The Costs of Bankruptcy: Chapter 7 Liquidation versus Chapter 11 Reorganization

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ABSTRACT

Our paper explores a comprehensive sample of small and large corporate bankruptcies in Arizona and New York from 1995 to 2001. Bankruptcy costs are very heterogeneous and sensitive to the measurement method used. We find that Chapter 7 liquidations appear to be no faster or cheaper (in terms of direct expense) than Chapter 11 reorganizations. However, Chapter 11 seems to preserve assets better, thereby allowing creditors to recover relatively more. Our paper also provides a large number of further empirical regularities.

OUR PAPER ANALYZES THE LARGEST SAMPLE OF CORPORATE bankruptcies to date. We research approximately 300 cases from the Arizona and New York federal bankruptcy courts from 1995 to 2001. These cases consist of (1) both publicly traded and privately held corporations, and (2) both Chapter 7 liquidations and Chapter 11 reorganizations. This sample is practically the entire population of unique corporate bankruptcies in these courts.

Our paper's primary objective is to measure how the two available bankruptcy procedures differ, especially but not only in terms of cost. We explore four variables, namely: the change in the estate's value during bankruptcy (a measure of indirect costs), the time spent in bankruptcy (another and more common measure of indirect costs), the expenses submitted to and approved by the bankruptcy court (a measure of direct costs), and the recovery rates for creditors and APR violations. Our most important findings are that Chapter 7 liquidations are not cheaper than Chapter 11 reorganizations, particularly after we control for endogenous self-selection of firms into bankruptcy procedure. Bankruptcy professionals (attorneys, accountants, trustees) regularly end up with most of the post-bankruptcy firm's value in Chapter 7.

Our paper challenges the conclusions of earlier literature that suggest that bankruptcy costs are "modest." Instead, we interpret the data as telling us that bankruptcy costs are very heterogeneous. Moreover, bankruptcy costs are measurement sensitive. For example, the conclusions one draws depend on whether one uses at-bankruptcy declared values or end-of-bankruptcy declared values, whether one believes the value declarations filed by management, and whether one reports means or medians. At the onset of bankruptcy, the eventual costs are quite predictable and different across cases. The regression suggests fitted values that range between 0% and 20% of assets.

Given that our study is the first to our knowledge that has access to a complete sample of ordinary corporate bankruptcies, we indulge in an exploration of bankruptcy-related variables. We uncover a number of interesting regularities—too numerous to list comprehensively here. For example, bankruptcy courts approve almost all requested expenses; the three phases of Chapter 11 bankruptcies take about equally long; firm scale is strongly related to the presence of a creditors' committee, to the choice of Chapter, and to total and debtor bankruptcy expenses; firm scale is fairly unrelated to percent value changes in bankruptcy, time needed to emerge from bankruptcy, and creditor recovery rates; the larger the management's ownership, the longer is the delay in filing a reorganization plan; the particular bankruptcy judge matters for APR violations and length of time in bankruptcy, but not recovery rates; and, creditor organization (bank presence, creditors' committee, number of creditors) and indebtedness often matters (but not in all regressions).

We review the literature in Section I and describe the data in Section II. We examine asset values changes in bankruptcy in Section III, bankruptcy duration in Section IV, legal and administrative court-reported fees and creditor recovery in Section V, and APR violations in Section VI. We take a brief look at the role of courts and judges in Section VII, before we conclude in Section VIII.

I. Related Literature

Our paper is related to the literature that focuses on estimating the costs of two bankruptcy procedures: cash auction procedures (i.e., Chapter 7s) and negotiation procedures (i.e., Chapter 11s).

With respect to Chapter 11 reorganizations, the literature offers mixed conclusions, perhaps due to variation in sample sizes and sample periods. Previous results mostly draw conclusions from the relatively small number of public corporations. Warner (1977) finds that the direct costs of Chapter 11 bankruptcy—compensation provided to lawyers, accountants, consultants, and expert witnesses—for 11 railroads are about 4% of the market value of the firm 1 year prior to default. Altman (1984) calculates these costs to be about 7.5% of firm value using a broader sample of 19 bankrupt companies from 1974 to 1978. Using 105 Chapter 11 cases from the Western District of Oklahoma, Ang, Chua, and McConnell (1982) report that administrative fees are about 7.5% of the total liquidating value of the bankrupt corporation's assets. Weiss (1990), Betker

(1995), and Tashjian, Lease, and McConnell (1996) provide similar estimates, relying on samples of 31 public Chapter 11 firms, 75 public and private Chapter 11 firms, and 49 pre-packed Chapter 11 firms, respectively. Lubben (2000) calculates in his sample of 22 firms from 1994 that the cost of legal counsel in Chapter 11 bankruptcy represents about 1.8% of the distressed firm's total assets, though it can be as high as 5% in some cases—in the average case, the debtor spends $500,000 on lawyers, and creditors spend $230,000. LoPucki and Doherty (2004) examine professional fees in a sample of 48 cases from 1998 to 2002, mostly from Delaware and New York. They report that professional fees are 1.4% of the debtor's total assets at the beginning of the bankruptcy case. Our view from reading the literature is that it is divided. For example, Altman (1984), Hotchkiss (1995), and Weiss and Wruck (1998), among others, consider Chapter 11 costs to be high, whereas Alderson and Betker (1995), Gilson (1997), and Maksimovic and Phillips (1998) consider costs to be low.

There is less evidence regarding bankruptcy-related cash auction systems. Pulvino (1998) examines commercial aircraft sales, and finds that asset fire sales can depress asset values. Stromberg (2000) also finds that asset fire sales and resales to management can lead to striking inefficiencies in the cash auction system. Lawless et al. (1994) and White (1984) find that bankruptcy costs consumed a large fraction of pre-bankruptcy assets in small Chapter 7 cases before the 1994 Bankruptcy Reform Act.

The controversy is even more lively when it comes to APR violations and recovery rates. Franks and Torous (1989) find that APR violations are frequent in a sample of 30 firms. Eberhart, Moore, and Roenfeldt (1990) and Betker (1995) confirm regular APR violations under Chapter 11, arguing that this may undermine the efficiency of ex ante contracts. Such Chapter 11 violations—we document that on occasion judges have deliberately used them to punish parties—are in contrast to a strict APR adherence in Chapter 7 procedure. When it comes to recovery rates, Pulvino (1999) exploits a large sample of Chapter 7 and Chapter 11 filings by nine U.S. airlines (43 subsidiary or individual airplane sales in Chapter 7 and 107 in Chapter 11) and finds that prices obtained in asset sales by firms reorganized under Chapter 11 are not greater than those obtained by Chapter 7 firms. However, Pulvino does not report information on bankruptcy costs, and his sample is not representative of the typical bankruptcy. Our study offers the most comprehensive data for both Chapter 7 and Chapter 11 within the United State. Moreover, we examine various measures of bankruptcy costs with the same sample.

Some recent studies turn their attention to bankruptcy procedures outside the United States. Using a rich data set from Swedish bankruptcy courts, Stromberg (2000) cautions that the efficiency of the cash auction procedure may be severely impaired by how the assets are auctioned. Eckbo and Thorburn (2002, 2003) show that both the outcome of the auction procedure and the resulting management turnover can vary dramatically, depending on CEO private benefits and the strategic role played by major creditors. Ravid and Sundgren (1998) find that the U.S. bankruptcy system is more efficient than the Finnish code, which is essentially an auction procedure. In contrast, Thorburn (2000)

argues that the Swedish auction system is much faster and much cheaper than the U.S. Chapter 11 process.

Our conclusion that Chapter 7 liquidation has very little to offer unsecured creditors differs so markedly from Thorburn (2000) that elaboration is in order. Both studies explore bankruptcy procedures that are essentially cash auctions. Thorburn (2000) shows that the Swedish procedure has slightly higher direct costs than either Chapter 7 or Chapter 11 in the United States but Swedish bankruptcy takes only 2.4 months to complete, versus the 23 months we document for the U.S. Chapter 7 procedure. We find that unsecured creditors in Chapter 7 rarely receive anything, although unsecured creditors in Chapter 11 do recover about one-third to one-half of their claims. This is not attributable to differing degrees of indebtedness or firm size.

There are at least four possible explanations for the discrepancy between studies. First, the majority of the Swedish bankrupt firms (74% of sample firms in Thorburn (2000)) are sold as "going concerns," whereby the appointed trustees have to run the business until the case is closed. In this case, being time constrained and running multiple bankruptcies at the same time may motivate the trustees to sell the bankrupt firm sooner rather than later. In contrast, U.S. firms in Chapter 7 cases usually cease as going concerns immediately after the trustee takes over—the trustee's major responsibility is to oversee and liquidate the remaining assets rather than manage the bankrupt firm. Second, the speed with which the Swedish trustees handle cases directly influences their reputations and future employment opportunities (Stromberg (2000, p. 2647)). In contrast, U.S. trustees are neither judged nor compensated by the speed with which they handle cases (U.S. Bankruptcy Code §326(a)). Third, Swedish Bankruptcy Law forbids running the firm's operations for more than 1 year, except under extraordinary circumstances and only if the court approves such (Stromberg (2000)). In contrast, the U.S. Code puts no limit on the length of the proceedings. Fourth, a myriad of other economic and noneconomic differences between the two countries, ranging from judicial to cultural differences, influence the way in which bankruptcy happens.

II. Bankrupt Firm Characteristics

A. The Sample

Our sample consists of all corporate bankruptcies filed under Chapter 7 and Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona (AZ) and Southern New York (NY) with sufficient data. Only these two courts have made their past cases available on the *Pacer* (Public Access to Court Electronic Records) service, which provides the full-text source for bankruptcy documents. From 1995 to 2001, each court handled about 5,200 business bankruptcies, which places both of them around rank 15 among the 94 U.S. bankruptcy courts. About half of all bankruptcy cases are routinely dismissed or transferred to other courts shortly after filing—we omit such cases. Further, we delete about 2,000 cases that are subsidiaries of one company, rather

than individual bankruptcy cases. We also exclude bankruptcies designated as "pre-packs," which can take as little as 2 weeks to resolve. After eliminating and consolidating such cases, there are "only" 225 unique corporate Chapter 11 cases and "only" 61 unique corporate Chapter 7 cases. We believe this is the largest and most comprehensive sample of corporate bankruptcies assembled for an academic paper. We note, however, that the sample period unfortunately does not include a recession.

Our Chapter 11 sample is roughly equally split across NY (117 cases) and AZ (108 cases), but there are more Chapter 7 cases in NY (50 cases) than in AZ (11 cases). As of late 2004, eleven Chapter 11 cases in AZ had not yet closed. When required, we estimate the remaining duration from bankruptcy cases that had taken at least as long, but had already closed. Our results reported below—especially the inference about time in bankruptcy—do not change if we simply winsorize these cases as if they were closed at the end of our sample or if we omit them.

All data are hand coded from the full bankruptcy documents. Although the forms are standardized, each firm reported its information in a different format. Some firms did not even report basic data, such as assets, despite a legal requirement to do so. In some cases, we have no choice but to discard the entire observation. In other cases, we can use an observation in some tests, but not in others.

To summarize, our database is quite comprehensive and tracks firm history from bankruptcy filing through September 2004. This database provides information on firm characteristics, creditor characteristics, judge characteristics and behavior, expenses, duration of proceedings, recovery rates, frequency of APR violations, and case outcome. Because we cannot possibly hope to describe here all interesting correlations in our data, we make our database publicly available to researchers, so that any interested reader can recompute the relevant statistics.

B. Pre-bankruptcy Firm Characteristics

Table I describes the characteristics of our firms as they entered bankruptcy. The median Chapter 11 bankruptcy is about 10 times as large as the median Chapter 7 bankruptcy—the mean difference is greater because the sample contains some extremely large Chapter 11 cases. (Subsequent results are equally weighted to not place too much weight on such firms.) Differences in indebtedness are surprisingly modest—the typical Chapter 7 case is no more underwater than the typical Chapter 11 case. Chapter 11 firms seem to have more secured debt, but the median fraction of secured creditors is the same. (Two Chapter 7 and two Chapter 11 cases had exclusively secured debt; 44 Chapter 11 cases and 20 Chapter 7 cases had exclusively unsecured debt.) The median Chapter 11 firm—much larger in terms of assets—has about twice as many creditors as the median Chapter 7 firm. In our Chapter 7 cases, at least one bank is among secured creditors in 31% of our cases and among unsecured creditors in 37% of our cases. In our Chapter 11 cases, a bank is among secured creditors in

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Table I
Descriptive Statistics

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Sample data are handcoded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases).

		N	Mean	SD	Min	Median	Max
Pre-bankruptcy	Chapter 7	61	$501,886	$1,271,522	$0	$110,813	$7,921,000
assets	Chapter 11	225	$19,800,000	$71,900,000	$0	$1,200,000	$712,000,000
Debt/assets ratio	Chapter 7	56	5.37	12.81	0.09	1.68	88.96
	Chapter 11	221	5.71	30.20	0.01	1.25	370.15
Secured debt to	Chapter 7	36	37.03%	42.22%	0%	12.30%	100%
total debt ratio	Chapter 11	222	47.64%	36.52%	0%	45.94%	100%
Total number of	Chapter 7	58	27	33	0	12	158
creditors	Chapter 11	216	159	538	1	23	5004
% of secured	Chapter 7	58	4.56%	4.88%	0%	8.70%	5.06%
creditors	Chapter 11	216	4.49%	10.53%	0%	8.70%	16.29%
Secured debt includes	Chapter 7	45	31.11%	46.82%	0	0	1
banks (Y/N)	Chapter 11	176	36.93%	48.40%	0	0	1
Unsecured debt includes	Chapter 7	46	36.96%	48.80%	0	0	1
banks (Y/N)	Chapter 11	176	18.18%	38.68%	0	0	1
Equity owned	Chapter 7	61	32.19%	44.31%	0%	0%	100%
by managers	Chapter 11	225	42.59%	45.27%	0%	20%	100%

37% of our cases, and among unsecured creditors in 18% of our cases.[1] Finally, managers tend to own more equity in Chapter 11 cases than in Chapter 7 cases. Though not reported here, AZ and NY cases tend to be similar in terms of the variables reported in Table I.

C. Determinants of Choice of Procedure

Table II investigates whether firms systematically begin their bankruptcies differently in terms of three binary choices: whether they work with an unsecured creditors' committee, whether they file voluntarily, and whether they file for Chapter 7 (vs. Chapter 11). These choices are endogenous, and self-selection

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[1] This masks the fact that banks are usually the secured and senior creditor (see Welch (1997)). In Chapter 11 (Chapter 7), of 176 (24) sample cases with both secured and unsecured credit, 39 (2) had a bank among the secured creditors, and 7 (5) had a bank among unsecured creditors. To complete the picture, 75 (9) had both secured and unsecured creditors but no banks; 55 (8) had both secured and unsecured creditors both including a bank.

Table II

Determinants of Procedural Choices: Unsecured Creditor Committee Presence—Creditors Forced Bankruptcy—Chapter Choice

Specification: The probit estimation for the existence of a creditors' committee includes only Chapter 11 cases. The probits for the choice of Chapter 11 (=1) vs. Chapter 7 (=0), and for Forced Filing (=1) vs. Voluntary Filing (=0) include both Chapter 11 and Chapter 7 observations. *t*-statistics below coefficient estimates are in absolute value. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Probits	Presence of Creditors' Committee (Y/N)	Forced Petition (Y/N)	Chapter 11 (Y/N)
(*SD* of Dependent Variable)	(0.35)	(0.24)	(0.46)
Number of secured creditors/100	7.008*	−36.701**	32.688***
	[1.85]	[2.05]	[2.65]
Number of unsecured creditors/100	0.091	0.142	0.199
	[1.28]	[1.36]	[0.90]
Secured debt includes ≥ 1 bank (Y/N)	0.030	−0.330	−0.784**
	[0.11]	[0.53]	[2.53]
Unsecured debt includes ≥ 1 banks (Y/N)	−0.993**	−0.230	−1.239***
	[2.41]	[0.40]	[3.79]
Equity owned by managers (%)	−0.003	−0.000	0.006*
	[1.25]	[0.06]	[1.78]
Secured debt to total debt	−0.284	−0.468	−0.278
	[0.72]	[0.55]	[0.74]
Debt/assets > 100% (Y/N)	1.181***	0.200	0.711**
	[3.99]	[0.55]	[2.32]
Total assets	−15.258*	−618.515	−11.514*
	[1.83]	[.]	[1.93]
Total assets × (assets > $100K)	15.082*	617.337***	12.657**
	[1.83]	[536.30]	[2.31]
Total assets × (assets > $1M)	0.264	1.186	−0.937
	[0.54]	[1.09]	[1.06]
Total assets × (assets > $10M)	−0.071		
	[1.07]		
χ^2-test (asset variables = 0) (*p*-value)	0.01**	0.00***	0.00***
Arizona dummy	−0.683**	−0.012	0.432
	[2.42]	[0.03]	[1.37]
Constant	−1.595***	−0.860	−0.108
	[3.63]	[1.38]	[0.29]
Observations	198	166	167
R^2	0.37	0.21	0.35

could contaminate our later attempts to determine the influence of other variables on procedural costs and outcome. Thus, in later regressions, we control for the self-selection into bankruptcy chapter (Chapter 7 or Chapter 11). We also experiment with endogeneity control for the other two choices (committee and who filed), but this ultimately matters little, so we do not report the related results.

Creditors' Committee. The court appointed a committee to represent unsecured creditors in 45 out of our 225 Chapter 11 cases. The left probit investigates the formation of a creditors' committee, which represents unsecured creditors. Under §1102 and §1103 of the Code, the trustee shall appoint a committee of creditors consisting of the persons that had the seven largest claims against the debtor. The committee has the right to employ attorneys, accountants, and other experts, and to request reimbursement from the court. Table II shows that the formation of a committee is reasonably predictable, with an R^2 of 37%. Firms with large scale (assets), firms in NY, firms without a bank among the unsecured debt (which could conceivably represent the unsecured creditors to the court), and very underwater firms tend to form creditors committees.

Petition Source. Under §301(a) of the Code, creditors can force bankruptcy if at least three secured creditors are out of money. Their claims must aggregate to at least $10,000 more than the value of any lien on property of the debtor securing such claims in order for an involuntary petition to be eligible for filing by these creditors. If there are fewer than 12 secured creditors, the petition can be filed by one or more of such holders who holds in the aggregate at least $10,000 of such claims. Therefore, under the bankruptcy code, forced filings are only possible when secured creditors are sufficiently concentrated. In our sample, 161 out of 166 of our bankruptcies were filed "voluntarily" by the firm (presumably under creditor threat), rather than forced by creditors. Our middle probit predicts whether some variables change this propensity. Only two variables stand out: our five forced firms were relatively smaller ($1.5 million on average) and had fewer secured creditors.

Bankruptcy Chapter. The focus of our paper is the most important choice of a bankrupt firm—whether to file for Chapter 7 or Chapter 11. If firms identifiably self-select, then it could be misleading to compare the cost of procedures, without controlling for endogeneity of chapter choice. The right probit shows that the choice of procedure is indeed correlated with a number of identifiable firm characteristics.

In the text, we often report the standardized beta coefficient for regression variables, and use this to gauge the relative importance of different variables (provided we have statistical significance). We multiply the estimated coefficient by the standard deviation of the independent variable, and divide it by the standard deviation of the dependent variable. The resulting number measures what fraction of the range of the dependent variable is implied to be explained by the range of the independent variable. The standardized beta is one among a number of reasonable measures of economic significance.

Listing the variables that help predict the choice of procedure, in rough order of importance:

- Firms are more likely to file for Chapter 11 when they are not tiny. For assets above $100,000, estimated coefficients need to be added to ascertain size. The propensity to reorganize is thus strongest in the $100,000 to $1 million category, and is still positive but diminishing when assets are above $1 million. (Reducing the number and type of asset controls makes no difference in later results.)
- Although Chapter 11 cases are larger, there is considerable overlap—from the perspective of asset scale, a good number of firms could have chosen either procedure. This is even easier to see in Figure 1 below.
- Firms that have a large number of secured creditors are more likely to file for Chapter 11 reorganization than Chapter 7 liquidation (standardized beta, 240%). This could point to coordination problems among creditors, with debtors recognizing that Chapter 11 could overcome this type of obstacle and result in a viable reorganized firm after bankruptcy.
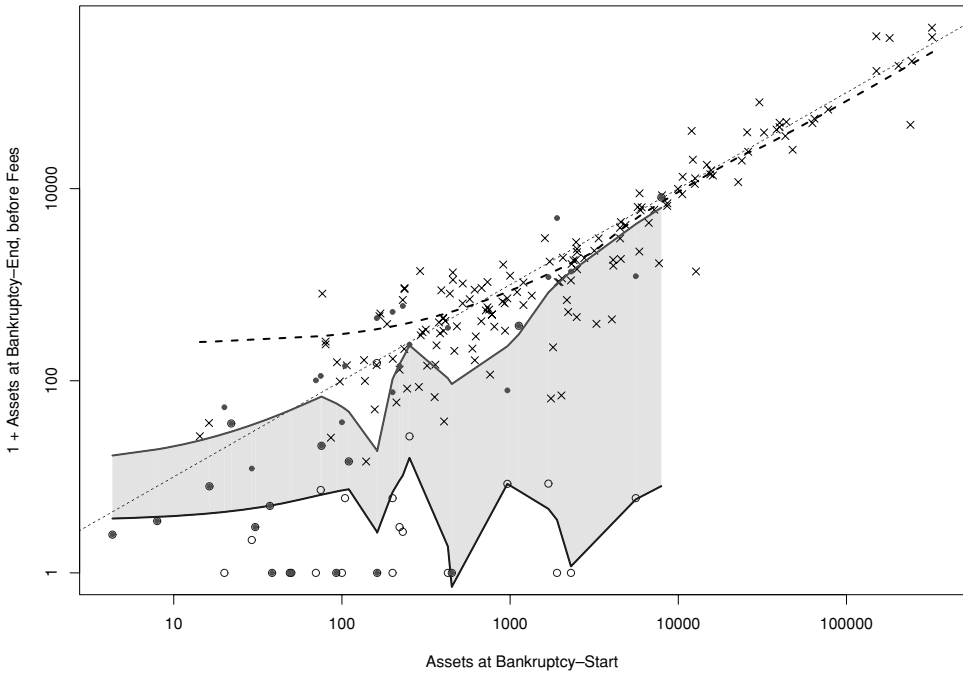
Figure 1. Pre-bankruptcy vs. Post-bankruptcy Pre-fee Assets (thousand dollars). Crosses are Chapter 11 cases. Circles are Chapter 7 cases—empty circles denote the pessimistic bound (with secured recovery assumed to be only what is in the court-filed documents), filled circles the optimistic bound (1.3 times pre-bankruptcy assets, up to the secured obligation). The dotted line is one-to-one correspondence between pre- and post-bankruptcy assets (before fees). The three fatter lines are Cleveland's (1981) locally weighted regression smoothers with a parameter of 0.25. The lower two smoothed lines are for Chapter 7 observations, and shaded between the pessimistic and optimistic estimates. The figure shows that Chapter 11 cases tend to retain assets better. Small Chapter 11 cases even appear to improve assets over the course of the bankruptcy.

- Firms in which a bank is a creditor—especially an unsecured creditor—are more likely to choose liquidation over reorganization (standardized beta, 130%). This is consistent with the view that pre-bankruptcy negotiations are more likely to occur when the main creditor is a bank, and this bank has already shown itself unwilling to compromise.
- Firms that are more underwater tend to prefer Chapter 11 reorganization over Chapter 7 liquidation (standardized beta, 80%). This could imply that firms not underwater that filed for Chapter 7 did so under economic, rather than financial, distress.

We use this probit regression as a first-stage control for endogenous self-selection in subsequent "treatment" and "Heckman (1979)" second-stage regressions. We also experiment with first-stage probits that rely on fewer, more carefully chosen variables, and with probits that focus only on observations used in a particular second-stage regression. Such first-stage variations make little or no difference in the second-stage regression results reported below. (In retrospect, this is not surprising. Regressions are fairly robust to endogeneity in terms of coefficient estimates *other* than the coefficient estimate of the specific first-stage procedural choice variable itself. This is the case in Heckman (1979), and such is the case here.)

III. Indirect Bankruptcy Cost: Reported Asset Value Changes during Bankruptcy

A. Descriptive Statistics

Upon entering bankruptcy, firms must fill out a standard form with declarations of their business outlook and financial situations, specifically their assets. (Debtors later collect more information, including more detailed financial statements.) Many firms exercise discretion in filling out the form. For instance, some firms report values excluding intangible assets, while other firms include them. Moreover, the reported numbers are not necessarily market values—especially for intangible assets, this could itself depend on whether the firm continues, is parceled up, or liquidated. (Unfortunately, we do not have data to distinguish between tangible and intangible assets.) Yet, these are the most accurate valuations available to academic research, so the reader must remain cognizant of their limitations.

At the end of bankruptcy, we again obtain information on firms' values through the declaration of the distributions. Our exit valuations are the sum of interim and final expert fees and creditor recovery—some of these were explicitly reported to be zero. (We never impute zero for missing or dubious values!) However, there is one important complication. In Chapter 11, when assets are sold, regardless of whether they are collateral, the cash returns to the estate and is thus recorded in the case. In Chapter 7, however, secured creditors can lay claim on their security, because continuation is not an argument that the

firm can muster to resist seizure.[2] For such direct asset seizures, both assets and claims should not appear in the final Chapter 7 bankruptcy declaration. Moreover, we cannot track the seizures because such claims are only recorded in the local courthouse that corresponds to where the assets are located. Because there is not even a central directory of where assets might be located, we cannot possibly trace them. Hence, we must consider the recorded Chapter 7 distributed assets to secured creditors (and the post-Chapter 7 assets) as a lower bound. For measuring at-exit values, our paper thus entertains two versions for secured creditor recovery. The lower, pessimistic bound uses only the recorded distributions in bankruptcy. For an upper, very optimistic bound, we double the highest observed total distribution to secured creditors in Chapter 7 (1.3 times the pre-bankruptcy assets). We therefore assume here that up to $1.3 \times 2 = 2.6$ times reported pre-bankruptcy assets were available to satisfy (up to 100% of) the secured claims.[3] In most but not all cases, this de facto assumes full satisfaction of secured claims. In contrast, the post-bankruptcy asset values and therefore recovery statistics for unsecured creditors are at least as trustworthy for Chapter 7 cases as they are for Chapter 11 cases.

The change in firm value during bankruptcy is interesting for two reasons. First, it can be considered a noisy measure of the indirect cost of bankruptcy. Second, earlier research typically measures legal fees as a fraction of reported assets upon entry into bankruptcy. However, such fees may appear relatively small either if at-entry bankruptcy assets are overstated, or if the bankruptcy itself dissipates assets rapidly—in which case, not much may be left to distribute in fees.

The left columns in Table III show that the median Chapter 11 case enters bankruptcy about 10 times larger than the typical Chapter 7 case. (The mean assets are 40 times larger.) The 75th percentile of Chapter 7 cases is about the same size as the 25th percentile of Chapter 11 cases. The middle columns show that total assets at the conclusion of bankruptcy, available to satisfy both

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[2] When a firm enters bankruptcy, there is an automatic stay of all collection efforts, including foreclosure of liens. A creditor can move to vacate the stay. The two principal criteria for vacation of a stay of secured creditor collection are: (a) the debtor has no equity in the collateral; and (b) the collateral is not necessary for an effective reorganization. A debtor in Chapter 7 has no chance to survive, and thus criterion (b) is always satisfied for Chapter 7. Regarding (a), if there is equity above the value of the secured creditor's lien, the trustee will sell the collateral and remit the average to general creditors. If there is no equity, criterion (a) is satisfied and the creditor forecloses. Because Chapter 7 debtors usually have no equity in the collateral (Table I shows that the median equity holdings of management ownership in Chapter 11 cases is zero; equity holdings of management is the only equity information for which we have reliable information), there usually is no secured property to be listed in an asset schedule. In contrast, in Chapter 11, for obvious reasons, the stay is commonly not vacated. And if the firm emerges, the secured creditor's lien continues (or it is given new debt), but the property usually stays.

[3] If one assumes 100% recovery for secured creditors, our results are robust—after eliminating one case, in which secured creditors were owed $169 million and the firm recorded $7.9 million in pre-bankruptcy assets and $7.3 million in secured payout, that is, where 100% assumed recovery would come to 90 times the assets. Not reported: Our results also hold up if we winsorize dependent and independent variables at reasonable levels.

experts and creditors, are considerably smaller than assets upon entry into bankruptcy for Chapter 7 cases. The right columns show that even assuming our overly optimistic secured recovery rate, Chapter 7 assets drop by at least 20% in mean and 62% in median. Assuming our overly pessimistic reported-only creditor recovery, the median Chapter 7 dissipates substantially all its assets, even before any fees are paid. In contrast, our Chapter 11 cases report that they exited bankruptcy with assets that were pretty similar to those reported upon entry into bankruptcy. The median value change is −13%; the mean value change is +7%. (Not reported, there is no obvious scale difference between cases filed in NY and AZ.)

Of course, firms, lawyers, unsecured creditors, and managers—though not the secured creditors—have incentives to overstate assets at Chapter 11 exit. Because it is not clear how accurate Chapter 11 post-bankruptcy values are, and because we suspect some value padding at bankruptcy exit, we try to track the firms. For our 225 Chapter 11 cases, we cannot locate 64 firms after bankruptcy. Of the remaining 161 firms, 11 still remained in the original bankruptcy process. Thus, we can determine the eventual fate of about 150 Chapter 11s: 15 firms emerged and later filed for Chapter 7, 53 were later liquidated, 78 continued as independent companies, 3 merged, and 1 refiled for Chapter 11. Thus, despite gaining value in Chapter 11, only about half of our Chapter 11 firms seem to ultimately survive healthy. We consider this to be a mild indication that the Chapter 11 exit values are optimistic.[4]

Figure 1 plots Chapter 7 and Chapter 11 assets before and after bankruptcy. The figure shows that the pessimistic lower bound for Chapter 7 cases is uniformly such that post-bankruptcy values are less than pre-bankruptcy, with one exception for the highest valued Chapter 7 case.[5] Even if we use the upper bound—our optimistic secured recovery, in which we gross up some observations to twice the pre-bankruptcy asset values—the Chapter 7 value decline seems worse than the Chapter 11 value decline. Equally remarkable to us, Chapter 11 cases asset changes are very heterogeneous. However, a one-to-one correspondence on average between pre- and post-bankruptcy recorded assets is not an unreasonable assumption, especially for larger bankruptcies—even though in one outlying Chapter 11 case, post-bankruptcy assets were over 10 times pre-bankruptcy assets.[6] There is also some regression to the meaning—the lowest

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[4] Kahl (2002) shows that in about one-third of the 102 firms in his sample of Chapter 11 cases, the firm survives as an independent company.

[5] *ES& US Corporation* (Case NY-99-10280) is our largest Chapter 7 case, a real estate holding company with one asset, a building at 34–36 West 32nd Street in New York. Its bankruptcy started out as a Chapter 11, but the secured creditors managed to convince Judge Gallet that the company had no good reorganization plan. It was therefore converted into a Chapter 7 bankruptcy, in which the secured creditors received the building, and were therefore fully satisfied. It is the only Chapter 7 case for which we find post-bankruptcy assets equal to pre-bankruptcy assets.

[6] *Quick Interiors* (Case NY-97-45020) had declared assets of $76,484 at bankruptcy entry. Oddly, secured creditors were owed $129,064 and were paid in full. Further, fees of $677,105 were paid, mostly to the creditors' committee. This again makes it clear how important it is to check robustness of results, winsorize, etc.

Table III

Distribution of Pre-bankruptcy Assets and Post-bankruptcy, Pre-fees Assets

Variables: Pre-Bankruptcy Assets are declared in the initial filing as "value of assets." *Post-bankruptcy, Pre-fee Assets* are calculated as percent recovery rates by creditors times amount owed to creditors, plus total legal fees disclosed and reimbursed by the court. "Optimistic Secured Recovery" assumes secured creditors can satisfy their claims as long as they do not exceed more than 2.6 times reported pre-bankruptcy assets. "Reported Secured Recovery" omits the value of collateralized assets that secured creditors could seize outside of the bankruptcy proceedings. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases).

| | Pre-bankruptcy | | Post-bankruptcy, Pre-fees | | | Ratio Post-Pre-bankruptcy | | |
| | | | Chapter 7 Secured Recovery Is: | | | Chapter 7 Secured Recovery Is: | | |
	Chapter 7	Chapter 11	Reported	Optimistic	Chapter 11	Reported	Optimistic	Chapter 11
N	61	225	50	50	157	34	34	152
Mean	$501,886	$19,800,000	$158,989	$388,339	$20,400,000	17.2%	80.0%	106.5%
SD	$1,271,522	$71,900,000	$1,035,574	$1,249,510	$68,800,000	35.2%	89.9%	83.2%
Minimum	$0	$0	$0	$0	$13,427	0.0%	0.0%	3.4%
Quartile 1	$49,000	$315,146	$0	$0	$335,341	0.0%	10.7%	55.3%
Median	$110,813	$1,100,000	$0	$6,593	$1,040,385	0.8%	38.0%	86.9%
Quartile 3	$278,900	$5,863,500	$0	$139,650	$6,529,087	12.3%	136.0%	120.4%
Maximum	$7,921,000	$712,000,000	$7,328,549	$7,328,549	$474,000,000	158.9%	278.2%	474.8%

pre-bankruptcy asset Chapter 11 cases tend to end up with relatively more assets post-bankruptcy.

Our first conclusion is that this evidence does not suggest that Chapter 7 cases are better at retaining value throughout the bankruptcy process than Chapter 11 cases. There are a number of possible explanations. First, Chapter 7 liquidations could be fire sales at the wrong time (as in Shleifer and Vishny (1992)). However, this is not consistent with the fact that the typical Chapter 7 case takes 2 years to unwind. Second, it could be that Chapter 11 firms are more pessimistic in estimating firm value at bankruptcy entry—although there is no ex ante reason to believe this. Third, Chapter 11 firms could be more optimistic in estimating firm value at bankruptcy exit, which is in the interest of some, but not all parties, and for which we provide some anecdotal evidence (poor ultimate corporate survivorship) above. Fourth, a combination of the preceding factors could be at work. Without an independent and unbiased value assessment, these causes cannot be disentangled.

Our second conclusion will be that the measurement of the estate value in bankruptcy—and therefore the measurement of fees as a fraction of the estate value, as we show below—is sensitive to specification and sample.

B. Determinants

In this section, we try to answer the following questions: How well do firms hold their value during the bankruptcy process *before* we subtract the direct bankruptcy costs? Is the poor performance of Chapter 7 cases due to differences in firm type or due to measurable factors? Or is the performance just equally bad in all bankruptcies?

Table IV introduces our reporting format for second-stage regressions. We attempt to entertain the same set of regressors in all regressions. As independent variables, we usually include: multiple nonlinear controls for assets; the degree to which the firm is underwater; the fraction of debt that is secured; the number of creditors, both secured and unsecured; the presence of a bank among creditors, secured or unsecured; the presence of a creditors' committee;[7] whether the firm or creditors initiate bankruptcy; and the jurisdiction. In the right-most Heckman regressions, we also control for fixed effects caused by differences in judges.

Our most interesting variables relate to the observed choice of procedure. The left-most regression is simple ordinary least squares (OLS), which ignores self-selection but does include the *actual* choice of chapter as a dummy. The coefficient measures both the influence of the procedure itself, and the differences between firms that choose Chapter 7 and firms that choose Chapter 11—the self-sorting effect. The remaining three regressions seek to disentangle these two effects by relying on the predictions from the procedural choice

[7] These are creditor coordination measures. The number of unsecured creditors matters less than the number of secured creditors because unsecured creditors are often syndicated in a creditors' committee and therefore can behave as a single creditor.

Table IV
Determinants of Percent Changes in Reported
Assets during Bankruptcy

The variables are named to make identification easy. The dependent variable is the ratio of the post-bankruptcy, pre-fees assets divided by pre-bankruptcy assets, as described in Table III. The variables include conversion from Chapter 11 to Chapter 7; length from filing to closing; forced petition, equal to one if filed by creditors; bank presence equal to one if at least one bank is among creditors; the total bankruptcy assets and percent of equity owned by managers, both declared by the firm in the original case filing; and expense components, as described in Table X. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Methods:* The Treatment Effects regression is estimated with both Chapter 7 and Chapter 11 cases. The Heckman regressions include only Chapter 11 cases. (The first step for Treatment and Heckman regressions is the procedure logit from Table II.) Boldfaced variables and "pluses/minuses" indicate where our text attributes robust statistical significance to a variable. *t*-statistics below coefficient estimates are in absolute value. *, **, and *** denote two-sided statistical significance at 10%, 5%, and 1%, respectively.

(*SD* of Dependent = 1.09)		OLS	Treatment Effects	Heckman	Heckman
Inverse Mills Ratio			sig*	insig	sig*
Chapter 11 (Y/N)	+	0.785***			
		[4.06]			
Chapter 11	+		1.373***		
(Y/N)—instrumented			[3.57]		
Conversion from Chapter 11		−0.114	−0.107		
(Y/N)		[0.56]	[0.53]		
Length of proceedings		0.010	−0.000	0.034	0.126
in days (log)		[0.10]	[0.00]	[0.36]	[1.07]
Forced petition (Y/N)	−	−0.667**	−0.608**	−0.730	−0.345
		[2.51]	[2.07]	[1.61]	[0.80]
Unsecured committee (Y/N)	−			−0.401*	−0.321
				[1.92]	[1.36]
Number of unsecured		−0.012	−0.018	−0.011	−0.006
creditors/100		[0.71]	[1.06]	[0.61]	[0.30]
Number of secured		−0.049*	−0.077***	−0.039	−0.008
creditors/100–		[1.95]	[3.09]	[1.28]	[0.23]
Secured debt includes banks		0.030	0.110	−0.037	−0.005
(Y/N)		[0.25]	[0.85]	[0.28]	[0.03]
Unsecured debt includes		−0.160	0.071	−0.135	−0.163
banks (Y/N)		[1.15]	[0.39]	[0.82]	[0.77]
Equity owned by managers (%)		−0.002	−0.002	−0.001	−0.002
		[1.15]	[1.52]	[0.91]	[1.09]
Total expenses to	++	3.893**	3.952**		
pre-assets		[2.39]	[2.41]		
Debtor expenses to	++			1.072***	1.069***
pre-assets				[14.83]	[11.32]

(*continued*)

Table IV—*Continued*

(*SD* of Dependent = 1.09)		OLS	Treatment Effects	Heckman	Heckman
Unsecured expenses to Pre-assets	+			11.879** [2.37]	3.379 [0.74]
Secured debt to total debt	+++	0.544** [2.14]	0.454* [1.73]	0.470** [2.08]	0.268 [1.05]
Debt/assets > 100% (Y/N)	++++	0.575*** [4.90]	0.485*** [3.66]	0.669*** [4.90]	0.670*** [4.27]
Total assets		6.510 [0.93]	9.835 [1.29]	−2.294 [0.35]	−0.924 [0.12]
Total assets × (assets > $100K)		−6.300 [0.91]	−9.677 [1.28]	2.140 [0.33]	0.802 [0.10]
Total assets × (assets > $1M)		−0.199 [1.02]	−0.161 [0.80]	0.107 [0.50]	0.086 [0.41]
Total assets × (assets > $10M)	+	−0.008 [0.28]	0.005 [0.17]	0.050* [1.70]	0.038 [1.22]
χ^2-test (asset variables = 0) (*p*-value)		0.42	0.25	0.30	0.60
Arizona dummy	− − −	−0.184* [1.74]	−0.210** [2.03]	−0.328** [2.54]	
χ^2-test (Specific Judge Effects) (*p*-value)					0.00***
Constant		−1.655** [2.48]	−1.983*** [3.10]	−0.521 [0.79]	1.858 [1.55]
Observations		150	150	121	120
R^2		0.52	0.52	0.74	0.79

probit regressions from Table II. The "treatment effects regression" uses both Chapter 11 and Chapter 7 cases, and therefore requires variables to have data in both cases. The two Heckman regressions are run only among Chapter 11 firms, thereby allowing inclusion of variables that are available only in Chapter 11 cases (such as a breakout of debtor expenses). The two regressions differ in that the latter tests whether the identity of the judge matters. Because judges are unique to a district, including the full set of judge dummies, subsumes the dummy that distinguishes between AZ and NY.

In both treatment and Heckman regressions, the Inverse Mills Ratio controls for the effect that is due to intrinsic firm differences (self-selection). Unfortunately, its sign is meaningless (see, e.g., Maddala (1983, p. 261), Kenny et al. (1979)). (The coefficient is the correlation between the errors in the selection and model equations, and the standard error in the model equation. Because the latter is always positive, the sign of the coefficient of the Inverse Mills Ratio tells us the sign of the correlation between two residuals.) In the treatment regressions, the coefficient on the Chapter 11 dummy measures the effect that is due to the pure direct procedural difference itself.

While the four regression specifications do have different economic meanings, a variable that matters in all of them is easiest to interpret. Thus, next to the variable name, we visually indicate whether a variable is statistically significant with a "+" or "−" for each regression, and we box those variables that are universally significant. These visuals ensure that in-text interpretations remain reasonably consistent. We also try various stepwise regressions, and note in the text instances in which variables seem not particularly robust.

Table IV explains percent changes in assets during bankruptcy, using the pessimistic "reported-only" scenario on secured recovery. We shall note where this matters.

Ceteris paribus, the average Chapter 11 case retains value 78% better than the average Chapter 7 case (standardized beta, 30%). Controlling for self-selection (the effect of which differs by specification) increases this number to 137% (standardized beta, 50%). Unreported, under the pessimistic scenario, the average Chapter 11 case does "only" 35% better in the OLS regression, and 75% better after controlling for self-selection (both with *t*-statistics of 1.5).

Therefore, our evidence suggests that it is the Chapter 11 procedure itself, and not the self-selection, that results in better reported asset retention in bankruptcy—regardless of the type of firm that chooses Chapter 11. This could also be because Chapter 11 overstates the remaining assets. We conclude that Chapter 11 as a procedure is no worse for asset retention than Chapter 7: Depending on the assumption about secured creditor recovery, Chapter 7 asset retention is somewhere between "statistically significantly worse" and "considerably but not statistically significantly worse." The self-selection component partially, but never fully, obscures this relationship.

A number of other variables have interesting correlations here, too. Debtor expenses or total bankruptcy expenses are not associated with less asset retention. Both variables not only come in statistically significantly positive but are also the most economically significant variables (standardized coefficients of around 80% and 60%, respectively.) The regressions suggest that some other variables may play less economically or statistically important roles. Firms that are very underwater seem to retain value significantly better—almost 50% better (standardized beta, 20%–25%). In some stepwise regressions, this variable loses its economic importance however. Next, the fraction of secured debt among total debt matters, if not controlled for judge (standardized beta of around 10%–20%). The other statistically significant variables (such as the AZ dummy and the forced petition) have less than 10% standardized beta. Finally, the identity of the judge matters.

Surprisingly, the scale of the estate does not seem to matter strongly for asset retention. As a set, the four asset variables are statistically insignificant. To assess the effect of, say, a $5 million firm, one needs to add the coefficient estimates. When both Chapter 7 and Chapter 11 cases are included, the (summed) coefficient is always nonnegative. There is no clear monotonicity—larger cases

may have had worse asset retention. This can be seen in a simple classification of mean percent asset changes (the medians are similar):

		Scale			
		$0–$100k	$100k–$1m	$1m–$10m	$10m and above
Mean asset change,	Ch7	−64%	−84%	−66%	n/a
Mean asset change,	Ch11	+195%	+17%	−31%	+15%

IV. Indirect Bankruptcy Cost: Time in Bankruptcy

A. Overall Duration

The time in bankruptcy is interesting because previous studies (Franks and Torous (1989), Thorburn (2000)) argue that it is a (very noisy) proxy for indirect bankruptcy costs. The rationale is that indirect bankruptcy costs such as bankruptcy's adverse impact on product and capital markets increase with the time that firms spend in bankruptcy. A bankruptcy that takes 5 years to resolve is likely to incur more indirect costs than a bankruptcy that takes 3 months to resolve. As noted, the retention of asset value, as measured in our previous section, could be considered an alternative (inverse) measure of indirect bankruptcy costs, though it, too, is very noisy.

Table V shows that the average Chapter 7 and Chapter 11 bankruptcies take about 2 years to resolve. This is shorter than the 3.7 years that Franks and Torous (1989) report for Chapter 11 cases. It surprises us how long Chapter 7

Table V
Days in Bankruptcy

Sample data are handcoded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Methods:* All Chapter 11 means and medians are significantly different from their Chapter 7 equivalents at the 1% significance level. Tests of medians are based on two-tailed Wilcoxon tests.

	Chapter 11	Chapter 7	(Ch11 →Ch7) Conversions
N	257	116	42 (out of 116)
Mean	828	709	672
SD	391	367	334
Minimum	56	74	120
Quartile 1	550	440	428
Median	866	672	655
Quartile 3	933	936	859
Maximum	2,215	1,553	1,509

cases take: It appears that ordinary managerial agency problems are not responsible for the bankruptcy process lengthiness, because Chapter 7 cases are conducted by elected trustees, whose interest should be to wind down the case, and no longer in the interest of the firm but only of the creditors. The fact that our Chapter 7 cases take so long also contrasts with Thorburn (2000), which finds that the Swedish cash auction system takes only 2 months. While the Swedish cash auction system seems to be more efficient in terms of time, this seems peculiar to the Swedish system—it does not apply to U.S.-style liquidation of assets.

Conversions: We can classify cases that start out as Chapter 11 but then convert into Chapter 7 as Chapter 7 cases. Such conversions from Chapter 11 to Chapter 7 are governed by §1019 of the U.S. Bankruptcy Code, which states that, upon the conversion, a new period for filing claims starts. The debtor-in-possession or trustee previously acting in the Chapter 11 must turn over to the Chapter 7 trustee all records and property of the estate under its control. Under §1112(a), the debtor can convert a case to Chapter 7, except when (a) the debtor is not a debtor-in-possession, or (b) the case originally commenced as an involuntary case or converted into a Chapter 11 as an involuntary case.

Table V also shows how the conversions differ. Forty-two cases with data converted, with these liquidations taking a total of 672 days on average (196 days in Chapter 11, and 476 in Chapter 7). This is shorter than either pure procedure, but not statistically significantly different from the total length of pure Chapter 7 of 709 days. The same inference obtains for the median, where the total length of Chapter 11 conversions to Chapter 7 is 655. This is not significantly different from the median length of a pure Chapter 7 case, which is 672 days. However, in the regressions in Table VI, we find that, controlling for other characteristics, our 42 Chapter 7 to Chapter 11 conversions take about 1 year longer.

Table VI explains the log of the time in bankruptcy. Our OLS regression indicates that firms in Chapter 11 took longer than firms in Chapter 7. The estimated coefficient of 0.41 (standardized beta, 24%) suggests that the dummy can explain about two-thirds of the observed heterogeneity in bankruptcy duration (0.61). Our remaining regressions disentangle this effect into a self-selection-induced effect and a procedure-induced effect. We find that the estimated coefficient for the latter not only becomes insignificant, but even reverses in sign when we control for the former. It therefore appears that Chapter 11 takes longer only because the types of firms that choose Chapter 11 intrinsically need more time. Our evidence therefore suggests that the procedure itself does not increase indirect costs when measured by duration.

With regards to our other variables, there are only four variables that matter. First, conversions from Chapter 11 to Chapter 7 take longer (economic significance, 21%). Second, firms with more secured creditors tend to spend more time in bankruptcy. However, the standardized beta is only a modest 5%–7% percent, and the significance disappears in some stepwise regressions. Third, the judge-fixed effects come in highly significant—the particular judge drawn to handle the case appears to play a role in how long a case takes, holding constant our

Table VI
Determinants of Overall Time in Bankruptcy (in log-days)

The variables are named to make identification easy. The variables include conversion from Chapter 11 to Chapter 7; length from filing to closing; forced petition, equal to one if filed by creditors; bank presence equal to one if at least one bank is among creditors; the total bankruptcy assets and percent of equity owned by managers, both declared by the firm in the original case filing; and expense components, as described in Table X. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Methods:* Both Chapter 7 and Chapter 11 cases are included in this table. The Treatment Effects regression is estimated with both Chapter 7 and Chapter 11 cases. The Heckman regressions include only Chapter 11 cases. (The first step for Treament and Heckman regressions is the procedure logit from Table II.) Boldfaced variables and "pluses/minuses" indicate where our text attributes robust statistical significance to a variable. t-statistics below coefficient estimates are in absolute value. *, **, and *** denote two-sided statistical significance at 10%, 5%, and 1%, respectively.

(*SD* of Dependent = 0.61)		OLS	Treatment Effects	Heckman	Heckman
Inverse Mills Ratio			insig	insig	insig
Chapter 11 (Y/N)	+	0.412**			
		[2.31]			
Chapter 11 (Y/N)—Instrumented			−0.062		
			[0.17]		
Conversion from Chapter 11 (Y/N)	+	0.467**			
		[2.28]			
Forced petition (Y/N)		0.052	0.010	0.051	0.008
		[0.23]	[0.04]	[0.21]	[0.03]
Unsecured committee (Y/N)		−0.045		−0.016	−0.117
		[0.30]		[0.10]	[0.73]
Number of unsecured creditors/100	+	0.012	0.014	0.013	0.029*
		[0.77]	[0.90]	[0.88]	[1.85]
Number of secured creditors/100	++++	0.057**	0.058**	0.063**	0.051*
		[2.50]	[2.37]	[2.43]	[1.84]
Secured debt includes banks (Y/N)		0.005	−0.016	0.036	−0.035
		[0.04]	[0.11]	[0.23]	[0.23]
Unsecured debt includes banks (Y/N)		−0.088	−0.146	−0.193	−0.168
		[0.65]	[0.85]	[1.02]	[0.96]
Equity owned by managers (%)		0.002	0.002	0.002	0.002
		[1.54]	[1.30]	[1.40]	[1.60]
Secured debt to total debt		0.038	0.078	0.125	0.113
		[0.23]	[0.41]	[0.61]	[0.51]
Debt/assets > 100% (Y/N)		0.158	0.187	0.141	0.147
		[1.43]	[1.53]	[1.08]	[1.10]
Total assets		−2.124	−1.756	−0.185	−0.732
		[0.83]	[0.67]	[0.06]	[0.20]
Total assets × (assets > $100K)		2.281	1.960	0.379	0.951
		[0.91]	[0.76]	[0.13]	[0.27]

Table VI—*Continued*

(*SD* of Dependent = 0.61)	OLS	Treatment Effects	Heckman	Heckman
Total assets × (assets > \$1M)	−0.121	−0.155	−0.150	−0.164
	[0.71]	[0.88]	[0.80]	[0.95]
Total assets × (assets > \$10M) −−	−0.035	−0.048*	−0.043	−0.054*
	[1.41]	[1.73]	[1.37]	[1.75]
χ^2-test (asset variables = 0) (*p*-value)	0.45	0.25	0.56	0.28
Arizona dummy	−0.062	−0.035	−0.061	
	[0.65]	[0.36]	[0.51]	
χ^2-test (Specific Judge Effects) (*p*-value)				0.01**
Constant	5.874***	6.262***	6.188***	5.925***
	[31.46]	[23.38]	[23.72]	[19.57]
Observations	195	195	165	164
R^2	0.10	0.09	0.07	0.26

other characteristics. Fourth, remarkably, the four variables controlling for size are not jointly statistically significant in the regressions. Again, the coefficient should be added for larger firms, and to the extent that there is any scale effect, it is very mild. (Table VII will show that this time saving occurs primarily in the middle and later stages—after the firm has filed its plan. Our court system therefore seems to be geared toward preferentially dealing with larger cases.) In a simple classification, we have

		Scale		
	\$0–\$100k	\$100k–\$1m	\$1m–\$10m	\$10m and above
Mean time, Ch. 7	666	674	738	
Mean time, Ch. 11	694	750	835	958

Though monotonic, these are mild differences in light of the typical standard deviation of 388 days. Unreported graphical inspection indicates the relationship between asset size and bankruptcy duration is indeed weak or nonexistent. Larger bankruptcies take longer to resolve, but the relative increase is small relative to the idiosyncratic variation. Even the largest bankruptcies seem to only require a couple of months longer than the smallest bankruptcies—except for the very largest Chapter 11s. Even a corporate bankruptcy worth only a couple of thousand dollars regularly takes 2 years to wind down.

B. Chapter 11 Phases

Chapter 11 has three distinct identifiable phases: from filing to plan, from plan to confirmation, and from confirmation to closure.

Filing to Submission: The first phase is mostly under the control of the corporation, although the Code (§1121) prescribes a deadline of 120 days. After the

Table VII
Days in Chapter 11 Bankruptcy Phases

Sample data are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases).

	Filing to Plan Submission		Plan Submission to Confirmation		Confirmation to Closure	
	Days	% of Length	Days	% of Length	Days	% of Length
N	199	193	147	146	139	139
Mean	207	28%	225	31%	239	33%
SD	231	23%	203	20%	216	24%
Minimum	0	0%	27	3%	0	0%
Quartile 1	12	3%	89	15%	79	13%
Median	152	24%	154	26%	171	29%
Quartile 3	297	44%	274	43%	337	52%
Maximum	1,329	95%	1,101	89%	1,268	95%
% less than 120 days	22%					

original financials have been filed, the debtor must file a reorganization plan to determine the new financial structure of the firm within 120 days of the bankruptcy filing. This period can be and usually is extended upon the debtor's requests. The debtor usually has the exclusive right to file the plan during these first 120 days. (Although creditors can motion to file the plan themselves, they are usually hampered by insufficient access to the financials and to the business.) The activities in the first phase reflect how complicated the cases are and how cooperative the debtor-in-possession is in facilitating the bankruptcy procedure.

Submission to Confirmation: The second phase is almost entirely under the control of the security holders and the court. In reorganizing the firm, all claimants are classified into different classes, such as secured creditors, priority unsecured creditors, nonpriority unsecured creditors, and equity holders. When a class is not fully satisfied, it is regarded as impaired and allowed to vote on the plan. Majority has to be reached in both the number of the creditors and the amount owed to all creditors before the court can confirm a plan.[8]

The length of the second phase can be considered a proxy for the degree of difficulty in the bargaining process. Because the plan has to be confirmed by all impaired classes with majority rule, the length of this phase in part reflects how difficult it is to satisfy the conditions of all parties. Although the court can use "cram down" to pass the plan and save time, no court used this in our sample.

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[8] Ordinarily, confirmation of the plan requires the approval of each impaired class of creditors. Within each class of impaired creditors, a majority vote requires that more than half of the creditors approve the plan, and that at least two-thirds of the claims vote to approve.

Confirmation to Closure: The third phase is often dedicated to the implementation of the plan and the final disbursement of fees to professional experts (lawyers, auditors, etc.). It is thus under the control of management and the court. The management of the debtor then sets out to implement the confirmed plan. The length of the third phase should be influenced less by stakeholder gaming and more by the scale of the case, rather than by the manager's incentive. Large cases usually involve more claimants and complex financial structure, which can prolong the process of distributing the assets. There could also be potentially greater opposition during the process of plan implementation if there are more stakeholders or complicated financial structures. Although debtor management may still have some incentive to delay the process, they should be more cooperative with the new creditors and equity holders than in the previous two phases in order to retain their jobs. Therefore, the length of the third phase should mostly reflect how complicated the cases are instead of how efficient the procedure is.

Table VII shows that the three phases take about equally long on average. Only 22% of our firms meet the 120-day legal deadline to file a plan.

Not reported, debtors in AZ take only 165 days on average to propose a plan, while debtors in NY take 296 days—almost twice as long. However, the plan takes as long to confirm in AZ as in NY (200 days in both). Implementation is again faster in AZ (207 days) than in NY (257). The differences in the first and third phases are statistically significant.

Table VIII explains the lengths of the three individual Chapter 11 phases: from filing to plan (Panel A), from plan to approval (Panel B), and from approval to emergence (Panel C).

We cannot explore the effect of procedural choice, because these three phases apply only to Chapter 11. However, the Inverse Mills Ratio tells us that self-selection seems not to have mattered, as to other variables.

Filing to Submission: There are two important variables that explain how long management takes to file a plan. First, firms with more secured creditors tend to file faster. Although this effect also appears in the overall time required regression (Table VI), it is even stronger here because the creditors do not appear necessarily as eager to approve the plan (Phase 2) when there are more of them. Second, and more interestingly, when management owns more of the firm, the first phase tends to drag on (standardized beta, 20%–30%). This may indicate that managers with more of their own money at stake "play the option" of keeping the firm alive, and are reluctant to resolve the bankruptcy. (In 17% of our Chapter 7 cases and 37% of our Chapter 11 cases, entrepreneurs own a majority of shares in the firm.)

Submission to Acceptance: There are two important variables that explain how long it takes to confirm the plan. First, firms with more unsecured creditors take longer to confirm (standardized beta, approximately 30%). Second, an unsecured creditors' committee substantially reduces this time (standardized beta, again about 30%). This is evidence of coordination problems, which are remedied by the presence of a coordinating organ. There is

Table VIII

Determinants of Time in Chapter 11 Phases

The variables are named to make identification easy. The variables include conversion from Chapter 11 to Chapter 7; length from filing to closing; forced petition, equal to one if filed by creditors; bank presence equal to one if at least one bank is among creditors; the total bankruptcy assets and percent of equity owned by managers, both declared by the firm in the original case filing; and expense components, as described in Table X. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Methods:* Only Chapter 11 cases can be included in this table. The Heckman regressions include only Chapter 11 cases. (The first step for Treatment and Heckman regressions is the procedure logit from Table II.) Boldfaced variables and "pluses/minuses" indicate where our text attributes robust statistical significance to a variable. *t*-statistics below coefficient estimates are in absolute value. *, **, and *** denote two-sided statistical significance at 10%, 5%, and 1%, respectively.

	Filing to Plan Submission			Plan Submission to Confirmation			Confirmation to Closure		
(SD of Dependent = 1.29, 0.81, 1.11)	OLS	Heckman	Heckman	OLS	Heckman	Heckman	OLS	Heckman	Heckman
Inverse Mills ratio		insig	insig		insig	insig		insig	insig
Forced petition (Y/N)	0.274	0.151	0.279	0.265	0.288	0.439	−0.368	−0.305	−0.894
	[0.96]	[0.57]	[0.57]	[0.77]	[0.82]	[1.17]	[0.71]	[0.57]	[1.44]
Unsecured committee (Y/N)	0.219	0.277	0.484	−0.408*	−0.419*	−0.406*	0.518	0.498	0.500
	[0.58]	[0.69]	[1.14]	[1.94]	[1.96]	[1.96]	[1.66]	[1.60]	[1.46]
Number of unsecured creditors/100	0.045	0.050	0.030	**0.056*****	**0.055*****	**0.072*****	−0.023	−0.023	0.024
	[0.72]	[0.82]	[0.39]	[3.42]	[3.41]	[2.69]	[0.81]	[0.85]	[0.86]
Number of secured creditors/100	**−0.220*****	**−0.194****	**−0.310*****	**0.138*****	**0.134*****	0.042	−0.938	−1.840	−1.318
	[3.40]	[2.61]	[3.86]	[3.23]	[3.05]	[0.91]	[0.18]	[0.34]	[0.22]
Secured debt includes banks (Y/N)	0.071	−0.098	−0.045	−0.131	−0.109	−0.205	0.462	0.549*	0.093
	[0.28]	[0.30]	[0.11]	[0.69]	[0.58]	[0.87]	[1.48]	[1.80]	[0.28]
Unsecured debt includes banks (Y/N)	0.057	−0.166	0.184	0.074	0.104	0.522*	0.199	0.308	−0.095
	[0.11]	[0.26]	[0.27]	[0.25]	[0.34]	[1.82]	[0.57]	[0.92]	[0.27]

Equity owned by managers (%)	0.008***	0.009***	0.006**	0.001	0.001	-0.000	-0.001	-0.002	0.001
	[2.89]	[2.81]	[2.10]	[0.46]	[0.38]	[0.25]	[0.48]	[0.62]	[0.23]
Secured debt to total debt	-0.702	-0.536	-0.678	0.069	0.043	0.492	0.176	0.111	0.274
	[1.54]	[1.00]	[1.18]	[0.31]	[0.19]	[1.66]	[0.46]	[0.30]	[0.65]
Debt/assets > 100% (Y/N)	-0.156	-0.033	-0.323	-0.195	-0.218	-0.315	0.036	-0.059	0.516*
	[0.44]	[0.09]	[0.84]	[1.11]	[1.28]	[1.64]	[0.12]	[0.19]	[1.73]
Total assets	6.917	2.608	1.121	-2.220	-1.537	8.729	6.261	8.252	-5.838
	[1.00]	[0.42]	[0.14]	[0.46]	[0.33]	[1.29]	[1.33]	[1.58]	[0.68]
Total assets × (assets > $100K)	-6.839	-2.441	-0.984	2.613	1.923	-8.123	-5.561	-7.574	6.225
	[1.01]	[0.40]	[0.12]	[0.55]	[0.42]	[1.21]	[1.22]	[1.49]	[0.74]
Total assets × (assets > $1M)	-0.118	-0.169	-0.144	-0.341	-0.340	-0.537**	-0.655*	-0.656*	-0.321
	[0.33]	[0.44]	[0.36]	[1.36]	[1.35]	[2.04]	[1.69]	[1.68]	[0.86]
Total assets × (assets > $10M)	0.034	-0.002	0.004	-0.052	-0.046	-0.071	-0.044	-0.022	-0.063
	[0.50]	[0.03]	[0.05]	[1.23]	[1.09]	[1.66]	[0.68]	[0.37]	[1.14]
χ^2-test (asset variables = 0) (*p*-value)	0.52	0.81	0.42	0.42	0.43	0.02**	0.42	0.37	0.77
Arizona dummy	-0.014	0.098	0.00***	0.142	0.128	0.00***	-0.411	-0.426	0.00***
	[0.05]	[0.30]		[0.81]	[0.71]		[0.99]	[1.03]	
χ^2-**test (specific Judge Effects) (*p-value*)**			0.00***			0.00***			0.00***
Constant	5.087***	4.687***	5.202***	4.957***	5.028***	4.843***	4.585***	4.848***	4.892***
	[10.66]	[6.31]	[5.55]	[19.66]	[18.19]	[12.22]	[12.72]	[10.31]	[7.00]
Observations	112	112	112	113	113	113	102	102	102
R^2	0.22	0.23	0.42	0.17	0.17	0.45	0.13	0.14	0.47

also mild evidence that coordination problems also play a role in how long
secured creditors require, but this is subsumed by the judge effects.
Acceptance to Emergence: There are no variables that explain how long it
takes for a firm with a confirmed plan to depart bankruptcy.

The identity of the judge matters for all three phases. Firm scale may or may
not play a role, depending on specification. In a simple classification:

		Scale			
		$0–$100k	$100k–$1m	$1m–$10m	$10m and above
Mean number of days,	First phase	285	231	343	144
Mean number of days,	Second phase	133	190	139	252
Mean number of days,	Third phase	112	210	224	339

Only the third phase shows monotonicity. Not reported, the lengths of the
first phase (plan filing) of a Chapter 11 has a modest $+0.10$ correlation with
the length of the second phase and a modest $+0.25$ correlation with the length
of the third phase; the latter two have a -0.15 correlation, each seemingly able
to substitute for the other.

V. Direct Bankruptcy Costs: Court-Declared Expenses

A. Descriptive Statistics

We now turn our attention toward direct expenses and their components.
Chapter 7 expenses have three major cost components, namely, the trustee
expenses,[9] accountant expenses, and debtor attorney expenses. Chapter 11
reorganizations have two identifiable reimbursable cost components, namely,
debtor expenses and unsecured creditors' committee expenses. In both cases, di-
rect costs exclude bankruptcy filing fees, and the salary collected by the debtor's
management is not really a bankruptcy cost because managers have to be paid
for running the firm in any event.

Direct expenses are not only relatively easier to measure than indirect ex-
penses, but they have also already attracted much attention in previous work.
LoPucki and Doherty (2004) report direct bankruptcy costs of 1.4%. Warner
(1977) reports 4%. Ang et al. (1982), Weiss (1990), and Betker (1995) report
direct expenses of about 7.5%. In Sweden, Thorburn (2000) reports 13.2%. All

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[9] Bankruptcy trustees in Chapter 7 and Chapter 11 are compensated according to mechanistic
stipulations, usually a fixed amount plus some additional amount depending on the asset size of
the case. Trustee compensation is governed by §330 of the Code, subject to the limits imposed in
§326(a). The trustee's compensation cannot "exceed 25% on the first $5,000 or less, 10% on any
amount in excess of $5,000 but not in excess of $50,000, 5% on any amount in excess of $50,000 but
not in excess of $1,000,000, and reasonable compensation not to exceed 3% of such moneys in excess
of $1,000,000, upon all moneys [sic] disbursed or turned over in the case by the trustee to parties in
interest, excluding the debtor, but including holders of secured claims." This compensation scheme
makes trustee costs a larger fraction of direct bankruptcy costs in smaller cases with less asset
value to be distributed.

of these are relative to asset value at entry into bankruptcy. The studied samples are typically small, but their value estimates are more reliable than our own because they restrict themselves to publicly traded companies, for which market value estimates can be readily obtained. It is not immediately clear why estimates differ across studies. Although many of the discrepancies may be sample-specific, our findings below indicate that differences induced by measurement could easily have played a role.

The left columns in Table IX measure fees as a fraction of pre-bankruptcy assets. Our 57 Chapter 7 cases have a mean expense ratio of about 8.1%, which is lower than the 16.9% reported in Chapter 11 (driven by four large outliers). The median expense ratio in Chapter 7 is a slightly higher 2.5% than the 1.9% in Chapter 11. With only 57 observations in Chapter 7, the difference is not statistically significant so one should not overread this difference. The evidence suggests that the typical pre-bankruptcy expense ratios are roughly similar across procedures.

The extremes here may be as interesting as the central statistics. Reported reimbursed expenses are less than 1% of firm value in about 40%–45% of our cases—and exactly zero in about 35% of all Chapter 7 cases and 20% of all Chapter 11 cases. (These are *not* cases for which we cannot locate data [either fees or assets], so this is a real effect. In a number of Chapter 11 cases, there are no unsecured creditors' committees and/or the unsecured creditors do not receive reimbursement. If the debtor does not ask for reimbursement either, the court-recorded Chapter 11 expenses are $0.)

The middle columns use post-bankruptcy assets as the denominator—Table III shows that assets can be very different at exit than at entry. Because at-exit values are the sum of fees and creditor recovery, it now matters whether we choose pessimistic or optimistic secured recovery rates in Chapter 7; this middle category also has the fewest observations due to data availability. Table IX shows that 68% of our Chapter 7 cases use up all assets to pay for expenses under the pessimistic reported-only secured recovery scenario. In the optimistic 2.6-times-grossed-up scenario (in this case, we gain 17 cases for which we have no reported secured recovery, but can impute a recovery), we find that this number drops to 29%, and the bankruptcy expense still remains around 38% of assets on average, with a median of 10%.

The right columns introduce a different denominator, total liabilities, which suffers from less declaration uncertainty—and offers more observations. However, this normalization masks the degree to which the firm is underwater. (We can control for some of this in the regressions.) In Chapter 11, average fees as a fraction of liabilities amount to around 1.4% in medians, and a hefty 11.5% in means, due to four outliers with fees-to-liability ratios of 140%, 290%, 520%, and 555%.[10] Chapter 7 seems to be cheaper, with expenses per dollar liability only 2.9% in means and 0.4% in medians.

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[10] *American Business Fundings,* case AZ-00-01782, owed $50,201 and suffered fees of $278,831. Quick Interiors, Inc., NY-97-45020, owed $129,064 and suffered fees of $677,105. George Goldring, NY-96-44577 owed $46,277 and suffered fees of $133,745. Jenny Fashions, Inc., owed $277,468, and suffered fees of $394,535.

Table IX
Range of Expenses as a Fraction of Firm

Variables: Pre-Bankruptcy Assets are declared in the initial filing as "value of assets." *Post-bankruptcy, Pre-Fee Assets* are calculated as percent recovery rates by creditors times amount owed to creditors, plus total legal fees disclosed and reimbursed by the court. "Optimistic Secured Recovery" assumes secured creditors can satisfy their claims as long as they do not exceed more than 2.6 times reported pre-bankruptcy assets. "Reported Secured Recovery" omits the value of collateralized assets that secured creditors could seize outside of the bankruptcy proceedings. Expense categories are standardized in the court filing forms. Chapter 7 expenses include debtor's attorney, accountant, trustee, and other expenses paid for by the company. Chapter 11 expenses include reimbursement requests by both the unsecured creditors committee and the debtor-in-possession. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases).

| | Expenses Divided by Pre-Bankruptcy Assets | | Expenses Divided by Post-Bankruptcy Assets | | | Expenses Divided by Total Liabilities | |
| | | | Chapter 7 Secured Recovery Is: | | | | |
	Chapter 7	Chapter 11	Reported	Optimistic	Chapter 11	Chapter 7	Chapter 11
N	57	222	21	38	157	76	227
Mean	8.1%	16.9%	80.4%	37.9%	9.4%	2.9%	11.5%
SD	11.9%	74.3%	32.7%	44.4%	16.8%	5.3%	55.2%
Minimum	0.0%	0.0%	9.7%	0.0%	0.0%	0.0%	0.0%
Quartile 1	0.0%	0.2%	55.2%	0.4%	0.8%	0.0%	0.2%
Median	2.5%	1.9%	100.0%	9.6%	3.5%	0.4%	1.4%
Quartile 3	10.7%	6.7%	100.0%	100.0%	9.5%	3.7%	5.5%
Maximum	47.8%	885.3%	100.0%	100.0%	98.5%	34.8%	555.4%
% ≥ 100%	0%	3%	68%	29%	0%	0%	2%
% <1 %	46%	41%	0%	29%	30%	54%	44%
% = 0%	35%	20%	0%	21%	9%	45%	19%
			Arizona				
N	11	106	6	7	66	11	108
Mean	9.4%	5.7%	75.9%	32.6%	4.3%	3.6%	7.8%
SD	10.7%	26.2%	37.9%	46.4%	5.7%	3.7%	53.4%
Median	6.5%	0.8%	100.0%	5.7%	1.9%	2.6%	0.7%
			New York				
N	46	116	15	31	91	65	119
Mean	7.8%	27.1%	82.2%	39.0%	13.1%	2.8%	14.8%
SD	12.2%	98.8%	31.7%	44.6%	20.8%	5.5%	56.7%
Median	2.1%	3.7%	100.0%	9.7%	4.6%	0.2%	2.8%

Table X shows that Chapter 7 cases consumed a median of $806 and a mean of $21,417 in identifiable fees. The debtor's attorney consumes 50% more than the trustee. Accountant and other expenses together consume about as much as the trustee. In the median case, the debtor attorney is the only charging

Table X
Expenses by Category

Variables: These expense categories are standardized in the court filing forms. Percents are relative to pre-bankruptcy assets. If other normalizations (liabilities, post-assets) are used, magnitudes change but relative importance does not change. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases).

	Mean	Median	*SD*
57 Chapter 7–Total Expenses	$21,417	$806	$81,742
In Percent	8.15%	2.50%	11.86%
222 Chapter 11–Total Expenses	$166,627	$21,403	$645,054
In Percent	16.9%	2.00%	74.3%
57 Chapter 7–Accountants	$1,449	$0	$8,023
In Percent	0.55%		1.13%
57 Chapter 7–Trustee	$6,010	$0	$28,991
In Percent	2.29%		6.36%
57 Chapter 7–Debtor's Attorney	$9,538	$806	$29,602
In Percent	3.63%	2.50%	9.68%
57 Chapter 7–Other	$4,421	$0	$34,402
In Percent	1.68%		2.0%
222 Chapter 11–Debtor Expenses	$132,698	$21,403	$481,693
In Percent	13.45%	1.95%	38.16%
222 Chapter 11–Unsecured Committee	$33,929	$0	$259,654
In Percent	3.45%		17.76%
(Secured creditors cannot file for reimbursement)			
42 Chapter 11 Cases with Unsecured Committee			
Debtor Expenses	$6,199,848	$183,661	
In percent	8.45%	1.24%	
Unsecured committee	$6,638,935	$56,017	
In percent	9.04%	0.38%	

entity. Chapter 11 cases occur in larger companies, so it is no surprise that the median consumption is $21,403 ($166,627 in mean). The debtor creates about 80% of the expenses in means (100% in median). The balance obviously goes to the creditors' committee. However, conditional on creditors' committee presence (which is the case in 20% of our Chapter 11 cases), the two parties seem to spend roughly equal amounts in means. Even in medians, the corporation spends only about three times what the creditor committee spends.

Table IX also splits the sample into cases from AZ and NY, and, though not reported in the tables, we can describe how the components differ across jurisdictions. Chapter 7 expenses are fairly similar in both jurisdictions. Debtors' attorney fees are similar in AZ and NY, around $10,000 per case, with total fees higher in NY than AZ, and attorneys' costs relatively higher in AZ (8% vs. 3%). While NY accountants charged $1,500 per case, AZ accountants charge only $200 per case, but these expense categories are relatively minor. The "big"

differences are due to trustee expenses ($6,000 per case, or 2%, in NY, and $1,000 per case, or 1%, in AZ) and other expenses ($5,000 per case, or 1.5%, in NY and $700 per case, or 0.5%, in AZ). Chapter 11 expenses, on the other hand, are at least twice as high in NY, both in terms of means and medians, as they are in AZ: the mean (median) AZ debtor expense is $30,447 ($4,368), while the NY debtor expense is about 10 times this amount, $256,430 ($62,250). In percentages, this is 4.5% (0.8%) versus 29% (3.9%) of assets. The unsecured creditors' committee spends $8,506 on average, or 1.25% of assets, in AZ, and $64,693, or 7.2%, in NY. This is consistent with the view that the climate is more adversarial in Chapter 11 cases in NY, where substantial amounts of money can be involved, but Chapter 7 stakes are just "too small to bother."

B. Determinants

Table XI explores the determinants of asset-normalized court-declared expenses. (The fraction of the firm captured by creditors is one minus this number.)

In the OLS regression, the procedure choice variable is positive and statistically significant: Chapter 11 cases have higher expense ratios (standardized beta, 17%). However, when we control for endogeneity, we find that Chapter 11 cases consume more fees proportionally, not because Chapter 11 is intrinsically the more expensive procedure, but rather only because self-selecting Chapter 11 firms intrinsically require more expenses. The Inverse Mills Ratio is highly statistically significant. The coefficient estimate for the "Instrumented Chapter 11 Procedure" in the Treatment Effects regression is not statistically significant, but it is negative, and its standardized coefficient of 60% is considerably higher than that of the OLS standardized coefficient of 17%.

Most of our other variables offer no explanatory power. The presiding judge's identity, which does robustly matter for duration, does not matter in terms of expenses. AZ cases are cheaper, but primarily so if both Chapter 7 and Chapter 11 cases are included. The only other variable of importance is firm size. Again, the coefficients need to be summed up to judge the slope at higher asset sizes. Thus, the net coefficient is negative for firms that are at least $100,000 in size. The estimated coefficients suggest that the proportional fee advantage diminishes as assets become larger. A simple categorization gives better intuition:

	Scale			
	$0–$100k	$100k–$1m	$1m–$10m	$10m and above
Mean fees/pre-assets	31.5%	10.2%	3.9%	1.3%
Median fees/pre-assets	23.2%	4.9%	1.4%	0.8%
Mean fees/liabilities	21.0%	7.4%	7.0%	1.2%
Median fees/liabilities	4.0%	3.9%	2.0%	0.7%

Not reported, these results are robust if, instead of normalizing by start-of-bankruptcy assets, we normalize expenses by end-of-bankruptcy value (with

Table XI
Determinants of Total Bankruptcy Expenses/Pre-assets

The variables are named to make identification easy. The dependent variable is defined in the previous Table X, and is normalized by pre-bankruptcy assets. The variables include conversion from Chapter 11 to Chapter 7; length from filing to closing; forced petition, equal to one if filed by creditors; bank presence equal to one if at least one bank is among creditors; the total bankruptcy assets and percent of equity owned by managers, both declared by the firm in the original case filing; and expense components, as described in Table X. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Methods:* The Treatment Effects regression is estimated with both Chapter 7 and Chapter 11 cases. The Heckman regressions include only Chapter 11 cases. (The first step for Treatment and Heckman regressions is the procedure logit from Table II.) Boldfaced variables and "pluses/minuses" indicate where our text attributes robust statistical significance to a variable. *t*-statistics below coefficient estimates are in absolute value. * and ** denote two-sided statistical significance at 10% and 5%, respectively.

(*SD* of Dependent = 0.35)		OLS	Treatment Effects	Heckman	Heckman
Inverse Mills ratio			sig*	sig**	sig**
Chapter 11 (Y/N)	+	0.100*			
		[1.80]			
Chapter 11 (Y/N)–Instrumented			−0.322		
			[1.34]		
Conversion from Chapter 11		−0.014	0.021		
(Y/N)		[0.22]	[0.33]		
Forced petition (Y/N)		0.224	0.218	0.176	0.158
		[1.42]	[1.46]	[1.34]	[1.21]
Length of proceedings		0.031	0.033	0.014	0.013
in days (log)		[1.29]	[1.44]	[0.58]	[0.43]
Unsecured committee (Y/N)		0.003		0.036	0.017
		[0.05]		[0.70]	[0.32]
Number of unsecured		0.001	0.001	0.005	0.005
creditors/100		[0.43]	[0.66]	[1.58]	[1.24]
Number of secured creditors/100		−0.005	0.000	0.000	−0.004
		[0.66]	[0.08]	[0.03]	[0.29]
Secured debt includes banks		0.001	0.006	−0.032	−0.029
(Y/N)		[0.03]	[0.20]	[1.08]	[0.87]
Unsecured debt includes banks		0.031	0.021	−0.009	−0.002
(Y/N)		[0.63]	[0.46]	[0.14]	[0.04]
Equity owned by managers (%)		−0.000	−0.000	−0.000	−0.000
		[0.64]	[0.94]	[0.65]	[0.17]
Secured debt to total debt		−0.067	−0.027	−0.019	−0.020
		[1.16]	[0.43]	[0.30]	[0.27]
Debt/assets > 100% (Y/N)		−0.005	0.004	0.036	0.041
		[0.15]	[0.14]	[0.91]	[0.97]
Total assets	+++	2.658**	2.237*	3.274*	3.428
		[1.98]	[1.70]	[1.78]	[1.37]
Total assets × (assets > $100K)	− − −	−2.781**	−2.395*	−3.366*	−3.521
		[2.08]	[1.84]	[1.84]	[1.42]

(*continued*)

Table XI—*Continued*

(*SD* of Dependent = 0.35)		OLS	Treatment Effects	Heckman	Heckman
Total assets × (assets > $1M)	+++	0.098**	0.146**	0.076*	0.076
		[2.18]	[2.57]	[1.69]	[1.59]
Total assets × (assets > $10M)	++++	0.023**	0.011*	0.015**	0.017**
		[3.02]	[1.84]	[2.46]	[2.73]
χ^2-Test (asset variables = 0) (*p*-value)		0.00**	0.00**	0.00**	0.00**
Arizona dummy	– – –	−0.079**	−0.091**	−0.049*	
		[2.49]	[2.95]	[1.66]	
χ^2-Test (Specific Judge Effects) (*p*-value)					0.14
Constant		−0.086	0.217	−0.014	0.342*
		[0.52]	[0.93]	[0.08]	[1.73]
Observations		194	194	165	164
R^2		0.26	0.28	0.41	0.46

either optimistic or reported secured recovery) or by total liabilities. For the latter, the results are modestly weaker, in that Chapter 11 again has a higher expense ratio in the OLS regression, and a statistically insignificant and again negative coefficient in the self-selection controlled Treatment Effects regression. The size and significance of the asset coefficients are virtually identical and the judge identity does not matter. The only novelty is that there is now a hint in the OLS and Treatment Effects regressions that firms that are more underwater consume less in expenses—this suggests that expenses are more closely related to available assets than to (historical) liabilities.

Table XII looks at Chapter 11 expenses incurred by the debtor only. (Chapter 7 cases have separate expenses, but trustee costs are fixed schedule by legal statute, and thus not too interesting. Moreover, as noted earlier, secured creditors are not reimbursed by the court, and therefore do not file their expenses.)

The effect of procedure choice and self-selection now drops below statistical significance, but the signs and interpretations are the same as in Table XI— firms with intrinsically higher debtor expense ratios disproportionately select into Chapter 11, but these higher expenses are not intrinsically due to the procedure itself. So, although Chapter 11 cases suffer proportionally higher debtor fees in the OLS regression, this is attributable to self-selection, not to the effect of the procedure itself.

As in Table XI, the AZ effect remains present. Judicial identity is irrelevant once other factors are taken into account. While asset size may or may not matter in the multivariate framework, it clearly matters in a simple classification of means or medians—larger cases have lower debtor expense ratios, which is almost the same pattern reported above for all expenses.

Our most interesting finding in Table XII is that expenses by debtor and unsecured creditors are strategic complements. When one spends more, so does

Table XII
Determinants of Debtor Expenses

The variables are named to make identification easy. The dependent variable is as in Table XI, but explores only debtor expenses normalized by pre-bankruptcy assets. A similar table for unsecured creditor expenses reveals no particularly interesting correlations. The variables include conversion from Chapter 11 to Chapter 7; length from filing to closing; forced petition, equal to one if filed by creditors; bank presence equal to one if at least one bank is among creditors; the total bankruptcy assets and percent of equity owned by managers, both declared by the firm in the original case filing; and expense components, as described in Table X. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Methods:* The Treatment Effects regression is estimated with both Chapter 7 and Chapter 11 cases. The Heckman regressions include only Chapter 11 cases. (The first step for Treatment and Heckman regressions is the procedure logit from Table II.) Boldfaced variables and "pluses/minuses" indicate where our text attributes robust statistical significance to a variable. *t*-statistics below coefficient estimates are in absolute value. *, **, and *** denote two-sided statistical significance at 10%, 5%, and 1%, respectively.

(*SD* of Dependent = 0.88)		OLS	Treatment Effects	Heckman	Heckman
Inverse Mills ratio			insig	insig	insig
Chapter 11 (Y/N)	+	0.446**			
		[2.18]			
Chapter 11 (Y/N)–			−0.816		
Instrumented			[0.86]		
Conversion from Chapter 11		−0.076	−0.086		
(Y/N)		[0.41]	[0.36]		
Forced Petition (Y/N)		0.030	−0.105	−0.023	−0.195
		[0.23]	[0.94]	[0.15]	[0.84]
Length of Proceedings in		0.073	0.081	0.050	0.103
Days (log)		[0.92]	[1.08]	[0.55]	[0.96]
Unsecured Committee (Y/N)	−	−0.308*		−0.230	−0.188
		[1.66]		[1.43]	[1.29]
Number of Unsecured		0.005	0.007	0.010	−0.004
Creditors/100		[0.68]	[0.72]	[0.94]	[0.18]
Number of Secured		0.014	−0.017	0.040	0.030
Creditors/100		[0.60]	[0.58]	[1.35]	[0.82]
Secured Debt Includes Banks		−0.165	−0.154	−0.263	−0.314
(Y/N)		[1.24]	[1.23]	[1.30]	[1.41]
Unsecured Debt Includes		−0.101	−0.051	−0.250	−0.369
Banks (Y/N)		[0.50]	[0.28]	[0.83]	[1.06]
Equity Owned by Managers		−0.000	−0.001	−0.001	−0.000
(%)		[0.24]	[0.53]	[0.51]	[0.11]
Unsecured Expenses to	++++	0.622***	0.478***	0.533***	0.545***
Pre-assets		[4.99]	[4.48]	[3.94]	[2.96]
Secured Debt to Total Debt		0.346	0.545	0.470	0.510
		[0.91]	[1.07]	[0.89]	[0.93]
Debt/Assets > 100% (Y/N)		0.188	0.301	0.333	0.403
		[0.87]	[0.99]	[1.05]	[1.26]

Table XII—*Continued*

(*SD* of Dependent = 0.88)		OLS	Treatment Effects	Heckman	Heckman
Total Assets		12.783	9.472	18.218	18.913
		[1.54]	[1.04]	[1.40]	[1.22]
Total Assets × (Assets > $100K)		−13.143	−9.758	−18.639	−19.288
		[1.58]	[1.08]	[1.44]	[1.24]
Total Assets × (Assets > $1M)	+	0.315	0.263	0.383	0.339*
		[1.33]	[1.31]	[1.41]	[1.68]
Total Assets × (Assets > $10M)		0.044	0.022	0.039	0.038
		[1.60]	[1.31]	[1.65]	[1.07]
χ^2-Test (Asset Variables = 0) (*p*-value)		0.23	0.00***	0.00***	0.00***
Arizona Dummy	$\boxed{- - -}$	−0.356**	−0.340**	−0.348**	
		[2.15]	[2.18]	[2.02]	
χ^2-Test (Specific Judge Effects) (*p*-value)					0.99
Constant		−0.624	0.175	−0.404	−1.017
		[1.16]	[0.18]	[0.74]	[1.10]
Observations		193	193	164	163
R^2		0.14	0.17	0.18	0.28

the other, though the standardized beta is only 0.1. This is consistent, either with negative externalities created by conflict, or with an optimal division of labor among multiple parties.

We omit the equivalent table that explain unsecured creditor expenses because it contains only one interesting finding: an unsecured creditors' committee translates into a mildly higher expense ratio (*t*-statistics are only between 1.6 and 1.8). In Table XII, the unsecured creditors' committee translates into a lower debtor expense ratio. Thus, the debtor seems to substitute for some of the tasks carried out by unsecured creditors if no creditors' committee is formed. Unfortunately, there are only 22 Chapter 7 observations available—too few to give us much confidence in disentangling the determinants. The significant findings are that trustees seem to spend more when there are more secured and unsecured creditors, when managers own more of the equity, and when the case is in AZ instead of NY. Both accountants and trustees spend less when the firm is more underwater.

C. Interpreting Direct Bankruptcy Cost Estimates

Empirical bankruptcy expense estimates are often used as proxies for future financial distress costs, for example in the calibration of theories of capital structure. Thus, the estimated distress cost magnitude has broad significance. In contrast to earlier work, we come away from our cost estimates with a new appreciation for their sensitivity. We are therefore reluctant to recommend a particular "take-away" expense ratio, and we also advise caution in interpreting other frequently cited expense estimates. Whether bankruptcy costs are modest or extreme can depend significantly on which statistic (mean or median)

and which asset valuation (pre- or post-bankruptcy) is reported. Our simple descriptive statistics show that a theorist can muster expense claims as low as 2% (median Chapter 11 costs, measured against at-bankruptcy entry asset values) or as high as 100% (median Chapter 7 costs, measured against post-bankruptcy asset values). Moreover, there is large heterogeneity in bankruptcy costs: the estimated standard deviations and interquartile ranges of bankruptcy costs, even measured in terms of pre-bankruptcy assets, are much larger than the means.

Perhaps most important is that the variation is predictable on a firm-by-firm basis, at least as early as at the onset of bankruptcy. To calibrate a model, a theorist could interpret fitted expected bankruptcy costs calculated on a firm-by-firm basis as a substitute for priors. For example, if we consider the fitted values from our regressions that predict the ratio of fees over assets from Table XI, we find that they have a mean of 10% and a standard deviation of 11% – 12%.[11] This translates into a range for prior expected bankruptcy costs of 0%–20%. Similarly, when expenses are measured as a fraction of liabilities, prior expected bankruptcy costs have a heterogeneity of about 10%. Again, this suggests that theorists should adopt a more balanced approach. Specifically, bankruptcy costs should be recognized to be high in some firms, and modest in other firms.

VI. Creditor Recovery Rates and APR Violations

The previous sections relate fees to assets left in the estate. This section relates disbursed assets to what creditors are owed. Looking at recovery rates also allows us to consider APR violations. In Weiss (1990), APR is violated in 29 out of 37 cases. In Franks and Torous (1989), 21 out of 27 cases violate APR, 18 of which are in favor of equity holders, and three of which (11%) are in favor of unsecured creditors.

A. *Descriptive Statistics*

Table XIII shows that secured creditors in Chapter 7 do not fare well, regardless of the recovery assumption. In about half of our 30 Chapter 7 liquidations, secured creditors receive nothing. Under the pessimistic reported-only secured-recovery scenario, we find that the mean recovery is 32%; under the optimistic 2.6-times secured-recovery scenario, the mean recovery is 51%. In contrast, secured creditors are deemed fully satisfied in 74% of our Chapter 11 reorganizations, and the unconditional mean satisfaction is around 90%. There was only one reorganization in which secured creditors do not receive anything.[12]

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[11] The regressions have two variables—length and creditor committee formation—not known at the onset of bankruptcy. If we exclude these, the standard deviation is "only" 10.3%.

[12] Case NY-96-41643: *Angelika Films 57th,* a movie theater, had $80,000 in assets, but owed $711,000 to a secured creditor (Angelika Film Center). Before bankruptcy, the creditor had sought "replevin," an old-fashioned legal remedy in which specific assets are returned at the outset of the case. When a NY court granted replevin, the company filed Chapter 11. Bankruptcy Judge Gonzalez allocated $0 to the secured creditor, $19,000 to the unsecured creditors, and $140,000 to the I.R.S. The remaining $900,000 went to expenses and fees.

Table XIII
Recovery Rates and APR Violations

Variables: Recovery rates are calculated as the percent of the initial claim that is distributed by the court to the corresponding creditor in the case closure. Total Recovery equals the total amount recovered by creditors (percent recovered times amount owed) divided by the total amount owed. "Optimistic Secured Recovery" assumes secured creditors can satisfy their claims as long as they do not exceed more than 2.6 times reported pre-bankruptcy assets. "Reported Secured Recovery" omits the value of collateralized assets that secured creditors could seize outside of the bankruptcy proceedings. The "APR Violation" dummy equals one when secured creditors get less than 100%, and unsecured creditors receive something. The APR adherence index is the linear combination of Full APR (secured get all that they are owed, unsecured get the rest) and Proportional Distribution (assets are distributed proportionally to the creditor's claim); an index of one means Full APR. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Statistical Significance:* All Chapter 11 means and medians are significantly different from their Chapter 7 equivalents at the 1% significance level, irrespective of the assumption about secured recovery. Tests of medians are based on two-tailed Wilcoxon tests.

| | Secured Recovery | | | Unsecured Recovery | | Total Recovery | | | APR Chapter 11 Only | |
| | Chapter 7 Secured Recovery Is: | | Chapter 11 | Chapter 7 | Chapter 11 | Chapter 7 Secured Recovery Is: | | Chapter 11 | APR Violation | Adherence |
	Reported	Optimistic				Reported	Optimistic			
N	29	30	143	115	173	47	47	157	263	261
Mean	32.4	51.4	90.2	1.1	51.6	5.4	27.4	69.4	12.2%	91.0%
SD	46.4	49.6	21.8	8.4	41.3	19.9	38.2	32.4	32.8%	27.2%
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	−40.5%
Quartile 1	0.0	0.0	95.0	0.0	10.0	0.0	0.0	45.8	0.0%	100.0%
Median	0.0	70.6	100.0	0.0	40.0	0.0	5.8	79.2	0.0%	100.0%
Quartile 3	100.0	100.0	100.0	0.0	100.0	0.0	64.7	100.0	0.0%	100.0%
Max	100.0	100.0	100.0	87.9	100.0	98.3	100.0	100.0	100.0%	100.0%
% = 0	59	47	1	95	5	79	43	0	88	0
% ≥ 100%	30	47	74	0	35	0	6	34	12	89

Fortunately, unlike secured recovery rates, our unsecured recovery rates are, if anything, more reliable in Chapter 7 liquidations than in Chapter 11 reorganizations. We find that unsecured creditors receive nothing in 95% of our Chapter 7 cases. The mean recovery rate is 1%, all driven by one case.[13] Unsecured creditors in Chapter 11 are more fortunate. Their mean (median) recovery rate was 52% (40%).[14]

Putting secured and unsecured recovery together shows that creditors in Chapter 11 reorganizations fare significantly better (mean 69%, median 79%) than creditors in Chapter 7 liquidations. Even in the optimistic 2.6-times secured-recovery scenario, the mean is 27% and the median is 6%. In the pessimistic scenario, this drops to 5.4% and 0%, respectively.

In Chapter 7, APR is always followed. Therefore, Table XIII reports only on APR violations in Chapter 11 reorganizations. In 88% of these cases, APR is strictly followed, and in 12% it is modified. The final column computes an APR index: for a case that follows proportional allocation (i.e., ignores APR), the index is zero. For a firm that follows absolute priority, the index is one. The average index is 91%, though even the 25th percentile is 100%. There is one outlier that yields an APR adherence index of –40.5%.[15] Compared to earlier studies, we find fewer APR violations in our sample. Although violations in favor of equity are not comparable with violations in favor of unsecured creditors, there are no public equity holders in most of our cases. (Private equity does not seem to receive anything in our cases, but many entrepreneurs are both unsecured lenders and equity holders.)

Conversions: Not reported, recovery rates for Chapter 7 conversions from Chapter 11 do not differ statistically from pure Chapter 7 cases. The mean recovery rate for secured creditors is 12.75% (median 0%), and the mean recovery rate for unsecured creditors is 2.20% (median is 0%). In total, creditors recover 4.3% of their total claims (median 0%), and 28.32% (median 4.78%) if we assume the maximum recovery by secured creditors of 2.6 times pre-bankruptcy assets. Relative to the post-bankruptcy value of the assets, creditors receive 11.74% (median 0%). The remaining assets go to pay fees.

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[13] In NY-98-22754, *World Wide Auto Parts,* secured creditors received $122,586 (100%) and unsecured creditors received $38,914 (87.5%).

[14] Tax agencies were also unsecured claimants (generally with priority over other unsecured claimants) in many cases, and are counted as such in our paper. (A tax payment counts as a recovery.) The average Chapter 11 tax claim was 25% of assets in NY and 9% of assets in AZ, 14% of liabilities in NY and 3% in AZ. The median tax claim, however, was always $0. Although we do not have data on tax collections in Chapter 7, from reading the filings, it is our impression that in many Chapter 7 liquidations, taxes receive most or all unsecured assets.

[15] In case AZ-98-0466, *Marlaine Associates,* NV, Inc., secured creditors were owed $75,000 (23% under proportional allocation); unsecured creditors were owed $250,000 (77%). Judge Baum awarded secured creditors 50% of what they were owed ($37,500/$75,000), and unsecured creditors 68.75% of what they were owed ($171,875/$250,000). Under proportional allocation, secured creditors would have received 23%$\times$ $209,375$\approx$$63,812. The actual recovery of $37,500 yields an APR adherence index of –40.5.

B. Determinants of Recovery Rates

Table XIV explores the total creditor recovery rate. Recall that we have solid data on recovery rates of unsecured creditors in both chapters, solid data on secured recovery in Chapter 11, and no good estimates of secured recovery in Chapter 7. Therefore, the left two regressions in Table XIV are not altogether trustworthy. The dependent variable in Chapter 7 here is based on our assumption of pessimistic secured creditor recovery in Chapter 7, but none of the significant correlations change when we use optimistic senior recovery instead.[16]

Chapter 11 unequivocally seems better for creditors from the perspective of total recovery rate, regardless of controls for self-selection (which matters little). The standardized beta is a strong 50%, and procedural choice is our single-most important variable. It is the procedure itself that indicates higher recovery rates, either through more optimistic valuations or through better asset retention.

As to our other variables, not surprisingly, creditors in firms that are more underwater recover less (standardized beta, 30%–40%). The fraction of secured debt in total debt matters (standardized beta, 25%–35%). That is, in firms with relatively more secured debt, creditors end up with more assets even in aggregate. Dispersion matters in the opposite fashion. When there are fewer secured creditors, creditors end up with less, but the standardized beta is a weak 5%. In the few firms that are forced into bankruptcy by creditors, recovery is less. In specifications that include Chapter 7 cases, creditors in AZ recover less than those in NY, again with only modest statistical and economic significance. Surprisingly, debtor expenses do not associate with lower recovery rates, but rather with higher recovery rates (standardized beta, 17%).

Also surprisingly, the identity of the judge does not matter. It is also a surprise to us how relatively weak the influence of firm scale can be—creditors in firms that are very large do not seem to end up with much better recovery. Specifically, these relations are:

			Scale			
	Recovery	$0–$100k	$100k–$1m	$1m–$10m	$10m and above	Relationship
Total	Ch. 11	46%	57%	75%	84%	Monotonic, but modest compared to 38% *SD*
Secured	Ch. 11	77%	91%	91%	94%	Step function
Unsecured	Ch. 11	47%	40%	61%	59%	Not monotonic
Total						
Pessimistic	Ch. 7	3%	1%	25%		Intrinsically unreliable
Optimistic	Ch. 7	11%	58%	61%		Intrinsically unreliable
Unsecured	Ch. 7	1%	0%	1.5%		Tiny

[16] The Chapter 11 coefficients become much smaller, but continue to be significantly positive. Length of proceedings and the AZ dummy become negatively statistically significant in the first two specifications, but remain insignificant in the latter two.

Table XIV

Determinants of Total Recovery Rate—Assuming Pessimistic Secured Recovery in Chapter 7

The variables are named to make identification easy. The dependent variable is described in Table XIII. *Total Proportional Recovery* is the total amount recovered by creditors (percent recovered times amount owed) divided by the total amount owed. (A component, secured recovery in Chapter 7, is the "as reported" figure, but all significant/insignificant correlations remain if we use the optimistic recovery assumption instead.) The variables include conversion from Chapter 11 to Chapter 7; length from filing to closing; forced petition, equal to one if filed by creditors; bank presence equal to one if at least one bank is among creditors; the total bankruptcy assets and percent of equity owned by managers, both declared by the firm in the original case filing; and expense components, as described in Table X. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Methods:* The Treatment Effects regression is estimated with both Chapter 7 and Chapter 11 cases. The Heckman regressions include only Chapter 11 cases. (The first step for Treatment and Heckman regressions is the procedure logit from Table II.) Boldfaced variables and "pluses/minuses" indicate where our text attributes robust statistical significance to a variable. *t*-statistics below coefficient estimates are in absolute value. *, **, and *** denote two-sided statistical significance at 10%, 5%, and 1%, respectively.

(*SD* of Dependent = 38.36)		OLS	Treatment Effects	Heckman	Heckman
Inverse mills ratio			insig	insig	insig
Chapter 11 (Y/N)	+	53.197***			
		[5.75]			
Chapter 11 (Y/N)— instrumented	+		58.938***		
			[4.76]		
Conversion from Chapter 11 (Y/N)		−7.662	−8.763		
		[0.73]	[0.82]		
Forced petition (Y/N)	− − −−	−27.631***	−27.005***	−21.137***	−23.818**
		[2.72]	[2.75]	[2.69]	[2.13]
Length of proceedings in days (log)		−2.723	−2.743	−6.658	−7.285
		[0.65]	[0.66]	[1.54]	[1.22]
Unsecured committee (Y/N)				6.151	5.049
				[0.94]	[0.69]
Number of unsecured creditors/100		−0.410	−0.483	−0.460	−0.187
		[0.90]	[1.09]	[1.04]	[0.32]
Number of secured creditors/100	− − −−	−2.423**	−2.725**	−3.707***	−3.341**
		[2.38]	[2.34]	[2.72]	[2.19]
Secured debt includes banks (Y/N)		3.304	4.277	7.024	9.194
		[0.71]	[0.90]	[1.36]	[1.48]
Unsecured debt includes banks (Y/N)		−0.606	2.049	5.313	2.239
		[0.08]	[0.22]	[0.44]	[0.18]
Equity owned by managers (%)		−0.049	−0.055	−0.061	−0.070
		[0.96]	[1.07]	[1.06]	[1.00]
Total expenses to pre-assets		−13.389	−10.322		
		[0.65]	[0.48]		

(*continued*)

Table XIV—*Continued*

(SD of Dependent = 38.36)		OLS	Treatment Effects	Heckman	Heckman
Debtor expenses to pre-assets	++			6.909*	6.468*
				[1.95]	[1.78]
Unsecured expenses to pre-assets				−49.877	−162.719
				[0.69]	[1.36]
Secured debt to total debt	++++	28.894***	27.446***	34.072***	30.930***
		[3.21]	[3.06]	[3.50]	[2.81]
Debt/assets > 100% (Y/N)	− − −−	−24.568***	−25.241***	−29.490***	−28.538***
		[5.33]	[5.38]	[5.33]	[4.49]
Total assets		60.131	67.861	−248.876	−320.769
		[0.33]	[0.38]	[0.95]	[1.22]
Total assets × (assets > $100K)		−68.583	−77.025	247.376	319.058
		[0.39]	[0.43]	[0.95]	[1.22]
Total assets × (assets > $1M)		8.798	9.410	1.432	1.485
		[1.18]	[1.27]	[0.18]	[0.17]
Total assets × (assets > $10M)		−0.243	−0.154	0.135	0.309
		[0.20]	[0.13]	[0.14]	[0.26]
χ^2-test (asset variables = 0) (p-value)		0.21	0.21	0.49	0.28
Arizona dummy		−7.324	−7.312	−5.471	
		[1.59]	[1.58]	[1.04]	
χ^2-test (Specific Judge Effects) (p-value)					0.63
Constant		39.191	35.222	114.094***	119.433***
		[1.33]	[1.13]	[3.87]	[2.79]
Observations		143	143	121	120
R^2		0.63	0.63	0.55	0.59

Once a case has a critical scale ($100,000 for Chapter 7s' secured creditors, and $1 million for Chapter 11s' secured creditors), size no longer matters. The unreported standard deviation is a high 38%, large enough to make even the smaller cases' recovery rates difficult or impossible to consider different. The differences are also obviated after controlling for other variables. Jointly, the asset variables are statistically insignificant.

In Table XV, we look at recovery rates separately by creditor. We can reliably measure both unsecured and secured creditor recovery in Chapter 11, but only unsecured creditor recovery in Chapter 7.

Panel A explores secured creditor recovery in Chapter 11. As in Table XVI, creditors in firms that are more underwater recover less (standardized beta is > 300%). In AZ, secured creditors also recover less (standardized beta, ≈200%). When there are more secured creditors in numbers, they recover less, but this correlation disappears when we control for judge identity. Still, this may point to coordination problems (e.g., Bris and Welch (2005)). The judge effects themselves are insignificant, however, and assets may or may not be important (see the in-text table above).

Table XV
Determinants of Creditors' Recovery Rates in Chapter 11

The variables are named to make identification easy. The dependent variables are described in Table XIII. The recovery rates are calculated as the percent of the initial claim that is distributed by the court to the corresponding creditor in the case closure. Panel A focuses on secured creditors, of course in Chapter 11 only due to measurement difficulties for secured creditors in Chapter 7. Panel B explores both Chapter 7 and Chapter 11 cases. The variables include conversion from Chapter 11 to Chapter 7; length from filing to closing; forced petition, equal to one if filed by creditors; bank presence equal to one if at least one bank is among creditors; the total bankruptcy assets and percent of equity owned by managers, both declared by the firm in the original case filing; and expense components, as described in Table X. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). *Methods:* The Treatment Effects regression is estimated with both Chapter 7 and Chapter 11 cases. The Heckman regressions include only Chapter 11 cases. (The first step for Treatment and Heckman regressions is the procedure logit from Table II.) Boldfaced variables and "pluses/minuses" indicate where our text attributes robust statistical significance to a variable. *t*-statistics below coefficient estimates are in absolute value. *, **, and *** denote two-sided statistical significance at 10%, 5%, and 1%, respectively.

Panel A: Secured Creditors				
(*SD* of Dependent = 41.74)		OLS	Heckman	Heckman
Inverse Mills ratio			insig	insig
Length of proceedings in days (log)		−3.331	−3.219	−4.349
		[0.94]	[0.91]	[1.09]
Forced petition (Y/N)		2.903	2.903	−1.026
		[0.75]	[0.73]	[0.16]
Unsecured committee (Y/N)		4.016	4.880	3.954
		[0.93]	[1.04]	[0.76]
Number of unsecured creditors/100		−0.251	−0.194	−0.064
		[0.98]	[0.76]	[0.14]
Number of secured creditors/100	−	−2.538***	−2.418**	−1.968
		[2.67]	[2.49]	[1.45]
Secured debt includes banks (Y/N)		4.420	3.830	4.244
		[0.96]	[0.84]	[0.79]
Unsecured debt includes banks (Y/N)		−4.713	−6.061	−10.983
		[0.61]	[0.75]	[1.30]
Equity owned by managers (%)		0.009	0.012	0.027
		[0.22]	[0.29]	[0.48]
Debtor expenses to pre-assets		1.551	1.171	0.513
		[1.48]	[1.04]	[0.43]
Unsecured expenses to pre-assets		−0.913	−8.574	−18.730
		[0.04]	[0.32]	[0.29]
Secured debt to total debt		−8.579	−7.226	−7.035
		[1.10]	[0.89]	[0.78]
Debt/assets > 100% (Y/N)	− − −	−13.482***	−12.565***	−12.961***
		[3.01]	[2.95]	[2.68]
Total assets		−287.747	−302.268	−314.100
		[1.26]	[1.32]	[1.23]
Total assets × (assets > $100K)		288.121	303.469	313.538
		[1.28]	[1.35]	[1.24]
Total assets × (assets > $1M)		−1.713	−2.368	−0.851
		[0.27]	[0.36]	[0.11]
Total assets × (assets > $10M)		1.354	1.191	1.464
		[1.13]	[0.98]	[1.27]
χ^2-test (asset variables = 0) (*p*-value)		0.44	0.05	0.04*
Arizona dummy	− −	−7.718*	−7.344*	
		[1.93]	[1.85]	
χ^2-test (Specific Judge Effects) (*p*-value)				0.37
Constant		129.749***	125.993***	137.696***
		[5.39]	[5.16]	[4.28]
Observations		124	124	123
R^2		0.21	0.22	0.31

Table XV—*Continued*

			Treatment		
Panel B: Unsecured Creditors					
(*SD* of Dependent = 41.06)		OLS	Effects	Heckman	Heckman
Inverse mills ratio			insig	insig	insig
Chapter 11 (Y/N)	+	56.448***			
		[7.36]			
Chapter 11 (Y/N)—Instrumented	+		58.314***		
			[4.27]		
Conversion from chapter 11 (Y/N)		0.605	0.710		
		[0.07]	[0.09]		
Length of proceedings in days (log)		−4.733	−4.798	−7.741	−8.558
		[0.97]	[0.98]	[1.37]	[1.15]
Forced petition (Y/N)	—	−22.101*	−22.130*	−14.640	−12.129
		[1.66]	[1.81]	[1.22]	[1.11]
Unsecured committee (Y/N)		−0.236		2.633	5.546
		[0.03]		[0.28]	[0.49]
Number of unsecured creditors/100		0.254	0.231	0.122	0.419
		[0.35]	[0.31]	[0.16]	[0.42]
Number of secured creditors/100	− − − −	−6.894***	−6.983***	−7.250***	−7.708***
		[4.94]	[5.14]	[4.41]	[3.75]
Secured debt includes banks (Y/N)		−1.325	−1.008	4.460	8.462
		[0.21]	[0.15]	[0.56]	[0.89]
Unsecured debt includes banks (Y/N)	+++	16.266**	16.919**	19.832*	15.230
		[2.36]	[2.00]	[1.81]	[1.42]
Equity owned by managers (%)		−0.003	−0.004	−0.029	−0.038
		[0.05]	[0.07]	[0.37]	[0.44]
Debtor expenses to pre-assets	++			8.509***	7.668***
				[3.98]	[2.67]
Unsecured expenses to pre-assets				−24.174	−219.895
				[0.27]	[1.05]
Total expenses to pre-assets		−3.699	−3.283		
		[0.22]	[0.20]		
Secured debt to total debt		13.275	12.840	15.443	16.471
		[1.41]	[1.30]	[1.30]	[1.11]
Debt/assets > 100% (Y/N)	− − − −	−31.499***	−31.887***	−40.407***	−37.004***
		[4.49]	[4.53]	[4.70]	[4.05]
Total assets		83.452	88.604	−133.727	−146.828
		[0.70]	[0.70]	[0.83]	[0.67]
Total assets × (assets > $100K)		−84.497	−89.724	142.128	153.019
		[0.72]	[0.73]	[0.90]	[0.71]
Total assets × (assets > $1M)		1.449	1.473	−7.786	−5.957
		[0.13]	[0.14]	[0.63]	[0.49]
Total assets × (assets > $10M)		−0.343	−0.296	−0.570	−0.175
		[0.22]	[0.18]	[0.31]	[0.10]
χ^2-test (asset variables = 0) (*p*-value)		0.88	0.00***	0.87	0.41
Arizona dummy		−8.278	−8.275	−9.266	
		[1.37]	[1.41]	[1.20]	
χ^2-test (Specific Judge Effects) (*p*-value)					0.03**
Constant		38.423	37.581	115.029***	155.155***
		[1.34]	[1.27]	[3.18]	[2.77]
Observations		162	162	132	131
R^2		0.42	0.42	0.36	0.46

Table XVI
APR Violations and APR Violation Index

The variables are named to make identification easy. The independent variables are described in Table XIII. A case is considered in violation of APR when there are both secured and unsecured creditors, and unsecured creditors receive more than zero when secured creditors receive less than 100%. The APR adherence index is calculated, for each case, as the convex combination of full APR violation (proportional distribution, equal to zero), and full APR adherence (all to secured, nothing or whatever is left to unsecured, equal to one). The variables include conversion from Chapter 11 to Chapter 7; length from filing to closing; forced petition, equal to one if filed by creditors; bank presence equal to one if at least one bank is among creditors; the total bankruptcy assets and percent of equity owned by managers, both declared by the firm in the original case filing; and expense components, as described in Table X. Sample data are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 11 or Chapter 7 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). Methods: The Treatment Effects regression is estimated with both Chapter 7 and Chapter 11 cases. The Heckman regressions include only Chapter 11 cases. (The first step for Treatment and Heckman regressions is the procedure logit from Table II.) Boldfaced variables and "pluses/minuses" indicate where our text attributes robust statistical significance to a variable. t-statistics below coefficient estimates are in absolute value. *, **, and *** denote two-sided statistical significance at 10%, 5%, and 1%, respectively. The +/− designation in the second column for the APR adherence index has been reversed to be sign consistent with the probability of APR violation.

(SD of Dependent = 0.39, 0.34)		Probability of APR Violation			APR Adherence Index		
		Probit	Probit	Heckman	OLS	Heckman	Heckman
Inverse Mills ratio				insig		sig**	sig***
Length of proceedings in days (log)	–	−0.497 [1.58]	−0.913 [1.48]	−0.070 [0.89]	0.070 [1.48]	0.043 [1.35]	0.016 [0.45]
Forced petition (Y/N)	– –				0.097 [1.43]	0.117* [2.03]	0.089 [1.08]
Unsecured committee (Y/N)	+	0.690 [1.52]	3.182*** [4.72]	0.135 [1.29]	0.003 [0.04]	−0.125* [1.74]	−0.094 [1.48]
Number of unsecured creditors/100		0.014 [0.18]	−0.169 [1.34]	0.005 [0.72]	0.001 [0.26]	−0.004 [1.15]	−0.002 [0.41]
Number of secured creditors/100	– – – – –	−14.351*** [2.66]	−30.080*** [4.14]	−0.052* [1.87]	0.040*** [2.72]	0.036*** [2.80]	0.031* [1.95]
Secured debt includes banks (Y/N)		0.022 [0.05]	−0.203 [0.34]	0.022 [0.24]	−0.067 [1.15]	−0.050 [0.91]	−0.020 [0.37]

Table XVI—*Continued*

(SD of Dependent = 0.39, 0.34)		Probability of APR Violation			APR Adherence Index		
		Probit	Probit	Heckman	OLS	Heckman	Heckman
Unsecured debt includes banks (Y/N)	++	−0.064 [0.11]	1.878** [2.50]	0.087 [0.48]	−0.095 [1.13]	0.069 [0.98]	0.048 [0.68]
Equity owned by managers (%)	++	0.007* [1.81]	0.021*** [3.33]	0.001 [0.57]	−0.000 [0.11]	−0.001 [1.53]	−0.001* [1.74]
Debtor expenses to pre-assets	+−	−0.181 [0.21]	−0.568 [1.54]	0.194** [2.01]	0.036** [2.24]	0.007 [0.65]	−0.004 [0.24]
Unsecured expenses to pre-assets	−−−	−10.484 [1.12]	−158.905*** [3.40]	−2.440* [1.76]	0.097 [1.01]	0.060 [1.27]	0.053 [0.70]
Secured debt to total debt	+++++	1.704*** [3.14]	3.749*** [4.40]	0.290** [2.04]	−0.081 [0.91]	−0.255*** [3.00]	−0.212** [2.15]
Debt/Assets > 100% (Y/N)	+++++	1.325** [2.41]	2.730*** [3.88]	0.210* [1.88]	−0.086 [1.31]	−0.168*** [2.92]	−0.141** [2.24]
Total assets	+++	41.850 [1.50]	67.236*** [91.06]	4.901* [1.81]	−4.281** [2.05]	−1.886 [1.11]	−3.051 [1.12]
Total assets × (assets > $100K)	−−	−41.199 [1.48]	−66.291 [.]	−4.748* [1.80]	4.282** [2.09]	1.786 [1.07]	2.917 [1.10]
Total assets × (Assets > $1M)		−0.487 [0.76]	−0.779 [1.15]	−0.131 [0.75]	−0.002 [0.02]	0.071 [0.82]	0.115 [1.01]
Total assets × (Assets > $10M)	−	−0.161* [1.88]	−0.166 [1.22]	−0.022 [0.98]	0.001 [0.03]	0.028 [1.30]	0.019 [0.96]
χ^2-test (Asset Variables = 0) (p-value)		0.07	0.00***	0.54	0.14	0.00***	0.21
Arizona dummy	++	1.352*** [2.79]			0.003 [0.04]	−0.143** [2.95]	
χ^2-test (**Specific Judge Effects) (p-value)**			0.00***	0.04**			0.01**
Constant		−0.860 [0.42]	1.533 [0.35]	0.091 [0.13]	0.512* [1.65]	1.149*** [5.44]	1.116*** [4.47]
Observations		106	79	109	142	121	120
R^2		0.34	0.60	0.44	0.12	0.18	0.43

Panel B explores unsecured recovery, this time reliably for both Chapters 7 and 11. Again, whether or not we control for self-selection, Chapter 11 cases offer much higher recovery rates for secured creditors. The coefficient estimate translates into a standardized beta of 50%. Thus, it essentially does not matter whether we control for self-selection or not.

As to our other variables, creditors in firms that are more underwater again recover less. Second, the number of secured creditors again matters and again negatively: There is less unsecured recovery when there are many secured creditors. We cannot think of a good explanation for this finding. Third, unsecured creditors recover relatively more when there is a bank among them, but this disappears when judge identity is taken into account. Fourth, when the debtor firm spends more on bankruptcy expenses, unsecured creditors recover more. Fifth, the identity of the judge matters here, that is, whether unsecured creditors recover more or less seems to relate to which judge is drawn. Assets do not matter.

C. Determinants of APR Violations

Table XVI explores APR violations in Chapter 11, either a dummy, which equals one if *both* secured creditors do not receive 100% *and* unsecured creditors receive something, or a continuous APR adherence index, which equals one under APR and zero under purely proportional allocation (i.e., perfect APR violation). APR violations are specific to Chapter 11 cases. There are no APR violations in Chapter 7.

Our findings are (in rough order of importance):

- APR tends to be violated when there are fewer secured creditors (in number, standardized beta $\approx$10%), and
- when secured creditors own a large fraction of the total debt (standardized beta, 11%–27%).
- APR tends to be violated when the firm is more underwater (standardized beta of 21%–27%).
- APR tends to be violated when the firm is very small, although there are only a few observations that drive this. The relation also seems to depend on the measure: Violations tend to mildly increase with size, but the APR index tends to mildly decrease, as the following shows:

	Scale			
	$0–$100k	$100k–$1m	$1m–$10m	$10m and above
APR violations	2/15 = 13%	8/42 = 19%	11/45 = 24%	11/55 = 20%
APR index mean	50%	24%	27%	23%

- The identity of the judge matters.
- A number of other variables have coefficients that hint at effects, but that are quite sensitive to specification. A larger sample will hopefully help determine whether these variables really play a role.

Table XVII
Court Control of Fees

The table shows granted reimbursement requests for debtors and the unsecured creditors' committee. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases).

	Fees Granted/Fees Requested by Debtor	Fees Granted/Fees Requested by Unsecured
N	179	34
Mean	98.7%	97.5%
SD	6.2%	8.1%
Minimum	38.1%	60.5%
$\geq$ Quartile 1	All fees granted	

First, when managers own more, APR violations (among creditors) are more likely. Second, when unsecured creditors spend more, APR violations in their favor are less likely. (This is consistent with an optimal endogenous choice in which unsecured creditors in some cases have to spend more to receive more, or with an agency conflict between unsecured creditors and their representing attorneys.) Third, in one specification, the presence of an unsecured creditors' committee apparently helps unsecured creditors violate APR. Fourth, cases in AZ are more likely to violate APR.

VII. The Role of Courts

A. Court Oversight of Fees

Legal expenses have to be approved by the court, and we know of no prior evidence regarding whether courts tend to approve or knock down expense requests. Thus, Table XVII explores whether the courts appear to act as a binding constraint on legal expenses in equilibrium. The answer is negative: Requests by either the debtor or unsecured creditor for reimbursement are almost always fully granted. The median reimbursement is 100%; the mean reimbursement is 99% for debtors, 97.5% for creditors. In equilibrium, courts mostly rubberstamp legal expense requests.

B. Behavioral Differences among Judges

Table XVIII offers some Chapter 11 statistics by judge, which are explored as fixed effects in previous tables. Many differences among judges are probably idiosyncratic case noise, but some differences are remarkably stark. For example, during our sample period, AZ Judge Baum handled typical cases (mean $7.5 million), but allowed much higher expenses than, say, AZ Judge Curley

Table XVIII
Chapter 11 Judicial Heterogeneity

Variables: The fraction ultimately paid to creditors is the ratio of dollar total creditor recovery divided by *post*-bankruptcy, pre-fees assets. These post-bankruptcy, pre-fees assets are calculated as percent recovery rates by creditors times amount owed to creditors, plus total legal fees disclosed and reimbursed by the court. An APR violation equals one when secured creditors get less than 100%, and unsecured creditors get something. The APR adherence index is the linear combination of full APR (secured get all that they are owed, unsecured get the rest), and Proportional Distribution (where assets are distributed proportionally to the creditor's claim). An index of one means Full APR. *Methods:* *, **, and *** denote two-sided statistical significance at 10%, 5%, and 1%, respectively. In Panel A, for an individual judge, this means difference from the mean. For the overall column, this is a test of equality of means by judge are based on *F*-tests. In Panel B, for judge by characteristic, this is a test of difference based on non-parametric Kruskal-Wallis tests. *Sample data* are hand coded from the Public Access to Court Electronic Records (PACER). They include all corporate bankruptcies with sufficient data filed under Chapter 7 or Chapter 11 between 1995 and 2001 in the Federal Bankruptcy Courts of Arizona or the Southern District of New York, but exclude pre-packs, dismissals, cases of subsidiaries of the same company after the initial filing by the parent, and transfers to other courts or chapters (except for Chapter 11 to Chapter 7 conversions, which are included among Chapter 7 cases). The law school rankings are from 2004 *U.S. News; America's Best Graduate Schools*, a special issue of the *U.S. News and World Report*.

Panel A: Individual Judges

Judge	N	Total Assets (in Thousands) Mean	Total Assets (in Thousands) Median	Fraction Ultimately Paid Creditors Mean	Frequency of APR Violations Mean	APR Adherence Index Mean	Days of Proceedings Mean	Total Fees/Total Assets Mean
Arizona								
Redfield T. Baum, Jr.	27	$7,512	$806	96.1%	17.2%	85.5%	803	12.4%
Charles G. Case, II	15	$21,700	$904	97.3%	22.2%	88.4%	783	7.5%
Sarah S. Curley	19	$5,899	$483	96.0%	13.6%	94.1%	792	3.9%
Randolph J. Haines	7	$513	$220*	92.6%	37.5%	63.9%	575	4.4%
Eileen Hollowell	3	$2,980	$4,025	96.6%	33.3%	81.4%	746	1.5%
James M. Marlar	3	$4,316	$4,585*	99.7%	33.3%	66.7%	747	0.1%
George B. Nielsen, Jr.	7	$69,900*	$1,423	92.9%	57.1%*	49.1%*	581*	1.9%
Total/Average	81	$18,200	$806	95.7%	18.1%	87.5%	789	5.7%
p-value for equality		(0.42)		(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.59)

Table XVIII—*Continued*

Panel A: Individual Judges

Judge	N	Total Assets (in Thousands) Mean	Median	Fraction Ultimately Paid Creditors Mean	Frequency of APR Violations Mean	APR Adherence Index Mean	Days of Proceedings Mean	Total Fees/Total Assets Mean
New York								
Prudence C. Beatty	12	$23,200	$2,640	91.7%	0	1	1,138*	3.7%
Jeremiah H. Berk	1	$390	$390	99.2%	0	1	568	1.8%
Stuart M. Bernstein	10	$2,952	$536	76.6%	20.0%	74.3%*	795	63.2%
Cornelius Blackshear	14	$24,300	$4,843	90.6%	7.1%	92.9%	1,026	33.1%
Tina L. Brozman	9	$42,700	$2,500	94.1%	11.1%	95.1%	788	6.1%
John J. Connelly	3	$196	$100	68.6%	0	1	949	52.2%
Robert D. Drain	1	$4,100	$4,100	78.7%	0	1	1,028	9.4%
Jeffry H. Gallet	13	$21,000	$2,018	71.5%	7.7%	91.7%	639*	78.6%
James L. Garrity, Jr.	8	$38,400	$4,828	91.0%	0	1	678	135.9%
Robert E. Gerber	4	$6,686	$1,812	93.8%	0	1	1,057	6.8%
Arthur J. Gonzalez	15	$8,001	$1,200	86.0%	6.3%	93.6%	1,000	29.3%
Allan Gropper	2	$264	$264	90.4%	0	1	626	42.1%
Adlai S. Hardin	7	$49,400	$1,750	82.9%	14.3%	89.9%	507	7.5%
Burton R. Lifland	12	$30,000	$4,324	92.3%	0	1	1,054	6.1%
Total/Average	111	$21,200	$1,921	95.4%	5.9%	94.3%	769	3.9%
p-value for equality		(0.23)		(0.00)***	(0.57)	(0.00)***	(0.00)***	(0.34)

Panel B: Categorizations

Judge		Total Assets (in Thousands) Mean	Median	Fraction Ultimately Paid to Creditors	Frequency of APR Violations	APR Adherence Index	Days of Proceedings	Total Fees/Total Assets
Top-10 law school	No	$19,512	$2,047	89.5%	21.4%	80.6%	822	10.08%
	Yes	$16,723	$502	92.2%	17.4%	84.8%	803	12.92%
p-value for equality		(0.04)**		(0.78)	(0.46)	(0.54)	(0.55)	(0.87)
Graduated After 1975	No	$18,079	$1,345	89.6%	20.4%	82.4%	809	9.49%
	Yes	$18,375	$1,883	91.3%	22.7%	78.7%	826	12.40%
p-value for equality		(0.10)		(0.01)***	(0.85)	(0.01)**	(0.83)	(0.17)
Gender	Female	$18,578	$806	95.4%	22.2%	81.5%	781	4.59%
	Male	$18,693	$1,750	89.2%	19.7%	82.0%	824	12.37%
p-value for equality		(0.60)		(0.15)	(0.86)	(0.95)	(0.65)	(0.15)

($5.9 million): 12% versus 4%. AZ Judge Nielsen handled the largest cases ($69.9 million). Remarkably, he did so much faster than any other judges (581 days vs. an average of 764 days in AZ), but he violated APR in four out of his seven cases and creditors received less (93%) than they did on average (96%). In NY, Judge Garrity handled large cases ($38.4 million), adhered strongly to APR, but also allowed very high expense ratios (above 100%!). NY Judge Burton Lifland, notorious for his creditor violations in earlier bankruptcies (such as that of Eastern Airlines), both stuck to APR in our sample and managed to keep expenses relatively modest.

A more rigorous analysis shows that judges differ statistically in terms of the fraction that they pay out to creditors, how they adhere to APR, and how many days the proceedings take. AZ judges systematically violate APR, while NY judges do so only on occasion. In terms of identifiable judge differences, the quality of the alma mater of the judge does not matter. However, judges who have graduated after 1975 (the mean graduation year in our sample) have seen creditors recover a higher fraction of the firm in total but are less likely to follow APR. We have few observations to obtain statistical significance on gender, but there is an intriguing correlation worth mentioning—female judges tend to pay considerably more to creditors, reigning in fees.

VIII. Conclusion

Our paper not only examines the most comprehensive sample of bankruptcy cases to date, but also explores the alternative between Chapter 11 reorganizations and Chapter 7 liquidations. We find that Chapter 7 cases are systematically different from Chapter 11 cases along a number of dimensions such as firm size. After controlling for self-selection (which is important and effective), Chapter 7 seems to offer few advantages: It takes almost as long to resolve, requires similar fees, and in the end provides creditors with lower recovery rates—often zero—than a comparable Chapter 11 procedure.

We advise caution when interpreting figures that measure the cost of bankruptcy. These costs are sensitive to the procedure, to the denominator (how assets are measured), and to the central statistic used. More importantly, they vary widely and predictably from firm to firm. A range of estimates from 2% to 20% can not only be defended, but can even be predicted by our regressions at bankruptcy onset. Thus, theorists would be well advised not to claim either uniformly low or uniformly high bankruptcy costs, but rather to recognize that bankruptcy costs are modest in some firms, and large in other firms.

Our paper uses a rich data source that also allows us to examine a variety of factors, such as: jurisdiction (AZ and NY), the identity of the judge, the role of scale (asset size), managerial equity holdings in the firm, the degree of firm indebtedness, the presence of a debtor's committee, the number of secured and unsecured creditors as well as their respective claims, the division of the Chapter 11 procedure into its three phases, and the legal fees requested and granted by the court to individual claimants. These variables provide many interesting

associations—again, too many to summarize here in our conclusion, or even to comprehensively cover in our paper. Therefore, we invite interested readers to further explore our data, which we make available on our websites.

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