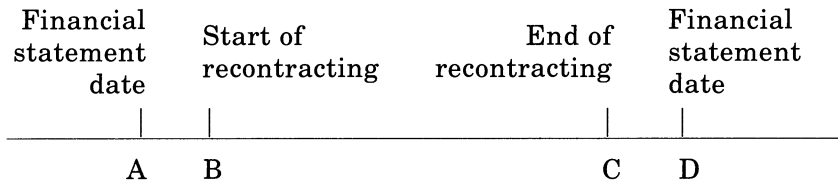
Overall, these results contribute to a growing body of evidence that the impact of financial distress on firm value and resource allocation can be radically different, depending on whether a firm recontracts with its creditors in Chapter 11 or out of court (Gilson, John, and Lang (1990), Gertner and Scharfstein (1991), Franks and Torous (1994)). More generally, these results add to a growing body of evidence that transactions costs—broadly defined—can be a major impediment to voluntary corporate restructuring. Recent research finds that various corporate policies, including dividend payouts (DeAngelo and DeAngelo (1990)) and investment in fixed production capacity (Jensen (1993)), can be extremely difficult to reverse when firms become financially troubled.

The article is organized as follows. Section I describes the sample. Section II develops an empirical model for analyzing leverage adjustments by financially distressed firms. Section III presents the results. Section IV discusses the research and policy implications of the findings.

I. Description of the Sample

A. Sample Design

The study analyzes 108 publicly-traded firms that recontracted with their creditors during 1980–1989, either by reorganizing under Chapter 11 of the U.S. Bankruptcy Code (51 firms), or by restructuring their debt out of court (57 firms). Following Gilson (1990), I define an out of court restructuring as an exchange of financial claims that a firm makes to avoid defaulting on its debt or filing for bankruptcy (this includes implicit exchanges, such as when creditors agree to extend the maturity of debt). For each firm, I obtain capital structure data from its annual financial statements (included in form 10-K or the annual report to shareholders) dated just before and just after the recontracting period. This dating convention is shown by the following schematic:



Characteristics of individual debt contracts are identified from the notes to the financial statements. For the purposes of the study, these data are the most detailed and timely available.¹ Additional information is obtained from the *Wall Street Journal* and Investment Dealer's Digest's (IDD) *Directory of Corporate Financing*.

The initial sample includes 425 financially distressed firms that were identified from Altman (1986), Altman and Nammacher (1987), Gilson *et al.* (1990), Hamer (1985), COMPUSTAT, the *Wall Street Journal*, and lists of junk bond exchange offers compiled by Salomon Brothers and Drexel Burnham Lambert. To ensure the data are timely, 290 firms that did not issue financial statements within one year of the recontracting period are eliminated. (In the final sample, the median lead (A–B) and lag (C–D) time is six and five months, respectively.) I eliminate an additional 19 firms that were liquidated or acquired, and 5 that acquired other firms during the recontracting period. Finally, three bank holding companies are eliminated (since banks cannot file for Chapter 11).

For bankruptcy, the recontracting period begins with the firm's Chapter 11 filing and ends when its reorganization plan becomes effective. For restructuring, the recontracting period begins with the first public reference to re-

¹ In Chapter 11, terms of the firm's reorganization plan are also described in the disclosure statement filed with the court and distributed to claimholders before they vote on the plan. However, this document reports information at an aggregated level—by “classes” of claims rather than individual claims—and lacks sufficient detail. Disclosure statements for less recent bankruptcies can only be obtained by visiting the federal courthouses where the documents are archived. Out of court restructuring plans are mostly unavailable or undocumented.

structuring, and ends when the firm announces a definitive agreement with its creditors, or physically distributes new claims under its restructuring plan. The median bankruptcy in the sample lasts for 23 months, and the median restructuring lasts for 14 months. Firms may be involved in more than one bankruptcy or restructuring over time; these are treated as independent events if they are more than one year apart.

B. Leverage

I analyze two leverage ratios in this study. The first is the ratio of long-term debt to the sum of long-term debt and the book value of shareholders' equity (long-term debt \div book value of assets).² The second is the ratio of long-term debt to the sum of long-term debt and the market value of common stock (long-term debt \div market value of assets). Related studies analyze similar measures of leverage (e.g., Bradley, Jarrell, and Kim (1984), Titman and Wessels (1988), Opler and Titman (1994a)). Each ratio contains measurement error, in the sense that management may refer to some other ratio or variable when setting the firm's debt level. Survey evidence suggests that some managers consider leverage ratios based on book values of debt and equity when setting their firms' debt, while others look at leverage ratios based on market values (Titman and Wessels (1988)). However, there is no reason to expect either of the two leverage ratios used to be a biased estimate of the "true" leverage ratio.

Analysis of sample firms yields two important stylized facts about capital structures. The first is that leverage ratios of financially distressed firms, *in general*, remain high even after these firms recontract with their creditors. The ratios in Table I, Panel A, fall well above the range of 0.25–0.35 considered "typical" for nonfinancial U.S. corporations (Masulis (1988), Houston and James (1996)). Panel A shows that the large majority of sample firms also end up more highly leveraged than the median firm in their primary industry (by sales).³ The largest such majority is for firms that restructure out of court; 86 percent of these firms end up with a value of (long-term debt \div market value of assets) that exceeds the industry median, compared to 65.5 percent of firms

² Because shareholders' equity can be negative, this ratio is unbounded. In the subsequent analysis, I exclude three firms for which this ratio is negative, because the ratio *decreases* in the amount of debt when the denominator is negative. Also excluded are four extreme outliers that exceed 3 (the highest is 530); alternative cutoffs of 2 and 1 yield two and 22 additional outliers, respectively. Later in the article I discuss how these outliers affect the results.

³ Firms are assigned to industries (2-digit SIC codes) based on industry segment information reported in my source documents. Based on this classification, 32 percent of sample firms changed industries over the recontracting period (most of these changes were not picked up by COMPUS-TAT). Some of these changes were dramatic. For example, Baldwin-United entered Chapter 11 in 1983 as a \$9.4 billion (assets) diversified financial services holding company; upon leaving three years later, the firm had assets of only \$0.5 billion, and was engaged in the trading stamps, motivational services, and travel services businesses. Gateway Sporting Goods, which originally manufactured apparel and office furnishings, emerged from Chapter 11 with no operating subsidiaries or operating income, and therefore could not be assigned to an industry.

Table I
Description of Sample Firms

Sample consists of 108 financially distressed public firms that recontracted with their creditors during 1979–1989, either by reorganizing under Chapter 11 of the U.S. Bankruptcy Code (51 firms) or by restructuring their debt out of court (57). Financial data for each firm are based on the 10-K reports filed just before and just after each firm's bankruptcy or restructuring. Additional data sources include *Moody's* and COMPUSTAT. *Long-term debt* equals the book value of the firm's contractual interest-bearing debt, including debt payable within one year. *Book value of assets* equals the sum of *long-term debt* and the book value of shareholders' equity. *Market value of assets* is defined the same way, except the book value of shareholders' equity is replaced by the market value of common stock. *Institutional debt* consists of debt owed to banks and insurance companies. The *industry median market-to-book ratio* is calculated for all firms on COMPUSTAT that have the same two-digit Standard Industrial Classification (SIC) code as that assigned to each sample firm (based on its largest business segment by sales) at the start of the recontracting period. *Liquidation costs* equal going concern value minus liquidation value, as reported in the firm's bankruptcy disclosure statement.

	Panel A: Leverage Ratios			
	Chapter 11		Out of Court Restructuring	
	Long-Term Debt ÷ Book Value of Assets	Long-Term Debt ÷ Market Value of Assets	Long-Term Debt ÷ Book Value of Assets	Long-Term Debt ÷ Market Value of Assets
Median (mean) ratio before recontracting	0.84 (0.89)	0.74 (0.69)	0.75 (0.79)	0.70 (0.66)
Median (mean) ratio after recontracting	0.59 (0.57)	0.47 (0.40)	0.73 (0.77)	0.64 (0.58)
Percentage of sample firms for which leverage ratio after recontracting exceeds industry median	70.0	65.5	86.7	86.0

coming out of Chapter 11.⁴ Restructured and reorganized firms also generally end up with substantially higher leverage ratios than they had historically (i.e., five years before the start of recontracting).⁵ Finally, high leverage after recontracting appears to be permanent. During the following three-year period, mean and median leverage ratios of sample firms are statistically unchanged, and only three firms issue new equity for the stated purpose of paying down their debt. One by-product of high leverage is a high rate of “recidivism”

⁴ Using a different sample, industry classification, and definition of leverage than this study, LoPucki and Whitford (1993) find that 76 percent of bankrupt firms emerge from Chapter 11 with debt-equity ratios that exceed industry averages.

⁵ I go back five years because leverage ratios will mechanically increase over time as the firm's profitability deteriorates, holding the face value of debt fixed. (Aharony, Jones, and Swary (1980) show that common stock prices start to decline in anticipation of bankruptcy at least four years before firms file, on average.) At this earlier date, the sample median value of (long-term debt ÷ market value of assets) is 0.46 (roughly the same median values are obtained for the Chapter 11 and out of court restructuring subsamples). Also at this earlier date, a smaller percentage of firms (65 percent) have above-industry leverage ratios than is the case after they recontract.

Table I—Continued

Panel B: Firm Characteristics			
	Median (Mean)		p-Value of Wilcoxon Rank-Sum Test (<i>t</i> -Test) for Difference in Medians (Means)
	Chapter 11	Out of Court Restructuring	
Number of long-term debt contracts (before recontracting)	6.0 (7.5)	6.5 (8.8)	0.53 (0.29)
Institutional debt (as % of long-term debt before recontracting)	47.5 (45.6)	44.1 (50.1)	0.31 (0.46)
Industry median market-to-book ratio (for common stock, after recontracting)	1.24 (1.39)	1.33 (1.37)	0.87 (0.78)
Asset sales (% decline in total assets over recontracting period)	68.2 (62.5)	37.6 (34.7)	0.00 (0.00)
Net operating loss (NOL) carryforwards (as % of total assets after recontracting)	243.4 (2,538.7)	49.2 (109.2)	0.00 (0.12)
Liquidation costs (as % of going concern value)	45.3 (44.4)	—	—
Total assets (after recontracting, in \$millions)	15.2 (116.6)	52.6 (439.7)	0.00 (0.05)
Earnings before interest and taxes as % of total assets (average for first 3 years after recontracting)	3.4 (-2.2)	0.4 (-2.6)	0.21 (0.93)

in the sample: more than 25 percent of all firms (28) have to file for bankruptcy or restructure their debt a second time.⁶

The second stylized fact one takes from Table I is that leverage ratios fall substantially more when firms recontract in Chapter 11. Panel A of Table I shows that at the start of recontracting, the median value of (long-term debt ÷ market value of assets) is roughly the same for firms that file for Chapter 11 (0.74) and firms that restructure out of court (0.70). At the end of recontracting, this ratio is still 0.64 for firms that restructure out of court, but only 0.47 for firms that come out of Chapter 11. This difference is significantly different from zero under a Wilcoxon rank-sum test, and similar results hold for the other ratios. The recidivism rate is also much higher for firms that restructure

⁶ To determine whether sample firms recontracted more than once, all public references to each firm through year-end 1992 are consulted. Six sample observations represent second-time bankruptcies or restructurings; the remaining 22 second-time events are not included in the sample due to missing data or because they were still in progress at the end of 1992. The median time between repeat recontracting periods is approximately two years. High recidivism rates for firms in Chapter 11 have also been reported by Altman (1993), LoPucki and Whitford (1993), and Hotchkiss (1995).

out of court (35 percent) than for firms that reorganize in Chapter 11 (16 percent).

These findings are robust to various data checks. Leverage ratios are essentially unchanged when I treat convertible and nonamortizing debt, original issue discounts, and debt with built-in repayment flexibility (like the option to defer interest) as straight equity.⁷ Leverage measured by the interest coverage ratio is also high, and exhibits the same patterns as the ratios in Table I.⁸ Finally, leverage ratios are not systematically related to the length of the reporting lag (A–B or C–D in the above schematic).

To summarize, leverage ratios in the sample are “sticky”: once firms encounter financial distress and become highly leveraged, they typically stay highly leveraged even after they negotiate new payment terms with their creditors. Leverage ratios are most sticky when debt is restructured out of court; they are least sticky when debt is restructured in Chapter 11. I next investigate possible explanations for these results, and discuss the implications for corporate debt policy.

II. Empirical Model of Leverage Adjustments

By definition, sample firms initially had too much debt. Why, since they had the opportunity to negotiate brand new capital structures, did they not reduce their debt more aggressively? Two things are possible: either (1) firms realized greater benefits from debt, so their optimal target leverage ratios increased, or (2) high transactions costs made it disadvantageous for firms to reduce their debt. These two hypotheses are not mutually exclusive; transactions costs and increases in optimal leverage could jointly explain the leverage ratio patterns in Table I. Both (1) and (2) imply that the market value of firms’ assets is maximized by keeping leverage high.

A number of empirical studies conclude that transactions costs affect corporate leverage choices (Jalilvand and Harris (1984), Auerbach (1985), Fischer, Heinkel, and Zechner (1989), Shyam-Sunder and Myers (1995), Opler and Titman (1994a)). Almost all of these studies assume that transactions costs are responsible for any lag in the adjustment of actual leverage ratios to “optimal” leverage ratios (as estimated by the studies’ authors). However, with the exception of Fischer *et al.* (1989), these studies do not specify precisely what factors give rise to transactions costs, or directly test for an association between transactions costs and debt adjustments. In this study I directly relate debt adjustments by financially distressed firms to empirical proxies for transactions costs.

⁷ At the end of the recontracting period, only 12 percent of sample firms have convertible debt, and only 17 percent have any bonds that were issued at a discount to face value (the median discount is 10 percent).

⁸ After recontracting, 67 percent of sample firms have a coverage ratio less than one, 51 percent have a negative coverage ratio, and 93 percent have a lower coverage ratio than the median firm in their primary industry. A large majority of firms continue to have low coverage ratios for the next three years.

Firms that are highly leveraged because of financial distress face a number of costly obstacles to reducing their debt. These obstacles include the creditor holdout problem, institutional lenders' preference for debt, the adverse tax consequences of debt cancellation, and managers' information advantage over outsiders. In addition, the option of paying down debt through asset sales can be costly because pressure from creditors and/or a lack of potential buyers results in assets being sold at fire-sale prices. In the rest of this section I discuss how these factors affect leverage choices by financially distressed firms, and develop an empirical model of leverage adjustments.

A. Obstacles to Reducing Leverage

A.1. The Creditor Holdout Problem

One obstacle to reducing debt during financial distress is the difficulty of binding all creditors to participate in a restructuring plan. Individually, each creditor has an incentive not to forgive principal or exchange debt for stock if he or she believes enough other creditors will make the concessions needed to return the firm to solvency. Firms that face a greater number of creditor holdouts will have more difficulty reducing their debt; in the extreme, they may fail altogether at restructuring their debt and have to liquidate (Roe (1987), Gertner and Scharfstein (1991)).

An individual creditor's incentive to hold out will be stronger when he or she holds a smaller claim, because the firm's future financial health is less likely to depend on whether he or she grants the firm concessions.⁹ I measure the "smallness" of creditors' claims by the number of long-term debt contracts divided by the total face value of long-term debt (producing an inverse measure of average contract size). Higher values of this variable should be associated with smaller debt reductions. As shown in Panel B of Table I, the median number of contracts outstanding before recontracting was 6 for Chapter 11 and 6.5 for out of court restructuring. (In the regressions reported below, I enter the natural logarithm of this variable, assuming that an increase in the number of creditors from, e.g., 1 to 2, will have a bigger marginal impact on creditors' collective incentive to hold out than an increase from 20 to 21.)

The holdout problem should also be more serious for firms that have more publicly traded debt, because such debt tends to be more widely held (compared to institutional debt, for example). Based on this reasoning, James (1996) argues that institutional lenders, as senior claimholders, will be less willing to make concessions in an out of court restructuring when the firm has more publicly traded debt. However, relatively few firms in the sample—only 17 percent—have any public debt (the median firm has none). Possibly as a

⁹ For example, when Allis-Chalmers Corp. appeared to be making slow progress in restructuring its debt in early 1985, the *Wall Street Journal* reported that "so far, Allis's creditors haven't shown any strong inclination to renegotiate quickly, possibly because the loan package is so widely distributed that none holds a disproportionately large part of the debt" (Richards and Kotlowitz (1985)).

result, debt reductions in the sample are unrelated to the amount of public debt outstanding, and for brevity these results are not reported.

A.2. Institutional Lenders' Preference for Debt

Debt reductions should be smaller for firms that initially owe more of their debt to commercial banks and insurance companies. Financially distressed firms can reduce their debt by persuading creditors to swap their debt for stock or forgive debt principal. The first option is especially costly for institutional lenders, however, because various regulations restrict how much stock these lenders can hold in nonfinancial firms (Gilson (1990), Roe (1983, 1990)), and risk-based regulatory capital guidelines require them to set aside more capital for riskier assets like stock.¹⁰ The second option is also costly because loan write-downs can reduce institutional lenders' reported earnings.¹¹ Also, institutional lenders' claims are generally senior and secured, so they have little incentive to make financial concessions that mostly benefit junior claimholders (Myers (1977), James (1995), Asquith, Gertner, and Scharfstein (1994)).

The view that institutional lenders have a "preference" for debt is held by many practitioners,¹² and is consistent with recent academic evidence that distressed bank loans are generally settled with more debt, and less stock, than distressed publicly traded debt (Gilson *et al.* (1990), Brown *et al.* (1993), James (1995), Asquith *et al.* (1994), Franks and Torous (1994)).

In the empirical tests, I measure institutional debt by the percentage of long-term debt outstanding at the start of the recontracting period that is owed to banks and insurance companies. As shown in Panel B of Table I, median institutional ownership of debt was 47.5 percent for firms that reorganized in Chapter 11 and 44.1 percent for firms that restructured out of court.

¹⁰ For example, when Ideal Basic Industries restructured its debt in December 1986, it issued over 125 million new common shares (and \$84 million in new notes) to its bank and insurance company lenders. These lenders immediately sold off 119 million of these shares.

¹¹ An example of institutional lenders' aversion to principal write-downs is related by professional turnaround manager Sam Zell:

About 10 years ago, I sat in a room with six of the largest banks in America. The Bank of American was there, Citibank was there, and we ended up negotiating for six months. We couldn't get the deal done because the various creditors in the room had written down the loans to different levels. One guy had already written it down 25%, and he was more than willing to take 75 cents on the dollar in cash. The other guy was carrying the same loan at 80 cents on the dollar, and there was no way in the world he was going to write his loan down. (Journal of Applied Corporate Finance (1991), pp. 47–48).

¹² As one prominent advisor to troubled companies notes: "It's very important to insurance companies to protect the principal amount of their bonds" (Jereski and Zweig (1991)). Another states: "(secured creditors) do everything in their power to saddle the company with as much debt as possible. The ability to fight off attempts by (these) creditors to preserve debt claims is the central issue in most workouts" (Evans (1991)).

A.3. Adverse Tax Consequences of Debt Cancellation

Debt reductions can create a significant tax liability for the borrower (Miller (1991)). When debt is repurchased or replaced for less than its face value, the difference is considered "cancellation of indebtedness" (COD) income under Section 61(a)(12) of the Internal Revenue Code, and is taxed at ordinary corporate rates. (The tax treatment of COD income is illustrated in the Appendix.) Sample firms therefore had an incentive to keep their debt high to avoid creating COD income. Anecdotal evidence suggests that many reorganizations are structured to minimize the amount of taxable COD income that is generated.¹³

Financially distressed firms that face a higher effective tax rate on COD income should reduce their debt by less when they renegotiate their debt contracts. Since the effective tax rate on COD income cannot be measured directly, in the empirical tests I attempt to control for changes in this rate during the sample period using a 0–1 dummy variable. The Deficit Reduction Act of 1984 increased the effective tax rate on COD income by limiting firms' ability to use the "stock for debt" exception (see the Appendix), while the Tax Reform Act of 1986 reduced the effective rate by lowering the marginal corporate tax rate from 46 percent to 34 percent. Since the 1984 Act mainly affected firms that restructured their debt out of court, the dummy variable is set to 1 (otherwise 0) for these firms if they finished restructuring their debt after 1983. For firms that reorganized in Chapter 11, the variable is set to 1 (otherwise 0) if they finished reorganizing after 1985.

A.4. Managers' Information Advantage Over Outsiders

Creditors will be less willing to exchange their senior claims for common stock when they believe the stock is overvalued. The risk of such overvaluation will be greater when managers have superior inside information about the firm's future profitability (Myers and Majluf (1984), Brown, James, and Mooradian (1993)). This risk will also discourage sales of new equity to outside investors (Shleifer and Vishny (1992)). Debt reductions in the sample should therefore be smaller when managers possess relatively more information than nonmanagers about the firm's value.¹⁴

¹³ This was the case, for example, in the bankruptcy of Federated Department Stores in 1991. In discussing the company's reorganization plan, one national business periodical noted:

The trick for Federated—and other bankrupts—is to reduce debt to a manageable level without triggering tax on the so-called cancellation of indebtedness income . . . "This reorganization is entirely tax-driven," says Richard Cieri, one of the partners heading up Federated's (legal) team . . . The plan involves forgiving some \$2.2 billion in debt. The tax bite on that "income" would normally run about \$700 million. Federated hopes to avoid the tax by issuing enough new stock to satisfy IRS guidelines. (Jereski (1991)).

¹⁴ Salant Corp.'s Chapter 11 bankruptcy (filed in February 1985) provides an example of the disputes that can arise over value:

Negotiations between Salant Corp. and its creditors committee for a Chapter 11 reorganization plan have stalled over the value of securities included in the offer. . . . William Fabrizio,

I assume that managers' information advantage is greater for firms that have more intangible assets. Because such assets typically are not traded in secondary markets, and often represent discretionary future investment opportunities (Myers (1977)), they are arguably more difficult for outsiders to value than "hard" assets. Several studies measure intangible assets by the firm's market-to-book ratio (Titman and Wessels (1988), Smith and Watts (1992)). Because financial distress will push this ratio below its "steady state" value, it cannot be calculated for sample firms directly. Instead, I use the median market-to-book ratio for each firm's primary industry (defined above), assuming that firms within industries have similar asset characteristics. Results are qualitatively similar when intangible assets are measured by the industry median ratio of annual R&D expense to sales, and for brevity they are not reported. As shown in Panel B of Table I, the median industry market-to-book ratio is 1.24 for firms in Chapter 11 and 1.33 for firms that restructure out of court.

A.5. Costs of Selling Assets

If financially distressed firms are unable to obtain significant concessions from their creditors or sell new securities on favorable terms, they can try to pay down their debt through asset sales. Gilson (1990) and Brown *et al.* (1994) show that distressed firms mostly sell assets to pay down debt, often under pressure from their bank lenders. Debt reductions in the sample should therefore be larger for firms that sell off relatively more of their assets. Financially distressed firms may find it quite costly to sell assets, however, because lender pressure or a lack of potential buyers (e.g., due to widespread financial distress in the firm's industry) results in assets being sold at fire-sale prices (Shleifer and Vishny (1992), Brown, James, and Mooradian (1994)).

I measure asset sales by the change in the book value of total assets over the recontracting period. Inspection of the source documents indicates that declines in asset book values generally reflect actual asset sales, not writedowns of assets' book values. Fifty-one percent of sample firms reported asset sales during the recontracting period; including the prior year, 69 percent of firms reported asset sales. As shown in Panel B of Table I, sample firms sold off a substantial fraction of their assets, and in general the fraction sold was significantly higher for firms that reorganized in Chapter 11 (median asset decline of 68.2 percent) than for firms that restructured out of court (median asset decline of 37.6 percent). Asquith *et al.* (1993), Brown *et al.* (1994), and Franks and Torous (1994) also report frequent and large asset sales by distressed firms.

counsel to the committee, said that the committee needed the "expert opinions" of its own investment banker because it believed Salant's "investment bankers may have overvalued the securities." (Wilner (1986)).

B. Empirical Model

I assume the following simple model of debt adjustments:

$$D_1 - D_0 = \mu(D^* - D_0) \quad (1)$$

where D_0 and D_1 denote the firm's leverage ratio at the start and the end of the recontracting period, respectively. D^* is the firm's "optimal" target leverage ratio at the end of the recontracting period, ignoring the costs of adjusting debt. These transactions costs are captured by the coefficient μ ($\in(0, 1)$). If these costs equal zero, then μ equals 1, and from equation (1) it follows that $D_1 = D^*$: the recontracting process allows the firm to pick a "fresh" capital structure and move directly to its optimal leverage ratio (this is implicitly assumed, for example, by Alderson and Betker (1995)). At the other extreme, μ equals 0, and the model implies that $D_1 = D_0$: transactions costs are so large that the firm is "stuck" with the same leverage ratio that it had at the start of the recontracting period. Values of μ between 0 and 1 therefore imply varying degrees of path dependence in leverage ratios. Other studies have used a similar model to analyze panel data on leverage choices by nondistressed firms (Jalilvand and Harris (1984), Auerbach (1985), Opler and Titman (1994a), Shyam-Sunder and Myers (1995)).

Rearranging the above expression, I begin my analysis by estimating the following regression:

$$D_1 = \mu D^* + (1 - \mu)D_0 + \xi \quad (2)$$

where the ξ are assumed to be independent and identically distributed with zero mean. D^* , which is unobservable, is assumed to be a linear function of various factors suggested by theory (but excluding transactions costs). Under the null hypothesis that transactions costs have no impact on firms' leverage choices, the estimated coefficient on the lagged leverage ratio (D_0) should equal zero, i.e., the past should not matter. Later I directly relate observed changes in debt to proxies for transactions costs.

B.1. Determinants of Optimal Target Leverage

The regressions include the following variables as proxies for the determinants of D^* : Net operating loss carryforwards (NOLs), the industry median leverage ratio, the industry median market-to-book ratio, liquidation costs, and the logarithm of assets (to control for size effects).

For two reasons, firms with larger NOLs should choose lower leverage ratios when they recontract. First, interest tax deductions are less valuable to high-NOL firms. By reducing taxable income, these or any other deductions force firms to postpone using their NOLs. As a result, the tax savings associated with NOLs may be reduced (in present value terms) or lost altogether (since NOLs expire after 15 years) (DeAngelo and Masulis (1980)). This rationale for

reducing leverage was explicitly given by one firm in the sample (Anglo Energy):

(The) Company has very substantial net operating loss, capital loss, and investment tax credit carryovers. These tax attributes . . . will expire at various times over the next fourteen years if not utilized before then. Unless (the Company) can generate sufficient taxable income or raise capital to acquire a company which has sufficient income, all or some of the benefits of these tax attributes will be lost. However, . . . the Secured Obligations and the Secured Debt Restrictions substantially inhibit the Company from generating sufficient taxable income or making any such acquisitions. (Company Chapter 11 disclosure statement dated January 21, 1988.)

The second reason high-NOL firms should choose lower leverage ratios is to lower the probability of future financial distress—hence the probability they will have to issue new common stock. Issuing new common stock is costly for high-NOL firms since it can result in an “ownership change” under Section 382 of Internal Revenue Code, leading to severe restrictions on, or the complete loss of, firms’ NOLs. The treatment of NOLs under Section 382 is illustrated in the Appendix. Stock ownership often changes significantly during a bankruptcy or restructuring, so the number of new shares needed to trigger an ownership change may be quite modest.

As shown in Panel B of Table I, NOLs are the largest single asset of many financially distressed firms: the median ratio of NOLs to total assets is 243.4 percent for the Chapter 11 subsample and 49.2 percent for out of court restructuring subsample. As discussed later, the extreme right tail of this distribution includes several firms that divested almost all of their operating assets during the recontracting period and emerged as pure “tax plays.”

The regression also includes a slope dummy to test whether the impact of NOLs changed after passage of the 1986 Tax Reform Act. The Act amended Section 382 to make it much harder for distressed firms to preserve their NOLs.¹⁵ It also reduced the federal marginal corporate tax rate. Based on earlier reasoning, the first change should have increased the sensitivity of leverage ratios to NOLs, while the second should have reduced this sensitivity (because the cost to the firm of having excess NOLs is directly proportional to its marginal tax rate).

¹⁵ Prior to the Act, all firms could avoid application of Section 382 simply by continuing in their historic line of business—regardless of how much their stock ownership changed. Subsequently, a Section 382 ownership change could severely limit a firm’s ability to use its NOLs even if it continued in the same business (see the Appendix). The 1986 Act also increased the ownership change test period, from two to three years. Finally, the Act made it more difficult for bankrupt firms to qualify for an exception to the most extreme Section 382 limitations on NOLs. Prior to the Act, this exception was available to bankrupt firms that distributed more than half their equity to old shareholders, “long-term” creditors (those who held their claims for more than five years), and new outside investors. After the Act, the definition of long-term creditors was changed, and new equity investment by outside investors was excluded from this sum (see the ellipse labeled “>50 percent of stock held by historic shareholders and creditors?” in the Appendix).

Sample firms' optimal leverage ratios should also be higher when their competitors are more highly leveraged (measured by the median leverage ratio in each firm's primary industry). A number of studies show that product market competition creates pressure for firms to mimic the leverage ratios of other firms in their industry,¹⁶ and clustering of leverage ratios within industries is well documented (Bowen, Daley, and Huber (1982), Campbell (1986)). Restructuring consultants often use industry benchmarks to help their clients choose new capital structures (Evans (1991)).

Finally, optimal leverage should be lower when more of the firm's assets are intangible. Such assets lose more of their value in financial distress, and cause managers to underinvest in positive-net present value (NPV) projects (Myers (1977)). I measure the intangibility of firms' assets using three variables: the industry median market-to-book ratio (defined earlier), the industry median R&D-to-sales ratio, and liquidation costs.

Following Alderson and Betker (1995), I define liquidation costs as the firm's going concern value minus its liquidation value, divided by its going concern value. Data for these two values are only available for firms in Chapter 11, from the official disclosure statement filed in bankruptcy court. Both values are estimates provided by management. As shown in Panel B of Table I, reported liquidation costs equal 45.3 percent for the median firm in the Chapter 11 subsample.

III. Results

A. Analysis of Leverage Ratios

Table II presents ordinary least-squares regression estimates of the empirical model in equation (2). Consistent with the raw changes in leverage ratios shown in Table I, the adjustment path that leverage ratios follow over the recontracting period critically depends on the recontracting method used. When financially distressed firms restructure their debt out of court, leverage ratios appear to be sticky: firms that were more highly leveraged going into the restructuring are also more highly leveraged coming out. Chapter 11, in contrast, appears to provide firms with a cleaner break from their old capital structures.

For the subsample of out of court restructurings (columns 3 and 4), the estimated coefficient on *Leverage ratio before recontracting* is positive and statistically significant in both regressions at the 5 percent and 10 percent

¹⁶ Bolton and Scharfstein (1990) argue that over-leveraged firms will be more vulnerable to price predation. Chevalier (1995) finds that supermarkets that do LBOs face significant price discounting by their less-levered competitors following the LBO. Lang and Stulz (1992) and Opler and Titman (1994b) find that more highly leveraged firms suffer greater losses in market capitalization and market share, respectively, in response to bankruptcy filings by competitors or industry-wide recession. On the other hand, Maksimovic and Zechner (1991) present an equilibrium model of capital structure in which such factors only determine the total level of debt within an industry, not individual firm-level ratios.

Table II

Regression Analysis of Leverage Ratios After Recontracting

Ordinary least-squares regressions are based on a sample of 108 financially distressed public firms that recontracted with their creditors during 1979–1989, either by reorganizing under Chapter 11 of the U.S. Bankruptcy Code (51 firms), or by restructuring their debt out of court (57). Financial data for each firm are based on the 10-K reports filed just before and just after each firm's bankruptcy or restructuring. *NOL carryforwards* is the natural logarithm of the ratio of net operating loss carryforwards after recontracting to the corresponding book value or market value of assets. *Post-1986 Tax Reform Act* is a dummy variable that equals 1 if a firm filed for Chapter 11 after August 14, 1986 or had a plan confirmed on or after January 1, 1987, and equals 0 otherwise. The *industry median leverage ratio* is calculated for all firms on COMPUSTAT that have the same two-digit Standard Industrial Classification (SIC) code as that assigned to each sample firm (based on its largest business segment by sales) at the end of the recontracting period. The *industry median market-to-book ratio* is calculated for all firms on COMPUSTAT that have the same two-digit SIC code as that assigned to each sample firm (based on its largest business segment by sales) at the start of the recontracting period. The *Logarithm of assets* is measured after the recontracting period. *t*-statistics are in parentheses.

Independent Variable	Chapter 11		Out of Court Restructuring	
	Leverage Ratio after Recontracting		Leverage Ratio after Recontracting	
	(1)	(2)	(3)	(4)
	Long-Term Debt ÷ Book Value of Assets	Long-Term Debt ÷ Market Value of Assets	Long-Term Debt ÷ Book Value of Assets	Long-Term Debt ÷ Market Value of Assets
Intercept	0.521 (1.13)	0.464 (1.06)	-0.303 (0.46)	0.345 (1.19)
Leverage ratio before recontracting	0.057 (0.51)	0.126 (0.53)	0.496 (2.11)**	0.308 (1.63)*
NOL carryforwards	-0.182 (3.14)**	-0.117 (1.53)	0.083 (1.24)	-0.012 (0.28)
NOL carryforwards × Post-1986 Tax Reform Act	-0.080 (1.43)	0.023 (0.28)	-0.116 (0.83)	-0.023 (0.27)
Industry median leverage ratio	-0.445 (0.57)	-0.117 (0.85)	1.05 (1.01)	0.254 (0.59)
Industry median market-to-book ratio	0.370 (2.90)**	-0.082 (0.42)	0.050 (0.24)	-0.038 (0.28)
Logarithm of assets	-0.037 (1.01)	0.002 (0.05)	0.24 (0.53)	-0.001 (0.04)
No. of observations	42	27	51	50
Adjusted <i>R</i> -square	0.241	0.139	0.128	0.014
Model <i>p</i> -value	0.012	0.164	0.056	0.515

** and * denote significance at the 5% and 10% levels, respectively, based on two-tailed tests.

levels, respectively.¹⁷ (Here and elsewhere in the article, statistical significance is evaluated using two-tailed tests.) None of the other explanatory variables, which measure firms' incentives to move towards an optimal target leverage ratio, are statistically significant for this subsample.

The same general result holds when the lagged leverage ratio is dropped from the regressions. As shown by equation (2) in the text, the coefficients on the determinants of D^* are multiplicative in μ , the leverage adjustment parameter. When, as in the last two regressions of Table II, the coefficient on the lagged leverage ratio approaches 1 (and μ approaches 0), the estimated coefficients on the other variables all necessarily approach zero. By omitting the lagged leverage ratio from the regressions, I effectively constrain μ to equal 1, allowing an assessment of whether the other variables independently affect leverage ratios.

For firms that reorganize in Chapter 11 (columns 1 and 2), I obtain exactly the opposite results. The estimated coefficient on *Leverage ratio before reconstructing* is not significantly different from zero in either of the first two regressions. However, the estimated coefficient on *NOL carryforwards* is negative and significantly different from zero in the first regression (at the 1 percent level) and negative and marginally significant in the second regression (at the 11 percent level). Given the small number of observations used in estimating the second regression, this last result arguably also supports the hypothesized negative relation between leverage ratios and NOLs. As discussed below, the significance of *NOL carryforwards* in the Chapter 11 subsample is much higher when the number of other explanatory variables is reduced (allowing the regressions to be estimated with more degrees of freedom).

Previous empirical research has consistently failed to produce support for capital structure theories that predict a negative relation between leverage and NOLs. (Mackie-Mason (1990) and Graham (1995) are exceptions, although they relate NOLs to the probability of new debt issues, not leverage ratios.) For two reasons, the sample provides a more powerful test of these theories than the more general samples of firms analyzed by earlier studies.

First, distressed firms by definition have much larger NOLs than nondistressed firms. The expected marginal loss in NOLs due to an increase in leverage is much larger for distressed firms. For nondistressed firms that have no NOLs, in contrast, this loss trivially equals zero. This reasoning may partly explain why NOLs and leverage ratios are unrelated in the subsample of out

¹⁷ The estimated coefficients on *Leverage ratio before reconstructing* imply a target adjustment parameters (μ) of 0.943 and 0.874 in regressions 1 and 2 (for Chapter 11), and 0.504 and 0.692 in regressions 3 and 4 (for out of court restructuring). This parameter measures the speed with which leverage ratios adjust to firms' optimal targets. To put these figures in context, other studies that have estimated such models for panels of non-distressed firms report corresponding values of μ of 0.383 (Jalilvand and Harris (1984), Table II), 0.304 (Auerbach (1985), Table 8.2), and 0.410 (Shyam-Sunder and Myers (1995), Table 2). As discussed later, one would expect smaller estimates of μ for such samples because firms are not proactively changing their leverage (as they are in the current sample by definition).

of court restructurings. As shown in Panel B of Table I, these firms have significantly smaller NOLs than firms in the Chapter 11 subsample.

Second, most capital structure theories make predictions about firms' *target* leverage ratios, but we can only observe *actual* leverage ratios. When firms are unprofitable, leverage ratios mechanically increase because the denominator of the ratio—the book or market value of the firm—decreases. Since these firms also have larger NOLs, leverage ratios and NOLs will be positively correlated, but the relation is spurious. This spurious correlation is attenuated in the current sample, which by design includes firms that have all just *reduced* the face value of their debt (the numerator of the leverage ratio).¹⁸

A.1. Special Cases: Double-Dippers and All-Equity Firms

Additional evidence of a negative relation between NOLs and leverage is provided by two small, but interesting, subsamples: seven firms that eliminate all of their long-term debt (“all-equity firms”), and six firms that appear in the sample twice (“double-dippers”).

The all-equity firms are pure “tax plays”: after recontracting, NOLs are their largest or only remaining asset (NOLs are *38 times* as large as total assets for the median firm). Most of these firms—71 percent—are from the Chapter 11 subsample. Typically, they eliminate their debt by selling off most of their assets and paying the proceeds to creditors. (The book value of total assets for the median all-equity firm declines by 99 percent over the recontracting period.) After recontracting, four of these firms had no operating assets left, and one transferred most of its operating assets to a special trust for creditors. Clearly these firms had no use for interest tax deductions; five planned to acquire other (profitable) businesses to use up their NOLs. Although here the negative relation between NOLs and leverage is driven by large asset sales, the results in Table II are qualitatively unchanged when these seven cases are excluded.

The subsample of double-dippers also exhibits a negative relation between leverage and NOLs. After these firms recontract the first time (two-thirds in Chapter 11), the median value of (long-term debt ÷ market value of assets) is 0.74. After they recontract the second time (one-half in Chapter 11), the median value of this ratio is only 0.10. Between these two dates, the only explanatory variable in Table II that changes significantly is *NOL Carryforwards* (NOLs divided by total assets). The median value of this variable

¹⁸ Such spurious positive correlation is not completely eliminated from the sample, however. As noted above, some firms in the sample have large negative shareholders' equity even after they recontract with their creditors, producing grossly inflated values of the ratio (long-term debt ÷ book value of assets). When analyzing this ratio, I exclude four firms where the ratio exceeds 3 (with values of 3.1, 3.4, 6.4, and 530). When these outliers are included in the regressions, the estimated coefficient on *NOL carryforwards* is either insignificantly different from zero or positive. When I adopt a lower cutoff for this ratio (e.g., 2 or 1), the results are qualitatively similar to those reported in Table II, although the statistical significance of the lagged leverage ratio declines in the third regression (which intuitively makes sense, since I am excluding those firms for which leverage ratios declined the least, and transactions costs were therefore arguably highest).

increases from 1.0 to 3.2. Of course, continued losses between the two recontracting dates could also have made creditors more willing to grant concessions the second time around. Again, excluding these special cases does not substantively change the regression results.

A.2. Intangible Assets and Liquidation Costs

The only other significant variable in Table II is *Industry median market-to-book ratio* in the first regression. This variable is meant to measure a firm's intangible assets. However, the sign of the estimated coefficient is positive, not negative as predicted.¹⁹ Two other measures of intangible assets—liquidation costs and the industry median ratio of R&D to annual sales—are also insignificant in the regressions (not shown in Table II).

Table III reports the analysis of leverage ratios and liquidation costs. Liquidation cost data are only available for firms in the Chapter 11 subsample. The number of observations used in estimating these regressions is small because bankrupt firms are not required to report an exact estimate of their liquidation value in the Chapter 11 disclosure statement, and in practice most firms choose not to report such an estimate. In the sample, 29 of 51 bankrupt firms simply assert they would be worth more if they were reorganized rather than liquidated.²⁰

In regressions 1 and 5, which include all of the explanatory variables, neither *Liquidation Costs* nor *NOL Carryforwards* are statistically significant at conventional levels (although the latter variable is significant at the 14 percent level). Because the coefficients in these regressions are estimated with relatively few degrees of freedom, the lack of significance could be due to the small sample size. This interpretation is supported by the remaining regressions, which include only *Liquidation Costs* and/or *NOL Carryforwards*. In these regressions, *Liquidation Costs* is always statistically insignificant, while *NOL Carryforwards* is always statistically significant (at the 5 percent or 10 percent level). Pairwise correlations between *Liquidation Costs* and the other explanatory variables are not significantly different from zero, so the insignificance of *Liquidation Costs* in Table III does not appear to be the result of simple multicollinearity.

¹⁹ One explanation for the positive sign is that the industry market-to-book ratio is a proxy for industry profitability, and firms in industries that have become more profitable feel encouraged to borrow more. This would also explain why the market-to-book ratio is not significant in the second regression: an increase in industry profitability leads to an increase in both the face value of debt and the market value of assets of firms in the industry, leaving the ratio of these two variables (the dependent variable) roughly unchanged.

²⁰ For example, one firm in the sample made the following very general statement:

Management is unable to quantify the Company's liquidation value because it is unaware of the existence of any willing buyers of major blocks of oil service industry assets or equipment due to the atmosphere of uncertainty that has been created by the recent drop in world crude oil prices . . . Management does, however, believe that the Plan provides greater value for all parties in interest than would liquidation. (Disclosure statement of Anglo Energy, approved by the bankruptcy court on May 28, 1986, p. 44).

Table III
Analysis of Liquidation Costs and Net Operating Loss Carryforwards

Ordinary least-squares regression analysis of firms that reorganized under Chapter 11 of the U.S. Bankruptcy Code during 1979–1989. The number of observations is less than the total number of bankrupt firms in the sample (51) due to missing data. *Liquidation costs* equal going concern value minus liquidation value, divided by going concern value (as estimated by debtor management and reported in the disclosure statement that it files in bankruptcy court). *NOL carryforwards* is the natural logarithm of the ratio of net operating loss carryforwards after recontracting to the corresponding book value or market value of assets. *Post-1986 Tax Reform Act* is a dummy variable that equals 1 if a firm filed for Chapter 11 after August 14, 1986 or had a plan confirmed on or after January 1, 1987, and equals 0 otherwise. The *industry median leverage ratio* is calculated for all firms on COMPUSTAT that have the same two-digit Standard Industrial Classification (SIC) code as that assigned to each sample firm (based on its largest business segment by sales) at the end of the recontracting period. The *industry median market-to-book ratio* is calculated for all firms on COMPUSTAT that have the same two-digit SIC code as that assigned to each sample firm (based on its largest business segment by sales) at the start of the recontracting period. The *Logarithm of assets* is measured after the recontracting period. *t*-statistics are in parentheses. Regressions (4) and (8) are estimated only for those firms for which I also have liquidation cost data.

	Leverage Ratio after Recontracting							
	Long-Term Debt ÷ Book Value of Assets				Long-Term Debt ÷ Market Value of Assets			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.435 (0.38)	0.771 (4.07)***	0.685 (3.79)***	0.655 (8.40)***	1.056 (0.94)	0.488 (3.13)***	0.436 (2.57)***	0.444 (6.87)***
Leverage ratio before recontracting	0.443 (1.25)				0.740 (1.14)			
Liquidation costs	-1.05 (1.18)	-0.286 (0.42)	-0.225 (0.56)		-0.687 (1.19)	-0.098 (0.31)	-0.157 (0.47)	
NOL carryforwards	-0.346 (1.57)	-0.005 (1.92)*		-0.005 (1.83)*	-0.389 (1.49)	-0.004 (2.32)**		-0.004 (2.39)**
NOL carryforwards × Post-1986 Tax Reform Act	0.204 (0.96)				0.254 (1.10)			
Industry median leverage ratio	3.795 (1.28)				0.768 (0.46)			
Industry median market-to-book ratio	0.068 (0.19)				-0.477 (0.85)			
Logarithm of assets	-0.212 (1.83)*				-0.123 (1.10)			
No. of observations	19	19	20	19	14	14	15	14
Adjusted <i>R</i> -square	-0.005	0.082	-0.035	0.11	-0.091	0.195	-0.055	0.251
Model <i>p</i> -value	0.483	0.187	0.579	0.084	0.592	0.108	0.646	0.033

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, based on two-tailed tests.

The absence of any meaningful relation between liquidation costs and leverage ratios in the sample contrasts sharply with Alderson and Betker (1995), who report a significant negative relation between these two variables. Also in contrast with these results, they find no relation between NOLs and leverage

ratios. This last result is puzzling, given strong anecdotal evidence that tax factors figure importantly in bankrupt firms' recapitalization decision (see the above excerpt from Anglo Energy's Chapter 11 disclosure statement).

One possible explanation for Alderson and Betker's results is that liquidation costs are spuriously correlated with their measure of leverage. Alderson and Betker define liquidation costs as the difference between estimated going concern value and estimated liquidation value (expressed as a percentage of estimated going concern value). They define leverage as the ratio of debt to estimated going concern value. Hence, these two variables are negatively correlated by construction. In contrast, I define leverage as the ratio of debt to total assets or total capital (book value of debt plus market value of equity).

More seriously, management's estimate of liquidation costs is almost certainly upward-biased, hence it is difficult to know how one should interpret results obtained using this variable. This bias arises because management of a bankrupt firm has an incentive to provide "low ball" estimates of the firm's liquidation value (thus producing an inflated estimate of liquidation costs). For any reorganization plan to be confirmed by the court, it must satisfy the "best interests of creditors" test: dissenting creditors must do at least as well under the plan as they would if the firm were liquidated (Section 1129(a)(7) of the U.S. Bankruptcy Code). By making the firm's liquidation value appear low relative to its going concern value, managers can improve the odds that their plan will be confirmed. Numerous bankruptcy practitioners who were interviewed for this study independently described managers' incentives this way.²¹

Academic evidence confirms that managers of bankrupt firms tend to deliberately understate liquidation values. One empirical study of Chapter 11 reorganizations notes that:

... the "liquidation analyses" contained in many of the disclosure statements of our cases, ... which contained the debtor's assertion as to what amounts would be distributed to creditors if the company were liquidated under chapter 7, were typically self-serving, since they were designed to convince creditors that they would receive more under the proposed plan that they would recover in a liquidation. (LoPucki and Whitford (1990), p. 172).

Bias in the liquidation cost variable could be substantial. Managers of a bankrupt firm face no legal or financial penalties for misrepresenting the firm's liquidation value in the disclosure statement: Section 1145(a) of the Bankruptcy Code exempts firms in Chapter 11 from ordinary registration and disclosure requirements under federal and state securities laws. Also, it is

²¹ One experienced investment banker expressed the following view:

As a practitioner, I'd put absolutely no credence in those liquidation numbers. They (debtor management) bake them low so liquidation looks so bad you'd never want to do it. This puts pressure on creditors to agree to a reorganization. The firm's investment bankers absolutely do not — ever — sign off on the liquidation numbers (speaker's emphasis). Liquidation values are provided directly by debtor management. (Telephone interview on December 8, 1994).

impossible to verify whether managers are ever telling the truth about liquidation values. Few firms in Chapter 11 ever liquidate, and when they do, managers no longer have any reason to disclose an estimate of the firm's liquidation value. Also, recall that many bankrupt firms simply assert that their going concern value is greater than their liquidation value, without ever estimating liquidation value exactly. Finally, creditors have little incentive to challenge management's estimate of the firm's liquidation value in court, because this value does not directly affect the size of the payouts under the reorganization plan. (A reorganization plan that is premised on a going concern value of 100 will support the same payouts to creditors, and satisfy the best interests of creditors test, whether the firm's stated liquidation value is 90 or 9.)²²

A.3. Increase in Firms' Optimal Target Leverage Ratios

Regression evidence in Table II suggests that the transactions costs of reducing debt are larger for firms that restructure their debt out of court than for firms that reorganize in Chapter 11. In the next section, I assess the importance of these costs directly. However, transactions costs alone do not fully explain the leverage adjustments reported in Table I. Evidence there shows that while leverage ratios fall by more when firms reorganize in Chapter 11, these firms still end up highly leveraged—although the Table II regressions indicate that transactions costs are not the reason why. Thus, the evidence is consistent with sample firms' optimal target leverage ratios— D^* in equation (2)—having increased as well.

Analysis of sample firms' financing histories suggests that firms' target leverage ratios most likely increased some time during the recontracting period (i.e., *after* firms filed for Chapter 11 or began discussions to restructure their debt out of court). Prior to the recontracting period (over a three-year window), there is no evidence that firms deliberately increased their leverage. New debt issues by sample firms were infrequent, small, and mainly used to refinance existing debt; no firm deliberately increased its leverage ratio through a leveraged recapitalization or LBO.²³

Why might firms' optimal target leverage ratios have increased? One plausible hypothesis is that creditors viewed high leverage as a way to put man-

²² The upward bias in the liquidation cost variable will be even more severe if managers also overstate the firm's future going concern value. Hotchkiss (1995) shows that managers of bankrupt firms issue significantly inflated projections of their firms' future operating performance (e.g., one year after plan confirmation, the median firm in her sample reports 80.6 percent less operating income than originally forecast in the disclosure statement; two years out the median shortfall is 71.9 percent). Alderson and Betker argue that such bias is not present in their sample, based on a comparison of the estimated common stock price (implied by the firm's estimated going concern value) with the realized stock price (observed immediately after the firm leaves Chapter 11).

²³ During the three years prior to the recontracting period, only 29 percent of sample firms sold new debt in any year on average, average debt issue proceeds were only 10 percent of total liabilities before the issue, and 48 percent of new debt issues refinanced existing debt.

agers on a “short leash” and limit their discretionary spending. Jensen (1986) and Stulz (1990) argue that high leverage can add value by reducing the resources available to managers to finance investments in negative net present value projects. High leverage can also add value by making default more likely, thus increasing the penalty on managers for poor performance (Grossman and Hart (1982), Gilson (1989)).

Creditors arguably have an incentive to monitor managers more closely after a bankruptcy or debt restructuring—especially if the firm has unresolved business problems, and managers’ role in having created these problems, or their ability to solve them, is unclear. Consistent with this argument, Gilson (1990) finds that distressed bank loan restructurings result in the systematic inclusion of highly restrictive operating and financial covenants in the loan indentures. In theory, high leverage can have the same inhibiting effect on managers’ actions as these restrictive covenants.

Unfortunately, this “monitoring” hypothesis, while consistent with the leverage patterns in Table I, is difficult to test empirically using cross-sectional data. I could find no relation between leverage ratios after recontracting and various proxies for creditors’ incentives to monitor managers, e.g., the CEO’s percentage stock ownership and the length of the CEO’s tenure. (CEOs who own more stock have less incentive to take negative-NPV projects; CEOs who are more recent hires are less likely to be at fault for the policies that got the firm into trouble, and are more likely to have been appointed by creditors (Gilson and Vetsuypens (1993).) However, these variables only crudely measure creditors’ incentives to monitor managers. And even if the increase in leverage ratios demanded by creditors was in fact quite large, cross-sectional tests would lack power to explain the increase, if it was roughly the same order of magnitude for all sample firms.

Following Ross (1977) and others, another reason firms may choose high leverage ratios is to signal an increase in their future profitability. However, this motive for high leverage is not evident in the sample. As shown in the last row of Table I, Panel B, sample firms perform poorly for at least three years after they finish recontracting (measured by the ratio of earnings before interest and taxes (EBIT) to total assets). In addition, firms’ future performance does not vary by the method of recontracting, even though leverage ratios do vary significantly by recontracting method.²⁴ I obtain similar results for various other measures of performance, consistent with Hotchkiss’ (1995) analysis of corporate performance for firms in Chapter 11.

B. Analysis of Debt Reductions

Table IV provides direct evidence on how transactions costs affect debt adjustments by financially distressed firms. The regressions in the table relate

²⁴ The data therefore do not support the prediction of Mooradian (1994), who argues that firms with relatively poor prospects will file for Chapter 11, while firms with better prospects will restructure their debt out of court.

Table IV
Regression Analysis of Long-Term Debt Reductions

Ordinary least-squares regressions are based on a sample of 108 financially distressed public firms that recontracted with their creditors during 1979–1989, either by reorganizing under Chapter 11 of the U.S. Bankruptcy Code (51 firms), or by restructuring their debt out of court (57). Financial data for each firm are based on the 10-K reports filed just before and just after each firm's bankruptcy or restructuring. Additional data sources include *Moody's* and COMPUSTAT. *Number of long-term debt contracts* is the natural logarithm of the ratio of the number of long-term debt contracts outstanding at the start of recontracting to the contracts' total face value. *Institutional debt* is the percentage of long-term debt that is owed to banks and insurance companies at the start of the recontracting period. *COD income tax dummy* equals 1 if the recontracting period ends after January 1, 1986 (for Chapter 11) or January 1, 1984 (for out of court restructuring), and equals 0 otherwise. The *industry median market-to-book ratio* is calculated for all firms on COMPUSTAT that have the same two-digit Standard Industrial Classification (SIC) code as that assigned to each sample firm (based on its largest business segment by sales) at the start of the recontracting period. *Asset sales* equals the percentage change in the book value of assets over the recontracting period. The sample analyzed in this table excludes firms that issued new debt during the recontracting period. *t*-statistics are in parentheses.

Independent Variable	Chapter 11	Out of Court Restructuring
	Percent Reduction in Long-Term Debt	Percent Reduction in Long-Term Debt
Intercept	0.230 (0.94)	-0.102 (0.38)
Number of long-term debt contracts	-0.003 (0.08)	-0.085 (1.98)*
Institutional debt	-0.003 (0.02)	-0.420 (2.48)*
COD income tax dummy	0.001 (0.12)	0.145 (1.49)
Industry median market-to-book ratio	0.072 (0.57)	0.046 (0.34)
Asset sales	0.565 (3.11)*	0.881 (4.74)*
No. of observations	40	42
Adjusted <i>R</i> -square	0.145	0.524
Model <i>p</i> -value	0.0610	0.0001

* denotes significance at the 5% level, based on a two-tailed test.

debt reductions in the sample to the proxies for transactions costs discussed in Section II.

The dependent variable is the percentage change in long-term debt over the recontracting period. Transactions costs are hypothesized to affect the *dollar* change in debt. The dollar change in debt is divided by the initial level of debt to reduce heteroskedasticity in the error terms. Also, a small number of firms that issued new debt during the recontracting period are excluded. Such interim debt financings will cause the percentage *reduction* in debt to be understated if the new debt is still outstanding at the end of the recontracting

period, producing measurement error in the dependent variable and possibly biased coefficient estimates. However, results are qualitatively the same when the regressions are estimated using the full sample (not shown in the table).

Regression evidence in Table IV is consistent with earlier evidence in Table II that financially distressed firms find it less costly to reduce their debt when they recontract in Chapter 11. For the Chapter 11 subsample, none of the first four proxies for transactions costs are statistically significant. In contrast, for the subsample of out of court restructurings, the estimated coefficients on *Number of long-term debt contracts* and *Institutional debt* are negative and statistically significant. Firms that restructure out of court are more successful at reducing their debt when they owe debt to fewer creditors and owe less debt to institutional lenders. The adjusted R-square is also much higher for this subsample. The coefficient on *Asset sales* is positive and significant for both subsamples, implying that asset sales help firms reduce their debt regardless of how they recontract. However, Table I shows that percentage asset sales are substantially larger on average when firms recontract in Chapter 11.

There are a number of reasons why the transaction costs of reducing debt are arguably much smaller in Chapter 11. First, Chapter 11 facilitates debt reductions by reducing the creditor holdout problem. In contrast to an out of court restructuring, where nonparticipating creditors are simply “left alone,” in Chapter 11 creditors who vote against a proposed reorganization plan, or who do not vote, can be forced to accept the terms approved by a majority of other creditors.²⁵ In addition, the Bankruptcy Code enjoins the judge to reject any plan that is “infeasible,” or leaves the firm with an excessive amount of debt (Section 1129(a)(11) of the U.S. Bankruptcy Code). This solvency test, in effect, allows the judge to override creditor holdouts; there is no equivalent test in an out of court restructuring.

Second, institutional lenders arguably face greater outside pressure to write down the value of a distressed loan when the borrower is legally bankrupt, because its financial condition is a matter of public record. In contrast, when a loan is restructured out of court, and the borrower’s financial condition is harder to verify, lenders have more discretion with respect to the amount or timing of any write-down. Senior institutional lenders will also be more willing to make concessions in Chapter 11 because bankruptcy rules bind all impaired claimholders to participate in a reorganization plan, eliminating “free riding” by junior claimholders (Gilson *et al.* (1990), James (1996), Asquith *et al.* (1994)). The estimated coefficient on *Institutional debt* in the second regression of Table IV is consistent with institutional lenders incurring substantial costs when they write down their debt outside of Chapter 11. For example, increas-

²⁵ For a Chapter 11 reorganization plan to be confirmed, all impaired “classes” of claimholders must vote in favor of the plan. Each class consists of similar claims and votes separately. Within a class, a voting majority equals one-half in number, and two-thirds in value, of all claims in the class that vote. Nonvoting or dissenting creditors in each class must accept the concessions agreed to by the voting majority.

ing institutional debt from 50 percent to 100 percent of long-term debt reduces the predicted decline in total debt from 37 percent to 16 percent (evaluating all other explanatory variables at their sample means).

Chapter 11 also reduces the costs of selling assets. Under Section 363 of the U.S. Bankruptcy Code, asset sales by a Chapter 11 debtor are executed by a court order and do not require the formal approval of shareholders or directors. Buyers can purchase assets out of Chapter 11 free and clear of most encumbrances (other than environmental liabilities), and have stronger recourse to the seller if the assets' value or quality has been misrepresented.²⁶ As noted before, percentage assets sales are almost twice as large on average when debt is restructured in Chapter 11 rather than out of court (median reduction in total assets of 68 percent compared to 38 percent, per Table I).

In addition, the tax penalty for reducing debt is less severe in Chapter 11. During the sample period, firms in Chapter 11 were able to avoid or defer paying tax on their COD income, while firms that restructured out of court were taxed on most or all of their COD income (see the Appendix). Hence, the effective tax rate on COD income was lower for firms in Chapter 11 than it was for firms that restructured out of court. (Since the repeal of the stock-for-debt exception in 1994, this difference in effective tax rates has become smaller, but it is still positive.) Although the estimated coefficient on *COD income tax dummy* is insignificant in Table IV, this variable only measures changes in the effective tax rate on COD income over time. The leverage patterns in Table I are therefore consistent with certain firms having faced a high, but stable, tax rate on their COD income over the sample period.

Finally, Chapter 11 reduces information asymmetries between managers and outsiders, thus making it less costly for financially distressed firms to sell new equity or exchange new equity for debt. Outsiders have access to relatively better information about a financially distressed firm when it enters Chapter 11 because the Bankruptcy Code requires the firm to file monthly financial reports and make other detailed disclosures (all of which are available publicly), and creditors have the right of legal discovery (Gilson (1995)). This hypothesized difference in the firm's information environment is difficult to verify empirically, however. In the Table IV regressions, I assume that information asymmetries are greater for firms that have relatively more intangible assets, measured by the variable *Industry median market-to-book ratio*. However, this variable is an imperfect proxy for information asymmetries, and the regressions do not control for other factors that also affect the firm's information environment.

²⁶ One possible deterrent to buying assets in Chapter 11 is the requirement that any bid for an asset be filed in writing with the court. Anyone can inspect the bid documents, which increases the risk that other potential buyers will submit competing bids. To discourage late bidders from free riding off the efforts of early bidders, most asset sale agreements in bankruptcy include standard protections for early bidders such as break-up fees, topping fees, and overbid provisions.

Table V
Changes in Other Capital Structure Characteristics

The first two characteristics in each panel are based on the 10-K reports filed just before and just after each firm's bankruptcy or out of court restructuring. The third characteristic is based on financing transactions reported in 10-K reports, the Investment Dealer's Digest *Directory of Corporate Financing*, the *Moody's* manuals, and the *Wall Street Journal*. The average time between the start and the end of recontracting in the sample is 22.8 months for bankruptcy and 14.2 months for out of court restructuring. Sample consists of 108 financially distressed public firms that recontracted with their creditors during 1979–1989, either by reorganizing under Chapter 11 of the U.S. Bankruptcy Code (51 firms) or by restructuring their debt out of court (57). Differences in characteristics before and after recontracting are evaluated using a *t*-test for means.

Characteristic	Start of Recontracting Period	End of Recontracting Period
Panel A: Chapter 11		
Debt repayment flexibility: percentage of firms with covenants that grant flexibility ^a	25.5	62.7*
Capital structure complexity: mean number of long-term debt contracts per firm ^b	7.5	3.6*
Debt ownership concentration: percentage of debt financings over previous two years that are private ^c	38.6	68.8*
Panel B: Out of Court Restructuring		
Debt repayment flexibility: percentage of firms with covenants that grant flexibility ^a	15.0	66.7*
Capital structure complexity: mean number of long-term debt contracts per firm ^b	8.8	7.5
Debt ownership concentration: percentage of debt financings over previous two years that are private ^c	36.5	41.1

* The value at the end of the recontracting period is significantly different from corresponding value at the start of the recontracting period at the 1% level, based on a two-tailed test.

^a Includes covenants in three general categories: (1) covenants that allow firms to postpone or defer cash outlays for debt service (e.g., debt is noninterest bearing or accrues interest over multiple years), (2) covenants that effectively convert debt into equity (e.g., interest is tied to the size of the firm's cash flows, or can be paid in common stock), and (3) covenants that allow the firm to opportunistically redefine the event of default (e.g., the firm has the option to extend the maturity of its debt, or to start accruing interest on its debt, if it would otherwise default on a cash payment).

^b Each outstanding issue of publicly-traded debt securities is treated as a single contract.

^c Private financings include private placements and bank loans.

C. Capital Structure Changes that Blunt the Impact of High Leverage

The above analysis concentrates on changes in the level of debt and in leverage ratios; Table V shows that sample firms' capital structures change in other important ways over the recontracting period. First, the percentage of firms that were granted some form of repayment flexibility or financial "breathing room" by their creditors (e.g., the option to pay interest in cash or common stock, or to accrue interest without penalty) increased significantly over the recontracting period. Second, sample firms' capital structures became less complex, as measured by the number of long-term debt contracts per firm. And third, ownership of sample firms' debt became more concentrated, as measured by the percentage of new debt issues over the previous two years that were private, as opposed to public, financings (results are qualitatively unchanged when I measure this variable over a one- or three-year window).

Changes in the above three characteristics made it easier for sample firms to live with high leverage ratios after recontracting, by reducing the real financial burden of carrying a given amount of debt. In formal terms, changes in these characteristics reduced the probability or cost of future financial distress. Lower capital structure complexity and higher debt ownership concentration imply lower expected future financial distress costs because the creditor hold-out problem is less severe when there are fewer creditors (Section II.A.1).²⁷

Evidence in Table V is consistent with transactions costs having discouraged sample firms from reducing their leverage ratios (although earlier evidence suggests that firms' optimal target leverage ratios also increased over the recontracting period). These transactions costs specifically penalize firms for reducing the *face value* of their debt (the numerator of the leverage ratio). By including more flexible repayment terms in their debt, firms would have been able to reduce the face value of their debt by less while achieving the same reduction in their real debt burdens. Consistent with this hypothesized substitution, I find that firms (in both subsamples) that were granted increased repayment flexibility also had significantly higher mean and median leverage ratios after they recontracted, compared to firms that were not granted such flexibility. Changes in capital structure complexity and debt ownership concentration are harder to interpret because changes in these variables could be explained by a variety of factors.²⁸

²⁷ Consider the following statement by Steve Miller, who was assistant treasurer of Chrysler Corporation when it restructured in the early 1980s:

... companies should plan for the possibility of financial trouble by reducing the complexity of their capital structures—because the more complex the credit structure, the more difficult and costly the workout process . . . What we have done (since the workout) is to streamline and simplify our credit lines and reduce substantially the number of lenders by raising the minimum amount required to participate. If we ever get into the soup again, we would much rather be dealing with a smaller, more homogeneous group. (Journal of Applied Corporate Finance (1991), p. 36).

²⁸ For example, capital structure complexity could have declined by more for firms in the Chapter 11 subsample because these firms reduced their debt by more than firms that restructured out of court. The number of debt contracts (capital structure complexity) declines by

IV. Summary and Research Implications

When financially distressed firms renegotiate their debt contracts, do they end up with the “right” amount of debt in their new capital structures? This study provides evidence that leverage ratio choices by financially distressed firms are significantly affected by transactions costs. The analysis is based on a sample of 108 public firms that filed for Chapter 11 (51 firms) or restructured their debt out of court (57). I show that leverage ratios generally remain quite high after financially distressed firms recontract with their creditors. Leverage ratios remain highest for firms that restructure their debt out of court, because various factors make it extremely costly for them to reduce debt and/or issue equity. These factors matter much less when firms reorganize in Chapter 11, hence these firms are able to reduce their leverage significantly more.

These findings have a number of important research and policy implications. First, analysis of financially distressed firms shows how transactions costs can have a first-order impact on corporate capital structure choices, and I identify precisely what factors make it costly for firms to adjust their debt. Previous empirical research has produced some evidence that transactions costs affect leverage choices, but this evidence is mostly indirect, and there has been little analysis of what lies inside the “black box” called transactions costs. My analysis suggests that theoretical models of optimal capital structure can potentially benefit from modeling transactions costs more explicitly. Future research may find that transactions costs are also important in constraining large capital structure shifts outside of financial distress (e.g., in leveraged buyouts (LBOs), recapitalizations, reverse initial public offerings (IPOs), and mergers).

Second, most models of corporate debt policy predict that the expected costs of financial distress deter firms from using too much debt. However, this prediction is difficult to reconcile with evidence that realized financial distress costs are relatively small (see Masulis (1988)). The analysis suggests that the expected costs of financial distress may be much larger when a firm’s experience with debt is properly viewed over a longer horizon. For some firms, financial distress—and high leverage—may be chronic, due to factors that make it costly for firms to eliminate their debt once they become highly leveraged. Evidence in this study suggests that, to avoid being “locked in” to high leverage, managers should plan ahead for the possibility of financial distress by maintaining a capital structure that can be restructured at relatively low cost (e.g., by limiting the number of creditors or the complexity of the capital structure).

Third, the large number of bankruptcies in recent years has stimulated debate over the economic efficiency of U.S. reorganization practices. A number of observers (e.g., Roe (1983), Bebchuk (1988), Aghion, Hart, and Moore (1992),

definition when a firm pays down its debt. Similarly, the importance of private debt financing (debt ownership concentration) could have increased by more for firms in the Chapter 11 subsample because the bankrupt status of these firms effectively precluded them from making public underwritten securities offerings under SEC rules.

Bradley and Rosenzweig (1992)) have called for a complete overhaul of Chapter 11, based in part on the perceived high rate of repeat bankruptcy filings and the belief that Chapter 11 saddles firms with excessive debt. Evidence presented here suggests that Chapter 11 in fact reduces the impact of various market imperfections that can make it costly for firms to reduce their debt, and leads to less leveraged capital structures than when debt is restructured outside of Chapter 11. My analysis also suggests that firms may rationally choose to remain highly leveraged after reorganizing in Chapter 11 (e.g., because high leverage allows creditors to more effectively monitor managers). Repeat bankruptcy filings or restructurings by these firms should not be taken as evidence that Chapter 11 produces economically inefficient capital structures.

Finally, these findings suggest why “prepackaged” Chapter 11 bankruptcy—lately an increasingly popular reorganization technique—may be an economically superior form of reorganization to both conventional Chapter 11 bankruptcy and out of court restructuring. In a prepackaged bankruptcy, the firm simultaneously files for Chapter 11 *and* submits a reorganization plan (having obtained creditors’ approval for the plan in advance). As a result, prepackaged bankruptcy is generally completed in much less time than conventional bankruptcy, thus reducing the costs of reorganization (Betker (1995) and Tashjian, Lease, and McConnell (1996)). In this sense prepackaged bankruptcy incorporates one of the key advantages of out of court restructuring (Gilson *et al.* (1990)). Prepackaged bankruptcy dominates out of court restructuring, however, in that it also incorporates a key advantage of Chapter 11—flexibility to reduce leverage.

An interesting topic for future research would be to investigate capital structure adjustments around financial distress for LBOs and other organizations which, in contrast to firms examined in this study, are highly leveraged *by choice*. As argued by Jensen (1989), financial problems of LBO firms are more likely to be limited to the liability side of their balance sheets, because high leverage ensures that a default will occur before the assets have lost too much of their value. Because the assets of Jensen’s archetypal LBO firm are relatively liquid and the liabilities are relatively closely held, the results of this study suggest that such firms may have a comparative advantage in restructuring their claims—and eliminating excess debt—if they should become financially distressed.

Appendix

Tax Considerations For Bankrupt and Insolvent Firms

Taxation of Cancellation of Indebtedness (COD) Income (Figure 1)

Under Section 61(a)(12) of the U.S. Internal Revenue Code, repaying or canceling a debt obligation creates taxable COD income by the amount that the obligation’s face value (net of any unamortized original issue discount or premium) exceeds the value of any consideration received by creditors in exchange. Prior to passage of the Revenue Reconciliation Act of 1990, the value of any debt included in this consideration was deemed to be its face value (subsequently its market value).

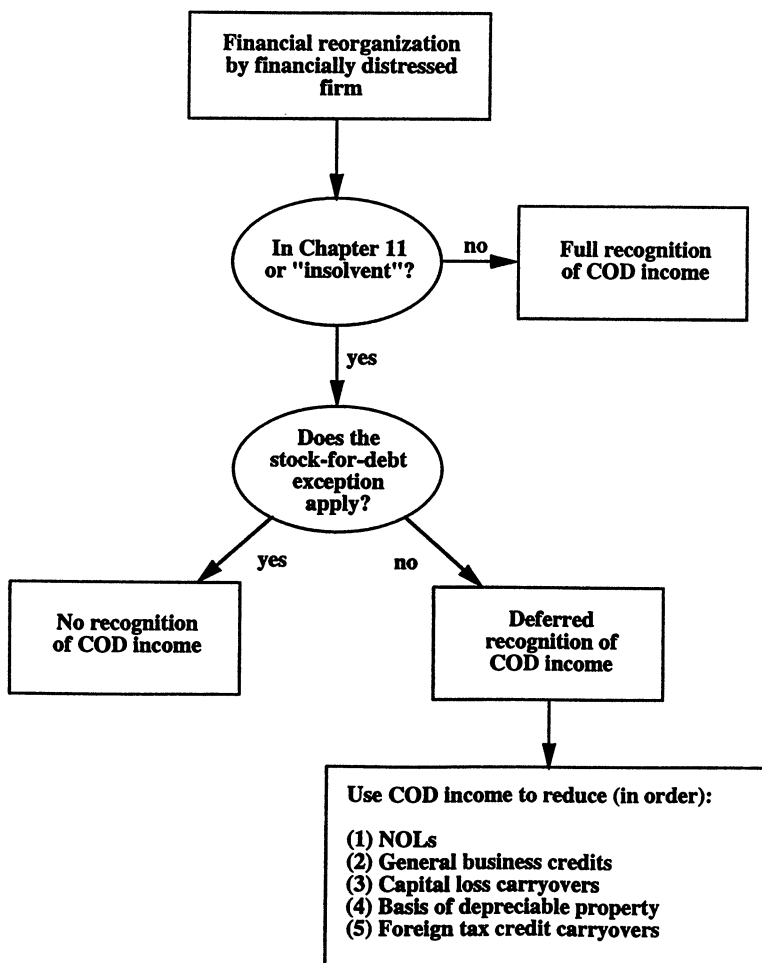


Figure 1. Taxation of Cancellation of Indebtedness Income.

- Firms that are in Chapter 11 can defer recognition of COD income by using it to reduce certain outstanding tax attributes, including (in order): NOLs, general business credits, capital loss carryovers, the basis of depreciable property (but only as long as the remaining basis exceeds the firm's aggregate liabilities), and foreign tax credit carryovers. Firms can also elect to reduce the basis of their depreciable property before any other tax attributes. Any remaining COD income does not have to be recognized.
- For firms that are "insolvent" (the book value of liabilities exceeds the "fair" market value of assets) but not in Chapter 11, the above exceptions apply only up to the amount of such insolvency.
- Such firms can avoid recognizing any COD income if they qualify for the "stock-for-debt exception," which applies if creditors receive a material amount of the firm's equity in exchange for reducing their debt. The

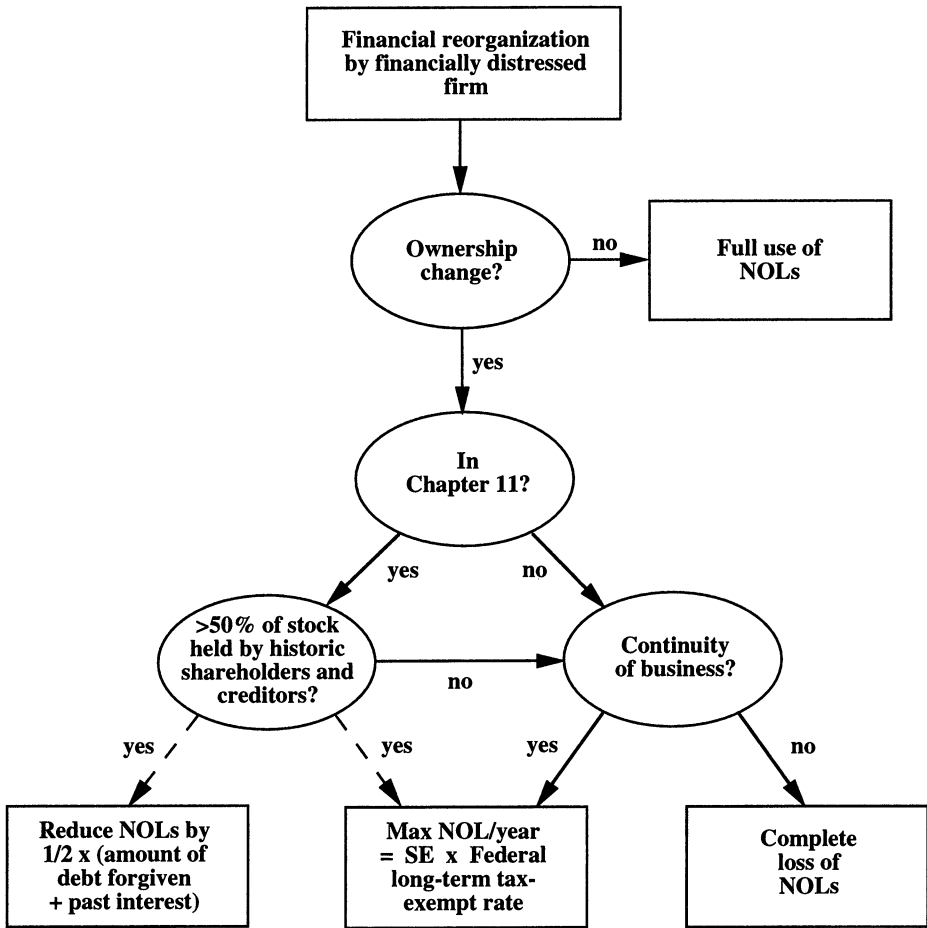


Figure 2. Allowed Use of Accumulated Net Operating Losses.

standards for determining whether a given amount of stock is material are highly subjective, and have changed over time. In general, the stock issued to creditors cannot be “nominal or token,” and must satisfy a “proportionality” test (holders of an unsecured claim must receive no less than 50 percent of the stock they would have received had all the stock been distributed proportionately across all unsecured claims whose face values are altered by the bankruptcy or restructuring). The stock-for-debt exception was repealed by the 1993 Tax Act, effective for all exchanges completed after December 31, 1994.

Allowed Use of Accumulated Net Operating Losses (NOLs) (Figure 2)

- Full use of NOLs means that NOLs may be used to shield positive taxable income going back three years and going forward 15 years; all remaining unused NOLs are lost.

- Under Section 382 of the U.S. Internal Revenue Code, a firm's ability to use its NOLs is restricted when it experiences an "ownership change," which occurs when any group of 5 percent shareholders collectively increases its total ownership percentage by more than 50 percentage points (relative to the lowest percentage held over the previous three years), ignoring any reductions in percentage ownership. All less-than-5 percent shareholders are collectively treated as a single 5 percent shareholder.
- If the firm is not in Chapter 11 when the ownership change occurs, Section 382 limits the NOLs that it may use each year to the product of (1) stockholders' equity (SE) measured just prior to the ownership change and (2) the Federal long-term tax-exempt rate. If the firm is in Chapter 11, the same limitation applies, but stockholders' equity is increased to reflect forgiveness of debt under the plan of reorganization. In either case, the firm must satisfy a continuity of business test, or else lose all of its NOLs.
- A firm in Chapter 11 can avoid the Section 382 limitation if it qualifies for the "bankruptcy exception." This option is available if more than 50 percent of the common shares outstanding after confirmation are held by the old shareholders and historic creditors (those who became creditors in the normal course of the firm's business or who acquired their claims more than 18 months prior to the bankruptcy filing). Under the bankruptcy exception, the firm can elect to reduce its NOLs by one-half of any COD income not recognized due to the stock-for-debt exception, plus interest expense previously claimed on that debt over the current and previous three tax years (the "toll charge"). However, if the firm experiences an ownership change within two years after leaving Chapter 11, all of its remaining NOLs are lost.

REFERENCES

- Aghion, Philippe, Oliver Hart, and John Moore, 1992, The economics of bankruptcy reform, *Journal of Law, Economics, and Organization* 8, 523–546.
- Aharony, Joseph, Charles Jones, and Itzhak Swary, 1980, An analysis of risk and return characteristics of corporate bankruptcy using capital market data, *Journal of Finance* 35, 1001–1016.
- Alderson, Michael, and Brian Betker, 1995, Liquidation costs and capital structure, *Journal of Financial Economics* 39, 45–69.
- Altman, Edward, 1986, Bankruptcy and reorganization, in Edward Altman, Ed., *Handbook of Corporate Finance* (John Wiley & Sons, New York).
- Altman, Edward, and Scott Nammacher, 1987, *Investing in junk bonds: Inside the high yield debt market* (John Wiley & Sons, New York).
- Altman, Edward, 1993, *Corporate financial distress and bankruptcy* (John Wiley & Sons, New York).
- Asquith, Paul, Robert Gertner, and David Scharfstein, 1994, Anatomy of financial distress: An examination of junk-bond issuers, *Quarterly Journal of Economics* 109, 625–658.
- Auerbach, Alan, 1985, Real determinants of corporate leverage, in Benjamin Friedman, Ed., *Corporate capital structures in the United States* (University of Chicago Press, Chicago).
- Bebchuk, Lucian, 1988, A new approach to corporate reorganizations, *Harvard Law Review* 101, 775–804.
- Betker, Brian, 1995, An empirical examination of prepackaged bankruptcy, *Financial Management* 24, 3–18.

- Bolton, Patrick, and David Scharfstein, 1990, A theory of predation based on agency problems in financial contracting, *American Economic Review* 80, 93–106.
- Bowen, Robert, Lane Daley, and Charles Huber, Jr., 1982, Evidence on the existence and determinants of inter-industry differences in leverage, *Financial Management* 11, 10–20.
- Bradley, Michael, Greg Jarrell, and E. Han Kim, 1984, On the existence of an optimal capital structure: Theory and evidence, *Journal of Finance* 39, 857–878.
- Bradley, Michael, and Michael Rosenzweig, 1992, The untenable case for Chapter 11, *The Yale Law Journal* 101, 1043–1089.
- Brown, Davis, Christopher James, and Robert Mooradian, 1993, The information content of distressed restructurings involving public and private debt claims, *Journal of Financial Economics* 33, 93–118.
- Brown, Davis, Christopher James, and Robert Mooradian, 1994, Asset sales by financially distressed firms, *Journal of Corporate Finance* 1, 233–258.
- Campbell, Cynthia, 1986, Industry leverage regularities: Optimal capital structures or neutral mutations?, manuscript, University of Michigan.
- Chevalier, Judith, 1995, Do LBO supermarkets charge more? An empirical analysis of the effects of LBOs on supermarket pricing, *Journal of Finance* 50, 1095–1112.
- DeAngelo, Harry, and Ronald Masulis, 1980, Optimal capital structure under corporate and personal taxation, *Journal of Financial Economics* 8, 3–27.
- DeAngelo, Harry, and Linda DeAngelo, 1990, Dividend policy and financial distress: An empirical investigation of troubled NYSE firms, *Journal of Finance* 45, 1415–1432.
- Evans, Carter, 1991, The investment banker's role in the workout process, in DiNapoli, Dominic, Sanford Sigoloff, and Robert Cushman, Eds., *Workouts and turnarounds* (Business One Irwin, Homewood, Ill).
- Fischer, Edwin, Robert Heinkel, and Josef Zechner, 1989, Dynamic capital structure choice: Theory and tests, *Journal of Finance* 44, 19–40.
- Franks, Julian, and Walter Torous, 1994, A comparison of financial restructuring in distressed exchanges and Chapter 11 reorganizations, *Journal of Financial Economics* 35, 349–370.
- Gertner, Robert, and David Scharfstein, 1991, A theory of workouts and the effects of reorganization law, *Journal of Finance* 46, 1189–1222.
- Gilson, Stuart, 1989, Management turnover and financial distress, *Journal of Financial Economics* 25, 241–262.
- Gilson, Stuart, 1990, Bankruptcy, boards, banks, and blockholders, *Journal of Financial Economics* 26, 355–387.
- Gilson, Stuart, 1991, Managing default: Some evidence on how firms choose between workouts and Chapter 11, *Journal of Applied Corporate Finance* 4, 62–70.
- Gilson, Stuart, 1995, Investing in distressed situations: A market survey, *Financial Analysts Journal* 51, 8–27.
- Gilson, Stuart, Kose John, and Larry Lang, 1990, Troubled debt restructurings: An empirical study of private reorganization of firms in default, *Journal of Financial Economics* 26, 315–353.
- Gilson, Stuart, and Michael Vetsuypens, 1993, CEO compensation in financially distressed firms, *Journal of Finance* 48, 425–458.
- Graham, John, 1996, Debt and the marginal tax rate, *Journal of Financial Economics* 41, 41–73.
- Grossman, Sanford, and Oliver Hart, 1982, Corporate financial structure and managerial incentives, in J. McCall, Ed., *The Economics of Information and Uncertainty* (University of Chicago Press, Chicago).
- Hamer, John, 1985, *Troubled debt restructuring* (UMI Research Press, Ann Arbor, Mich).
- Hotchkiss, Edith, 1995, Post-bankruptcy performance and management turnover, *Journal of Finance* 50, 3–22.
- Houston, Joel, and Christopher James, 1996, Bank information monopolies and the mix of private and public debt claims, *Journal of Finance* 51, 1863–1889.
- James, Christopher, 1995, When do banks take equity in debt restructurings?, *Review of Financial Studies* 8, 1209–1234.

- James, Christopher, 1996, Bank debt restructurings and the composition of exchange offers in financial distress, *Journal of Finance* 51, 711–727.
- Jalilvand, Abolhassan, and Robert Harris, 1984, Corporate behavior in adjusting to capital structure and dividend targets: An econometric study, *Journal of Finance* 39, 127–145.
- Jensen, Michael, 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323–329.
- Jensen, Michael, 1989, Active investors, LBOs, and the privatization of bankruptcy, *Journal of Applied Corporate Finance* 2, 235–244.
- Jensen, Michael, 1993, The modern industrial revolution and the challenge to internal control systems, *Journal of Finance* 48, 831–880.
- Jereski, Laura, 1991, Damn the torpedos, *Forbes*, June 10, 66.
- Jereski, Laura, and Jason Zweig, 1991, Step right up folks, *Forbes*, March 4, 74–77.
- Journal of Applied Corporate Finance*, 1991, Bankruptcies, workouts, and turnarounds: A roundtable discussion, 4, 34–61.
- Lang, Larry and René Stulz, 1992, Contagion and competitive intra-industry effects of bankruptcy announcements: An empirical analysis, *Journal of Financial Economics* 32, 45–60.
- LoPucki, Lynn, and William Whitford, 1990, Bargaining over equity's share in the bankruptcy reorganization of large, publicly held companies, *University of Pennsylvania Law Review* 139, 125–196.
- LoPucki, Lynn, and William Whitford, 1993, Patterns in the bankruptcy reorganization of large, publicly held companies, *Cornell Law Review* 78, 597–618.
- MacKie-Mason, Jeffrey, 1990, Do taxes affect corporate financing decisions?, *Journal of Finance* 45, 1471–1493.
- Maksimovic, Vojislav, and Josef Zechner, 1991, Debt, agency costs, and industry equilibrium, *Journal of Finance* 46, 1619–1643.
- Masulis, Ronald, 1988, *The Debt/Equity Choice* (Ballinger Publishing Company, Cambridge, Mass).
- Miller, Merton, 1991, Tax obstacles to voluntary corporate restructuring, *Journal of Applied Corporate Finance* 4, 20–23.
- Mooradian, Robert, 1994, The effect of bankruptcy protection on investment: Chapter 11 as a screening device, *Journal of Finance* 49, 1403–1430.
- Myers, Stewart, 1984, The capital structure puzzle, *Journal of Finance* 39, 575–592.
- Myers, Stewart, 1977, Determinants of corporate borrowing, *Journal of Financial Economics* 5, 147–175.
- Myers, Stewart, and Nicholas Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187–221.
- New Generation Research, 1995, *The Bankruptcy Yearbook & Almanac* (Boston, Mass).
- Opler, Tim, and Sheridan Titman, 1994a, The debt/equity choice: An analysis of issuing firms, manuscript, Ohio State University and Boston College.
- Opler, Tim, and Sheridan Titman, 1994b, Financial distress and corporate performance, *Journal of Finance* 49, 1015–1040.
- Richards, Bill, and Kotlowitz, Alex, 1985, Allis-Chalmers's financial woes grow as company works on refinancing plan, *The Wall Street Journal*, February 20.
- Roe, Mark, 1983, Bankruptcy and debt: A new model for corporate reorganization, *Columbia Law Review* 83, 527–602.
- Roe, Mark, 1987, The voting prohibition in bond workouts, *The Yale Law Journal* 97, 232–279.
- Roe, Mark, 1990, Political and legal restraints on ownership and control of public companies, *Journal of Financial Economics* 27, 7–41.
- Ross, Stephen, 1977, The determination of financial structure: The incentive signalling approach, *Bell Journal of Economics* 8, 23–40.
- Shyam-Sunder, Lakshmi, and Stewart Myers, 1995, Testing static trade-off against pecking order models of capital structure, manuscript, MIT.
- Shleifer, Andrei, and Robert Vishny, 1992, Liquidation values and debt capacity: A market equilibrium approach, *Journal of Finance* 47, 1343–1366.

- Smith, Clifford, and Ross Watts, 1992, The investment opportunity set and corporate financing, dividend, and compensation policies, *Journal of Financial Economics* 32, 263–292.
- Stulz, René, 1990, Managerial discretion and optimal financing policies, *Journal of Financial Economics* 26, 3–27.
- Tashjian, Elizabeth, Ronald Lease, and John McConnell, 1996, Prepacks: An empirical analysis of prepackaged bankruptcies, *Journal of Financial Economics* 40, 135–162.
- Titman, Sheridan, and Roberto Wessels, 1988, The determinants of capital structure choice, *Journal of Finance* 43, 1–19.
- Wilner, Rich, 1986, Securities value conflict impedes Salant's Chapter 11, *Daily News Record*, June 24.