Draft—January 25, 2013

Secured Finance Externalities

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Abstract

Critics of secured credit suspect that financially distressed firms pledge assets to finance unduly risky, and thus inefficient, projects at the expense of unsecured creditors. Others believe, to the contrary, that distressed firms avoid secured credit, which can create creditor conflict and impose creditor control. While anecdotal evidence supports the former hypothesis, the only prior study of the issue supports the latter. We directly test the change in secured debt levels as firms approach bankruptcy. Our sample comprises publicly traded firms that filed for bankruptcy between 1993 and 2012. Consistent with the anecdotal evidence, and the prior study notwithstanding, we find a significant run-up of secured credit, as a proportion of assets and of liabilities, prior to bankruptcy filing, this even controlling for similar firms that do not file for bankruptcy in our sample period. That is, our results suggest that more than at other times in their life cycles, firms increase the use of secured credit when bankruptcy becomes imminent, just as the critics of secured credit claim. Consequently, our results support proposals for the subordination of secured debt to nonconsensual claims and for enhanced enforcement of covenants against the issuance of secured credit.

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I. Introduction

Critics of secured finance, LoPucki (1996), for example, argue that financially vulnerable firms use priority credit to externalize (at least in an ex post sense) the risk of failure. See also generally, e.g., Scott (1977). On this view, the winners are a coalition of a debtor's shareholders and secured creditors, which share investment's upside, at the expense of the debtor's unsecured creditors, who bear the downside. And because the debtor may be more interested in enhanced risk that favors junior interests than expected return to the firm, the expected loss may well exceed the expected gain. See generally Bulow and Shoven (1978). The threat of such inefficient overinvestment has led some to call for a reduction in secured credit's priority. See, e.g., Bebchuk and Fried (1996).[1]

Other scholars, Listokin (2008), for instance, describe a competing dynamic where, in part to avoid secured creditor control and conflict among creditors, managers of financially distressed firms shy away from secured credit at least where the use of such credit would be inefficient. See also, e.g., Bolton and Scharfstein (1996); compare Ayotte and Morrison (2009).[2] The recent trend of secured creditor dominance in bankruptcy practice, documented by Warren

[1] There are also theoretically efficient uses of secured credit, such as the *prevention* of risk alteration by a debtor and a later creditor at the expense of an earlier creditor—see, e.g., Schwartz (1989); Smith and Warner (1979)—and the mitigation of underinvestment in positive-net-value but low-risk projects—see, e.g., Stulz and Johnson (1985). See also Myers and Majluf (1984), which describes the issuance of senior claims as a solution to information asymmetry. We do not further discuss these potential benefits of secured credit because it is not our purpose here to enter the debate on whether secured credit is on net a valuable institution. Rather, as explained below, we seek to determine whether there is evidence that secured credit is used under circumstances where a policymaker might reasonably be concerned that financially distressed firms use such credit inefficiently.

[2] There are other reasons for a firm to forgo secured credit including the direct, transactions cost of such credit. See, e.g., Bebchuk and Fried (1996). For a financially distressed firm, however, these costs may be small compared to the indirect costs referred to in the text.

and Westbrook (2003), e.g., can be seen to strengthen this hypothesis and give managers greater reason to have the firms forgo secured credit as bankruptcy approaches.[3]

The former argument stems from the finance theory principle that secured credit is the cheapest, and thus most effective, way for shareholders to extend equity's option on a debtor's assets. The latter argument rests on a belief that the cost of secured credit, at least to a firm's managers, eliminates or restrains a debtor's tendency to use such credit.

Consistent with the malign theory of secured credit, anecdotal accounts of firm behavior provide that debtors, desperate for funds, increasingly pledge assets to and sacrifice control to secured creditors as financial distress intensifies. See, e.g., Baird and Rasmussen (2002), (2003). These accounts are supported formally, albeit indirectly, by Leeth and Scott (1989) and Adler et al. (2013).[4] In contrast, consistent with a benign theory of secured credit, Listokin (2008) finds no such pattern of increased secured debt as firms approach bankruptcy and, for some industries, he observes a decline; additionally, Listokin finds that among financially distressed firms secured debt is used less than average in industries where tort liability is most likely and where, therefore, critics of secured finance would predict greater use (because while consensual creditors cannot in all cases adjust to or covenant against another creditor's priority, tort victims cannot ever so covenant or adjust).

We design our own tests to determine whether firms load up on secured credit as they approach bankruptcy. If they do, then there is evidence to support critics' call for limitations on priority, though a cautious policymaker would nevertheless seek an explanation of Listokin's

[3] As Adler et al. (2013) observes, however, the hard landing for managers in bankruptcy, of which secured creditor control is a part, may well have exactly the opposite effect on management incentives because, as a firm becomes increasingly distressed, secured credit may be a debtor's only option to delay a bankruptcy filing.

[4] As described below, like Adler et al. (2003), we study large, publicly traded firms while Leeth and Scott (1989) looks at small businesses; the principles described, however, are common to firms of any size.

observations about tort-burdened industries. If firms do not increase the use of secured finance as they sink toward bankruptcy, then the concern over secured credit may well be misplaced.

Our study comprises publicly traded firms that filed for bankruptcy between 1993 and 2012. We find a significant run-up of secured credit, as a proportion of assets and of liabilities, prior to bankruptcy filing, this even controlling for similar firms that do not file for bankruptcy in our sample period. That is, more than at other times in their life cycles, firms increase the use of secured credit when bankruptcy becomes imminent. This observation is consistent with the claim that firms perversely employ secured finance to transfer risk from shareholders to unsecured creditors, and thus to transfer value in the other direction. Our results do not directly address whether the use of secured finance by distressed debtors is on balance inefficient but, as we explain below, our data do support the call for legal reform, and we are not dissuaded by the evidence for firms in industries heavily burdened by tort liability.

Further analysis proceeds in parts. In Part II we describe our research methodology. In Part III we explain our results. In Part IV we offer a conclusion and some suggested implications.

II. Research Methodology

Described below are the models we use to test our hypothesis. These are followed by a description of our sample.

A. Regression Models

To test our prediction that firms increasingly employ secured credit as they approach bankruptcy, we estimate two regression models. We first estimate a tobit model based on Barclay and Smith (1995). We estimate a tobit regression model to take into account firms that have no

secured debt. We estimate our regression model with standard errors clustered by firm and year (see Petersen, 2009, Thompson, 2011). The model is as follows:

$$Sec_{j,t} = \beta_0 + \beta_1 (Trend_{j,t}) + \beta_2 (M\text{-}t\text{-}b_{j,t}) + \beta_3 (Lcf_{j,t}) + \beta_4 (Size_{j,t})$$

$$+ \beta_5 (Reg_{j,t}) + \beta_6 (Return_{j,t}) + \varepsilon \qquad (1)$$

where, in each case for firm *j* in year *t*, *Sec* equals one of the four proxies for secured debt, *Sec_at*, *Sec_at2*, *Sec_lt*, and *Sec_lt2*. *Sec_at* is secured debt scaled by firm value (the sum of equity market value and the book value of liabilities); *Sec_at2* is secured debt scaled by book value of total assets; *Sec_lt*, and *Sec_lt2* are secured debt scaled by total liabilities, and secured debt scaled by the difference between total assets and common equity.See Barclay and Smith (1995); Listokin (2008).

Trend is a variable that ranges from -6 and -1, representing the difference between the fiscal year and the year of Chapter 11 filing.[5] We choose this variable to proxy for the moment at which the secured credit is reported. Against the null hypothesis that firms do not use more secured credit as they approach bankruptcy, we predict that a firm should have more secured debt in year -1 than in year -6. We expect the coefficient associated with this variable to be positive and statistically significant. In addition to the *Trend* variable we also consider alternative measures. Instead of one variable, we introduce a series of five indicator variables (for each of the years, from -6 to -1). We then test the differences between coefficients associated with each of the indicator variables.

We include a set of control variables that the literature describes as correlated with secured debt. See Barclay and Smith (1995); Listokin (2008). Each of the following variables

[5] Our results are not sensitive to this choice of time frame. As reported below, we observe significant year-to-year increases in secured debt within the frame chosen. Moreover, if we extended the frame to include a period earlier than year -6, we'd observe little or no change within the extended period, but for years that long before bankruptcy, no significant change would be expected on any theory.

may change as a firm approaches a bankruptcy filing and thus may be correlated our *Trend* variable: *M-t-b* is the ratio of the sum of market value of equity and liabilities to book value of equity and liabilities; *Lcf* is an indicator variable equal one if firm has tax loss carry forward in that fiscal year, and zero otherwise; *Size* is the natural log of the sum of the market value of equity and the book value of liabilities; and *Return* is income before extraordinary items, scaled by total assets.[6] For reasons explained by Barclay and Smith (1995), as a firm approaches bankruptcy: *M-t-b* is likely to decrease; *Lcf* is likely to increase; *Size* is likely to decrease; and *Return* is likely to decrease. We additionally control for the mix of debtors over time with *Reg*, an indicator variable equal one if firm is in a regulated industry (SIC codes 4900-4939) and zero otherwise.

Next, to test if financially distressed firms use more secured debt than non-distressed firms as they approach bankruptcy, to test if this difference is increasing, to control for year and industry effects, we estimate the following OLS regression model:[7]

$$Adj_Sec_{j,t} = \beta_0 + \beta_1 (Trend_{j,t}) + \beta_2 (Adj_M\text{-}t\text{-}b_{j,t}) + \beta_3 (Adj_Lcf_{j,t}) + \beta_4 (Adj_Size_{j,t}) + \beta_5 (Adj_Return_{j,t}) + \varepsilon \quad (2)$$

where the suffix *Adj* indicates that the variable has been adjusted for the median of its two-digit SIC industry, annually. Given that we control for industry effects, compared to model (1), model (2) does not contain the *Reg* variable. In model (2), we expect the coefficient associated with the *Trend* variable to be positive and statistically significant, consistent with the difference between

[6] As a robustness check, we replace *Return* with *Abnearn* equal to the difference between forward and current income before extraordinary items, scaled by the share price at year-end, as in Barclay and Smith (1995). Our results, reported below, are not qualitatively changed by this substitution. We do not use *Abnearn* in our main results because it reduces the number of observations significantly, especially in the year before the bankruptcy filing.

[7] Given that our *Adj_Sec* variables represent the differences between secured debt and industry median, we estimate an OLS instead of a Tobit.

distress firms' secured debt and non-distressed firms' secured debt increasing as distressed firms approach bankruptcy. We expect all adjusted variables in model (2) to have the same sign as the non-adjusted variables in model (1). As in model (1), in model (2) we cluster standard errors by both firm and year.

B. Sample and Descriptive Statistics

In order to compile a sample of firms that filed for Chapter 11 bankruptcy in the US, we use the Altman-NYU Salomon Center bankruptcy list for the 20-year period from January 1993 to August 2012. The database contains firms filing for bankruptcy with more than $100 million in liabilities for the cited sample period. We use the Compustat database containing financial and industry information to exclude financial firms, those with SIC codes ranging from 60 to 69, as the financial statements of financial firms differ significantly from those of other firms We also exclude firms where industry information was not available or where the firm did not exist in the Compustat database. We use the financial information from the Compustat database to compute our variables. We exclude all observations for which any of the variables could not be computed. This yields a sample of 551 firms, and 2,497 observations (for the six year period preceding the year of Chapter 11 filing). Table 1 Panel A shows the distribution of firms and observations by year of bankruptcy filing. Panel B shows the distribution of firms and observations by industry (SIC division). Most bankruptcy filings occurred during the "dot-com bubble" in the 2000 – 2002 period, and during the recent financial crisis in the 2008-2010 period. Most bankrupt firms come from manufacturing, followed by transportation/utilities, and services.

Table 2 shows the descriptive statistics used in our analysis. The mean secured debt scaled by firm value (*Sec_at*) equals 0.15, while the mean secured debt scaled by book total assets equals 0.18. The mean secured debt scaled by total liabilities (*Sec_lt*) equals 0.23, while

the mean secured debt scaled by the difference between assets and common equity (*Sec_lt*) equals 0.22. Compared to their respective industries, the ratios (*Adj_Sec_at, Adj_Sec_at2, Adj_Sec_lt, and Adj_Sec_lt2*) are 0.11, 0.14, 0.16, and 0.15 (consistent with distressed firms holding more secured debt on their balance sheets than non-distressed firms). Note that for 559 out of 2,497 firm-year observations (22%) secured debt equals zero, comparable to Barclay and Smith (1995) and Listokin (2008). To eliminate extreme observations, *M-t-b* and *Return* variables are winsorized at the 5% level.[8]

III. Results

The report of our results begin with a description of changes in secured debt levels and, so that these data can be properly interpreted, a description of pre-bankruptcy debt reclassifications. Our multivariate analysis follows these descriptions.

A. Changes in Secured Debt and pre-Bankruptcy Reclassifications

In Table 3 we report the debt structure of firms filing for Chapter 11 by year relative to the bankruptcy filing. Panel A of Table 3 shows the changes in mean and median secured debt (*Sec_at, Sec_at2, Sec_lt* and *Sec_lt2*) variables. From year -6 relative to bankruptcy filing, secured debt increases from 11% of firm value to 19% of firm value two years before filing for chapter 11, on average (median increases from 3% to 10% of firm value). As a percentage of book assets secured debt increases from 14% in year -6 to 22% in year -2 (median increases from 5% to 13%). We observe a similar pattern when we scale secured debt by total liabilities and the difference between total assets and common equity. Secured debt increases from 20% to 26% of total liabilities (median increases from 9% to 18%). Secured debt as a percentage of the

[8] Winsorizing at 1% or not winsorizing these variables does not change our results qualitatively.

difference between total assets and common equity increases from 19% to 25% (median increases from 9% to 17%). All the measures of secured show an economically significant increase in secured debt in the pre-bankruptcy period from year -6 to year -2 relative to bankruptcy filing.

In Panel B we show the changes in mean and median industry-adjusted secured debt (*Adj_Sec_at, Adj_Sec_at2, Adj_Sec_lt* and *Adj_Sec_lt2*). All variables show an increase from year -6 to year -2 prior to bankruptcy filing, consistent with distressed firms using more secured debt, more than their non-distressed counterparts, and increasing secured debt relative to their industry peers, as they approach bankruptcy.

In Panel A and B, across all measures, non-adjusted and adjusted alike, however, we observe a decrease in secured debt in year before the bankruptcy filing (-1) compared to year -2 relative to the filing. To explain this change in secured debt in year before the bankruptcy filing, in Panel C we tabulate long term debt scaled by total liabilities (*Dltt_lt*), and debt in current liabilities scaled by total liabilities (*Dlc_lt*). Long term debt increases from year -6 to year -2. Between years -2 and -1 there is a decrease in secured and long term debt, and an increase in current debt.

The reason for this sudden shift from long term and secured debt to current debt between year -2 and -1 may be found in the way the debt is reported in firms' financial statements, and the way Compustat records debt reclassifications. In the event of default or breach of debt contract (bond) covenants, a debt has to be reclassified into short-term (see FASB ASC 210-10-45, ASC 470-10, triggering reclassification of secured debt (long term) on firms' financial statements, and in the Compustat database into short-term debt (debt in current liabilities). Compustat does not distinguish between secured and unsecured short-term debt. Note that, often,

defaulting on one debt contract triggers cross-defaulting on others, meaning that much of long term financial debt (secured and unsecured) may be reclassified into current debt category in the event of default.

For example, Bayou Steel, which filed for bankruptcy in January of 2003, reclassified its secured long term debt into current debt. As a result, the balance sheet as of September 2001 shows long term debt of approximately $120 million, while the one on September 2002 shows no long term debt. The whole amount of 120 million was transferred to current liabilities. Compustat classifies this as zero long term debt, and zero secured debt.

Salant Corp filed for bankruptcy in 1998, but prior to filing entered into a restructuring agreement in which it planned to exchange long term secured debt for equity. As a result Salant technically defaulted on its long term debt (still reported on its end of 1996 balance sheet) of approximately $110 million by missing an interest payment. Consequently, Salant reclassified it into current debt on the balance sheet reported at the end of 1997. Compustat again reported a decrease in secured debt, and an increase in debt in current liabilities from 1997 to 1998.

The above demonstrates that using Compustat data on secured debt in the year preceding the bankruptcy filing might not be representative of the real level of secured debt the firms bear. The level of secured (and long term) debt is systematically understated given that at least some of the firms that file for Chapter 11 either default or breach debt covenants prior to the actual bankruptcy filing.

While it is possible that reclassifications occurs in year -2 (or earlier), the likelihood of this is lower, as the likelihood that a firm can avoid bankruptcy after a default or breach declines as time passes.. Even if reclassifications occurred earlier than year -1, such reclassification would

introduce bias against our results. Consequently, in our regression analysis, we test the trend of secured debt between years -6 and -2.[9]

Reclassification sheds light on the difference between our results and those of Listokin (2008). As noted above, Listokin finds that firms file for bankruptcy subject to no more, or, in some industries, less, secured debt than in their recent past.[10] But, as best we can determine, Listokin's data do not account for the tendency of firms on the brink of bankruptcy to reclassify, and thus understate, secured debt on their balance sheets (a tendency that would be reflected in the Compustat database used by Listokin as well as by us).

B. Multivariate Analysis

In Table 4 we show our tobit regression model estimates using unadjusted variables (model 1). As predicted, the coefficient associated with the *Trend* variable is positive and statistically significant across our regression models, indicating that the closer a firm gets to Chapter 11 bankruptcy filing, the more it increases its secured debt. Our results for control variables are similar to those of Barclay and Smith (1995). The coefficients associated with the *M-t-b* and *Size* variables are negative and statistically significant. The coefficient associated with *Lcf* and *Reg* variables are positive and statistically significant. Finally, the coefficient associated with the *Return* variable is not statistically significant in the first two regression models, and positive and statistically significant in the last two models.

In Table 5 we show our OLS regression model with industry and year adjusted dependent variables (model 2). The coefficient associated with the *Trend* variable is positive and

[9] Including the year prior to bankruptcy filing (-1) leaves our results qualitatively unchanged.

[10] For a subset of firms Listokin examines, those in industries not subject to significant tort liability, he finds no run up of secured debt in advance of bankruptcy even up to a time before we anticipate reclassification is likely to occur. This inconsistency with our data may simply reflect Listokin's small sample, roughly a tenth the size of ours.

statistically significant, consistent with secured credit use increasing as a firm approaches Chapter 11 filing, relative to non-distressed firms from the same industry and over the same time period. The coefficients associated with our (adjusted) control variables have the same signs as those associated with unadjusted variables in Table 4.

Finally, in Table 6 we estimate model (2), but replace the *Trend* variable with dummies representing years relative to bankruptcy filing, ranging from -6 to -2. We show the regression model estimates in Panel A of Table 6, and tests of combinations of coefficients in Panel B of Table 6. The coefficients associated with Year -5, Year -4, Year -3 and Year-2 represent the difference in the level of secured debt in their respective years relative to its level in Year -6. The coefficient associated with the Year -5 variable is not statistically significant. The coefficients associated with Year -4, Year-3, and Year -2 dummies are positive and statistically significant (with the exception of Year -4 coefficients in *Adj_Sec_lt* and *Adj_Sec_lt2* models), consistent with secured debt being higher in years closer to bankruptcy filing relative to year -6. To test for year-to-year change we test the differences between coefficients in Panel B of Table 6. With the exception of the difference between Year -2 and Year -3 in *Adj_Sec_lt* and *Adj_Sec_lt2* models, the differences in coefficients are positive and statistically significant from Year -5 to Year -2, consistent with a gradual increase in secured debt as a firm approaches bankruptcy filing.

These data, which measure only balance-sheet debt, may not capture a true financial picture of a firm as it approaches bankruptcy. This is because, instead of on-balance sheet financing of their activities, firms can opt for off-balance sheet financing, a practice that would understate the level of their secured debt. See e.g. Ryan et al. (2001); Feng et al. (2009). To address the impact of off-balance sheet financing on our results we conduct a robustness check

that considers the use of operating leases and special purpose vehicles on our results. For brevity, we do not tabulate these results.

We first take into account the reported operating leases in annual reports of firms as they approach bankruptcy. Operating leases are off-balance sheet, while capital leases are on and are counted as secured credit in our original regressions. Economically, however, an operating lease is often (albeit not always) equivalent to secured credit (equivalent to capital leases).[11] Past research has shown that through the use of operating leases firms manage their leverage, that is, keep some of liabilities off the books. See e.g. Ryan et al. (2001).

To account for the possibility that firms hide secured debt through the use of operating leases, we run two robustness checks. We first estimate our regression model (2) with our four variables restated to include the reported amount of operating leases in the nominator and denominator of our independent variables. This yields results qualitatively unchanged compared to our main results. We then estimate our regression model (2) using only the operating lease variables in the nominator and adding the operating leases to the denominators from our four secured credit measures. We find either a positive and non-significant or a positive and significant coefficient associated with the operating lease variables, consistent with operating leases increasing as the firm approaches bankruptcy filing.

We also consider the use of special purpose vehicles (SPV) by firms approaching bankruptcy. As illustrated in the case of Enron, a debtor can use SPVs, like operating leases, to pledge property off-balance-sheet.. A firm creates a shell corporation to hold assets and liabilities, and has what is formally a third-party entity hold the equity stake; so structured, the SPV's balance sheet need not be consolidated with that of the firm. See Healy and Palepu

[11] Operating lease is treated simply as a rent, meaning that no liabilities or assets are recognized at the contract initiation on the balance sheet of the lessee (FAS 13). While often used to hide liabilities off balance sheet, operating lease can be just a long-term rent contract accounted for justly as a rent expense.

(2003); Feng et al. (2009). See generally, e.g., Ayotte & Gaon (2011). This practice understates the level of a firm's secured debt. While our data do not permit us to test the use of SPVs by firms in our sample, we note that Feng et al. (2009) find that SPV use increases with leverage. Leverage, we observe, is positively correlated with our *Trend* variable. Thus, we suspect the increase in secured debt that we observe as firm approaches bankruptcy is understated, as our measure does not include secured financing via SPVs.

The understatement of secured credit as a consequence of SPVs may also help explain results in Listokin (2008), which observes that firms in tort-burdened industries use less secured debt than those in other industries. In this regard, Feng et al. (2009) is noteworthy as it reports that firms in industries subject to heavy tort liability—tobacco and chemical, e.g.—are also unusually (though not uniquely) heavy users of off-book subsidiaries.[12]

IV. Conclusion and Implications

Consistent with critical rather than benign accounts, our data support the hypothesis that to promote equity's interest (or management's) as failing firms decline they increasingly use secured credit—on or off their books—to finance their operations. And it is reasonable to conclude that this practice increases the risk, and thus reduces the return, to unsecured creditors, who (at least in the *ex post* sense) suffer a redistributive externalization. The question arises whether this presents a problem and, if so, whether legal reform should address the problem.

[12] It may be telling that, according to Feng et al., the pharmaceutical industry is an unusually light user of SPVs while Listokin finds that this industry is an exception to his observation that firms in tort-burdened industries use less secured credit.

The most troubling case of risk externalization is the one where the victim is a nonconsensual creditor. In line with our discussion just above, it is by now old hat that a debtor's ability to trump a tort victim's priority creates an overinvestment incentive (while tort victims suffer externalization in *every* sense) and that efficient incentives require tort victims to have the highest priority, even above secured creditors. See, e.g., LoPucki (1996); Adler (1993a). Our data, though not isolated on firms subject to tort liability, lend support to the argument that the law should award tort victims top priority.

The proper treatment of consensual unsecured creditors is more complicated. As we have repeatedly noted above, a debtor's incentive to externalize risk on unsecured creditors includes the incentive to do so inefficiently. But (as we have intimated) this may be merely an *ex post* incentive. Unlike tort victims, consensual unsecured creditors can charge a debtor for any anticipated investment that would come at the creditors' expense. If such charge is properly calibrated, from an *ex ante* perspective, the debtor loses the ability to externalize the cost of its investments. Consequently, the debtor has an incentive to bond itself against inefficient investment. A bond that debtors can and do employ is a pledge to unsecured creditors that the debtor will not, without the unsecured creditors' consent, finance future operations with more than a specified amount of secured credit, and that specified amount can be zero.[13] Other, perhaps less restrictive, covenants are employed as well, the requirement that a debtor maintain a minimum capitalization, for example. See generally Li et al. (2012).

Although no one contends that debt covenants or other measures operate perfectly to render a debtor's investment incentives socially optimal (even in the absence of nonconsensual creditors), our data do not reveal whether the secured credit issued by failing firms is used

[13] The question of why any creditor would allow itself to be unsecured while a debtor possesses unpledged assets is a contested one—see, e.g., Adler (1993b)—but this question is beyond the scope of this paper.

efficiently or inefficiently and it is possible that covenants with unsecured creditors, or other factors, restrict the use of secured finance to profitable projects. Thus, we do not advocate for a general restriction on the use or priority of secured credit.

This is not to say that we are entirely agnostic on legal reform that would protect a consensual unsecured creditor from a debtor's incentive to externalize risk financed by secured credit. If it is a debtor's bond to unsecured creditors that promotes efficient investment, the law should, to the extent possible, facilitate such bond. Thus we support proposals, such as that made in Adler and Kahan (2013), for the enforcement of debt covenants against third parties with actual or constructive notice of such covenants. If the law permitted enforcement against third parties, an unsecured creditor could avoid a security interest granted by a debtor in violation of a loan covenant. The vigorous enforcement of debt covenants would address what our data suggest is a valid concern.

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Table 1 – Distribution of Chapter 11 filings by year and industry

Panel A – Distribution of firms and observations by bankruptcy year

Bankruptcy year	N (firms)	% (firms)	N (observations)	% (observations)
1993	7	1.27%	41	1.64%
1994	10	1.81%	36	1.44%
1995	9	1.63%	43	1.72%
1996	15	2.72%	60	2.40%
1997	13	2.36%	57	2.28%
1998	17	3.09%	74	2.96%
1999	36	6.53%	150	6.01%
2000	50	9.07%	237	9.49%
2001	93	16.88%	402	16.10%
2002	61	11.07%	268	10.73%
2003	39	7.08%	205	8.21%
2004	22	3.99%	118	4.73%
2005	21	3.81%	96	3.84%
2006	12	2.18%	57	2.28%
2007	12	2.18%	57	2.28%
2008	32	5.81%	136	5.45%
2009	57	10.34%	259	10.37%
2010	19	3.45%	72	2.88%
2011	16	2.90%	73	2.92%
2012	10	1.81%	56	2.24%
Total	551	100.00%	2,497	100.00%

Panel B – Distribution of firms and observations by industry

Industry	N (firms)	% (firms)	N (observations)	% (observations)
Agriculture, Forestry, And Fishing	2	0.36%	11	0.44%
Mining	29	5.26%	133	5.33%
Construction	14	2.54%	66	2.64%
Manufacturing	193	35.03%	922	36.92%
Transportation, Comm., El., Gas	106	19.24%	452	18.10%
Wholesale Trade	26	4.72%	110	4.41%
Retail Trade	77	13.97%	363	14.54%
Services	97	17.60%	410	16.42%
Public Administration and Other	7	1.27%	30	1.20%
Total	551	100.00%	2,497	100.00%

Table 1. Distribution of firms by bankruptcy filing year and SIC division industry. The sample consists of US firms that filed for bankruptcy from January 1993 through August 2012 with total liabilities in excess of $100 million. Data was collected from Altman-NYU Salomon Center bankruptcy list and Compustat.

Table 2 – Descriptive statistics

	N	Mean	S.D.	p25	Mdn	p75
Sec_at	2497	0.1502	0.1888	0.0008	0.0554	0.2581
Sec_at2	2497	0.1848	0.2375	0.0012	0.0734	0.3140
Sec_lt	2497	0.2261	0.2541	0.0018	0.1125	0.4032
Sec_lt2	2497	0.2202	0.2492	0.0017	0.1083	0.3965
Adj_Sec_at	2497	0.1148	0.1852	-0.0033	0.0258	0.2123
Adj_Sec_at2	2497	0.1395	0.2346	-0.0054	0.0371	0.2550
Adj_Sec_lt	2497	0.1550	0.2517	-0.0087	0.0498	0.3199
Adj_Sec_lt2	2497	0.1514	0.2468	-0.0085	0.0491	0.3110
Dltt_lt	2497	0.4747	0.2876	0.2417	0.5349	0.7110
Dlc_lt	2493	0.1126	0.1978	0.0039	0.0276	0.1109
Trend	2497	-3.3416	1.6527	-5.0000	-3.0000	-2.0000
M-t-b	2497	1.4212	0.6303	0.9979	1.1953	1.6337
Lcf	2497	0.7569	0.4290	1.0000	1.0000	1.0000
Size	2497	6.3571	1.2772	5.5044	6.2491	7.0730
Reg	2497	0.0024	0.0490	0.0000	0.0000	0.0000
Return	2497	-0.0780	0.1667	-0.1222	-0.0144	0.0276

Table 2. The sample consists of US firms that filed for bankruptcy from January 1993 through August 2012 with total liabilities in excess of $100 million. Data was collected from Altman-NYU Salomon Center bankruptcy list and Compustat. *Sec_at* is secured debt divided by the sum of equity market value and book value of total liabilities. *Sec_at2* is secured debt divided by the book value of total assets. *Sec_lt* is secured debt divided by the book value of total liabilities. *Sec_lt2* is secured debt divided by the difference between total assets and common equity. Prefix *Adj* indicates the variable equals the difference between the firms variable (*Sec_at, Sec_at2, Sec_lt, Sec_lt2*) and SIC two-digit code industry median for the year. *Dltt_lt* is long term debt divided by total liabilities. *Dlc_lt* is current debt divided by total liabilities. *Trend* is a variable that ranges from -6 and -1, equal the difference between the fiscal year and the year of Chapter 11 filing. *M-t-b* is the ratio of the sum of market value of equity and liabilities to book value of equity and liabilities. *Lcf* is an indicator variable equal one if firm has tax loss carry forward in that fiscal year, and zero otherwise. *Size* is the natural log of the sum of the market value of equity and liabilities. *Reg* is an indicator variable equal one if firm is in a regulated industry (SIC codes 4900-4939), and zero otherwise. *Return* is income before extraordinary items, scaled by total assets.

Table 3 – Debt structure by year to Chapter 11

Panel A – Secured debt by year to Chapter 11

Year to Chapter 11	Sec_at		Sec_at2		Sec_lt		Sec_lt2		
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	N
-6	0.1095	0.0341	0.1413	0.0526	0.1981	0.0930	0.1930	0.0913	338
-5	0.1089	0.0306	0.1457	0.0462	0.2008	0.0851	0.1952	0.0770	371
-4	0.1285	0.0391	0.1613	0.0540	0.2163	0.0927	0.2099	0.0895	420
-3	0.1623	0.0659	0.1928	0.0994	0.2492	0.1572	0.2426	0.1383	465
-2	0.1906	0.1012	0.2230	0.1311	0.2612	0.1769	0.2544	0.1698	483
-1	0.1812	0.0811	0.2248	0.0958	0.2150	0.0970	0.2102	0.0921	420

Panel B – Adjusted secured debt by year to Chapter 11

Year to Chapter 11	Adj_Sec_at		Adj_Sec_at2		Adj_Sec_lt		Adj_Sec_lt2		
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	N
-6	0.0757	0.0098	0.0980	0.0215	0.1288	0.0361	0.1254	0.0358	338
-5	0.0749	0.0070	0.1000	0.0096	0.1295	0.0119	0.1263	0.0116	371
-4	0.0954	0.0160	0.1183	0.0203	0.1482	0.0305	0.1439	0.0292	420
-3	0.1270	0.0413	0.1478	0.0527	0.1781	0.0647	0.1738	0.0621	465
-2	0.1550	0.0711	0.1779	0.0832	0.1899	0.1006	0.1855	0.0939	483
-1	0.1414	0.0377	0.1757	0.0458	0.1396	0.0438	0.1377	0.0413	420

Panel C – Long term and current debt by year to Chapter 11

Year to Chapter 11	Dltt_lt		Dlc_lt		
	Mean	Median	Mean	Median	N
-6	0.4380	0.4875	0.0739	0.0250	338
-5	0.4624	0.5075	0.0641	0.0243	371
-4	0.4879	0.5475	0.0774	0.0224	420
-3	0.5205	0.5795	0.0799	0.0207	465
-2	0.5385	0.6055	0.0952	0.0260	483
-1	0.3780	0.3952	0.2789	0.1148	420

Table 3. The sample consists of US firms that filed for bankruptcy from January 1993 through August 2012 with total liabilities in excess of $100 million. Panel A shows secured debt, Panel B adjusted secured debt, and Panel C long term and current debt by year to Chapter 11 filing. Data was collected from Altman-NYU Salomon Center bankruptcy list and Compustat. *Sec_at* is secured debt divided by the sum of equity market value and book value of total liabilities. *Sec_at2* is secured debt divided by the book value of total assets. *Sec_lt* is secured debt divided by the book value of total liabilities. *Sec_lt2* is secured debt divided by the difference between total assets and common equity. Prefix *Adj* indicates the variable equals the difference between the firms variable (*Sec_at, Sec_at2, Sec_lt, Sec_lt2*) and SIC two-digit code industry median for the year. *Dltt_lt* is long term debt divided by total liabilities. *Dlc_lt* is current debt divided by total liabilities.

Table 4 – Secured debt regression models

	Sec_at	Sec_at2	Sec_lt	Sec_lt2
Trend	0.023***	0.024***	0.024***	0.024***
	(6.205)	(5.141)	(4.434)	(4.402)
M-t-b	-0.088***	-0.027*	-0.043**	-0.046***
	(9.039)	(1.825)	(2.536)	(2.749)
Lcf	0.065***	0.085***	0.088***	0.084***
	(4.022)	(4.277)	(3.500)	(3.382)
Size	-0.009***	-0.008***	-0.021***	-0.021***
	(6.904)	(2.839)	(9.049)	(8.878)
Reg	0.127***	0.207***	0.088***	0.094***
	(23.038)	(13.519)	(3.713)	(4.023)
Return	0.050	0.006	0.198**	0.223***
	(0.869)	(0.062)	(2.211)	(2.705)
Constant	0.337***	0.258***	0.422***	0.424***
	(6.954)	(4.419)	(6.641)	(6.815)
lnsigma				
Constant	-1.581***	-1.329***	-1.193***	-1.214***
	(40.249)	(27.835)	(32.907)	(33.062)
N	2077	2077	2077	2077

Table 4. Tobit regression model. Standard errors are clustered by firm and year. T-stats are in parentheses. The sample consists of US firms that filed for bankruptcy from January 1993 through August 2012 with total liabilities in excess of $100 million. Data was collected from Altman-NYU Salomon Center bankruptcy list and Compustat. *Sec_at* is secured debt divided by the sum of equity market value and book value of total liabilities. *Sec_at2* is secured debt divided by the book value of total assets. *Sec_lt* is secured debt divided by the book value of total liabilities. *Sec_lt2* is secured debt divided by the difference between total assets and common equity. *Trend* is a variable that ranges from -6 and -2, equal the difference between the fiscal year and the year of Chapter 11 filing. *M-t-b* is the ratio of the sum of market value of equity and liabilities to book value of equity and liabilities. *Lcf* is an indicator variable equal one if firm has tax loss carry forward in that fiscal year, and zero otherwise. *Size* is the natural log of the sum of the market value of equity and liabilities. *Reg* is an indicator variable equal one if firm is in a regulated industry (SIC codes 4900-4939), and zero otherwise. *Return* is income before extraordinary items, scaled by total assets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Table 5 – Adjusted secured debt regression models

	Adj_Sec_at	Adj_Sec_at2	Adj_Sec_lt	Adj_Sec_lt2
Trend	0.020***	0.021***	0.019***	0.019***
	(5.582)	(4.565)	(3.552)	(3.542)
Adj_M-t-b	-0.067***	-0.011	-0.032**	-0.035***
	(8.285)	(0.844)	(2.343)	(2.596)
Adj_Lcf	0.036***	0.047***	0.038***	0.035***
	(3.675)	(3.912)	(2.679)	(2.598)
Adj_Size	-0.015***	-0.015**	-0.033***	-0.033***
	(3.233)	(2.363)	(4.740)	(4.878)
Adj_Return	0.037	-0.051	0.130**	0.154**
	(0.837)	(0.641)	(1.963)	(2.568)
Constant	0.180***	0.196***	0.218***	0.216***
	(10.773)	(9.325)	(9.107)	(9.251)
N	2077	2077	2077	2077
F	58.118	19.052	20.548	22.030
Prob>F	0.000	0.000	0.000	0.000
R2	0.103	0.043	0.050	0.053
Adjusted R2	0.100	0.040	0.048	0.051

Table 5. OLS regression model. Standard errors are clustered by firm and year. T-stats are in parentheses. The sample consists of US firms that filed for bankruptcy from January 1993 through August 2012 with total liabilities in excess of $100 million. Data was collected from Altman-NYU Salomon Center bankruptcy list and Compustat. Prefix *Adj* indicates the variable equals the difference between the firm's variable and its SIC two-digit code industry median for the year. *Sec_at* is secured debt divided by the sum of equity market value and book value of total liabilities. *Sec_at2* is secured debt divided by the book value of total assets. *Sec_lt* is secured debt divided by the book value of total liabilities. *Sec_lt2* is secured debt divided by the difference between total assets and common equity. *Trend* is a variable that ranges from -6 and -2, equal the difference between the fiscal year and the year of Chapter 11 filing. *M-t-b* is the ratio of the sum of market value of equity and liabilities to book value of equity and liabilities. *Lcf* is an indicator variable equal one if firm has tax loss carry forward in that fiscal year, and zero otherwise. *Size* is the natural log of the sum of the market value of equity and liabilities. *Return* is income before extraordinary items, scaled by total assets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.

Table 6 – Adjusted secured debt regression models with individual year effects

Panel A – Regression model estimates

	Adj_Sec_at	Adj_Sec_at2	Adj_Sec_lt	Adj_Sec_lt2
Year -5	0.004	0.004	0.006	0.006
	(0.556)	(0.559)	(0.425)	(0.442)
Year -4	0.023**	0.023**	0.027	0.026
	(2.090)	(2.044)	(1.397)	(1.347)
Year -3	0.050***	0.052***	0.056***	0.055***
	(5.324)	(4.758)	(3.523)	(3.368)
Year -2	0.073***	0.077***	0.069***	0.069***
	(4.764)	(4.094)	(2.853)	(2.845)
Adj_M-t-b	-0.066***	-0.010	-0.032**	-0.034**
	(8.059)	(0.784)	(2.275)	(2.517)
Adj_Lcf	0.035***	0.046***	0.038***	0.035***
	(3.639)	(3.890)	(2.660)	(2.579)
Adj_Size	-0.015***	-0.015**	-0.033***	-0.033***
	(3.250)	(2.378)	(4.760)	(4.897)
Adj_Return	0.039	-0.050	0.129**	0.153***
	(0.881)	(0.626)	(1.973)	(2.589)
Constant	0.071***	0.083***	0.111***	0.109***
	(6.930)	(6.991)	(6.613)	(6.374)
N	2077	2077	2077	2077
F	36.259	12.109	13.041	14.004
Prob>F	0.000	0.000	0.000	0.000
R2	0.104	0.044	0.051	0.053
Adjusted R2	0.100	0.040	0.047	0.050

Panel B - Combinations of coefficients

Year -5 – Year -6	0.004	0.004	0.006	0.006
	(0.556)	(0.559)	(0.425)	(0.442)
Year -4 – Year -5	0.020***	0.019***	0.021**	0.020*
	(2.738)	(38.317)	(2.109)	(1.946)
Year -3 – Year -4	0.026***	0.029***	0.029***	0.029***
	(5.311)	(5.507)	(2.550)	(2.723)
Year -2 – Year -3	0.024***	0.025**	0.013	0.014
	(3.136)	(2.208)	(0.979)	(1.129)

Table 5. OLS regression model. Standard errors are clustered by firm and year. T-stats are in parentheses. Panel A shows regression model estimates, and Panel B shows tests of linear combinations of coefficients. The sample consists of US firms that filed for bankruptcy from January 1993 through August 2012 with total liabilities in excess of $100 million. Data was collected from Altman-NYU Salomon Center bankruptcy list and Compustat. Prefix *Adj*

indicates the variable equals the difference between the firm's variable and its SIC two-digit code industry median for the year. *Sec_at* is secured debt divided by the sum of equity market value and book value of total liabilities. *Sec_at2* is secured debt divided by the book value of total assets. *Sec_lt* is secured debt divided by the book value of total liabilities. *Sec_lt2* is secured debt divided by the difference between total assets and common equity. *Year -5 to Year -2* are indicator variables representing the difference between the fiscal year and the year of Chapter 11 bankruptcy filing (*Year -6* is the base case). *M-t-b* is the ratio of the sum of market value of equity and liabilities to book value of equity and liabilities. *Lcf* is an indicator variable equal one if firm has tax loss carry forward in that fiscal year, and zero otherwise. *Size* is the natural log of the sum of the market value of equity and liabilities. *Return* is income before extraordinary items, scaled by total assets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels respectively.