Essays on Credit Markets and Corporate Finance

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ESSAYS ON CREDIT MARKETS AND CORPORATE FINANCE

a dissertation by

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ESSAYS ON CREDIT MARKETS AND CORPORATE FINANCE
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ABSTRACT:
In my first essay, I study how the rise of non-bank loan investment from CLOs, mutual funds, and hedge funds influenced contracting relationships between firms and their senior lenders. Contrary to common perception that non-bank investors diluted the incentive for banks to monitor firms, I find evidence that bank underwriters embraced tighter contracts to mitigate agency and holdout problems associated with less-informed and dispersed non-bank investors. While recent studies show that non-bank loan investors lowered the cost and expanded the availability of capital \textit{ex ante}, I conclude that tighter contracts also assigned stronger control rights to lenders and imposed higher renegotiation costs to firms \textit{ex post}.

In my second essay, we examine the drivers of M&A activity in bankruptcy. M&A in bankruptcy is counter-cyclical, and is more likely when the costs of financing a reorganization are greater than financing costs to a potential acquirer. Consistent with a senior creditor liquidation bias, the greater use of secured debt leads to more sales in bankruptcy – but, this result holds only for sales that preserve going concern value. We also show that overall creditor recovery rates are higher, and unsecured creditor recoveries and post-bankruptcy survival rates are not different, when bankrupt firms sell businesses as going concerns.

Finally, in my third essay, we examine whether corporate credit rating analysts are rewarded based on ratings accuracy or bias. Overall, accurate analysts are more likely to be promoted. However, analysts who disproportionately downgrade firms compared to the corresponding S&P rating are less likely to be promoted despite being more accurate than analysts who disproportionately upgrade firms. Further, analysts whose rating decisions lead to significantly negative announcement returns are also less likely to be promoted. We conclude that Moody’s rewards accurate analysts but punishes analysts for negative bias.
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Chapter 1: The Cost of Easy Credit: Loan Contracting with Non-Bank Investors

I. Introduction

Widespread easing in contract terms of corporate loans prior to the crisis mirrored an unprecedented surge in non-bank loan investment from CLOs, mutual funds, and hedge funds. These aggregate trends have contributed to a common perception that increased loan funding from non-bank investors weakened the incentive for banks to monitor firms. Indeed, non-bank investors fueled a boom in lending to leveraged U.S. firms leading up to the crisis which recent studies show lowered the cost and expanded the availability of capital (Ivashina and Sun (2011); Nadauld and Weisbach (2012); Nini (2008); Shivdasani and Wang (2011)). But did the rise of non-bank loan investment also induce bank underwriters to set looser contracts and neglect monitoring of firms relative to traditional bank-funded loans?

To shed light on this question, I study how non-bank investment in corporate loans influenced contracting relationships between firms and their senior lenders at the peak of credit cycle in 2007. Contrary to the view that non-bank investors are associated with weaker loan contracts, I show that firms with loans funded by non-bank investors had significantly tighter covenants than otherwise similar firms with exclusively bank-funded loans. Moreover, counter to the aggregate trend, firms that replaced traditional sources of debt with non-bank loans during the pre-crisis period adopted tighter financial covenant thresholds. Consistent with tighter covenant thresholds, firms that issued non-bank loans prior to the crisis were also more likely to renegotiate and violate covenants during the subsequent crisis period. These empirical findings support the conclusion that bank underwriters embraced a closer contracting relationship when a portion of the loan was funded by non-bank investors, even under intense supply pressure.

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1 Figure 1 (Panel A) shows that non-bank loan issuance surged relative to high yield bonds in the years preceding the liquidity crisis of 2007. This loan boom mirrored a surge in collateralized loan obligations (“CLOs”) that invest in corporate loans using funds from non-bank investors. Figure 1 (Panel B) shows that banks were loosening loan standards in aggregate prior to the crisis and issuance of “covenant-lite” loans (which do not include standard performance covenants) from leveraged borrowers surged in 2007.
Why do banks set tighter covenants when non-bank investors participate in the loan? Financial contracting theory (e.g., Aghion and Bolton (1992); Garleanu and Zwiebel (2009); Hart and Moore (1988)) suggests that covenants help resolve agency and informational problems between lenders and managers by shifting control rights to lenders in relatively distressed states. I argue that these contracting problems are especially severe with dispersed non-bank investors, who often lack any broader financial or business relationship with the firm. Tighter covenant thresholds increase the range of states in which managers must renegotiate loan contracts which, as firms’ prospects evolve, transfers control rights to lenders in earlier stages of economic decline. This closer contracting relationship serves both as a commitment from bank underwriters to monitor borrowers across a broader range of states (Rajan and Winton (1995)) and as a means to preempt potential holdout problems that are more difficult to resolve in states of severe economic distress (Bolton and Scharfstein (1996)). In sum, financial contracting theory predicts that tighter covenants help to resolve financing frictions associated with less-informed and dispersed non-bank investors.

For the main empirical analysis, I measure how the presence of non-bank loans in a firm’s debt structure influences loan covenant tightness using a benchmark of otherwise similar firms reliant exclusively on bank-funded loans and bonds. Naturally, the main empirical challenge is that firms’ decisions to issue non-bank loans are not determined by random assignment. For instance, issuers of non-bank loans tend to have high financial leverage with an average credit rating of B+. To ensure a comparable set of control firms with respect to observable measures of credit risk and firm characteristics, I condition the sample on a similar set of speculative-grade firms and conduct a propensity-score matching procedure. To address concerns of potential unobservable factors, I propose an instrument that determined the cost of access to non-bank loans during the boom period, but did not affect covenant negotiations with senior lenders directly: the presence of a negative pledge covenant attached to public bonds issued prior to the beginning of the non-bank loan boom. The empirical results are robust to the choice of identification strategy, alleviating the concern that observed or unobserved factors are confounding the treatment effect.
I also rule out several alternative explanations that may confound the treatment effect, including the firms’ lead bank relationship (Murfin (2012); Wang and Xia (2014)) and whether the firm had loans sold in the secondary market (Drucker and Puri (2009)). Controlling for the firm’s lead bank relationship, the treatment coefficient is robust when measured as a within-bank effect. This interpretation differs from Wang and Xia (2014), who show that securitization-active banks write looser loan contracts relative to other banks. In contrast, I show that Citigroup, for example, writes tighter contracts on loans with funding from non-bank investors than exclusively bank-funded loans to borrowers with otherwise similar characteristics. Controlling for the presence of loans traded in the secondary market also shows that the results are not driven by loan sales to lenders that did not participate in the primary syndicate. The findings of this paper are consistent with Drucker and Puri (2009), however, who find that loans sold in the secondary market have tighter covenants at origination. Controlling for these alternative explanations supports the interpretation that the treatment effect is driven by the presence of non-bank investors rather than correlations with factors explored in other studies.

To quantify tightness of loan covenants in the empirical analysis, I propose a novel measure called *Covenant Risk*. This measure is defined as the ex ante probability that the firm’s operating earnings decline to a covenant threshold over a one-year horizon, given the firm’s current capital structure and earnings. The interpretation of the measure is consistent with managers’ assessments of expected compliance with covenant thresholds in financial reports. The methodology for calculating the measure is similar to other multivariate measures (e.g., Murfin (2012) and Freudenberg et al (2013)), but requires fewer inputs by focusing on earnings-based covenant thresholds, which I show account for the predictive component of covenant violations. I use *Covenant Risk* to quantify the ex ante risk of a firm breaching covenant thresholds.

Consistent with tighter covenants set prior to the crisis, using hand-collected data, I also show that non-bank loans were associated with more frequent renegotiations and violations to covenants during the crisis. In exchange for additional flexibility under the firm’s covenant
thresholds, I document that firms often incurred considerable renegotiation costs in the form of increased loan spreads, up-front amendment fees, and reductions in loan commitments. Firms with non-bank loans in particular were more than twice as likely as firms with only bank-funded loans and bonds to pay a large amendment fee and were less likely to obtain an increase in their loan commitment upon renegotiation. This evidence suggests that tighter covenants associated with non-bank loans imposed higher costs *ex post* through more frequent renegotiation while requiring more generous concessions to win consent from a dispersed non-bank lender base.

Finally, I test whether the decision to issue non-bank loans prior to the crisis had real effects on *ex post* investment, credit risk, and payment defaults during the crisis. With respect to investment, I find that issuers of non-bank loans cut investment significantly during the liquidity crisis relative to other firms, but had slightly higher investment at the height of the financial crisis in late 2008 and 2009. With respect to credit risk performance and payment defaults, I find no significant differences. However, consistent with Demiroglu and James (2014), I find that issuers of non-bank loans were more likely to file for bankruptcy during the crisis. This evidence is consistent with the conclusion that tighter contacts associated with non-bank loans led to lower levels of investment earlier in the crisis while holdout from a dispersed non-bank lenders led to a higher incidence of bankruptcy upon a payment default. Evidence that tighter covenants still did not entirely resolve higher renegotiation costs and a higher incidence of bankruptcy upon payment default during the crisis underscores the importance of tighter contracting relationships for alleviating contracting problems associated with non-bank investment.

Taken together, this paper highlights how non-bank loans are a unique debt contract compared to traditional forms of bank loans and bond debt. Although the advent of non-bank lending originated from a regulatory incentive to shed credit risk from bank balance sheets with costly capital requirements, bank underwriters adopted tighter contracts *ex ante* when allocating credit risk to non-bank investors, even at the height of the pre-crisis boom in non-bank lending. By transferring increased contingent control rights to lenders, non-bank lending allowed firms to
access to a low cost source of arm’s length debt through the corporate loan market. I conclude that while non-bank loan investment lowered the price and expanded the availability of capital prior to the crisis, it also increased costs \textit{ex post} in a state-contingent manner during the crisis.

This paper contributes to the empirical literature on financial contracting and non-bank corporate lending. The empirical contracting literature has documented that renegotiation is an important factor in the relationship between firm management and its senior lenders (Roberts (2012); Roberts and Sufi (2009a); Denis and Wang (2014)) and binding covenants have an important influence on firms’ real and financing activities (Chava and Roberts (2008); Roberts and Sufi (2009b); Nini, Smith, and Sufi (2011)). The non-bank corporate lending literature has examined whether informational problems arise when loans are sold into CLOs. Benmelech, Dlugosz, and Ivashina (2013) find that non-bank loans sold to CLOs did not perform differently \textit{ex post} than other loans with similar credit risk. Shivdasani and Wang (2011) conclude that investment from CLOs helped fuel an increase in levered buyout activity, but also find that these deals were not associated with increased risk. I extend these studies by showing that the presence of non-bank investment has important implications for the timing and frequency of creditor involvement outside of payment defaults and by highlighting the role of covenants for mitigating contracting problems that arise with non-bank loan investment.

The remainder of this paper is organized as follows. Section II describes the sample and data. Section III presents the main empirical specifications and analysis. Section IV presents an analysis of the real effects of non-bank loan issuance. Finally, Section V concludes.

II. Data and Descriptive Statistics

A. Sample Description

I study a detailed firm-level dataset of debt structure and financial covenant information for a sample of public U.S. firms that had access to the leveraged loan and high yield bond markets prior to the 2007 crisis. In selecting the sample, I begin with a list of 644 U.S. firms covered by
Moody’s and Compustat that had a credit rating equivalent to BB, B, or CCC on Standard & Poor’s scale as of 2007Q2.\(^2\) From this initial list, I exclude 92 firms that did not issue long-term debt in the form of a bond or term loan from 2004Q1 to 2007Q2. By filtering on these criteria, the sample is tailored to larger public firms that are similar with respect to debt market access and credit risk, but potentially differ with respect to debt composition and covenant structure. Finally, to ensure complete information on the firms’ outstanding loan agreements, I exclude 92 additional firms that are missing financial covenant data or report a loan commitment greater than $50 million in quarterly financial statements that does not match to Thompson Reuter’s DealScan loan database.\(^3\) After applying these criteria, the final sample consists of 460 firms.

Panels A and B of Table 1 summarize average characteristics for the final sample of firms alongside comparable statistics for broader selections of Compustat firms as of 2007Q2. Compared to the complete Compustat universe, conditioning on a speculative-grade rating skews the sample toward firms that are slightly larger, have higher financial leverage, and significantly positive operating earnings. These characteristics, together with the condition that these firms have a corporate credit rating, suggest that these firms had access to both the leveraged loan and high yield bond markets. Of the 831 firms that satisfy the credit rating selection criteria, 644 (75%) are also covered by Moody’s. I restrict the sample to this subset of firms because they are likely to receive the most complete coverage from corporate debt market analysts and the Moody’s database provides helpful information on debt issuances and payment default events for these firms. Conditioning on Moody’s coverage and the remaining sample criteria does not meaningfully

\(^2\) The initial list of firms are categorized as U.S.-domiciled firms by Moody’s and exclude financial firms and regulated utilities. I determine a firm’s credit rating by first coding S&P’s long-term issuer credit rating at the end of each quarter. If there is no credit rating from S&P, I fill in the equivalent S&P letter rating using Moody's long-term issuer rating, corporate family rating, or senior debt rating (in order of priority).

\(^3\) I benefited from Michael Robert's DealScan to Compustat linking file in matching loans from DealScan to the sample firms (see Chava and Roberts (2008)).
change the average descriptive statistics of the firms. With respect to observable characteristics, therefore, the final sample is similar to the universe of speculative-grade firms in Compustat.

For each firm in the sample, I construct a quarterly time series of financial covenant thresholds, covenant violations, and waivers to the firms’ senior loan agreement. The panel focuses on the six most common earnings-based financial maintenance covenants: 1) Debt to EBITDA, 2) Senior Debt to EBITDA, 3) Interest Coverage, 4) Debt Service Coverage, 5) Fixed Charge Coverage, and 6) Minimum EBITDA. I utilize DealScan’s financial covenant data to gather initial covenant thresholds associated with new loan packages at the time of issuance. I supplement the DealScan covenant data to capture covenant amendments subsequent to loan issuances and fill in any missing data where possible using hand-collected information from SEC filings of 10-Ks, 10-Qs, and credit agreements. In cases where covenant thresholds are not identical across all loans within the same firm, I aggregate the covenants to a firm level by taking the most restrictive threshold for each covenant across all loans. Firms must comply with these covenant thresholds at all times to avoid technical default, meaning this panel captures the firms’ most salient financial covenant thresholds.

I also track levels and changes to commitment amounts, maturities, and drawn interest spreads for loan facilities using data from DealScan and SEC filings. I include loans that are

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4 I manually verify that the covenant thresholds reported in DealScan represent an unconditional event of default under the credit agreement. This verification process leads to exclusion of some financial covenants in DealScan that only apply under certain, often extreme, trigger events. In a typical example, the credit agreement will specify that a fixed charge coverage ratio covenant applies only when the revolving facility is over 80 percent drawn. While DealScan records these trigger-based covenants the same as unconditional covenants, I exclude these trigger-based covenant thresholds from the panel because they effectively represent a contingent reduction in the size of the loan commitment rather than a true earnings covenant threshold.

5 Initially, I use DealScan to construct a panel of loans for the sample firms using all facilities that were potentially outstanding in each quarter based on fields provided in the DealScan facility table (which provides data as of the loan closing date) and facility amendments table (which provides updates to loan terms subsequent to the loan closing date). However, relying on this information alone leads to an over-inclusive selection of loans because DealScan does not usually record an amendment when a loan is retired or refinanced prior to its stated maturity and amendments to existing loans frequently appear in the DealScan data as new facilities. To ensure that the panel includes only loans that were actually outstanding in a given quarter, I pare this initial selection of DealScan loans using the descriptions of outstanding long-term debt in footnotes to 10-Q and 10-K filings.
categorized in DealScan as revolving or term loan facilities, and exclude facilities that are categorized as a bridge loan, letter of credit facility (except where the facility also serves as a revolver), or other types of loans. I distinguish between bank-funded term loans and non-bank term loans using loan type descriptions in DealScan and the list of lender names in the primary loan syndicate. I categorize term loans as a non-bank loan if any of the following criteria are true: 1) DealScan labels the loan a “Term Loan B” (or higher letter tranche), 2) there is a CLO in the primary syndicate of lenders, 3) a majority of the loan commitment value in the primary syndicate is represented by non-bank lenders, or 4) a majority of lender names in the primary syndicate were non-bank lenders. Term loans that do not satisfy these criteria are considered bank-funded term loans. In total, after applying these criteria, the 460 sample firms had 1,521 unique DealScan loan facilities outstanding during the sample period.

Finally, I supplement basic capital structure information from Compustat with detailed debt and capital structure data from the CapitalIQ Debt Structure database, which is compiled from footnotes to annual company 10-K filings. These data break out the total amount of long term debt outstanding in each year by the type of debt instrument (e.g., drawn bank revolvers, term loans, and bonds) and debt priority (e.g., senior secured, senior unsecured, and subordinated). Since the CapitalIQ data do not further break out term loans into bank-funded and non-bank term loans, I hand-collect the amount of principal outstanding for each of the term loan facilities in DealScan from SEC filings at each annual 10-K filing and all quarters before and after any changes to the firms’ loan agreement. Collectively, these data provide a rich panel of the firms’ debt and covenant structure, as well as the terms in the firms’ senior loan agreements.

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6 I identify CLOs by hand-collecting a list of 967 CLO names from the Moody's and Fitch websites that were closed prior to August 2012 and matching the names to lender names in DealScan
B. Treatment and Control Groups

I am interested in comparisons between two groups within the sample: firms that issued non-bank loans (in addition to bank-funded loans and bonds) compared to firms that had traditional debt structures composed of only bank-funded loans and bonds. I consider the former type of firm the “treatment” group and the later type the “control” group. I call the treatment group Non-Bank Loan Issuers, defined as firms with non-bank loans that represent at least 25 percent of total debt outstanding, and call the remaining control group of firms Control Issuers. I set the threshold at 25 percent because there are few firms that issue non-bank loans as a smaller fraction of debt and it is sensible to focus on cases where non-bank lenders represent an important creditor to the firm. Nevertheless, the findings of this study are not sensitive to this threshold assumption. In the main empirical analysis, I measure the treatment effect of including a non-bank loan within a firm’s debt structure relative to a debt structure consisting of bank-funded loans and bonds only.

C. Descriptive Statistics

i. Credit Risk and Firm Characteristics

Table 1 presents summary statistics for the total sample, Non-Bank Loan Issuers, the unmatched group of Control Issuers, and a matched group of Control Issuers. Panel B shows statistics as of the last quarter prior to the liquidity crisis [2007Q2] and Panel C shows statistics as of the last quarter that the firm accessed the syndicated loan market prior to the crisis. It turns out that there is not an important distinction between analyzing the cross-section of sample in calendar time (at 2007Q2) or in event time (at the last loan financing quarter). Of the 460 firms in the sample, all but three firms had last accessed the loan market in 2004 or later. For over 95 percent of the firms, the oldest loan outstanding as of 2007Q2 was issued in 2004 or later, highlighting how frequently loans are refinanced and renegotiated in the syndicated loan market. According to treatment-control status, the sample breaks down into 200 firms (43%) in the Non-Bank Loan Issuer group and 260 (57%) firms in the Control Issuer group.
In the unmatched comparisons, while the sample selection criteria ensures that all firms have high financial leverage, the descriptive statistics indicate that Non-Bank Loan Issuers have slightly higher average credit risk than Control Issuers with about a one-half notch lower credit rating, lower Altman Z-scores, higher leverage ratios, and lower expense coverage ratios. Interestingly, Non-Bank Loan Issuers also have less tangible assets on average. Since non-bank loans usually require a pledge of collateral while bonds generally do not, one might expect that firms with more tangible assets would have a comparative advantage in the secured loan market. However, firms with less tangible assets may also receive higher benefits from tighter contracts associated with secured loan financing through reduced agency costs. To correct for these statistically significant differences in credit risk and firm characteristics, I employ a propensity-score matching procedure (discussed later) to draw firms from the Control Issuer group that are comparable to Non-Bank Loan Issuers.

In the matched comparisons, Table 1 shows that the propensity-score matching yields a consistent set of firms between the treatment and control groups with respect to observable measures of credit risk and firm characteristics, with the same average credit rating of B+. For the cross-section of firms as of 2007Q2, there are no statistically significant differences in means for any of the 17 measures tested. For firms as of their last loan financing, just two measures show statistically significant differences at a five percent significance level: the debt to EBITDA ratio and EBITDA volatility measures. However, the magnitudes of these differences are not economically large and there are no statistically significant differences across the other 15 measures. I conclude that the matched samples of Control Issuers are comparable to Non-Bank Loan Issuers with respect to credit risk and observable firm characteristics.

ii. Loan and Debt Structure Characteristics

In Table 2, after holding constant credit risk and observable firm characteristics with the matching procedure, I study univariate differences in the firms’ loan agreements and debt structure.
These comparisons reflect endogenous correlations that may be associated with the decision to issue a non-bank loan. Therefore, to the extent that issuing a non-bank loan is related to each characteristic, I expect to find statistically significant differences.

With respect to loan agreement characteristics, I find that Non-Bank Loan Issuers paid higher interest spreads, were more likely to have a private equity sponsor backing the loan, and were more likely to pledge all assets of the firm as collateral. These comparisons suggest that Non-Bank Loan Issuers incurred less favorable terms under their loan agreements than Control Issuers. In exchange, however, Non-Bank Loan Issuers had access to a larger syndicate of lenders as evidenced by the average number of lenders and a higher probability that the loans were quoted by dealers in the secondary loan market. Non-bank loans were also more likely than traditional bank-funded debt to be used for capital-intensive purposes. For instance, Non-Bank Loan Issuers were more likely use the syndicated loan market to finance acquisitions.\footnote{The observed differences in loan purposes do not indicate that Non-Bank Loan Issuers were more acquisitive, but rather were more likely to use the loan market instead of alternative sources of capital for this purpose. Though not reported in this paper, I check the incidence of acquisitions for the sample firms using deals reported in the SDC Platinum mergers and acquisitions database and find no significant differences in acquisition activity during the period 2004Q1-2007Q2.} These differences for Non-Bank Loan Issuers suggest that these firms benefited from access to an expanded lender base from non-bank investors, but generally incurred less favorable loan terms.

Next, I examine the debt structures of the sample firms. These comparisons highlight that non-bank term loans represent the majority of debt outstanding for Non-Bank Loan Issuers, with an average debt ratio of 0.59, and bonds represent the majority of debt outstanding for Control Issuers, with an average debt ratio of 0.79. Since non-bank term loans usually require pledge of collateral while bonds generally do not, the ratio of senior secured debt to total debt is correspondingly higher for the Non-Bank Loan Issuer group at 0.54 compared to 0.31 for Control Issuers. With respect to bank-funded debt, Non-Bank Loan Issuers also have lower ratios of debt in drawn revolvers than Control Issuers (0.06 to 0.15). Across both groups of firms, bank-funded
term loans represent an insignificant share of total debt. These univariate comparisons show that, in the main empirical analysis, non-bank funded loans represent a majority of debt for treatment group firms and bonds represent a majority of debt for control group firms.

III. Empirical Analysis

A. Specification & Identification

i. Sample Period Selection

The main empirical analysis focuses on the cross-section of firms prior to the crisis and the ten-quarter period beginning with the liquidity crisis in 2007Q3 through the end of the financial crisis in 2009Q4. Conveniently, the economic circumstances of the crisis are well-suited to studying outcomes driven by the endogenous decision to issue a non-bank loan. First, the crisis was preceded by an unprecedented boom in credit from non-bank loan investors, representing an exogenous supply shock to firms’ debt structure choices. Second, the crisis effectively shuttered the markets for new debt to leveraged firms, meaning that these firms became locked into their existing debt structures as past debt issuances became difficult to refinance. Finally, the recession brought on by the financial crisis provided an exogenous demand shock that shifted the economic prospects for all firms, unrelated to previous debt issuance decisions of individual firms. For these reasons, the pre-crisis loan boom and crisis period offer an appropriate setting for studying causal outcomes from the decision to issue a non-bank loan.

Examining the evolution of debt structures for the sample firms through the crisis supports the point that pre-crisis issuance decisions were difficult to reverse during the crisis. As the collapse in aggregate loan issuance suggests, it was rare for firms that did not issue a non-bank loan prior to the crisis to issue new non-bank loans during the crisis: just 14 firms (or less than four percent of the remaining sample in 2009Q4) became a Non-Bank Loan Issuer subsequent to 2007Q2. This alleviates a potential endogeneity concern that firms were more likely to access non-bank loans as their economic prospects declined. It was relatively more common for firms to switch from the
Non-Bank Loan Issuer group to the Control Issuer group over the sample period. Of the 200 Non-Bank Loan Issuers at the start of the sample, 47 firms had become a Control Issuer by 2009Q4. This switching from treatment to control groups over time may be correlated with changes in firms’ economic prospects if only relatively healthy firms were able to restructure their debt during the crisis. Though it does not substantively change the results, to address this concern, I define static treatment and control groups for the main empirical analysis according to the presence of non-bank loans prior to the start of the crisis in 2007Q2.

ii. Covenant Risk Measure

To quantify covenant tightness for the main empirical tests, I employ a novel measure that follows from methodology managers use to assess expected compliance with earnings covenants. I call this measure Covenant Risk, defined as the ex ante probability that the firm’s operating earnings decline to an earnings covenant threshold over a one-year horizon, given the firm’s current capital structure and earnings. The novel feature of this measure is that it models covenant tightness with respect to future expectations of earnings, which are subject to macroeconomic and industry shocks outside of management’s control. Discussions of covenant compliance in company SEC filings will often cite internal analysis consistent with this measure:

“If … EBITDA were to decrease in excess of approximately 11% to 26% … the Company believes that it would breach the maximum allowed leverage ratio covenant.”

[Entravision Communications 10-Q filing for period ending March 31, 2009]

Consistent with the Covenant Risk measure, this assessment highlights that future fluctuations in operating earnings drive the ex ante risk of covenant compliance rather than future changes to capital structure that are primarily at the discretion of management.

Covenant Risk is calculated using a firm-level panel of earnings covenant thresholds and quarterly financial information. The measure incorporates the three types of earnings-based performance covenants: 1) leverage ratios (maximum debt to EBITDA), 2) expense coverage ratios (minimum EBITDA to expense), and 3) earnings level thresholds (minimum EBITDA). In contrast
to other multivariate measures (e.g., Murfin (2012) and Freudenberg et al (2013)), I omit capital-based covenants because these covenants are designed to mitigate agency problems arising from managers’ actions under normal conditions, such as limiting capital expenditures, and are not likely to cause an involuntary violation of covenant thresholds.\(^8\) Performance covenants, in contrast, are designed to shift control rights from shareholders to lenders when the firm approaches economic distress. Following this structure for measuring covenant tightness, I calculate \textit{Covenant Risk} using a three-step process.

The first step is to calculate the minimum level of earnings implied by the covenant thresholds given its current financial ratios. For the maximum leverage covenants, the implied minimum level of earnings is computed as \(\hat{e}_t^l = D_t / l_t\), the ratio of the debt outstanding to the leverage covenant threshold. For the minimum coverage covenants, the implied minimum level of earnings is computed as \(\hat{e}_t^c = X_{t-3, t} c_t\), where \(X\) is the applicable expense amount during the previous four quarters multiplied by the coverage ratio covenant threshold. Finally, the minimum earnings covenant implies the minimum level of earnings directly, denoted as \(\hat{e}_t^m = m_t\). Intuitively, the most binding earnings covenant to the firm corresponds to the covenant threshold with the highest implied minimum level of earnings. Therefore, the overall implied minimum level of earnings for the firm is equal to the maximum implied minimum earnings across all covenant thresholds, defined as \(\hat{e}_t = \max\{\hat{e}_t^l, \hat{e}_t^c, \hat{e}_t^m\}\). With this first step, I obtain the minimum level of earnings the firm must maintain to comply with its earnings covenants.\(^9\)

\(^8\) In Appendix Table A-1, I reproduce the analysis in Table 4 using the \textit{Covenant Strictness} measure from Murfin (2013) for performance and capital covenants separately to confirm that the analysis is not dependent on the methodology for measuring covenant tightness. In Appendix Table A-2, I show that the capital-based covenants included in \textit{Covenant Strictness} are not predictive of covenant violations.

\(^9\) Covenant ratios are often set to evolve over a pre-set path throughout the life of the contract. Typically, the covenant ratios are loosest at initiation of the contract and become progressively tighter over time. For purposes of this measure, I calculate the minimum implied earnings as the mid-point of the implied earnings at the tightest ratios and the loosest ratios within the ranges specified by the contract.
In the second step, with the following formula, I compute the *Covenant Risk* measure for firms with earnings covenants as the *ex ante* probability that the firm’s earnings will decline to the implied minimum earnings threshold over a one-year horizon:

\[
CR_t = \hat{F}_{t-1}^{ind} \left( \frac{\hat{e} - E_{t-3,4}}{A_t} \right)
\]  

[1]

In the formula, \( \hat{F}_{t-1}^{ind} \) represents the cumulative empirical distribution function for a one-year change in operating earnings to lagged book assets for the universe of firms in the same Fama-French 30 industry group over the previous ten years. The terms inside the brackets represent the difference between the implied minimum earnings threshold calculated in the first step and the level of operating earnings for the firm over the past four quarters, divided by its current level of book assets.\(^{10}\) Thus, *Covenant Risk* represents the *ex ante* probability that earnings decline to a covenant threshold and increases with tighter covenant thresholds.\(^{11}\)

In the final step, I set the *Covenant Risk* measure equal to zero for a minority of firms without any earnings covenants. These firms are not subject to performance covenants (known as “covenant-lite”), and therefore are not subject to the same state-contingent transfer of control rights from shareholders to lenders as firms that are subject to earnings covenants. Instead of removing these firms from the analysis, I assign a value on the lower end of the *Covenant Risk* distribution. Conceptually, this assumption preserves the ordinal ranking of covenant tightness, even though the distribution is censored at zero for this portion of the sample. In addition, because these firms in fact have a zero probability of breaching a minimum earnings covenant, this assumption also

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\(^{10}\) To validate the measure, I check whether *Covenant Risk* predicts renegotiations and violations to covenants. Figure 2 (Panel A) plots cumulative hazard rates for covenant renegotiations and violations for the sample of firms over the crisis period, showing that the incidence of covenant renegotiation and violation is indeed monotonically and significantly increasing in the level of *Covenant Risk* at 2007Q2.

\(^{11}\) Note that the *Covenant Risk* measure avoids making an assumption about the distribution of earnings, which tends to have fatter tails than a standard normal distribution. To ensure that the results are not sensitive to this assumption, in Appendix Tables A-1 and A-2, I show the measure produces similar results using a normal distribution with both industry- and firm-level means and standard deviations.
preserves interpretation of the measure. With the final step, the *Covenant Risk* measure has a value for covenant tightness across all firms.

iii. **Empirical Specifications**

For the main empirical analysis, I first test whether *Non-Bank Loan Issuers* had tighter *ex ante* covenants as compared to *Control Issuers* according to the *Covenant Risk* measure. I perform this test using the following cross-sectional regression specification at the quarter immediately preceding the crisis (2007Q2) and the quarter of the firm’s last loan financing prior to the crisis:

\[
CR_i = \alpha + \beta \text{NonBank}_i + \gamma X_i + \epsilon_i \tag{2}
\]

This equation relates values for *Covenant Risk* to a constant term, an indicator variable for *Non-Bank Loan Issuer* status (i.e., the treatment group), controls for observable firm characteristics, and an error term. The main coefficient of interest for the treatment effect is $\beta$, where a positive coefficient indicates tighter covenants for *Non-Bank Loan Issuers* as compared to *Control Issuers*. In the base specification, the controls for observable firm characteristics include the firm’s credit rating, asset size, leverage, liquidity, tangibility, operating earnings level and volatility, sales growth, and industry fixed effects. I also test an alternative specification that includes additional controls for firms’ lead bank relationship, whether the firm had loans trading in the secondary market, whether firms’ loans were backed by a private equity sponsor, the presence of bank-funded term loans, and whether the loans had a performance-based pricing grid. The specification in equation [2] represents the main empirical analysis of *ex ante* covenant tightness.

Next, I study how the decision to issue a non-bank loan prior to the crisis affected the incidence of covenant renegotiations and violations *ex post* during the crisis period. To perform these tests, I estimate an augmented panel specification:

\[
g\left[\{\text{Event}^j\}\right]_{it} = \alpha + \beta \text{NonBank}_{i,2007Q2} + \lambda V_{it} + \gamma X_{i,2007Q2} + \delta d_{it} + u_{it} \tag{3}
\]
On the left side of the equation, \( g(\cdot) \) represents the complimentary log link function, corresponding to a discrete-time proportional hazards model. On the right side of the equation, I allow for a non-parametric baseline hazard with repeated events by including effects for the number of quarters since the last renegotiation or violation event. The constant, treatment-control group indicator, and firm controls are identical to equation 2 and held constant over the sample period. To control for changes in credit risk and firm performance over the panel, I augment the equation with additional controls (denoted \( V_{it} \)) for changes in credit rating, operating earnings, and leverage over the previous year. Finally, I test the specifications with both quarterly time-series effects and with industry by quarter effects (denoted \( d_{it} \)). The specification in equation [3] represents the main empirical analysis of ex post covenant tightness.

iv. Propensity Score Matching

One potential endogeneity concern is that non-linear relationships between covenant tightness and the observable control variables are confounding the treatment effect. To alleviate this concern, I perform the main tests using a propensity score-matched control sample. The propensity scores are generated using predicted probabilities of Non-Bank Loan Issuer treatment status from the first stage logistic regressions shown in Table 3, specification [3], set during the pre-crisis period. For each treatment group firm, I match the three nearest-neighbor control firms within the same Fama-French 12 industry classification. Since I am matching firms at the beginning of the sample period, and not re-matching on a quarterly basis over the panel, the three-to-one match prevents treatment group firms from dropping out of the analysis if a matched control firm exits the panel. In addition, the procedure draws information from a larger number of unique firms in the control group. The propensity score matching procedure produces treatment and control groups that are from the same industry and, as discussed above, are not statistically distinct
with respect to a variety of credit risk and firm characteristic measures at the beginning of the sample period.

v. Instrumental Variable: Negative Pledge to Bondholders

A further concern is that unobserved differences between firms are confounding the treatment effect. To address this issue, I identify the treatment effect using an instrumental variable, defined as the presence of a negative pledge covenant attached to public bonds issued just prior to the boom in non-bank lending. A negative pledge is a standard bondholder protective covenant that prevents the firm from issuing new secured debt (such as a non-bank loan) while the bond is still outstanding, unless the bond is also granted secured status on a pari passu basis. The negative pledge covenant is intended to preserve the bondholders’ priority in the firm’s capital structure, but it also effectively requires firms to restructure its outstanding bonds (which require significant “make-whole” or call premiums in the first few years after issuance) in order to pledge the collateral needed for a large non-bank loan. I argue that firms with a negative pledge covenant on bonds issued just prior to the temporary boom in non-bank loans faced an exogenous cost of non-bank loan issuance relative to firms that happened to have bonds issued in earlier periods or no public bond debt outstanding.

To pass as a valid instrument, the negative pledge variable should determine the decision to issue a non-bank loan during the boom (relevance condition), but not directly determine the outcome variables (exclusion condition). With respect to the relevance condition, I find that the presence of a pre-boom negative pledge covenant did in fact influence firms’ decisions to issue a non-bank loan during the boom period. As shown in Table 3 (specification 1), firms with a pre-boom negative pledge were about half as likely to issue a non-bank loan with a marginal probability of 0.17. This magnitude is economically significant and passes a “weak instrument” test with Z-

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12 I use public bonds with negative pledge covenants issued 2001-2003 that mature in 2007Q3 or later.
statistics greater than three. The relevance of the negative pledge instrument also becomes stronger in terms of both economic and statistical significance with the inclusion of industry fixed effects and controls for firm characteristics. These specifications demonstrate that the negative pledge variable is not simply a proxy for other firm characteristics such as firm size or credit risk, suggesting that the presence of a pre-boom negative pledge covenant was in fact a distinct and relevant factor in the decision to issue a non-bank loan during the boom period.

While it is not possible to provide a direct empirical test of the exclusion restriction, I conduct falsification tests using pre-sample period data to support that the presence of a negative pledge covenant does not directly determine covenant tightness (in Table A-3 of the Appendix). Using a specification consistent with equation [2], I find that the presence of a negative pledge covenant on bonds issued during the period 1998-2000 is not significantly correlated with Covenant Risk in 2003Q4, prior to the boom in non-bank lending. In addition, I find that the instrument in the main analysis constructed during the period 2001-2003 is also not significantly correlated with Covenant Risk in 2003Q4. These falsification tests support the exclusion condition that the negative pledge covenant influenced tightness of loan covenants only indirectly through its constraint on non-bank loan issuance during the boom period.

In addition to the falsification test, I offer a series of economic arguments to support that the negative pledge instrument satisfies the exclusion restriction. First, a negative pledge covenant only restricts the priority of the firm’s issuance decisions, and does not place constraints on covenant negotiations between firms and its senior lenders. By design, therefore, a negative pledge can only affect covenant outcomes through its constraint on the firm’s issuance of new secured debt. Second, firms could not have anticipated the timing of the boom in non-bank loans and the

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13 It is possible to test for a rejection of the exclusion restriction when the number of excluded instruments is greater than the number of endogenous variables in the second stage equation. Though not reported in the paper, I perform a Hansen J test for the linear specifications in equation [2] using a second potential instrument: whether the firm issued non-bank loans in the pre-boom period (2001-2003). In these tests, I do not reject the null that the exclusion restriction is satisfied at a five percent significance level.
subsequent crisis during the pre-boom period. Therefore, firms could not have altered timing of their issuance decisions in the public bond market as part of a plan to access the future boom in non-bank loans. Third, in contrast to the boom period, a negative pledge would not likely pose a binding constraint to firms during the crisis period because credit market conditions significantly limited firms’ ability to issue new secured debt. Finally, due to the lag in timing between initiation of the negative pledge and the outcomes in the second stage, bonds issued during the pre-boom period would be closer to maturity and would no longer be subject to the same costly redemption provisions. For these economic reasons, together with the results of the falsification test, I conclude that the presence of a pre-boom negative pledge meets the exclusion restriction and constitutes a valid instrument.

B. Main Empirical Results

i. Did Non-Bank Loan Issuers Have Tighter Covenants?

Figure 2 (Panel B) illustrates the full empirical distribution for the Covenant Risk measure. The unconditional mean of Covenant Risk for the unmatched sample is 0.287, where 18 percent of firms were classified as covenant-lite because they did were not subject to any earnings covenants. Comparing the treatment and control groups in the figure, the distributions of Covenant Risk for Non-Bank Loan Issuers are significantly shifted to the right of Control Issuers. As of 2007Q2, for instance, just 9 percent of Non-Bank Loan Issuers were covenant-lite compared to 25 percent for Control Issuers. Interestingly, controlling for credit risk and observable firm characteristics in the matched sample barely shifts the Covenant Risk distribution for Control Issuers. Put differently, if unobserved factors are driving the observed differences in Covenant Risk, these factors would need to explain significantly more of the observed disparity than all of the observable covariates shown in Table 1 combined. This univariate comparison suggests that issuers of non-bank loans accepted tighter covenants from their lenders compared to firms that relied only on bank-funded loans and bonds.
In Table 4, I present estimates of the main cross-sectional specification for *Covenant Risk* defined in equation [2]. With a univariate specification, I confirm that the unconditional mean of *Covenant Risk* is significantly higher for *Non-Bank Loan Issuers* than *Control Issuers* with a coefficient of 0.15. After controlling for observable firm characteristics in the unmatched sample, the coefficient is lowered slightly to 0.11 but remains highly significant with a t-statistic greater than four. The matched sample and instrumental variable specifications also show significantly positive treatment effects for the *Non-Bank Loan Issuer* group of 0.15 and 0.34, respectively. Though not reported in the table, using the sample as of the quarter of the last loan financing yields substantially similar results across all specifications. These cross-sectional regressions demonstrate that *Non-Bank Loan Issuers* had significantly tighter covenants compared to *Control Issuers* during the pre-crisis period across alternative identification strategies.

Is the *Non-Bank Loan Issuer* treatment group definition simply a proxy for other correlated explanations? To address this concern, I include into the model fixed effects for the firm’s lead bank relationship and controls for whether the firm had loan prices quoted by dealers in the secondary loan market (Drucker and Puri (2009)), a private equity sponsor backing the loan, large bank-funded term loans, or a performance-based pricing grid. The specifications with lead bank relationship effects show that the result is not driven by firms’ choice of lender and allow for a *within-bank* interpretation of the treatment effect. For example, the results indicate that Citigroup required significantly tighter covenants for *Non-Bank Loan Issuers* compared to *Control Issuers* with otherwise similar characteristics. These alternative specifications demonstrate that the treatment effect is not sensitive to other factors that might be correlated with treatment status.

ii. **Were Non-Bank Loan Issuers More Likely to Renegotiate and Violate Covenants?**

So far, the empirical analysis shows that non-bank loans are associated with tighter covenants *ex ante* prior to the crisis. To test whether higher *Covenant Risk* translated into differences in covenant events *ex post*, I analyze hand-collected covenant renegotiation and
violation data during the crisis. In Table 5 (Panel A), I show that both the treatment and control groups renegotiated covenant thresholds and violated covenants quite frequently during the crisis period. Of the 4,136 firm-quarters in the panel, firms renegotiated covenant thresholds in 371 firm-quarters and violated covenants in 215 firm-quarters, or a cumulative annual rate of 36 percent and 21 percent, respectively. Consistent with tighter contracts *ex ante*, I find that *Non-Bank Loan Issuers* indeed had a significantly higher incidence of covenant renegotiations and violations *ex post* during the crisis.

In Tables 6 and 7, I estimate the relative incidence of covenant renegotiations and violations using the proportional hazard model in equation [3]. With respect to covenant renegotiations, the hazard models show that *Non-Bank Loan Issuers* were 1.7 times as likely to renegotiate covenants compared to *Control Issuers* after controlling for initial firm characteristics and recent changes in performance. This treatment effect is highly significant with Z-statistics greater than four, and is not sensitive to inclusion of industry by quarter panel effects. This specification confirms that *Covenant Risk* is indeed a strong and highly significant predictor of covenant renegotiation over the sample period. As an alternative specification, I include the initial level and changes to the *Covenant Risk* measure over the panel as control variables. This specification shows that *Non-Bank Loan Issuers* were still 1.4 times more likely to renegotiate covenants than *Control Issuers*, even controlling the firm’s distance from covenant thresholds. As in the other models, the matched sample and instrumental variable results confirm the estimates from the unmatched sample. These results provide strong support that tighter covenants associated with non-bank loans required more frequent covenant renegotiations between firms and their senior lenders.

With respect to covenant violations in Table 7, I find that *Non-Bank Loan Issuers* were 1.4 times as likely to violate covenants compared to *Control Issuers* after controlling or initial firm

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14 I define a covenant renegotiation as a firm-quarter in which the firm adjusted an earnings covenant threshold or obtained a waiver for a financial covenant.
characteristics and recent changes in firm performance. The magnitude of the treatment effect is not sensitive to inclusion of industry by quarter panel effects, but becomes weaker statistically with a Z-statistic of 1.8. Including controls for the initial level and changes to Covenant Risk during the crisis period reduces the magnitude of the treatment effect to a statistically insignificant level. This result is sensible because, in contrast to covenant renegotiations, covenant violations are triggered by an actual breach of covenant thresholds. Therefore, if Covenant Risk is in fact an unbiased measure of covenant tightness, it should largely capture the differential risk of covenant violations. These results support the conclusion that issuers of non-bank loans had tighter covenants than otherwise similar firms reliant only on bank-funded loans and bonds.

C. Changes in Loan Terms upon Covenant Renegotiations

Conditional on covenant renegotiations, Table 5 (Panel B) summarizes changes to material terms in the firms’ loan agreements. These statistics show that covenant renegotiations resulted in looser covenant thresholds in the vast majority of cases, but firms often incurred significant costs during the renegotiation process. With respect to changes in covenants, thresholds were loosened or a financial waiver was granted in 79 percent of cases, and in 90 percent of cases when the renegotiation was likely forced by an eminent covenant violation. These findings suggest that covenant renegotiations during the crisis were most often motivated by the need for additional flexibility under the firms’ loan agreement.

In exchange for changes to covenant thresholds, lenders appear to extract concessions from firms in three ways: 1) increasing the interest spread (53 percent of cases), 2) charging a large up-front amendment fee (27 percent of cases), or 3) reducing the loan commitment amount (30 percent of cases). A shortening of the contract maturity is rarely imposed upon covenant renegotiations. Conditional on receiving an increased spread or amendment fee, the average cost is considerable.

\[15\] I define forced renegotiations as covenant renegotiations where 1) the firm is in current violation of a covenant, 2) financial statements indicate that the firm would have been in non-compliance of its covenants absent the renegotiation, or 3) Covenant Risk in the prior quarter is 0.5 or higher.
Non-Bank Issuers, for instance, incurred an average change in loan spread of 150 basis points upon a spread increase and an average amendment fee of 63 basis points when the firm paid a fee of at least 25 basis points. In nominal terms, for a $500 million loan, these changes in pricing translate into $7.5 million per year for an increase in spread or $3.2 million in up-front amendment fees. This evidence suggests that covenant renegotiations provide firms additional flexibility with respect to covenants, but provide the opportunity for lenders to limit their exposure to the borrower or extract direct compensation from shareholders in a state-contingent manner.

A dispersed non-bank lender base may pose higher costs for a covenant renegotiation because it may be more difficult to win the required agreement among lenders for a material change to the loan agreement. Indeed, comparing renegotiation outcomes for the treatment and control groups, Non-Bank Loan Issuers were less likely to obtain an increase in the commitment amount and were more than twice as likely to pay a large up-front amendment fee. These differences support the conclusion that firms with non-bank loans required an incremental incentive to win the required agreement among lenders for a covenant renegotiation.

D. Earnings Performance Conditional on Covenant Events

Is the higher incidence of covenant renegotiations and violations for Non-Bank Loan Issuers driven by differences in ex post earnings performance rather than tighter covenant thresholds? In Table 8, consistent with tighter covenant thresholds, I show that Non-Bank Loan Issuers had significantly higher levels of operating earnings to assets upon renegotiation events (by 0.04) and covenant violations (by 0.06) compared to Control Issuers. Measuring operating earnings relative to its level in 2007Q2, I also find that a smaller average decline in operating earnings triggered covenant renegotiations and violations for Non-Bank Loan Issuers. Including an interaction term for forced renegotiations, I find that the higher operating earnings upon renegotiation are driven by cases where the firm faced binding covenant thresholds. Higher
operating earnings at covenant events suggests that tighter covenants associated with non-bank loans forced covenant renegotiations and violations at earlier stages of economic distress.

E. Covenant Tightness around Changes in Non-Bank Loan Issuer Status

If non-bank loan investment is in fact associated with tighter loan covenants, I should observe tightening in covenant thresholds for firms that introduce non-bank loans into their debt structure and a loosening of covenant thresholds for firms that repay non-bank loans. In Table 9, I test this prediction by estimating how changes in Non-Bank Loan Issuer status affect covenant tightness. In addition to measuring overall changes in Covenant Risk, I examine separately how each of three main inputs to the Covenant Risk measure contribute to the change: 1) covenant thresholds, 2) actual financial ratios, and 3) level and distribution of earnings. As expected, this analysis confirms that the main empirical results are consistent when measured as a within-firm change; firms that introduced non-bank loans into their debt structure experienced a tightening of covenant thresholds while firms that repaid non-bank loans experienced a loosening of covenant thresholds. This analysis reinforces the main findings while demonstrating that the treatment effect is not confounded by time-invariant firm characteristics.

Table 9 (Panel A) examines how covenant tightness evolved over the pre-crisis boom in non-bank lending according to changes in Non-Bank Loan Issuer status from 2003Q4 to 2007Q2. In the model for the overall change in Covenant Risk, consistent with aggregate trends in bank loan standards, the constant term shows that covenant tightness declined in general over the boom period. However, firms that switched from a Control Issuer to a Non-Bank Loan Issuer over the boom period experienced a larger and statistically significant increase of 0.09 in Covenant Risk. Focusing on changes due to the individual inputs of Covenant Risk, the results are clearly

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16 To attribute changes in covenant tightness for each input, I vary one input at a time while leaving the other two inputs at their pre-differenced values. For example, I measure the change due to covenant thresholds only by calculating the change in Covenant Risk assuming the firm’s financial ratios and earnings do not change from their pre-differenced values.
attributable to changes in covenant thresholds, rather than changes in firms’ actual financial ratios or earnings. These results demonstrate that, counter to the aggregate trend, firms that became Non-Bank Loan Issuers during the pre-crisis period adopted tighter covenant thresholds.

Table 9 (Panel B) presents a similar analysis to examine how covenant tightness changed after firms repaid their non-bank loans during and after the crisis period (2007Q3 to 2011Q4). The dependent variable is measured as the change in Covenant Risk from the quarter after repayment of a firm’s non-bank loans minus the quarter one year prior. As expected, the constant term shows a large and statistically significant average decrease in Covenant Risk upon repayment of non-bank loans with a magnitude consistent with the treatment effect in the main covenant tightness regressions. Focusing on changes due to the individual inputs of Covenant Risk, the change is attributable to changes in covenant thresholds rather than changes in firms’ actual financial ratios or earnings. Combined with the main empirical analysis, these findings provide robust evidence that non-bank loans are associated with tighter covenant thresholds than debt structures consisting of only bank-funded loans and bonds.

IV. Real Effects

A. Did Tighter Contracts with Non-Bank Loan Investors Affect Ex Post Investment?

Did issuance of non-bank loans lead to ex post differences in investment during the crisis? In Table 10, I examine whether tighter contracts associated with Non-Bank Loan Issuers led firms to cut capital expenditures relative to Control Issuers during the crisis. I define the dependent variable as the change in log capital expenditures from the firm’s average pre-crisis level. On the right-hand side, I specify the model with a direct treatment effect for Non-Bank Loan Issuers, an interaction effect for the second half of the crisis period (2008Q4 to 2009Q4), as well as controls for credit risk and firm characteristics. Consistent with tighter contracts, the direct effect indicates

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17 In the tables, I measure the change relative to the year prior to the crisis (2006Q3 to 2007Q2). Though not reported, I obtain consistent results using changes relative to the entire boom period average (2004Q1 to 2007Q2).
that *Non-Bank Loan Issuers* cut capital expenditures by 10 to 12 percent more than *Control Issuer* firms during the first half of the crisis period (2007Q3 to 2008Q3). However, the interaction effect between *Non-Bank Loan Issuer* and the second half of crisis period more than off-sets the direct effect with a coefficient of 0.15 to 0.19 percent. Taken together, the interaction indicates that *Control Issuer* firms cut investment to levels even lower than the *Non-Bank Loan Issuer* group during the second half of the crisis (2008Q4 to 2009Q4). This result is consistent with conclusion that *Non-Bank Loan Issuers* with tighter contracts cut investment earlier in the crisis period than *Control Issuers*, but sustained similar levels of investment during the height of the financial crisis.

**B. Did Holdout from Non-Bank Loan Investors Affect Ex-Post Credit Risk?**

Did issuance of non-bank loans lead to ex-post differences in credit risk or payment defaults during the crisis? If *Non-Bank Loan Issuers* faced disagreement among a dispersed group of lenders upon a violation of covenants during the crisis, for instance, it is possible that *Non-Bank Loan Issuers* would experience an increased likelihood payment default. In Table 11, I test this hypothesis using two cross-sectional predictive regression specifications. The first specification relates the change in firms’ credit rating relative to 2007Q2 over the panel to an indicator for *Non-Bank Loan Issuer* and controls for credit risk, firm characteristics, and quarter effects. A coefficient for *Non-Bank Loan Issuer* of negative one, for example, would mean that *Non-Bank Loan Issuers* were downgraded by one notch on average compared to *Control Issuers* over the crisis period. The second specification is a logit model that relates the incidence of a payment default occurring at any point during the crisis period (2007Q3 to 2009Q4) to *Non-Bank Loan Issuer* status and controls for credit and firm characteristics. These regression specifications allow for a test of whether *Non-Bank Loan Issuer* status was predictive of declines in credit quality and default incidence during the crisis period, controlling for other observable measures of pre-crisis credit risk and firm characteristics.
The results in Table 11 show that the presence of non-bank loans prior to the crisis was not associated with any statistically significant differences the evolution of credit ratings or payment default incidence during the crisis period. However, focusing on incidence of bankruptcy filings separately (i.e., excluding missed interest payments or out-of-court distressed exchanges), I do find evidence that Non-Bank Loan Issuers were more likely to file for bankruptcy compared to Control Issuers. Without controls, Non-Bank Loan Issuers were 2.2 times more likely to file bankruptcy than Control Issuers and the difference is statistically significant at a five percent significance level. Including credit risk and firm controls, the magnitude of the odds ratio increases to 2.7 but becomes slightly less significant. This higher incidence of bankruptcy compared to other out-of-court defaults is consistent with Demiroglu and James (2014), who attribute a lower likelihood of successful out-of-court restructurings to holdout from non-bank lenders. This evidence is consistent with the conclusion that tighter covenants associated with non-bank loans did not lead to higher credit risk and payment defaults in general, but holdout problems upon payment defaults led to a higher incidence of bankruptcy.

V. Conclusion

I show that bank underwriters adopted tighter contracts *ex ante* when allocating credit risk to non-bank investors, even at the height of the pre-crisis boom in non-bank lending. Firms that issued non-bank loans prior to the crisis had significantly tighter covenants than otherwise similar firms with debt structures consisting of only bank-funded loans and bonds. This result is robust to a *within-bank* interpretation, meaning firms that borrowed from the same bank received tighter covenants when accessing loan funding from non-bank investors. Consistent with tighter covenant thresholds pre-crisis, issuers of non-bank loans were more likely to renegotiate and violate covenants during the crisis. Despite tighter covenants and more frequent renegotiation, however, higher costs of renegotiation and a higher incidence of in-court restructuring upon payment default suggest that these contracts did not completely resolve holdout problems associated with a
dispersed non-bank lender base. I conclude that, while non-bank loan investment lowered the price and expanded the availability of capital prior to the crisis, tighter covenants transferred incremental control rights to lenders and holdout from non-bank investors posed incremental renegotiation costs to borrowers in a state-contingent manner ex post during the crisis.

References


This figure presents aggregate trends in issuance and non-price lending terms in U.S. leveraged debt markets. Panel A shows that non-bank loan issuance surged relative to high yield bonds in the four years prior to the liquidity crisis of 2007. The pre-crisis boom in non-bank loan issuance corresponds to a surge in new collateralized loan obligations (CLOs), the primary supplier of non-bank loan investment during this period. Panel B shows that the surge in non-bank loan issuance was mirrored by an easing in non-price terms of corporate loans. In addition to a decline in the percentage of banks tightening loan standards, issuance of covenant-lite loans began to rise prior to the liquidity crisis of 2007.
This figure provides an empirical description of the Covenant Risk measure, interpreted as the ex-ante probability that the firm's EBITDA declines to an earnings covenant threshold over a one-year horizon, given the firm's current level of earnings and capital structure. Panel A illustrates the ex-post hazard rates for covenant renegotiation and violation for given initial levels of the Covenant Risk measure [as of 2007Q2], showing that both the incidence of covenant renegotiation and violations are monotonically increasing with the measure. Panel B shows the empirical distribution functions for Covenant Risk. The empirical CDF for Non-Bank Loan Issuers is shifted to the right of the unmatched and matched Control Issuers at both the quarter immediately preceding the liquidity crisis [2007Q2] and the quarter of last loan issuance, indicating a higher degree of initial covenant risk for these firms across the sample distribution.

Panel A: Does Pre-Crisis Covenant Risk Predict Covenant Renegotiation and Violation?

<table>
<thead>
<tr>
<th>Covenant Renegotiation Incidence</th>
<th>Covenant Violation Incidence</th>
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</thead>
<tbody>
<tr>
<td><img src="cumulative_hazard.png" alt="" /></td>
<td><img src="cumulative_hazard.png" alt="" /></td>
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Panel B: Pre-Crisis Covenant Risk Distributions

<table>
<thead>
<tr>
<th>Pre-Crisis Calendar Time [2007Q2]</th>
<th>Last Loan Financing Event Time [Quarter of Issuance]</th>
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</thead>
<tbody>
<tr>
<td><img src="empirical_cdf.png" alt="" /></td>
<td><img src="empirical_cdf.png" alt="" /></td>
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</table>
Table 1
Sample Selection and Firm Characteristics by Non-Bank Loan Issuer Status

This table presents cross-sectional means of credit risk, leverage, and other observable characteristics for the sample firms. Panel A shows how the summary statistics change at each step of the sample selection process: the Compustat universe [1], firms with a speculative-grade credit rating from S&P or Moody’s [2], and firms covered by Moody’s Default Risk Service database [3]. The final sample selection step requires that the firm issued a bond or term loan during 2004-2007Q2 and has DealScan loan data availability [4]. Panels B and C report cross-sectional summary statistics for the sample as of the last calendar quarter prior to the liquidity crisis [Panel B] and as of the quarter of the last loan financing prior to the liquidity crisis [Panel C]. The Non-Bank Loan Issuer group (shown in [5] and [11]) is defined as firms with at least 25 percent of debt composed of non-bank loans. The matched sample from the Control Issuer group is constructed using the three nearest-neighbor propensity scores from the model shown in Table 3, specification [3], within the same Fama-French 12 industry classification. Panels B and C report statistical tests for equal means between the Non-Bank Loan Issuer and Control Issuer groups: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level. Control Issuers in the matched samples are assigned reduced weight in the statistical tests to account for the multi-neighbor matching methodology.

<table>
<thead>
<tr>
<th>Panel A</th>
<th>Panel B</th>
<th>Panel C</th>
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<tbody>
<tr>
<td>Sample Selection [2007Q2]</td>
<td>Pre-Crisis [2007Q2]</td>
<td>Last Loan Financing Event [Quarter of Issuance]</td>
</tr>
<tr>
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<td><strong>Rated BB to CCC</strong></td>
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**Firm Characteristics**

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<th><strong>EBITDA [Mil. $]</strong></th>
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<th><strong>Cash Holdings</strong></th>
<th><strong>Tangibility</strong></th>
<th><strong>EBITDA to Assets</strong></th>
<th><strong>EBITDA Volatility</strong></th>
<th><strong>Sales Growth</strong></th>
<th><strong>CapEx to Assets</strong></th>
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<td>4,298</td>
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<td>3,776</td>
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<td>2.91</td>
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<td>1.66</td>
<td>1.59</td>
<td>1.61</td>
<td>1.56</td>
<td>*</td>
<td>1.68</td>
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<td>0.08</td>
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<td>0.05</td>
<td>0.07</td>
<td>***</td>
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<td>0.28</td>
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<td>0.32</td>
<td>0.31</td>
<td>0.26</td>
<td>0.36</td>
<td>***</td>
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<td>0.00</td>
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<td>0.15</td>
<td>0.16</td>
<td>0.14</td>
<td>**</td>
<td>0.16</td>
<td>0.16</td>
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<tr>
<td>0.18</td>
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<td>0.02</td>
<td>0.02</td>
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<td>0.37</td>
<td>0.17</td>
<td>0.14</td>
<td>0.13</td>
<td>0.17</td>
<td>0.10</td>
<td>***</td>
<td>0.13</td>
<td>0.16</td>
<td>0.14</td>
</tr>
<tr>
<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
<td>0.07</td>
<td>0.06</td>
<td>0.08</td>
<td>***</td>
<td>0.05</td>
<td>0.07</td>
<td>0.05</td>
</tr>
</tbody>
</table>

This table presents cross-sectional means of credit risk, leverage, and other observable characteristics for the sample firms. Panel A shows how the summary statistics change at each step of the sample selection process: the CompuStat universe [1], firms with a speculative-grade credit rating from S&P or Moody’s [2], and firms covered by Moody’s Default Risk Service database [3]. The final sample selection step requires that the firm issued a bond or term loan during 2004-2007Q2 and has DealScan loan data availability [4]. Panels B and C report cross-sectional summary statistics for the sample as of the last calendar quarter prior to the liquidity crisis [Panel B] and as of the quarter of the last loan financing prior to the liquidity crisis [Panel C]. The Non-Bank Loan Issuer group (shown in [5] and [11]) is defined as firms with at least 25 percent of debt composed of non-bank loans. The matched sample from the Control Issuer group is constructed using the three nearest-neighbor propensity scores from the model shown in Table 3, specification [3], within the same Fama-French 12 industry classification. Panels B and C report statistical tests for equal means between the Non-Bank Loan Issuer and Control Issuer groups: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level. Control Issuers in the matched samples are assigned reduced weight in the statistical tests to account for the multi-neighbor matching methodology.
Table 2
Loan Agreement and Debt Structure Characteristics by Non-Bank Loan Issuer Status

This table compares differences in means of measures describing the firms’ loan agreements and debt structure by the decision to issue a non-bank loan. All measures are defined in Table A-4 of the Appendix. Statistics as of the last pre-crisis loan financing quarter are not reported because they are substantially similar to the reported statistics as of 2007Q2. The Non-Bank Loan Issuer group [2] is defined as firms with at least 25 percent of debt composed of non-bank loans. The matched sample from the Control Issuer group is constructed using the three nearest-neighbor propensity scores from the model shown in Table 3, specification [3], within the same Fama-French 12 industry classification. The table reports statistical tests for equal means between the Non-Bank Loan Issuer and Control Issuer groups for the Unmatched and Matched samples: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level. Control Issuers in the matched samples are assigned reduced weight in the statistical tests to account for the multi-neighbor matching methodology.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Crisis [2007Q2]</th>
<th></th>
<th></th>
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<th></th>
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<tbody>
<tr>
<td></td>
<td>Unmatched</td>
<td>Matched</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Sample</td>
<td>Non-Bank Issuer</td>
<td>Control Issuer</td>
<td>Average Diff.</td>
<td>Test for Equality of Means</td>
</tr>
<tr>
<td>Number of Firms</td>
<td>460</td>
<td>200</td>
<td>260</td>
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</tr>
<tr>
<td>Firm-Quarters</td>
<td>460</td>
<td>200</td>
<td>260</td>
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Loan Agreement Characteristics

All-In-Drawn LIBOR Spread (bps)

<table>
<thead>
<tr>
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<th></th>
<th></th>
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<tr>
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<td>Matched</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Sample</td>
<td>Non-Bank Issuer</td>
<td>Control Issuer</td>
<td>Average Diff.</td>
<td>Test for Equality of Means</td>
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<tr>
<td>All Facilities</td>
<td>187</td>
<td>215</td>
<td>165</td>
<td>49</td>
<td>***</td>
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<tr>
<td>Revolver</td>
<td>179</td>
<td>205</td>
<td>160</td>
<td>45</td>
<td>***</td>
</tr>
<tr>
<td>Bank-Funded Term Loan</td>
<td>202</td>
<td>246</td>
<td>170</td>
<td>75</td>
<td>**</td>
</tr>
<tr>
<td>Non-Bank Term Loan</td>
<td>-</td>
<td>218</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Top 10 CLO Bank</td>
<td>82.2%</td>
<td>87.0%</td>
<td>78.5%</td>
<td>8.5%</td>
<td>**</td>
</tr>
<tr>
<td>PE Sponsor Backed</td>
<td>23.3%</td>
<td>36.0%</td>
<td>13.5%</td>
<td>22.5%</td>
<td>***</td>
</tr>
<tr>
<td>Number of Lenders</td>
<td>13.5%</td>
<td>16.8%</td>
<td>10.9%</td>
<td>5.9%</td>
<td>***</td>
</tr>
<tr>
<td>Loans Traded [LSTA/TR]</td>
<td>28.7%</td>
<td>45.5%</td>
<td>15.8%</td>
<td>29.7%</td>
<td>***</td>
</tr>
</tbody>
</table>

Primary Loan Purposes:

<table>
<thead>
<tr>
<th></th>
<th>Pre-Crisis [2007Q2]</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unmatched</td>
<td>Matched</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Sample</td>
<td>Non-Bank Issuer</td>
<td>Control Issuer</td>
<td>Average Diff.</td>
<td>Test for Equality of Means</td>
</tr>
<tr>
<td>Buyout/Acquisition</td>
<td>28.7%</td>
<td>45.5%</td>
<td>15.8%</td>
<td>29.7%</td>
<td>***</td>
</tr>
<tr>
<td>Corporate Purposes</td>
<td>42.4%</td>
<td>39.0%</td>
<td>45.0%</td>
<td>-6.0%</td>
<td>***</td>
</tr>
<tr>
<td>Debt Repayment</td>
<td>11.3%</td>
<td>17.0%</td>
<td>6.9%</td>
<td>10.1%</td>
<td>***</td>
</tr>
<tr>
<td>Recapitalization</td>
<td>5.9%</td>
<td>10.0%</td>
<td>2.7%</td>
<td>7.3%</td>
<td>***</td>
</tr>
<tr>
<td>Working Capital</td>
<td>32.6%</td>
<td>19.0%</td>
<td>43.1%</td>
<td>-24.1%</td>
<td>***</td>
</tr>
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Collateral Pledged:

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<tr>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Unmatched</td>
<td>Matched</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Sample</td>
<td>Non-Bank Issuer</td>
<td>Control Issuer</td>
<td>Average Diff.</td>
<td>Test for Equality of Means</td>
</tr>
<tr>
<td>All Assets</td>
<td>58.9%</td>
<td>71.0%</td>
<td>49.6%</td>
<td>21.4%</td>
<td>***</td>
</tr>
<tr>
<td>Current Assets</td>
<td>3.9%</td>
<td>3.5%</td>
<td>4.2%</td>
<td>-0.7%</td>
<td>***</td>
</tr>
<tr>
<td>Specific Long-Term Assets</td>
<td>3.5%</td>
<td>4.5%</td>
<td>2.7%</td>
<td>1.8%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Other</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>0.0%</td>
<td>2.0%</td>
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</tbody>
</table>

Debt Structure Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Pre-Crisis [2007Q2]</th>
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<th></th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>Unmatched</td>
<td>Matched</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Sample</td>
<td>Non-Bank Issuer</td>
<td>Control Issuer</td>
<td>Average Diff.</td>
<td>Test for Equality of Means</td>
</tr>
<tr>
<td>Drawn Revolver</td>
<td>0.11</td>
<td>0.06</td>
<td>0.15</td>
<td>-0.10</td>
<td>***</td>
</tr>
<tr>
<td>Bank-Funded Term Loan</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>Non-Bank Term Loan</td>
<td>0.27</td>
<td>0.59</td>
<td>0.02</td>
<td>0.57</td>
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<tr>
<td>Bonds</td>
<td>0.60</td>
<td>0.34</td>
<td>0.79</td>
<td>-0.45</td>
<td>***</td>
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</table>

Debt Priority to Total Debt Outstanding:

<table>
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<tbody>
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<td>Unmatched</td>
<td>Matched</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Sample</td>
<td>Non-Bank Issuer</td>
<td>Control Issuer</td>
<td>Average Diff.</td>
<td>Test for Equality of Means</td>
</tr>
<tr>
<td>Senior Secured</td>
<td>0.41</td>
<td>0.54</td>
<td>0.31</td>
<td>0.23</td>
<td>***</td>
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<tr>
<td>Senior Unsecured</td>
<td>0.38</td>
<td>0.25</td>
<td>0.47</td>
<td>-0.23</td>
<td>***</td>
</tr>
<tr>
<td>Subordinated</td>
<td>0.20</td>
<td>0.19</td>
<td>0.21</td>
<td>-0.02</td>
<td>0.21</td>
</tr>
<tr>
<td>Has Public Bonds [FISD]</td>
<td>84.1%</td>
<td>73.0%</td>
<td>92.7%</td>
<td>-19.7%</td>
<td>***</td>
</tr>
<tr>
<td>Bonds Traded [TRACE]</td>
<td>73.5%</td>
<td>60.0%</td>
<td>83.8%</td>
<td>-23.9%</td>
<td>***</td>
</tr>
</tbody>
</table>
Table 3
Determinants of Non-Bank Loan Issuer Status

This table presents logistic regressions for the decision to issue a non-bank loan prior to the liquidity crisis of 2007. The Negative Pledge variable is a binary instrument that is equal to one if the firm issued a public bond with a negative pledge covenant prior to the non-bank loan boom [2001-2003] with a maturity later than 2007Q2. The variables B Rating and CCC Rating measure the effect of credit rating relative to firms with a BB credit rating. The remaining continuous variables are de-meaned and normalized by their standard deviation. All variables are defined in Table A-4 of the Appendix. In the regressions as of the last loan financing, I exclude two firms that did not have a new loan financing during the non-bank loan boom [2004Q1-2007Q2]. Regression coefficients are reported both as odds ratios (bold) and marginal probabilities evaluated at the sample means. Z-statistics are reported below the coefficients in parentheses corresponding to the statistical significance levels noted next to the odds ratios: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Pre-Crisis [2007Q2]</th>
<th>Last Loan Financing [Quarter of Issuance]</th>
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</thead>
<tbody>
<tr>
<td>Negative Pledge [2001-2003]</td>
<td>0.489***</td>
<td>0.393***</td>
</tr>
<tr>
<td></td>
<td>-0.170</td>
<td>-0.180</td>
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<tr>
<td>B Rating</td>
<td>2.358***</td>
<td>2.338***</td>
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<tr>
<td></td>
<td>(3.064)</td>
<td>(3.010)</td>
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<tr>
<td>CCC Rating</td>
<td>1.986</td>
<td>2.197</td>
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<td></td>
<td>(0.933)</td>
<td>(1.080)</td>
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<td>Log of Book Assets</td>
<td>1.064</td>
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<tr>
<td></td>
<td>(0.528)</td>
<td>(1.762)</td>
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<tr>
<td>Book Leverage</td>
<td>1.407**</td>
<td>1.449**</td>
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<tr>
<td></td>
<td>(2.359)</td>
<td>(2.514)</td>
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<tr>
<td>Cash Holdings</td>
<td>0.704**</td>
<td>0.687***</td>
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<td>(-2.530)</td>
<td>(-2.691)</td>
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<td>Tangibility</td>
<td>0.618***</td>
<td>0.590***</td>
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<tr>
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<td>(-2.727)</td>
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<td>EBITDA to Assets</td>
<td>1.467**</td>
<td>1.473**</td>
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<tr>
<td></td>
<td>(2.508)</td>
<td>(2.537)</td>
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<td>EBITDA Volatility</td>
<td>0.781*</td>
<td>0.771*</td>
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<tr>
<td></td>
<td>(-1.842)</td>
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<td>Sales Growth</td>
<td>1.287**</td>
<td>1.232*</td>
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<td>(1.671)</td>
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<td>Fama-French 30 Industry Effects</td>
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<td>Yes</td>
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<td>Quarter Effects</td>
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<td>-</td>
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<td>N</td>
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<tr>
<td>Pseudo R-Squared</td>
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<td>Wald Test Chi-Squared</td>
<td>11.7</td>
<td>1775.4</td>
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<tr>
<td>Wald Test p-Value</td>
<td>0.001</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Table 4

Did Non-Bank Loan Issuers Have Tighter Covenants Pre-Crisis?

This table presents a linear regression analysis of the Covenant Risk measure prior to the liquidity crisis of 2007. The dependent variable is interpreted as the ex-ante probability that the firm’s EBITDA declines to an earnings covenant threshold over a one-year horizon, given the firm’s current level of earnings and capital structure. The main explanatory variable of interest is Non-Bank Loan Issuer, which is a binary variable equal to one if the firm had at least 25 percent of its debt composed of non-bank loans. The variables B Rating and CCC Rating measure the effect of credit rating relative to firms with a BB credit rating. Continuous variables are de-meaned and normalized by their standard deviations. All variables are defined in Table A-4 of the Appendix. Specifications [3]-[7] include fixed effects for the top 15 lead bank arrangers. Specification [5] shows the results after dropping any firms with "covenant-lite" covenants, where the dependent variable is equal to zero. Specifications [4]-[7] shows that the results are not driven by correlations with the indicator variables Loans Traded, PE Sponsor Backed, Bank-Funded Term Loan, and Performance Pricing. The matched sample in specification [6] is constructed using the three nearest-neighbor propensity scores from the model shown in Table 3, specification [3], within the same Fama-French 12 industry classification. The instrumental variable specification [7] uses the predicted probabilities from Table 3, specification [2], as an instrument for the Non-Bank Loan Issuer explanatory variable. Regression coefficients are reported in bold and t-statistics are reported below the coefficients in parentheses corresponding to the statistical significance levels noted next to the coefficients: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

<table>
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<tr>
<th>Explanatory Variable</th>
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<th>IV</th>
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<td>Non-Bank Loan Issuer</td>
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<td>(6.303)</td>
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<td></td>
<td>0.114***</td>
<td>(4.509)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.114***</td>
<td>(4.396)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.120***</td>
<td>(4.322)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>0.067***</td>
<td>(2.544)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>0.153***</td>
<td>(7.402)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.337***</td>
<td>(2.303)</td>
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<td>Loans Traded</td>
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<td></td>
<td>-0.009</td>
<td>(-0.289)</td>
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</tr>
<tr>
<td>PE Sponsor Backed</td>
<td>-0.046*</td>
<td>(-1.655)</td>
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</tr>
<tr>
<td></td>
<td>-0.049*</td>
<td>(-1.737)</td>
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<td>Bank-Funded Term Loan</td>
<td>0.020</td>
<td>(0.602)</td>
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<td></td>
<td>0.000</td>
<td>(0.008)</td>
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<td>Performance Pricing</td>
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<td></td>
<td>0.050**</td>
<td>(2.053)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Rating</td>
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<td>(-2.965)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.065**</td>
<td>(-2.504)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.062**</td>
<td>(-2.406)</td>
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<td>Log of Book Assets</td>
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<td></td>
<td>-0.044*</td>
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<td></td>
<td>-0.091***</td>
<td>(-6.161)</td>
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<td></td>
<td>-0.116***</td>
<td>(-8.897)</td>
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<td>-0.072**</td>
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<td>EBITDA Volatility</td>
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<td>-0.002</td>
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<td>Sales Growth</td>
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<td>(1.198)</td>
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<td>(1.160)</td>
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<td></td>
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<td>(1.076)</td>
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<td>0.023*</td>
<td>(1.896)</td>
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<td>0.011</td>
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<tr>
<td></td>
<td>0.007</td>
<td>(0.540)</td>
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<tr>
<td>Constant</td>
<td>0.231***</td>
<td>(15.189)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.219***</td>
<td>(2.874)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.214***</td>
<td>(2.803)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>0.171**</td>
<td>(2.185)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>0.289***</td>
<td>(3.885)</td>
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<td>0.266***</td>
<td>(3.803)</td>
<td></td>
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<td></td>
<td>0.049</td>
<td>(0.396)</td>
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<td>Fama-French 30 Industry Effects</td>
<td>No</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Lead Arranger Bank Effects</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Covenant-Lite Dropped</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>N</td>
<td>449</td>
<td>449</td>
<td>449</td>
<td>449</td>
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<td>Adjusted R-Squared</td>
<td>0.080</td>
<td>0.275</td>
<td>0.279</td>
<td>0.286</td>
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</table>
### Table 5: Covenant Event Descriptive Statistics

This table presents statistics of covenant events for the crisis period [2007Q3-2009Q4]. Covenant Renegotiations are defined as a firm-quarter in which the firm adjusted an earnings covenant threshold or obtained a waiver for a financial covenant. Covenant Violations are defined as a firm-quarter in which the firm is in current violation of a covenant or the firm anticipates that it would be in non-compliance of a covenant absent a renegotiation in the current quarter. Forced Renegotiations are defined as covenant renegotiations where the firm is 1) in violation of a covenant, 2) the firm anticipates that it would be in non-compliance of a covenant absent the renegotiation, or 3) Covenant Risk is 0.5 or higher. Panel A shows the incidence of covenant renegotiations and violations by quarter during the sample period. Panel B presents statistics conditional on renegotiation firm-quarters. The Relative Risk Ratio is the ratio of probabilities for changes to firms’ credit agreements for Non-Bank Loan Issuers compared to Control Issuers. The Mean Difference statistic is the mean difference conditional on occurrence of the change. Statistical significance levels are noted next to the relative risk ratios and mean differences: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

#### Panel A: Covenant Events by Quarter

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Total</th>
<th>Non-Bank Loan Issuer</th>
<th>Control Issuer</th>
<th>Count</th>
<th>Cumulative Hazard</th>
<th>Count</th>
<th>Cumulative Hazard</th>
<th>Count</th>
<th>Cumulative Hazard</th>
</tr>
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<tbody>
<tr>
<td>2007Q3</td>
<td>450</td>
<td>199</td>
<td>251</td>
<td>20</td>
<td>0.101</td>
<td>20</td>
<td>0.080</td>
<td>8</td>
<td>0.040</td>
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<tr>
<td>2007Q4</td>
<td>439</td>
<td>195</td>
<td>244</td>
<td>18</td>
<td>0.193</td>
<td>15</td>
<td>0.141</td>
<td>7</td>
<td>0.076</td>
</tr>
<tr>
<td>2008Q1</td>
<td>434</td>
<td>192</td>
<td>242</td>
<td>8</td>
<td>0.235</td>
<td>21</td>
<td>0.228</td>
<td>4</td>
<td>0.097</td>
</tr>
<tr>
<td>2008Q2</td>
<td>427</td>
<td>187</td>
<td>240</td>
<td>16</td>
<td>0.320</td>
<td>25</td>
<td>0.487</td>
<td>8</td>
<td>0.097</td>
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<tr>
<td>2008Q3</td>
<td>425</td>
<td>186</td>
<td>239</td>
<td>16</td>
<td>0.406</td>
<td>22</td>
<td>0.378</td>
<td>11</td>
<td>0.199</td>
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<tr>
<td>2008Q4</td>
<td>412</td>
<td>182</td>
<td>230</td>
<td>12</td>
<td>0.472</td>
<td>25</td>
<td>0.487</td>
<td>11</td>
<td>0.199</td>
</tr>
<tr>
<td>2009Q1</td>
<td>400</td>
<td>178</td>
<td>222</td>
<td>26</td>
<td>0.618</td>
<td>19</td>
<td>0.573</td>
<td>18</td>
<td>0.360</td>
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<td>2009Q2</td>
<td>390</td>
<td>171</td>
<td>219</td>
<td>20</td>
<td>0.735</td>
<td>25</td>
<td>0.687</td>
<td>12</td>
<td>0.431</td>
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<tr>
<td>2009Q3</td>
<td>383</td>
<td>168</td>
<td>215</td>
<td>17</td>
<td>0.836</td>
<td>20</td>
<td>0.780</td>
<td>12</td>
<td>0.502</td>
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<td>2009Q4</td>
<td>376</td>
<td>162</td>
<td>214</td>
<td>23</td>
<td>0.978</td>
<td>14</td>
<td>0.845</td>
<td>9</td>
<td>0.558</td>
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<tr>
<td>Totals</td>
<td>4,136</td>
<td>1,820</td>
<td>2,316</td>
<td>176</td>
<td></td>
<td>195</td>
<td></td>
<td>100</td>
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</table>

#### Panel B: Covenant Renegotiation Outcomes [2007Q3-2009Q4]

<table>
<thead>
<tr>
<th>Incidence of Outcomes</th>
<th>Non-Bank Loan Issuer</th>
<th>Control Issuer</th>
<th>Relative Risk Ratio</th>
<th>Equality Test</th>
<th>Sample Means</th>
<th>Mean Diff.</th>
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<tbody>
<tr>
<td>All Covenant Renegotiations</td>
<td>176</td>
<td>100.0%</td>
<td>195</td>
<td>100.0%</td>
<td>1.06</td>
<td>0.55</td>
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<tr>
<td>Loosened / Financial Waiver</td>
<td>143</td>
<td>81.3%</td>
<td>149</td>
<td>76.4%</td>
<td>0.79</td>
<td>0.79</td>
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<tr>
<td>Tightened</td>
<td>33</td>
<td>18.8%</td>
<td>46</td>
<td>23.6%</td>
<td>1.25</td>
<td>*</td>
</tr>
<tr>
<td>No Term Changes</td>
<td>78</td>
<td>44.3%</td>
<td>69</td>
<td>35.4%</td>
<td>0.70</td>
<td>*</td>
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<tr>
<td>Increased Amount [%]</td>
<td>32</td>
<td>18.2%</td>
<td>51</td>
<td>26.2%</td>
<td>0.83</td>
<td>1.79</td>
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<tr>
<td>Decreased Amount [%]</td>
<td>47</td>
<td>26.7%</td>
<td>63</td>
<td>32.3%</td>
<td>0.98</td>
<td>1.79</td>
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<tr>
<td>Extended Maturity [Years]</td>
<td>67</td>
<td>38.1%</td>
<td>76</td>
<td>39.0%</td>
<td>0.98</td>
<td>1.79</td>
</tr>
<tr>
<td>Shortened Maturity [Years]</td>
<td>6</td>
<td>3.4%</td>
<td>8</td>
<td>4.1%</td>
<td>0.83</td>
<td>-0.64</td>
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<tr>
<td>Increased Spread</td>
<td>87</td>
<td>49.4%</td>
<td>110</td>
<td>56.4%</td>
<td>0.88</td>
<td>150</td>
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<tr>
<td>Amendment Fee ≥ 25 bps</td>
<td>65</td>
<td>36.9%</td>
<td>36</td>
<td>18.5%</td>
<td>2.00</td>
<td>63</td>
</tr>
<tr>
<td>Forced Renegotiations</td>
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<td>100.0%</td>
<td>116</td>
<td>100.0%</td>
<td>0.99</td>
<td>1.79</td>
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<tr>
<td>Loosened / Financial Waiver</td>
<td>109</td>
<td>89.3%</td>
<td>105</td>
<td>90.5%</td>
<td>1.12</td>
<td>184</td>
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<tr>
<td>Tightened</td>
<td>13</td>
<td>10.7%</td>
<td>11</td>
<td>9.5%</td>
<td>0.87</td>
<td>184</td>
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<tr>
<td>Increased Spread</td>
<td>54</td>
<td>44.3%</td>
<td>59</td>
<td>50.9%</td>
<td>0.87</td>
<td>184</td>
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<tr>
<td>Amendment Fee ≥ 25 bps</td>
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<td>45.1%</td>
<td>27</td>
<td>23.3%</td>
<td>1.94</td>
<td>58</td>
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</table>
This table presents discrete-time proportional hazard models of covenant renegotiation during the crisis period [2007Q3-2009Q4]. In specifications [1]-[6], the main explanatory variable of interest is *Non-Bank Loan Issuer*, which is a binary variable equal to one if the firm had at least 25 percent of its debt composed of non-bank loans at 2007Q2. Specification [7] is a reduced form instrumental variable regression, where the *Negative Pledge* instrument is placed directly into the second stage equation. All variables are defined in Table A-4 of the Appendix. Continuous variables (except *Covenant Risk* and *Δ Rating*) are de-meaned and normalized by their standard deviations. The note "(-1)" next to a variable indicates that the sign of the coefficient is reversed for interpretation purposes. Regression coefficients are reported both as hazard ratios (in bold) and marginal probabilities evaluated at the sample mean (for the main coefficients). Z-statistics (with standard errors clustered by firm) are reported below the coefficients in parentheses corresponding to the statistical significance levels noted next to the hazard ratios: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

<table>
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<th>Explanatory Variable</th>
<th>Regression Period: 2007Q3-2009Q4</th>
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<th>Matched</th>
<th>IV</th>
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<td><strong>Non-Bank Loan Issuer [2007Q2]</strong></td>
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<td>1.709***</td>
<td>1.403***</td>
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<td></td>
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<td>0.048</td>
<td>0.041</td>
<td>0.019</td>
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<td>(4.538)</td>
<td>(4.642)</td>
<td>(2.625)</td>
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<tr>
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<td>0.041</td>
<td>0.019</td>
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<td></td>
<td></td>
<td>(4.538)</td>
<td>(4.642)</td>
<td>(2.625)</td>
</tr>
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<td><strong>Covenant Risk [2007Q2]</strong></td>
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<td>7.242***</td>
<td>9.361***</td>
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<td></td>
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<td>0.095</td>
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<td></td>
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<td>(7.158)</td>
<td>(6.666)</td>
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</tr>
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<td>3.535***</td>
<td>3.464***</td>
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<td></td>
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<td>0.060</td>
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<td>(4.555)</td>
<td>(4.425)</td>
<td></td>
</tr>
<tr>
<td><strong>Δ Rating [t-5, t-1] (-1)</strong></td>
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<td>1.425***</td>
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<td></td>
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<td>(6.611)</td>
<td>(4.955)</td>
</tr>
<tr>
<td><strong>Δ EBITDA to Assets [t-5, t-1] (-1)</strong></td>
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<td>1.189***</td>
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<td>(4.201)</td>
<td>(3.691)</td>
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<td>(1.032)</td>
<td>(0.075)</td>
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<td>(0.491)</td>
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<td><strong>CCC Rating [2007Q2]</strong></td>
<td></td>
<td>0.766</td>
<td>0.801</td>
<td>0.804</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.618)</td>
<td>(0.502)</td>
<td>(0.513)</td>
</tr>
<tr>
<td><strong>Log of Book Assets [2007Q2]</strong></td>
<td></td>
<td>0.878</td>
<td>0.831**</td>
<td>0.833**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.581)</td>
<td>(2.081)</td>
<td>(2.042)</td>
</tr>
<tr>
<td><strong>Book Leverage [2007Q2]</strong></td>
<td></td>
<td>0.860**</td>
<td>0.804***</td>
<td>0.809***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.040)</td>
<td>(3.100)</td>
<td>(2.979)</td>
</tr>
<tr>
<td><strong>Cash Holdings [2007Q2]</strong></td>
<td></td>
<td>0.985</td>
<td>1.013</td>
<td>1.025</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.229)</td>
<td>(0.215)</td>
<td>(0.350)</td>
</tr>
<tr>
<td><strong>Tangibility [2007Q2]</strong></td>
<td></td>
<td>0.982</td>
<td>0.995</td>
<td>1.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.250)</td>
<td>(0.076)</td>
<td>(0.111)</td>
</tr>
<tr>
<td><strong>EBITDA to Assets [2007Q2]</strong></td>
<td></td>
<td>0.865*</td>
<td>0.926</td>
<td>0.914</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.728)</td>
<td>(0.987)</td>
<td>(1.237)</td>
</tr>
<tr>
<td><strong>EBITDA Volatility [2007Q2]</strong></td>
<td></td>
<td>0.924</td>
<td>0.917</td>
<td>0.912</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.972)</td>
<td>(1.033)</td>
<td>(1.149)</td>
</tr>
<tr>
<td><strong>Sales Growth [2007Q2]</strong></td>
<td></td>
<td>0.788**</td>
<td>0.801***</td>
<td>0.795***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.426)</td>
<td>(2.636)</td>
<td>(3.123)</td>
</tr>
<tr>
<td><strong>Quarters Since Last Renegotiation Effects</strong></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Fama-French 30 Industry Effects</strong></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Quarter Effects</strong></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Fama-French 12 Industry by Quarter Effects</strong></td>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td></td>
<td>4,136</td>
<td>3,975</td>
<td>3,975</td>
</tr>
<tr>
<td><strong>Unconditional Probability</strong></td>
<td></td>
<td>0.090</td>
<td>0.092</td>
<td>0.092</td>
</tr>
<tr>
<td><strong>Pseudo R-Squared</strong></td>
<td></td>
<td>0.083</td>
<td>0.118</td>
<td>0.149</td>
</tr>
</tbody>
</table>

*Note: All variables are defined in Table A-4 of the Appendix. Continuous variables (except *Covenant Risk* and *Δ Rating*) are de-meaned and normalized by their standard deviations. The note "(-1)" next to a variable indicates that the sign of the coefficient is reversed for interpretation purposes. Regression coefficients are reported both as hazard ratios (in bold) and marginal probabilities evaluated at the sample mean (for the main coefficients). Z-statistics (with standard errors clustered by firm) are reported below the coefficients in parentheses corresponding to the statistical significance levels noted next to the hazard ratios: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.*
Table 7  
Were Non-Bank Loan Issuers More Likely to Violate Covenants in Crisis?  
This table presents discrete-time proportional hazard models of covenant violations during the crisis period [2007Q3-2009Q4]. In specifications [1]-[6], the main explanatory variable of interest is Non-Bank Loan Issuer, which is a binary variable equal to one if the firm had at least 25 percent of its debt composed of non-bank loans at 2007Q2. Specification [7] is a reduced form instrumental variable regression, where the Negative Pledge instrument is placed directly into the second stage equation. All variables are defined in Table A-1 of the Appendix. Continuous variables (except Covenant Risk and Δ Rating) are de-meaned and normalized by their standard deviations. The note "(-1)" next to a variable indicates that the sign of the coefficient is reversed for interpretation purposes. Regression coefficients are reported both as hazard ratios (in bold) and marginal probabilities evaluated at zero (for the main coefficients). Z-statistics (with standard errors clustered by firm) are reported below the coefficients in parentheses corresponding to the statistical significance levels noted next to the hazard ratios: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Unmatched</th>
<th>Matched</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Bank Loan Issuer [2007Q2]</td>
<td>1.441**</td>
<td>1.425**</td>
<td>1.367*</td>
</tr>
<tr>
<td>Negative Pledge [2001-2003] (-1)</td>
<td>2.038***</td>
<td>3.585***</td>
<td>0.085</td>
</tr>
<tr>
<td>Covenant Risk [2007Q2]</td>
<td>3.585***</td>
<td>3.468***</td>
<td>0.0069</td>
</tr>
<tr>
<td>Δ Covenant Risk [2007Q2, t-1]</td>
<td>3.543***</td>
<td>3.468***</td>
<td>0.0069</td>
</tr>
<tr>
<td>Δ Rating [t-5, t-1] (-1)</td>
<td>1.390***</td>
<td>1.431***</td>
<td>1.406***</td>
</tr>
<tr>
<td>Δ EBITDA to Assets [t-5, t-1] (-1)</td>
<td>2.838***</td>
<td>2.860***</td>
<td>0.069</td>
</tr>
<tr>
<td>Δ Book Leverage [t-5, t-1]</td>
<td>1.273</td>
<td>1.316</td>
<td>1.487*</td>
</tr>
<tr>
<td>CCC Rating [2007Q2]</td>
<td>2.470**</td>
<td>2.300**</td>
<td>2.113</td>
</tr>
<tr>
<td>Log of Book Assets [2007Q2]</td>
<td>0.983</td>
<td>0.914</td>
<td>0.942</td>
</tr>
<tr>
<td>Cash Holdings [2007Q2]</td>
<td>1.021</td>
<td>1.020</td>
<td>1.103</td>
</tr>
<tr>
<td>Tangibility [2007Q2]</td>
<td>0.888</td>
<td>0.875</td>
<td>1.043</td>
</tr>
<tr>
<td>EBITDA to Assets [2007Q2]</td>
<td>0.711***</td>
<td>0.749***</td>
<td>0.791**</td>
</tr>
<tr>
<td>Sales Growth [2007Q2]</td>
<td>0.997</td>
<td>1.009</td>
<td>1.008</td>
</tr>
<tr>
<td>N</td>
<td>4136</td>
<td>3975</td>
<td>3975</td>
</tr>
<tr>
<td>Unconditional Probability</td>
<td>0.052</td>
<td>0.052</td>
<td>0.052</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.286</td>
<td>0.323</td>
<td>0.374</td>
</tr>
</tbody>
</table>

Proportional Hazard Dependent Variable: 1 [Covenant Violation]  
Regression Period: 2007Q3-2009Q4  
IV
Table 8
Earnings Performance Conditional on Covenant Events

This table shows regressions of the level and the evolution of EBITDA to Assets on the Non-Bank Loan Issuer indicator, conditional on covenant renegotiation and violation events. The main variables of interest are Non-Bank Loan Issuer and its interaction term with the Forced Renegotiation indicator. A positive coefficient means that firms in the Non-Bank Loan Issuer group had a higher level of EBITDA to Assets, conditional on the covenant event. Forced Renegotiations are defined as covenant renegotiations where the firm is 1) in violation of a covenant, 2) anticipates that the firm would be in non-compliance of a covenant absent the renegotiation, or 3) Covenant Risk is 0.5 or higher. Regression coefficients are reported in bold and t-statistics (clustered by firm) are reported below the coefficients corresponding to the statistical significance levels noted next to the coefficients: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>EBITDA to Assets [t-1]</th>
<th>ΔEBITDA [07Q2, t-1] to Assets [07Q2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Bank Loan Issuer</td>
<td>0.042**</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(2.576)</td>
<td>(0.024)</td>
</tr>
<tr>
<td>Forced Renegotiation</td>
<td>-0.133***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-6.673)</td>
<td></td>
</tr>
<tr>
<td>Non-Bank Loan Issuer * Forced Ren.</td>
<td>0.077***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.784)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.090***</td>
<td>0.168***</td>
</tr>
<tr>
<td></td>
<td>(4.608)</td>
<td>(9.557)</td>
</tr>
<tr>
<td>2007Q4</td>
<td>0.010</td>
<td>0.003</td>
</tr>
<tr>
<td>2008Q1</td>
<td>-0.011</td>
<td>-0.004</td>
</tr>
<tr>
<td>2008Q2</td>
<td>-0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>2008Q3</td>
<td>-0.012</td>
<td>-0.012</td>
</tr>
<tr>
<td>2008Q4</td>
<td>-0.017</td>
<td>-0.026</td>
</tr>
<tr>
<td>2009Q1</td>
<td>-0.030</td>
<td>-0.018</td>
</tr>
<tr>
<td>2009Q2</td>
<td>-0.021</td>
<td>-0.019</td>
</tr>
<tr>
<td>2009Q3</td>
<td>-0.052**</td>
<td>-0.049**</td>
</tr>
<tr>
<td>2009Q4</td>
<td>-0.004</td>
<td>-0.002</td>
</tr>
<tr>
<td>N</td>
<td>368</td>
<td>368</td>
</tr>
<tr>
<td>Adjusted R-Squared</td>
<td>0.034</td>
<td>0.245</td>
</tr>
</tbody>
</table>
This table shows regressions of differences in Covenant Risk around changes in Non-Bank Loan Issuer status. The first dependent variable ([1] and [5]) measures the change in overall Covenant Risk. The three remaining dependent variables measure changes in Covenant Risk attributable to each input: 1) changes in the covenant thresholds only ([2] and [6]), 2) changes in actual covenant ratios only ([3] and [7]), and 3) changes in the level and distribution of earnings only ([4] and [8]). These dependent variables are calculated by varying the input of interest over time while holding the other inputs fixed at their pre-differenced values. Panel A presents first difference regressions across the boom period, from 2003Q4 to 2007Q2. The main variables of interest are the constant term, which measures the unconditional average change in Covenant Risk during the boom period, and the coefficient for Δ Non-Bank Loan Issuer, which measures the effect of a firm changing from the Control to Non-Bank Loan Issuer group. Panel B presents annual first differences around changes from a Non-Bank to a Control Issuer during the post-boom period (2007Q3 to 2011Q4). The constant term is the main variable of interest, which measures the average change in Covenant Risk from one year prior to the change to the first quarter following the change in status. All continuous variables are de-meaned and normalized by their standard deviations. Statistical significance levels are noted next to the coefficients: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

### Panel A

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>2003Q4 to 2007Q2</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Δ Covenant Risk</td>
<td>Δ Covenants Only</td>
<td>Δ Ratios Only</td>
<td>Δ Earnings Only</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.061***</td>
<td>-0.048***</td>
<td>0.017**</td>
<td>0.017**</td>
</tr>
<tr>
<td></td>
<td>(-3.893)</td>
<td>(-3.767)</td>
<td>(1.782)</td>
<td>(1.990)</td>
</tr>
<tr>
<td>Δ Non-Bank Loan Issuer</td>
<td>0.091***</td>
<td>0.070***</td>
<td>0.005</td>
<td>0.030*</td>
</tr>
<tr>
<td></td>
<td>(3.124)</td>
<td>(2.741)</td>
<td>(0.309)</td>
<td>(1.784)</td>
</tr>
<tr>
<td>Δ Credit Rating</td>
<td>0.038*</td>
<td>0.073***</td>
<td>-0.004</td>
<td>-0.010</td>
</tr>
<tr>
<td></td>
<td>(1.807)</td>
<td>(4.029)</td>
<td>(-0.377)</td>
<td>(-0.903)</td>
</tr>
<tr>
<td>Δ Log of Book Assets</td>
<td>0.045**</td>
<td>0.009</td>
<td>-0.038***</td>
<td>0.030***</td>
</tr>
<tr>
<td></td>
<td>(2.001)</td>
<td>(0.650)</td>
<td>(-2.608)</td>
<td>(2.901)</td>
</tr>
<tr>
<td>Δ Book Leverage</td>
<td>0.043*</td>
<td>0.005</td>
<td>0.105***</td>
<td>-0.010</td>
</tr>
<tr>
<td></td>
<td>(1.656)</td>
<td>(0.352)</td>
<td>(6.103)</td>
<td>(-1.003)</td>
</tr>
<tr>
<td>Δ Cash Holdings</td>
<td>-0.014</td>
<td>-0.043**</td>
<td>0.012</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(-0.682)</td>
<td>(-2.387)</td>
<td>(0.792)</td>
<td>(0.669)</td>
</tr>
<tr>
<td>Δ Tangibility</td>
<td>-0.036*</td>
<td>-0.012</td>
<td>-0.006</td>
<td>-0.028***</td>
</tr>
<tr>
<td></td>
<td>(-1.897)</td>
<td>(-0.658)</td>
<td>(-0.485)</td>
<td>(-2.794)</td>
</tr>
<tr>
<td>Δ EBITDA to Assets</td>
<td>-0.098***</td>
<td>0.004</td>
<td>0.023*</td>
<td>-0.130***</td>
</tr>
<tr>
<td></td>
<td>(-0.028)</td>
<td>(0.280)</td>
<td>(1.840)</td>
<td>(-8.207)</td>
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<tr>
<td>Δ EBITDA Volatility</td>
<td>0.020</td>
<td>-0.007</td>
<td>-0.001</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(1.071)</td>
<td>(-0.365)</td>
<td>(-0.102)</td>
<td>(0.173)</td>
</tr>
<tr>
<td>Δ Sales Growth</td>
<td>0.006</td>
<td>0.003</td>
<td>0.003</td>
<td>0.021*</td>
</tr>
<tr>
<td></td>
<td>(0.363)</td>
<td>(0.198)</td>
<td>(0.296)</td>
<td>(1.831)</td>
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</table>

### Panel B

<table>
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<th>Explanatory Variable</th>
<th>2007Q3 to 2011Q4</th>
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<tbody>
<tr>
<td></td>
<td>Δ Covenant Risk</td>
<td>Δ Covenants Only</td>
<td>Δ Ratios Only</td>
<td>Δ Earnings Only</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.122***</td>
<td>-0.092***</td>
<td>-0.007</td>
<td>0.020</td>
</tr>
<tr>
<td></td>
<td>(-4.718)</td>
<td>(-4.123)</td>
<td>(-0.771)</td>
<td>(2.101)</td>
</tr>
<tr>
<td>Δ Non-Bank Loan Issuer</td>
<td>-0.016</td>
<td>0.040*</td>
<td>-0.003</td>
<td>-0.025</td>
</tr>
<tr>
<td></td>
<td>(0.441)</td>
<td>(1.669)</td>
<td>(-0.265)</td>
<td>(-1.231)</td>
</tr>
<tr>
<td>Δ Log of Book Assets</td>
<td>0.062**</td>
<td>0.024</td>
<td>-0.004</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(2.620)</td>
<td>(1.226)</td>
<td>(-0.470)</td>
<td>(0.579)</td>
</tr>
<tr>
<td>Δ Book Leverage</td>
<td>-0.022</td>
<td>-0.040</td>
<td>0.016</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>(-0.724)</td>
<td>(-1.493)</td>
<td>(1.374)</td>
<td>(0.934)</td>
</tr>
<tr>
<td>Δ Cash Holdings</td>
<td>0.013</td>
<td>-0.009</td>
<td>0.026***</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.344)</td>
<td>(-0.336)</td>
<td>(2.684)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>Δ Tangibility</td>
<td>0.050*</td>
<td>0.020</td>
<td>0.029***</td>
<td>0.024</td>
</tr>
<tr>
<td></td>
<td>(1.803)</td>
<td>(0.910)</td>
<td>(2.666)</td>
<td>(1.096)</td>
</tr>
<tr>
<td>Δ EBITDA to Assets</td>
<td>-0.038</td>
<td>0.028</td>
<td>-0.034</td>
<td>-0.130**</td>
</tr>
<tr>
<td></td>
<td>(-0.512)</td>
<td>(0.668)</td>
<td>(-1.064)</td>
<td>(-2.105)</td>
</tr>
<tr>
<td>Δ EBITDA Volatility</td>
<td>0.051</td>
<td>0.003</td>
<td>0.003</td>
<td>0.058*</td>
</tr>
<tr>
<td></td>
<td>(1.472)</td>
<td>(0.319)</td>
<td>(0.566)</td>
<td>(1.700)</td>
</tr>
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<td>Δ Sales Growth</td>
<td>-0.044</td>
<td>-0.003</td>
<td>-0.033**</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(-0.871)</td>
<td>(-0.67)</td>
<td>(-2.580)</td>
<td>(-0.047)</td>
</tr>
</tbody>
</table>

| N                    | 382              | 381              | 381              | 381              |
| Adjusted R-Squared   | 0.161            | 0.098            | 0.241            | 0.355            |
Table 10
Did Non-Bank Loan Issuance Affect Investment in Crisis?

This table presents regression analysis of capital expenditures and changes in leverage during the crisis period [2007Q2-2009Q4]. The dependent variable that measures the percentage change in capital expenditures from the pre-crisis period [average quarterly capital expenditures for the year ending 2007Q2]. The main explanatory variable of interest is Non-Bank Loan Issuer, which is a binary variable equal to one if the firm had at least 25 percent of its debt composed of non-bank loans at 2007Q2. The Non-Bank Loan Issuer indicator is also interacted with Crisis-2, which is an indicator variable equal to one for the second half of the sample that begins in the quarter of Lehman Brothers’ collapse. The variables B Rating and CCC Rating measure the effect of credit rating relative to firms with a BB credit rating. All variables are defined in Table A-4 of the Appendix. Continuous variables are de-meaned and normalized by their standard deviations. Linear regression coefficients are reported in bold and t-statistics are reported below the coefficients in parentheses corresponding to the statistical significance levels noted next to the coefficients: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Bank Loan Issuer</td>
<td>-0.035</td>
<td>-0.127**</td>
<td>-0.030</td>
<td>-0.116**</td>
<td>-0.030</td>
<td>-0.098*</td>
</tr>
<tr>
<td></td>
<td>(-0.653)</td>
<td>(-2.535)</td>
<td>(-0.577)</td>
<td>(-2.348)</td>
<td>(-0.567)</td>
<td>(-1.919)</td>
</tr>
<tr>
<td>Crisis-2 [2008Q4-2009Q4]</td>
<td>-0.374***</td>
<td>-0.464***</td>
<td>-0.809**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-10.037)</td>
<td>(-8.405)</td>
<td>(-1.973)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Bank Loan Issuer * Crisis-2</td>
<td>0.192***</td>
<td>0.185***</td>
<td>0.146***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.783)</td>
<td>(3.649)</td>
<td>(2.847)</td>
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<td></td>
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<td>(1.502)</td>
<td>(1.501)</td>
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<td>0.338**</td>
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<td>0.009</td>
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<tr>
<td></td>
<td>(0.299)</td>
<td>(0.309)</td>
<td>(1.030)</td>
<td>(1.040)</td>
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<td>0.008</td>
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<td>-0.009</td>
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<tr>
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<td>(0.289)</td>
<td>(0.262)</td>
<td>(-0.259)</td>
<td>(-0.281)</td>
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<td>0.073**</td>
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<td></td>
<td>(2.019)</td>
<td>(2.024)</td>
<td>(2.293)</td>
<td>(2.296)</td>
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<tr>
<td>Tangibility</td>
<td>-0.065*</td>
<td>-0.064*</td>
<td>-0.016</td>
<td>-0.016</td>
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</tr>
<tr>
<td></td>
<td>(-1.678)</td>
<td>(-1.668)</td>
<td>(-0.417)</td>
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<td>-0.072**</td>
<td>-0.054</td>
<td>-0.055</td>
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<td></td>
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<td>-0.026</td>
<td>-0.042</td>
<td>-0.042</td>
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<td></td>
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<tr>
<td></td>
<td>(-0.791)</td>
<td>(-0.789)</td>
<td>(-1.555)</td>
<td>(-1.550)</td>
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<td>Sales Growth</td>
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<td>-0.068*</td>
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<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Quarter Effects</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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<td>Fama-French 12 Ind. by Qtr. Effects</td>
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<td>No</td>
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<td>0.163</td>
<td>0.166</td>
<td>0.127</td>
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</table>

42
## Table 11

**Did Non-Bank Loan Issuance Affect Credit Performance in Crisis?**

This table presents regression analysis of ex post credit and payment default performance on Non-Bank Loan Issuer status and predictors determined at 2007Q2. Panel A shows a linear panel regression with a dependent variable that measures the change in credit rating from the pre-crisis period. Panel B shows a cross-sectional logit model for payment default incidence during the period 2007Q3 to 2009Q4. The main explanatory variable of interest is Non-Bank Loan Issuer, which is a binary variable equal to one if the firm had at least 25 percent of its debt composed of non-bank loans at 2007Q2. The variables B Rating and CCC Rating measure the effect of credit rating relative to firms with a BB credit rating. All variables are defined in Table A-1 of the Appendix. Continuous variables are de-meaned and normalized by their standard deviations. Linear regression coefficients [Panel A] or odds ratios [Panel B] are reported in bold and t-statistics [Panel A] or Z-statistics [Panel B] are reported below the coefficients in parentheses corresponding to the statistical significance levels noted next to the coefficients: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

<table>
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<th>Explanatory Variable</th>
<th>Panel A</th>
<th>Panel B</th>
</tr>
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<td>Δ Credit Rating [Linear]</td>
<td>Payment Default Incidence [Cross-Sectional Logit]</td>
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<td></td>
<td>[1] - Rating ['07Q2]</td>
<td>1 {Any Payment Default}</td>
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<td>Non-Bank Loan Issuer</td>
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<td>-0.095</td>
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<td>(-0.986)</td>
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<td>2.913*</td>
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<tr>
<td></td>
<td>(2.734)</td>
<td>(1.923)</td>
</tr>
<tr>
<td>CCC Rating</td>
<td>0.959**</td>
<td>2.822</td>
</tr>
<tr>
<td></td>
<td>(2.534)</td>
<td>(1.004)</td>
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<td>Log of Book Assets</td>
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<td>1.236</td>
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<tr>
<td></td>
<td>(-0.583)</td>
<td>(1.126)</td>
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<td>Book Leverage</td>
<td>-0.135**</td>
<td>2.356***</td>
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<td></td>
<td>(-2.230)</td>
<td>(3.789)</td>
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<tr>
<td>Cash Holdings</td>
<td>0.112***</td>
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<td></td>
<td>(2.842)</td>
<td>(-0.935)</td>
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<tr>
<td>Tangibility</td>
<td>0.079</td>
<td>1.016</td>
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<td></td>
<td>(1.363)</td>
<td>(0.056)</td>
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<td>EBITDA to Assets</td>
<td>0.206***</td>
<td>0.402***</td>
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<tr>
<td></td>
<td>(4.305)</td>
<td>(-3.318)</td>
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<tr>
<td>EBITDA Volatility</td>
<td>-0.074*</td>
<td>1.383</td>
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<td></td>
<td>(-1.768)</td>
<td>(1.610)</td>
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<td>Sales Growth</td>
<td>0.039</td>
<td>1.261</td>
</tr>
<tr>
<td></td>
<td>(0.714)</td>
<td>(0.915)</td>
</tr>
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<td>Fama-French 30 Industry Effects</td>
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<td>Yes</td>
</tr>
<tr>
<td>Quarter Effects</td>
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<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>4,055</td>
<td>4,055</td>
</tr>
<tr>
<td>Unconditional Probability</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Adjusted R-Squared</td>
<td>0.024</td>
<td>0.158</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
This figure illustrates the debt structures of the treatment (Non-Bank Loan Issuer) and control (Traditional Debt Structure) groups. For the treatment group, the non-bank loans are designated tranches of syndicated loan deals, which are usually packaged under the same loan agreement as other bank-funded tranches. For both the treatment and control groups, a lead bank (e.g., Citigroup) negotiates pricing and covenants with the borrower firm for the overall package and shops allocations in the loans to other lenders. Similar to bank-funded loans, non-bank loans are usually secured with collateral pledged by the borrower (sharing the most senior priority in the firm’s capital structure) and require maintenance of financial covenants. Similar to bond debt, however, non-bank loans are held by a dispersed group of lenders that are not likely interested in a long-term relationship with the firm.

**Figure A-1**

**Treatment and Control Debt Structures**

This figure illustrates the debt structures of the treatment (Non-Bank Loan Issuer) and control (Traditional Debt Structure) groups. For the treatment group, the non-bank loans are designated tranches of syndicated loan deals, which are usually packaged under the same loan agreement as other bank-funded tranches. For both the treatment and control groups, a lead bank (e.g., Citigroup) negotiates pricing and covenants with the borrower firm for the overall package and shops allocations in the loans to other lenders. Similar to bank-funded loans, non-bank loans are usually secured with collateral pledged by the borrower (sharing the most senior priority in the firm’s capital structure) and require maintenance of financial covenants. Similar to bond debt, however, non-bank loans are held by a dispersed group of lenders that are not likely interested in a long-term relationship with the firm.
Table A-1

Alternative Measures: Pre-Crisis Covenant Tightness Analysis

This table reproduces the analysis in Table 4 for alternative measures of covenant tightness. Covenant Risk is calculated using three alternative assumptions about the distribution of earnings: 1) using a non-parametric distribution of earnings changes from the same Fama-French 30 industry group over the previous 10 years (the base assumption), 2) using a parametric normal distribution of earnings based on the mean and standard deviation of earnings changes from the same Fama-French 30 industry group over the past 10 years, 3) using a parametric normal distribution of earnings based on the mean and standard deviation of earnings changes for the same firm over the past 10 years. In addition, I produce the analysis with covenant tightness as measured using methodology proposed by Murfin (2012): 4) for earnings covenants only (thresholds used in Covenant Risk) and 5) for capital covenants only (thresholds not used in Covenant Risk).

Panel A: Pre-Crisis Covenant Tightness Regressions

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<th></th>
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<tbody>
<tr>
<td></td>
<td>[1]</td>
<td>[2]</td>
<td>[3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Bank Issuer</td>
<td>0.114*** (4.509)</td>
<td>0.111*** (4.870)</td>
<td>0.135*** (3.952)</td>
<td>0.080*** (4.196)</td>
<td>0.067** (2.563)</td>
</tr>
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<td>B Rating</td>
<td>-0.074*** (-2.965)</td>
<td>-0.088*** (-3.837)</td>
<td>-0.019 (-0.523)</td>
<td>-0.004 (-0.205)</td>
<td>0.044 (1.594)</td>
</tr>
<tr>
<td>CCC Rating</td>
<td>-0.178* (-1.922)</td>
<td>-0.217** (-2.462)</td>
<td>-0.115 (-1.019)</td>
<td>-0.109* (-1.663)</td>
<td>0.030 (0.469)</td>
</tr>
<tr>
<td>Log of Book Assets</td>
<td>-0.015 (-1.184)</td>
<td>-0.012 (-1.010)</td>
<td>-0.022 (-1.367)</td>
<td>-0.003 (-0.234)</td>
<td>-0.030** (-2.408)</td>
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<td>Book Leverage</td>
<td>0.066*** (4.445)</td>
<td>0.041*** (3.096)</td>
<td>0.078*** (3.712)</td>
<td>0.031*** (2.793)</td>
<td>0.002 (0.165)</td>
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<tr>
<td>Cash Holdings</td>
<td>-0.024** (-2.035)</td>
<td>-0.038*** (-3.209)</td>
<td>-0.030** (-2.251)</td>
<td>-0.031*** (-3.160)</td>
<td>0.012 (1.007)</td>
</tr>
<tr>
<td>Tangibility</td>
<td>-0.066*** (-3.739)</td>
<td>-0.060*** (-3.583)</td>
<td>-0.062*** (-2.731)</td>
<td>-0.004 (-0.262)</td>
<td>0.038** (2.184)</td>
</tr>
<tr>
<td>EBITDA to Assets</td>
<td>-0.093*** (-6.384)</td>
<td>-0.072*** (-5.478)</td>
<td>-0.091*** (-4.881)</td>
<td>-0.058*** (-4.617)</td>
<td>-0.030** (-2.247)</td>
</tr>
<tr>
<td>EBITDA Volatility</td>
<td>-0.011 (-0.866)</td>
<td>-0.009 (-0.791)</td>
<td>0.010 (0.582)</td>
<td>-0.012 (-1.041)</td>
<td>-0.003 (-0.244)</td>
</tr>
<tr>
<td>Sales Growth</td>
<td>0.014 (1.198)</td>
<td>0.003 (0.221)</td>
<td>-0.004 (-0.249)</td>
<td>0.011 (1.021)</td>
<td>0.035*** (3.025)</td>
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<td>Fama-French 30 Industry Effects</td>
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<td>Yes</td>
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<td>449</td>
<td>427</td>
<td>456</td>
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<td>Adjusted R-Squared</td>
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Panel B: Pre-Crisis Covenant Tightness Measure Correlations

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<th>Covenant Risk / Non-Parm</th>
<th>Covenant Risk / Normal-Industry</th>
<th>Covenant Risk / Normal-Firm</th>
<th>Covenant Strictness / Earnings</th>
<th>Covenant Strictness / Capital</th>
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</thead>
<tbody>
<tr>
<td>Covenant Risk / Non-Parm</td>
<td>1.00</td>
<td>0.91</td>
<td>0.85</td>
<td>0.73</td>
<td>-0.01</td>
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<td>1.00</td>
<td>0.72</td>
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<tr>
<td>Covenant Risk / Normal-Firm</td>
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<td>1.00</td>
<td>1.00</td>
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<td>Covenant Strictness / Earnings</td>
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<td>0.76</td>
<td>0.60</td>
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<td>-0.05</td>
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<tr>
<td>Covenant Strictness / Capital</td>
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<td>1.00</td>
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Table A-2
Alternative Measures: Predictability of Covenant Violations

This table presents proportional hazard models of covenant violations for alternative measures of covenant tightness during the crisis period [2007Q3-2009Q4]. Covenant Risk is calculated using three alternative assumptions about the distribution of earnings: 1) using a non-parametric distribution of earnings changes from the same Fama-French 30 industry group over the previous 10 years (the base assumption), 2) using a parametric normal distribution of earnings based on the mean and standard deviation of earnings changes from the same Fama-French 30 industry group over the past 10 years, 3) using a parametric normal distribution of earnings based on the mean and standard deviation of earnings changes for the same firm over the past 10 years. In addition, I produce the analysis with covenant tightness as measured using methodology proposed by Murfin (2012): 4) for earnings covenants only (thresholds used in Covenant Risk) and 5) for capital covenants only (thresholds not used in Covenant Risk).

<table>
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</thead>
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<td>Covenant Risk / Non-Parm [2007Q2]</td>
<td>2.834***</td>
<td>(2.738)</td>
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<td>Covenant Risk / Normal-Firm [2007Q2]</td>
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<td>(1.932)</td>
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<tr>
<td>Covenant Strictness / Capital [2007Q2]</td>
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<td>(0.894)</td>
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<td>Δ Rating [t-5, t-1] (-1)</td>
<td>1.411***</td>
<td>(5.237)</td>
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<tr>
<td>Δ EBITDA to Assets [t-5, t-1] (-1)</td>
<td>1.232***</td>
<td>(3.347)</td>
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<td>Δ Book Leverage [t-5, t-1]</td>
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<td>(2.925)</td>
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<td>Fama-French 30 Industry Effects</td>
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<td>Yes</td>
<td>Yes</td>
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<td>Quarter Effects</td>
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<td>3.943</td>
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<td>0.321</td>
<td>0.329</td>
<td>0.320</td>
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</table>
**Table A-3**

**Falsification Test: Covenant Tightness and Negative Pledge Covenants**

This table presents a falsification test to support validity of the exclusion restriction for the Negative Pledge instrument used in the main empirical analysis. The regressions test for a relationship between the presence of a negative pledge covenant and the tightness of covenants prior to the boom in non-bank loans. The dependent variable, Covenant Risk, is measured prior to the boom period as of 2003Q4. I test for correlations with the presence of a negative pledge on bonds issued during the following periods: 1) 2001-2003 (used in the main analysis), 2) 1998-2000 (with equivalent lag as the main analysis). Regression coefficients are reported in bold and t-statistics are reported below the coefficients in parentheses corresponding to the statistical significance levels noted next to the coefficients: *** corresponds to a 1 percent significance level, ** to a 5 percent significance level, and * to a 10 percent significance level.

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</tr>
<tr>
<td>Negative Pledge [2001-2003]</td>
<td>0.014</td>
<td>0.017</td>
<td></td>
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<tr>
<td></td>
<td>(0.386)</td>
<td>(0.512)</td>
<td></td>
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<tr>
<td>Negative Pledge [1998-2000]</td>
<td></td>
<td></td>
<td>0.038</td>
<td>0.033</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(1.026)</td>
<td>(1.097)</td>
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<tr>
<td>B Rating</td>
<td>-0.053</td>
<td></td>
<td>-0.054</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.518)</td>
<td></td>
<td>(-1.537)</td>
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<tr>
<td>CCC Rating</td>
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<td></td>
<td>-0.122</td>
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</tr>
<tr>
<td></td>
<td>(-1.654)</td>
<td></td>
<td>(-1.548)</td>
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<tr>
<td>Log of Book Assets</td>
<td>0.029</td>
<td></td>
<td>0.028</td>
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</tr>
<tr>
<td></td>
<td>(1.277)</td>
<td></td>
<td>(1.222)</td>
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</tr>
<tr>
<td>Book Leverage</td>
<td><strong>0.114</strong>*</td>
<td></td>
<td><strong>0.115</strong>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.006)</td>
<td></td>
<td>(4.254)</td>
<td></td>
</tr>
<tr>
<td>Cash Holdings</td>
<td><strong>-0.063</strong>*</td>
<td></td>
<td><strong>-0.063</strong>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-3.015)</td>
<td></td>
<td>(-2.958)</td>
<td></td>
</tr>
<tr>
<td>Tangibility</td>
<td><strong>-0.046</strong></td>
<td></td>
<td><strong>-0.046</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.072)</td>
<td></td>
<td>(-2.072)</td>
<td></td>
</tr>
<tr>
<td>EBITDA to Assets</td>
<td><strong>-0.117</strong>*</td>
<td></td>
<td><strong>-0.119</strong>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-4.873)</td>
<td></td>
<td>(-5.040)</td>
<td></td>
</tr>
<tr>
<td>EBITDA Volatility</td>
<td>0.018</td>
<td></td>
<td>0.018</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.107)</td>
<td></td>
<td>(1.133)</td>
<td></td>
</tr>
<tr>
<td>Sales Growth</td>
<td>0.033</td>
<td></td>
<td>0.033*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.641)</td>
<td></td>
<td>(1.669)</td>
<td></td>
</tr>
<tr>
<td>Fama-French 30 Industry Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>239</td>
<td>239</td>
<td>239</td>
<td>239</td>
</tr>
<tr>
<td>Adjusted R-Squared</td>
<td>-0.004</td>
<td>0.372</td>
<td>0.000</td>
<td>0.374</td>
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### Table A-4

#### Variable Definitions

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit Rating</td>
<td>Category</td>
<td>Issuer-level credit rating from Standard &amp; Poor's or Moody's. I create this field by first coding the S&amp;P long-term issuer credit rating at the end of the quarter. If there is no issuer rating from S&amp;P, I code the equivalent S&amp;P letter rating from Moody's.</td>
</tr>
<tr>
<td>Z-Score</td>
<td>Ratio</td>
<td>Altman Z Score: [3.3 \times (OIBDPQ(t, t-3) / ATQ(t))] + [1 \times (REVTQ(t, t-3) / ATQ(t))] + [1.2 \times ((ACTQ(t) - LCTQ(t)) / ATQ(t))] + [0.6 \times ((PRCCQ(t) \times CSHOQ(t))/LTQ(t))]</td>
</tr>
<tr>
<td>Book Leverage</td>
<td>Ratio</td>
<td>Total Book Debt / Book Assets: [DLTTQ(t) + DLCQ(t)] / ATQ(t)</td>
</tr>
<tr>
<td>Market Leverage</td>
<td>Ratio</td>
<td>Total Book Debt / Market Value of Assets: [DLTTQ(t) + DLCQ(t)] / [DLTTQ(t) + DLCQ(t) + (PRCCQ(t) \times CSHOQ(t))]</td>
</tr>
<tr>
<td>Debt/EBITDA</td>
<td>Ratio</td>
<td>Total Book Debt / EBITDA: [DLTTQ(t) + DLCQ(t)] / OIBDPQ(t, t-3)</td>
</tr>
<tr>
<td>Interest Coverage</td>
<td>Ratio</td>
<td>EBITDA / Interest Expense: [INTQ(t, t-3) / OIBDPQ(t, t-3)]</td>
</tr>
<tr>
<td>Debt Service Coverage</td>
<td>Ratio</td>
<td>EBITDA / Debt Service Expense: [INTQ(t, t-3) + DLCQ(t-4)] / OIBDPQ(t, t-3)</td>
</tr>
<tr>
<td>Fixed Charge Coverage</td>
<td>Ratio</td>
<td>EBITDA / Fixed Coverage Expense: [INTQ(t, t-3) + DLCQ(t-4) + XRENT(t, t-3)] / OIBDPQ(t, t-3)</td>
</tr>
<tr>
<td>Book Assets</td>
<td>Value</td>
<td>Book Assets: ATQ(t)</td>
</tr>
<tr>
<td>EBITDA</td>
<td>Value</td>
<td>Four-Quarter Rolling EBITDA: OIBDPQ(t, t-3)</td>
</tr>
<tr>
<td>Market to Book</td>
<td>Ratio</td>
<td>Market Value of Assets / Book Assets: [ATQ(t) - CEQQ(t) - TXDITCQ(t) + (PRCCQ(t) \times CSHOQ(t))] / ATQ(t)</td>
</tr>
<tr>
<td>Cash Holdings</td>
<td>Ratio</td>
<td>Cash to Book Assets: CHEQ(t) / ATQ(t)</td>
</tr>
<tr>
<td>Tangibility</td>
<td>Ratio</td>
<td>PP&amp;E to Book Assets: PPENTQ(t) / ATQ(t)</td>
</tr>
<tr>
<td>EBITDA to Assets</td>
<td>Ratio</td>
<td>Annual EBITDA to Lagged Book Assets: OIBDPQ(t, t-3) / ATQ(t-4)</td>
</tr>
<tr>
<td>EBITDA Volatility</td>
<td>Statistic</td>
<td>3-year Standard Deviation of: A0IBDPQ(t) / ATQ(t-1)</td>
</tr>
<tr>
<td>Sales Growth</td>
<td>Ratio</td>
<td>Four-Quarter Rolling Average of: [REVTQ(t) / REVTQ(t-4)] - 1</td>
</tr>
<tr>
<td>CapEx to Assets</td>
<td>Ratio</td>
<td>Annual CapEx to Lagged Book Assets: CAPXQ(t, t-3) / ATQ(t-4)</td>
</tr>
<tr>
<td>Top 10 CLO Bank</td>
<td>Yes/No</td>
<td>DealScan: A top 10 securitization-active bank from Nadauld and Weisbach (2012) was a lead arranger on any outstanding loan.</td>
</tr>
<tr>
<td>PE Sponsor Backed</td>
<td>Yes/No</td>
<td>DealScan: Any outstanding loan was backed by a private equity sponsor.</td>
</tr>
<tr>
<td>Number of Lenders</td>
<td>Value</td>
<td>DealScan: The total number of lenders in the primary syndicates of all outstanding loans.</td>
</tr>
<tr>
<td>Loans Traded</td>
<td>Yes/No</td>
<td>The firm had a syndicated loan debt trading in the secondary loan market. I code this field as &quot;Yes&quot; if the firm had loans quoted in the LSTA/LPC Mark-To-Market Pricing Service database.</td>
</tr>
</tbody>
</table>
Chapter 2 – Cashing out: The Rise of M&A in Bankruptcy

Co-authored with Stuart Gilson and Edith Hotchkiss

I. Introduction

An immediate consequence of the financial crisis was the virtual disappearance of traditional M&A activity. With massive losses in equity markets, the general flight of credit, and widespread pessimism over the real economy, financing and enthusiasm for doing deals all but dried up. From the second to the fourth quarter of 2007, the value of announced M&A deals in the U.S. fell by more than half, marking an end to a record merger wave.¹

The years following the onset of the crisis demonstrated, however, that M&A deal making was alive and well – in Chapter 11. During 2008-2010, 455 U.S. public companies filed for Chapter 11 bankruptcy, representing over $1.8 trillion of reported assets – more than the corresponding total for the prior 20 years.² In the sample we study in this paper alone, between 2008 and 2010 over $100 billion of corporate assets are sold by firms operating under bankruptcy court protection. While many of the firms sold in bankruptcy have come to epitomize the crisis – Lehman Brothers, Chrysler, General Motors, AIG – M&A activity in bankruptcy goes far beyond this short list, and is in fact part of a longer secular trend.

In this paper, we provide a new perspective on the use of M&A in bankruptcy. Specifically, we examine the following questions:

- What factors are related to the probability that firms merge or sell assets, rather than pursue a traditional stand-alone reorganization?
- Can the use of M&A in bankruptcy be explained by the same factors, such as liquidity constraints and industry shocks, which have been shown in recent research to drive M&A waves in general?

² Source: Thomson One.
Is the shift towards M&A in bankruptcy as a means of resolving distress driven instead by unique features of the U.S. bankruptcy process?

We first provide descriptive evidence on the use of M&A in bankruptcy for a sample of 350 public firms that filed for Chapter 11 between 2002 and 2011, based on an extensive analysis of bankruptcy court documents, news sources, and corporate filings. In virtually all cases, “M&A” means the sale of some or all of the debtor firm’s assets for cash. Such sales can be part of a formal plan of reorganization, but more often they are undertaken using a special section of the U.S. Bankruptcy Code – Section 363 – that can greatly facilitate these sales. Control over assets can also be transferred through a merger of companies, such as occurred recently between US Airways and bankrupt American Airlines, though such transactions are uncommon in our sample. And sometimes most or all of the debtor’s assets are liquidated, either as part of a “liquidating” plan (approved by a vote of creditors), or because the debtor fails to reorganize under Chapter 11 and is redirected to Chapter 7.

The variety of ways in which assets are restructured in bankruptcy suggests that the traditional distinction between “reorganization” and “liquidation” in the academic literature – and the presumption that asset sales/liquidations generate less value for creditors than reorganizations – has become increasingly less meaningful. This distinction is further blurred when investors buy debt in a bankrupt firm with the goal of exchanging it for a controlling equity stake under a plan of reorganization. This strategy gives the investor effective control of the assets, and economic ownership that is equivalent to having purchased the business directly in a Section 363 sale. Recognizing that reorganization and (partial) liquidation are not mutually exclusive

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3 Inefficient liquidations are a key aspect of models such as Bolton and Scharfstein (1996) and Hart and Moore (1998). Mandated auctions, as an alternative to bankruptcy reorganizations, are described by Aghion, Hart and Moore (1992). Hotchkiss and Moorian (2003) show that a voluntary (rather than mandatory) auction regime can improve the efficiency of asset redeployment outcomes.
outcomes, our analysis focuses on a somewhat different outcome – whether going concern value is preserved in the sale.\(^4\)

We first describe important characteristics of asset sales that are unique to the M&A process in bankruptcy. As we explain more fully below, Section 363 can greatly increase the attractiveness of selling assets, both by reducing buyers’ legal risks and by increasing sellers’ expected net proceeds by conducting the sale in a court-supervised competitive auction. The extent to which Section 363 facilitates sales will be affected by factors such as the number of bidders who participate in the auction, the degree of creditor involvement in the sale process, and the complexity of the firm’s liabilities.

We next propose and test empirical hypotheses regarding what economic and legal factors drive firms’ incentives to sell assets in bankruptcy. These factors fall into six categories, and are motivated by the academic literature on M&A and asset sales: economic (industry) shocks; buyer liquidity constraints; seller economic versus financial distress; costs of financial distress; senior creditor control; and the complexity of liabilities.

*Economic (industry) shocks:* When an industry experiences a significant exogenous economic shock, the incentive to reallocate assets within the industry will be greater and we expect more M&A activity (Mitchell and Mulherin (1996)). In our sample of bankrupt firms, economic shocks are predominantly negative.

*Liquidity:* Harford (2005) finds that industry shocks impact the propensity to merge mainly when potential buyers have sufficient liquidity to finance acquisitions. Liquidity constraints may be even more binding if buyers of bankrupt firms are more likely to come from the same industry and distress is clustered within industries (Shleifer and Vishny (1992, 2011)). From the perspective of the bankrupt firm, the alternative to a sale of assets is to finance a

---

\(^4\) Over the past decade, this debate has become increasingly relevant for the U.S., where it has been suggested that asset sales have come to replace traditional reorganization as the primary means of resolving financial distress (Baird and Rasmussen (2002), Eckbo and Thornburn (2009), Ayotte and Morrison (2009)). Baird and Rasmussen (2002) speculate that “corporate reorganizations have all but disappeared.”
reorganization – requiring so called ‘exit’ financing to fund the operations of the restructured firm. Thus, when exit financing is more costly relative to acquisition financing, we expect more M&A activity in bankruptcy.

**Degree of economic versus financial distress:** Although Chapter 11 is designed to help firms generate higher cash flows that can be used to invest in the business, pay vendors, and/or finance a plan of reorganization, if the degree of economic distress is sufficiently severe, a stand-alone reorganization may not be viable. This implies a greater incidence of liquidations or sales, unless severe economic distress also impacts the most likely buyers. When firms are financially but not economically distressed, a Chapter 11 reorganization may provide an attractive opportunity to reduce debt and emerge with their operating assets intact.

**Costs of financial distress:** Selling assets can arguably preserve more value for firms that face greater costs of financial distress in bankruptcy. We refer to this explanation as the ‘melting ice cube’ theory (Jacoby and Janger (2014)). Proponents of an expedited sale can argue in court that the sale is needed to avoid losses in firm value that would occur during a longer stay in Chapter 11.

**Senior creditor control:** A growing number of academics and practitioners have argued that senior secured creditors have become increasingly powerful in Chapter 11 relative to management. These creditors may have incentive to force the sale of assets to repay their claims even if this means selling at fire sale prices, at the expense of more junior claimants (Baird and Rasmussen (2002, 2010), Skeel (2003), Miller and Shai (2004), Westbrook (2004), Ayotte and Morrison (2009), Adler et al. (2012)). This shift in the balance of power is said to be the result of distressed-debt investors, particularly hedge funds, which increasingly acquire large positions

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5 Increased pressure to sell assets in Chapter 11 has also been noted by the news media (Palank (2013)) and is currently under review by the American Bankruptcy Institute’s Bankruptcy Reform Commission (http://commission.abi.org/).
in the senior debt of bankrupt firms, thus forming concentrated voting blocks.\textsuperscript{6} These investors have also become a significant source of debtor-in-possession (DIP) financing for firms in Chapter 11; the terms of the DIP financing may explicitly require the firm to sell assets within a short window, or grant the lender the right to acquire the assets by “credit bidding” its loan. Thus, when senior creditors are more powerful, we expect more assets will be sold – possibly, but not necessarily, for less than they would be worth in a stand-alone reorganization.

\textit{Complexity of liabilities:} The complexity of the firm’s liabilities can determine the preferred channel to preserve, or in some cases gain control, of the company. If liabilities are difficult or take longer to renegotiate, or the outcome of negotiations is more uncertain, an acquisition of assets becomes relatively more attractive. Characteristics that often lead to longer cases and less certain outcomes are the complexity of the firm’s capital structure, claims such as underfunded pensions, and the number of competing claims that are involved in the plan negotiations. A related concern is whether the bankruptcy judge who oversees the case is burdened by a relatively higher caseload, increasing the time needed to complete a reorganization (Iverson (2014)).

We use proxies for each of these six factors to empirically examine the determinants of Section 363 sales. In our sample of 350 Chapter 11 cases, 184 cases (53\%) involve a Section 363 sale of some kind. The proportion of cases involving sales is counter-cyclical, peaking in the downturns of the early 2000’s and in the financial crisis. Perhaps our most striking finding is that the incidence of these sales is increasing in the firm’s secured debt ratio at filing, consistent with the argument that senior lenders prefer to be cashed out via these transactions rather than maintaining their claims in a reorganization. This result is robust to alternative proxies for senior lender control, and to several approaches addressing endogeneity concerns.

\textsuperscript{6} The strategies used by hedge funds to invest in financially distressed firms are discussed by Hotchkiss and Mooradian (1997), Gilson (2010), Jiang et al. (2010), Li and Wang (2014), and Ivashina, Iverson and Smith (2014), and Feldhütter, Hotchkiss, and Karakaş.
Market and industry conditions and the liquidity of potential acquirers are also important in explaining sales activity, but in a quite different way than has been documented for non-distressed M&A. As expected, both positive and negative industry shocks are associated with a higher incidence of sales. But, in contrast to prior research, the interaction of such shocks with market borrowing rates – a proxy for the cost of financing to potential acquirers – is positive. We find that what is important in our setting is the relative cost of financing to potential acquirers versus the cost of financing to a reorganized firm, which we measure as the difference in B and BBB-rated yield spreads. This difference is an important factor in understanding the counter-cyclical nature of sales in bankruptcy. Other factors that are significantly related to a substantially lower incidence of Section 363 sales are higher book leverage, indicating firms that are more financially distressed, and firms with more specific assets that are less easily redeployed.

It is critically important in evaluating the efficiency of the case outcomes to focus not simply on the incidence of sales, but also on whether such sales preserve the going concern value of a business. In our sample of 350 bankruptcy cases, 237 firms confirm a traditional reorganization plan and emerge from bankruptcy, though they may sell some small portion of their assets prior to emergence. Notably, 75 firms (21.4% of the sample) sell substantially all their assets as going concern businesses, approximately 40% of which are sales to financial buyers (such as private equity firms). This high proportion reflects the increasing use of Section 363 to sell the entire firm.\textsuperscript{7} The remaining 38 sample firms liquidate assets with no ongoing business or convert their case to Chapter 7.

The results for the determinants of overall M&A activity overall largely remain when we distinguish going concerns from other sales of assets, but with one key exception – the relationship between the use of secured debt and sales only holds for sales of a going concern, and not for other asset liquidations. This result continues to hold when we instrument for the pre-

\textsuperscript{7} The sale is typically followed by a “liquidating plan”; thus, these cases are often treated along with other piecemeal liquidations even when the going concern business continues intact.
petition use of secured debt, and has important efficiency implications; our findings do not support claims that going concern value is destroyed in inefficient liquidations due to senior lender control. Rather, to the extent senior lenders are biased toward asset sales, and to the extent such sales in fact occur at fire sale prices, one could question the fairness of the process for more junior creditors.\textsuperscript{8}

We therefore consider a further series of tests that provide evidence related to the efficiency of the process and fairness of distributions. First, we examine whether sales occur more quickly when expected costs of financial distress are high, but do not find support based on available empirical proxies for distress costs. Second, we consider the post-bankruptcy survival of businesses that are either reorganized or sold as a going concern to a financial buyer. To do so, we use news and other sources to verify whether, after emerging from Chapter 11, the business continues to operate or has subsequently been merged with yet another buyer (our analysis therefore does not depend on the firm continuing to file financial statements with the SEC post-bankruptcy). Although the sample size post-bankruptcy becomes much smaller, we find no significant differences in the survival rates between firms post-reorganization versus post-acquisition. Third, we examine the overall creditor recovery rates, as well as recoveries to secured and unsecured creditors. Our key finding is that the overall recoveries to creditors are not significantly lower in the cases where the assets are sold as a going concern.

Our interpretation of these results is consistent with two recent papers that study asset sales in bankruptcy, though with different focuses than ours. Lemmon, Ma, and Tashjian (2009) focus on how economic versus financial distress explains asset restructuring in bankruptcy, and argue that neither liquidation nor acquisitions appear to be inefficient outcomes. Meier and Servaes (2014) show that shareholders of the acquirers of distressed firms earn higher returns

\textsuperscript{8} We do not focus on the prices at which sales occur, and in particular whether such prices represent fire sales, but rather on the asset sale process and whether observed outcomes are consistent with an efficient redeployment of assets. For evidence on the existence of fire sales, see Pulvino (1998) and others as summarized in Shleifer and Vishny (2011).
than in acquisitions of non-distressed firms, consistent with a redistribution from the target firm when assets are sold at fire-sale prices.\footnote{See also Hotchkiss and Mooradian (1998).

When a firm is in danger of failing, it faces two options: M&A and bankruptcy. While these mechanisms for redeploying assets have been extensively studied in separate academic literature, our paper recognizes that M&A has become a significant part of the Chapter 11 process. While creditor control is one explanation for this development, it is not the only significant explanation, and empirically it is not linked to inefficient outcomes; rather, a shift in the balance of power in Chapter 11 appears more an issue of the allocation of value. Our analysis of recovery rates, however, does not show that junior creditors are less well off when the firm is sold in bankruptcy.

The remainder of this paper proceeds as follows. Section 2 provides background on the process for selling assets in Chapter 11 under Section 363 of the Bankruptcy Code. Sections 3 describes our data and sample. Section 5 provides our analysis of the determinants of Section 363 sales overall and of sales of all assets as a going concern. Sections 6 and 7 provide our analysis of the time to case resolution (sale or reorganization), post-bankruptcy survival rates, and creditor recovery rates. Section 8 concludes.

II. Background and Mechanics of Section 363 Sales

When firms are operating in Chapter 11, sales of assets that are outside of the ordinary course of business are governed by Section 363 of the U.S. Bankruptcy Code. Section 363 establishes a formal process through which bankrupt firms can sell their assets on an expedited basis. Selling assets in Section 363 has a number of potential benefits for both sellers and buyers, and can even be used to sell the entire firm. The assets are generally sold “free and clear” of most liabilities, leaving behind claims not specifically assumed in the transaction (such as unfunded
Section 363 sales are not subject to a formal vote by creditors and require only the approval of the bankruptcy judge. Because the final sale is executed by a bankruptcy court order, the validity of the transaction is generally immune to later legal challenges. The prominent role that Section 363 sales played during the 2008-2009 financial crisis – in such large cases as General Motors, Chrysler, Lehman Brothers, and Delphi – certainly appears to support the claim that auctions have played an increasingly important role in restructuring U.S. companies.

Section 363 sales can range from the sale of a piece of equipment to sales of substantially all of the operating assets of the company. Typically, the debtor enters an asset purchase agreement with a proposed purchaser known as a stalking horse bidder. The court then must approve procedures for other potential purchasers to submit bids; if other bidders appear, an auction is held. Following the auction, the court holds a hearing to approve the sale to the winning bidder. The court must find that the sale has a legitimate business purpose, is proposed in “good faith,” and is justified by the firm’s current financial circumstances – i.e., absent the sale, the value of the firm and therefore creditor recoveries would be lower.

Although in principle Section 363 auctions can produce greater value for creditors, in practice the proceeds from sales in bankruptcy may be limited by a number of factors. Bankruptcy judges are permitted to consider non-price factors in choosing the winner of an auction. For example, In Polaroid’s 2009 Section 363 auction, the judge awarded the sale to the second-highest bidder which had a better track record of buying and managing bankrupt company brands (Gilson (2010), p. 40). Break-up fees awarded to stalking horse bidders may be set too high, discouraging competing bids. Bidders who follow the stalking horse in general have less

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10 Arguably, such use of these provisions of the Bankruptcy Code were not anticipated when they were created under the Bankruptcy Reform Act of 1978. The benefits and risks of Section 363 asset sales are discussed in Chapter 1 of Gilson (2010).
11 The deal protection devices are similar to those used in non-bankruptcy M&A transactions (see Hotchkiss et al, 2014). The two most common devices are break-up fees and topping fees paid to the stalking horse if its bid fails.
time to evaluate the assets. They may also receive less information if the seller favors the stalking horse, and may undervalue the assets due to a lack of information or liquidity. Finally, senior secured creditors may exert pressure to sell assets for too low a price – maximizing their recoveries, but leaving less value for junior creditors than would be available in a reorganization.

While the purchase price paid in the auction is typically cash, some investors follow what has come to be known as a “loan to own” strategy. These investors first provide senior secured loans prior to or during the bankruptcy (as debtor in possession (DIP) financing), followed by an offer to buy the assets that secure the debt. DIP credit agreements sometimes contain provisions requiring the lender’s approval of bidding procedures or of the Section 363 sale itself (we provide description of such “milestones” in DIP agreements in Table 3). The purchase is paid in whole or part by forgiving the debt, a practice known as “credit bidding.” Information about the firm that the investor obtains in its role as lender may give it an advantage over other bidders.

III. Data and Sample Description

We study a sample of large Chapter 11 bankruptcy cases filed by U.S. public firms from 2002 through 2011. To form our sample, we first identify 561 Chapter 11 filings by U.S. industrial firms contained in either LoPucki’s Bankruptcy Research Database or Moody’s Default database. 12 From this initial list, we exclude firms without Compustat data available within the two years prior to filing. In addition, we exclude 13 cases dismissed by the bankruptcy court, still pending, or where the firm has less than $10 million in debt outstanding at the time of filing. After applying these criteria, our final sample consists of 350 Chapter 11 bankruptcy cases.

For each bankruptcy, we determine whether the debtor sold any assets pursuant to Section 363 of the U.S. Bankruptcy Code, based on deal information collected from Capital IQ, Deal Pipeline, press articles, and PACER (the electronic database of court filings with the U.S.

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12 Detailed information on sales in bankruptcy is often not available electronically prior to 2002. The LoPucki data covers all bankruptcy filings from U.S. firms with assets of at least $100 million (in 1980 dollars). The Moody’s data covers bankruptcy filings and other defaults from a broad sample of public and private firms. Our sample consists of 204 filings covered in both the LoPucki data and the Moody’s data, 80 filings covered in the LoPucki data only, and 66 filings covered in the Moody’s data only.
federal appellate, district and bankruptcy courts). Specific terms and characteristics of each 363 sale collected from these sources include the value of consideration offered for the assets (primarily cash, assumed liabilities, or credit bids), a description of the assets sold, and characteristics of the bidding process. These data allow us to identify the frequency of Section 363 sales in Chapter 11, measure their economic significance, and assess the competitiveness of the bidding process.

To measure the involvement of senior creditors in the bankruptcy process, including 363 sales, we compile detailed information on the debt structure and senior credit facilities in place at filing. We supplement basic capital structure information from Compustat using data from Moody’s Ultimate Recovery Database (URD), Capital IQ, Thompson Reuters LPC DealScan, and hand-collected information from footnotes to 10-K or 10-Q filings. These data allow us to measure the proportion of debt outstanding by the type of debt instrument (e.g., term loans, drawn bank revolvers, and bonds), the priority of debt in the capital structure (senior secured, senior unsecured, and subordinated), and the firms’ pre-petition lending relationships. Terms of the DIP financing are determined using bankruptcy court documents including the DIP credit agreement, as well as a proprietary study of DIP financing by the law firm Wilmer Hale. Collectively, our data on debt structure and senior credit facilities provide a rich set of information to study the influence of secured creditors on the bankruptcy process and 363 sales.

Finally, we collect data on creditors’ financial recoveries at the end of the bankruptcy case. We utilize recovery information from Moody’s Ultimate Recovery Database (URD), which provides family- and instrument-level recovery rates for debt outstanding at the time of filing date for about two-thirds of the bankruptcies in our sample. The recovery data allow us to measure overall recoveries to creditors as well as recoveries to secured and unsecured creditors.

IV. Descriptive Statistics

Table 1 provides firm-level descriptive statistics for our sample of 350 Chapter 11 filings between 2002 and 2011. Panel A categorizes these cases based on the economic outcome – i.e.,
whether and how going concern value is preserved. In the large majority of these cases (237 + 75, or 89% of the sample), the business is preserved as a going concern. In the remaining 38 cases, the firm is eventually liquidated, often because attempts to reorganize fail and assets are sold off piecemeal.\textsuperscript{13} Table 1 also shows that the sample bankruptcy filings are relatively more frequent during 2002-2003 (144, 41% of the sample) and 2008-2009 (93, 27% of the sample), coinciding with the general economic downturns in those sub-periods. In contrast to non-distressed M&A waves, these sales appear somewhat counter-cyclical; this can be seen more clearly in Figure 1, which shows that the proportion of yearly filings with sales is highest at the 2003 and 2008 peaks.

When a going concern business is preserved, the firm either restructures through a conventional stand-alone plan of reorganization (237 cases) or sells off at least 95% of its assets in one or more Section 363 sales (75 cases). We hereafter refer to cases in the latter group as a “sale of all assets.”\textsuperscript{14} While a going concern business is preserved in both subsets of cases, these two groups differ in that a reorganization plan must be approved by majority of creditors (at least one-half in number and two-thirds in face amount of voting creditors in each impaired claimholder class must vote to approve the plan); in contrast, a Section 363 sale must be approved by the bankruptcy judge, but does not require a formal creditor vote.\textsuperscript{15}

We also observe that only four cases of a sale of all assets take place through a prepackaged bankruptcy. In contrast, of the 190 conventional (non-prepackaged) bankruptcy filings where the firm’s business is preserved as a going concern, a large proportion (71 cases) are a sale of all assets using Section 363.

\textsuperscript{13} Studies of U.S. bankruptcies typically do not distinguish between sales of a going concern business versus other liquidations, or combine acquisitions with liquidation outcomes in comparing to reorganizations. Notably, Lemmon Ma, and Tashjian (2009) describe acquisitions as lying somewhere between firms that are reorganized or liquidated. Thorburn (2000) studies mandated bankruptcy auctions in Sweden where there is no reorganization provision, and compares firms sold as a going concern to those that are liquidated piecemeal.

\textsuperscript{14} For clarity, we sometimes also refer to these 75 firms as a “sale of all assets as a going concern.” The determination that the going concern is preserved in a sale of all assets is based on our reading of court documents and other sources that the majority of assets continue to operate after the sale. See Appendix Table A-2 for examples.

\textsuperscript{15} A sale of all assets can arguably be used to circumvent the vote required for a Chapter 11 plan. As such, these sales have been characterized as ‘sub rosa’ plans (Roe and Skeel (2009)).
In a liquidation or piecemeal sale, no ongoing business emerges from the bankruptcy. Proceeds from asset sales are passed through to creditors under a liquidating plan or a conversion to Chapter 7. These cases represent failed attempts to reorganize and preserve the business.

For clarity, we provide examples of each outcome group in Appendix Table A-2, making several points useful to our subsequent analysis. We consider first cases where the going concern value is preserved, either through a reorganization or through a sale of substantially all assets. Milacron, Inc. provides an example of a sale of all assets, where distressed debt investors DDJ and Avenue Capital gain control of the business via the 363 sale. In some cases, ongoing businesses are sold to more than one buyer – for example, two separate private equity firms sponsor the purchase of separate divisions of Tokheim, which then become portfolio companies. The sale of all assets of National Steel Corporation includes an agreement with unionized workers of the company which preserves employment, emphasizing the preservation of going concern in the transaction. In each case, the cash proceeds from the sale are distributed to claimants in a subsequent “liquidating plan.”

In contrast, consider the reorganization of Tribune Company; Tribune makes use of Section 363 to sell one business division, but its remaining business is reorganized under a plan. Notably, investors purchase debt claims during the bankruptcy and convert those claims to a controlling equity stake under the plan. This illustrates that the same economic outcome – that the business is preserved and an investor gains control, can be reached either through the sale of all assets or through a traditional reorganization.

Overall, these cases make the point that asset sales are not equivalent to liquidations, and going concern value is frequently preserved via the sales. While prior research often treats the 75 cases of sales of all assets as equivalent to liquidations, we show that our key results below are sensitive to this classification.

Our case outcome classifications are based on the overall disposition of assets in the case; however, Section 363 sale transactions can still occur within any of these groups. Therefore, the
last three rows in Panel A show the extent to which 363 sales occur within each case outcome category. For example, among the 237 reorganizations, there are 52 cases in which the firm sells a business division and 25 cases in which the firm sells some other asset (such as a piece of equipment), yet the firm reorganizes around the remaining assets. When no going concern is preserved, the assets are predominantly sold using Section 363 sales, with only 6 firms moving straight to a liquidating plan or conversion to Chapter 7. Put differently, 166 of the 350 sample cases make no use of Section 363 to any degree, showing that over half of our sample firms make some use of these provisions of the Bankruptcy Code. The incidence of all types of Section 363 sales by year is shown in Figure 1b.

We provide further detail for the characteristics of sample firms in Panel B of Table 1. Firms classified as sale of all assets are typically somewhat smaller (median book value of assets of $569 million) than firms reorganized as going concerns ($783 million). In comparison to firms that reorganize, these firms also have a higher ratio of secured to total debt at filing (median of 66.2% vs. 48.7%), are less profitable in the year prior to filing (median ratio of EBITDA to assets of 6.3% vs. 8.5%), are less leveraged (median book leverage (ratio of debt-to-assets) of 40.5% vs. 57.8%), and have a higher ratio of non-cash current assets-to-total assets (median of 34.3% vs. 21.3%). The ratio of plant, property, and equipment-to-assets is slightly lower for firms that do not reorganize. This measure has been suggested as a proxy for asset specificity, meaning assets are not easily redeployed in another industry. Williamson (1988) and others suggest that the discount on a sale of assets will be greater when the assets are more specific to a particular firm or industry.16

Section 363 sales arguably lead to a quicker disposition of the firm’s assets, avoiding lengthier and more costly bankruptcy proceedings. In approving such sales, the court considers whether the sale is needed to preserve the value of the assets, sometimes referred to as the

16 Stromberg (2000) finds that auctions of bankrupt firms in Sweden are more likely to lead to a sale rather than a liquidation when the firm has fewer specific assets; Acharya, Bharath and Srinivasan (2007) find that creditor recoveries following default are lower in distressed industries with more specific assets.
“melting ice cube” argument. At the same time, expedited sales are a source of criticism, and have been pointed out as a sign of inefficient liquidations due to pressure from lenders. Focusing on non-prepackaged cases, Table 1-b shows that reorganization cases reach a plan confirmation on average in 1.25 years (median 1.10 years); for cases with a sale of all assets, the time to a 363 sale of the firm as a whole or of a major division is 0.57 years (median 0.35 years). Thus, the resolution of the case is typically much faster when all assets are sold under Section 363.

It is also informative to consider characteristics of the sale transactions themselves, in particular to demonstrate the extent of lender involvement and the competitiveness of bidding in the sales. Table 2 reports descriptive statistics for 270 individual sale transactions that occur within the 350 Chapter 11 cases, recognizing that a single firm can undertake multiple transactions. These statistics are based on all deals where such detail is publicly available from news articles, press releases, and bankruptcy court documents including the approval of bidding procedures and the court order approving a sale; we also separately report these statistics for the cases where a going concern is preserved (i.e. excluding liquidations and piecemeal sales).

For the 75 cases of sale of all assets, sales of substantially all of the firm’s assets are accomplished through 138 sale transactions. Of these, 60.6% are sales to “strategic” buyers (i.e., operating companies that can potentially realize synergies from acquiring the assets), while 39.4% are sales to “financial” buyers (e.g., hedge funds and private equity funds). Distinguishing between these two types of buyers is important if they have differential access to financing or if one is able to realize greater gains from acquiring assets from a bankrupt firm. DIP lenders appear as frequent bidders for the assets in these cases; the DIP provider bids in 16.1% of the 138 sale transactions and is the winning bidder in 13.9% of the sales. The incidence of DIP lender bidding is much lower when the sales are part of a reorganization case (6.3% of the 96 sales within reorganization cases). Bidding by the DIP lender has been labeled a “loan-to-own” strategy, and is recognized as an alternative to gaining ownership by converting loans to equity through a
These strategies have also been characterized as evidence of excessive lender control. Interestingly, when lenders use these mechanisms to bid for assets, they are not always the winning bidder. The frequency of bidding by pre-petition lenders that do not provide DIP financing is only slightly lower.

Two key criticisms of auction based mechanisms for resolving bankruptcy are that related-industry buyers will be distressed at the same time (Shleifer and Vishny (1992)), and that the advantages of a stalking horse bidder deter other bidders (LoPucki and Doherty (2007)). We therefore provide description of the bidding process and competition, based on a smaller number of sale transactions (shown in brackets for each variable) where the presence or absence of bidders and their characteristics can be confirmed.

We do observe some cases where there is no stalking horse bidder, noting again that the percentage is based on cases where we can positively verify their presence or absence. Cases of sale of all assets have a somewhat higher incidence of stalking horse bidders (84.3%) compared to sales within reorganization cases (67.2%). To the extent a stalking horse bidder has a strong competitive advantage, they may deter subsequent bidding. A stalking horse bidder wins the auction 59.4% of the time. Still, we observe competing bidders in over half of the transactions (52%). When the assets attract competing bids, the stalking horse bidder wins the auction just 58.8% of the time and often pays a significant premium to their initial bid. Based on the 114 transactions with information on all bidders, the final price increases over the initial bid in 56.1%.

Determinants of loan to own strategies are examined in Li and Wang (2014).

Notably, for the case of Delphi in our sample, the initial bidder is not the DIP lender; the DIP lender would not have been repaid in full based on the initial bid, and subsequently formed its own group to bid higher for the assets.

The number of deals for which we can obtain information on bidding falls substantially in sales of smaller business divisions (based on book value of assets); there are seldom cases of multiple bidders for smaller asset sales. When there is no mention of a stalking horse bidder in court documents or other sources, it is likely that there is only a purchase agreement with an initially proposed buyer.

In contrast, Boone and Mulherin (2007) report for a sample of 400 takeovers an average of 1.13 public bidders. Only 51 of the 400 have more than one public bidder.
of sales and increases by over 25 percent of the initial bid in 22.8% of sales. The incidence of credit bidding can be verified for a much greater number of transactions. Despite the attention to this mechanism in some high profile bankruptcy cases, the overall incidence for the large bankruptcy cases we examine is somewhat low (6.7% of the 270 sales); still, for sales of all assets, the incidence is more significant (12.8% of the 138 sales).

Finally, Panel B reports the deal value and the form of payment (consideration). In all but one sale where the bidder pays in stock, the consideration paid consists of cash or assumed liabilities. Most often, the payment is 100% cash – as such, proceeds from a sale of some portion of the firm’s assets can substitute for external financing when the remaining assets are retained in a reorganization. Assumed liabilities are an important component of the total consideration paid in the cases of sales of all assets. Credit bids, where the bidder exchanges the debt claims it holds (plus in some cases additional cash), are included in assumed liabilities. If assumed liabilities are preserved via the sale while more senior claimants of the firm ultimately are not repaid in full, the result can be a deviation from the absolute priority rule that guides a reorganization plan (but not necessarily a sale).

The third important component serving as a basis for the variables in our subsequent tests is the description of the firms’ debt structure. We consider the firm’s financing in the period leading up to filing, and any changes to the financial structure that result from the DIP financing obtained once the firm enters bankruptcy (variables and data sources are further defined in Appendix Table A-1). Closest to the date of filing, the median ratio of secured to total debt is 53%, though there is significant variation within the sample. The median change in the two years

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21 If one conservatively assumes that all 115 transactions with no mention of competing bidders indeed have no competing bidder, this implies that 29% of all sales in our sample have more than one bidder. If one assumes that the 156 transactions with no information on changes in the bid price have no increase in the bid price, this implies that 18.5% of transactions have some increase.

22 Hotchkiss and Mooradian (2003) and Eckbo and Thorburn (2009) show that the bidding of an existing creditor in the auction can lead to overbidding for the assets, which would benefit recoveries of other claimants.

23 This is the crux of the Chrysler sale controversy; see Blaylock, Edwards, Stanfield (2014).
before filing is modest, increasing by 4%. Secured debt typically consists of a revolver accompanied by a similarly sized term loan; the median increase in the revolver debt ratio shows that much of the increase prior to filing is due to a draw down on a revolver.

Panel B of Table 3 shows that 67.7% of the sample firms have access to public bond markets pre-filing, defined as firms that have an issuer-level credit rating from S&P or Moody's in the second year prior to filing (Faulkender and Peterson (2006)). The incidence of public debt is significantly lower for firms with a higher (>50%) proportion of secured debt. We use this indicator in Section 5.3 when we instrument for secured debt. DIP financing is obtained by 70.9% of the overall sample, and by a somewhat greater proportion (78.8%) of firms with higher pre-petition secured debt. This level is comparable that reported by Li and Wang (2014) and significantly higher than the 31% reported by Dahiya et al (2003) for the period 1988 to 1997.

The remainder of Table 3 provides further details (using cases where sufficient data are available) for the secured debt in place before filing, and for the 248 cases where additional secured debt – DIP financing – is obtained during the bankruptcy. Specifically, we seek to provide measures that indicate potentially greater control by secured lenders. More than one quarter of the cases have non-bank lenders; these claims are often purchased by hedge funds and other distressed debt investors that are typically active in determining the outcome of the case (Ivashina, Iverson, and Smith (2014)). For a subset of cases, we can also characterize whether the secured debt is over-collateralized, based on the ex-post recovery to these claims at the conclusion of the bankruptcy. This distinction is important because the influence of senior lenders depends on their security level (Ayotte and Morrison (2009); Jenkins and Smith (2014); Feldhutter, Hotchkiss and Karakas (2014)). When the debt is oversecured, the claimant will be paid off in full in a restructuring and typically has little voice in negotiations. At the other extreme, when the debt is undersecured and/or more junior, the holder benefits more from outcomes that maximize the total value available to creditors, reducing concerns of a bias toward inefficient liquidations. Within the identifiable cases, secured debt is over-collateralized 47.3% of
the time, and there is substantial variation within our sample in the extent to which these claims are over-secured. We also observe that secured debt frequently has a lien on all assets of the firm, which is typical of firms borrowing in the leveraged loan market (Osborn (2014)).

Prior research associates DIP financing with positive case outcomes (Dahiya et al (2003)). However, to the extent that DIP financing conveys further control to lenders once the firm is in bankruptcy, it might exacerbate a liquidation bias. Similar to pre-petition debt, DIP lenders are often non-banks. As available from court documents (including the DIP credit agreement), we determine that DIP loan proceeds are frequently used to refinance pre-petition loans (“pre-petition rollup”), improving the priority of the pre-petition secured lenders. The DIP financing also sometimes includes “milestones” related to the sale of assets, either that the sale must be achieved by a particular date, or that the DIP lender must approve the procedures for the sale. Inclusion of these provisions likely reflects that a sale of assets is anticipated at the time of filing (as such we do not use the presence of milestones as a potential explanatory variable below). Lastly, the DIP financing sometimes “primes” the prepetition lenders, meaning that it takes a lien on collateral already pledged to those lenders; this figure may be artificially high, however, since a “new” lending syndicate providing the DIP financing can differ only slightly from pre-petition lenders (but is then technically a new lender).

In summary, asset sales under Section 363 often preserve going concern value, and we use our classifications based on the occurrence of these sales for our subsequent tests. The data also provides us with proxies that reflect the influence of senior lenders on these sales. We focus in particular on characteristics of the secured debt, given the rise of secured lending that began in the early 2000s and the unique characteristics of the DIP financing. In the subsequent sections, we examine the relationship between these and other firm and industry factors and the observed case outcomes.
V. Determinants of Section 363 Sales in Bankruptcy

In this section, we examine two key sets of regressions. The first set examines the determinants of Section 363 sale activity, regardless of the overall case outcome. The second considers whether going concern value is preserved in the bankruptcy case, through either a sale of substantially all assets or a reorganization.

A. Incidence and Magnitude of Section 363 Sales

Table 4 presents regressions for the use of Section 363 sales in bankruptcy, using explanatory variables that measure the influence of secured creditors, financing liquidity, industry structure and financial condition, and other firm and case characteristics. We first model the incidence of asset sales during the case using probit regressions, where the dependent variable equals one when proceeds from asset sales during the case exceed five percent of book assets. We next model the same specifications using tobit regressions, where the dependent variable measures the value of the proceeds from asset sales to book assets in the case. Positive (negative) coefficients indicate that the variable increases (decreases) the probability of a sale (in the logit model) or the magnitude of sales (in the tobit model). For each model, we estimate four incremental specifications.

In the first specification of Table 4, we focus on the influence of secured creditors. We find the striking result that higher secured debt ratios are associated with significantly greater use of 363 sales: a one standard deviation increase in the secured debt ratio is associated with a 7.1% greater likelihood of a sale. The tobit model confirms that this result is not only driven by economically smaller sales: a one standard deviation increase in the secured debt ratio is associated with a 6.1% increase in sale proceeds to book assets. In Section 5.3 below, we demonstrate that this relationship between secured debt and the use of sales is also robust to

24 Correlations of key variables used in our analysis are provided in Appendix Table A-3.
endogeneity concerns and other measures of control by senior lenders. At this stage in the analysis, however, we simply document a strong and robust positive correlation between the level of secured debt at filing and the use of 363 sales during the bankruptcy case.

Next, we add additional explanatory variables that relate closely to those used to predict M&A activity in the literature (e.g., Shleifer and Vishny (1992) and Harford (2005)). In contrast to the M&A literature for non-distressed firms, however, our specifications have two important differences. First, in contrast to studies that examine the effect of aggregate liquidity on M&A, we argue that the relevant liquidity measure in bankruptcy is the cost of financing for potential acquirers relative to the bankrupt firm’s cost of financing, since a bankrupt firm can fund creditor recoveries either by selling assets or by raising outside exit financing under a stand-alone plan of reorganization. If the firm’s relative cost of obtaining outside financing increases, the alternative of selling assets will be more attractive. Prior literature documents that firms emerging from Chapter 11 are typically more highly levered than industry peers and have lower credit ratings (Gilson (1997)), and are therefore likely to borrow at rates closer to those of B-rated firms. Second, as opposed to positive industry shocks that are likely to influence non-distressed M&A, negative industry shocks are more likely to have an important influence in our sample of distressed firms. Negative industry shocks may portend a decline in an industry’s growth prospects, making it more difficult for bankrupt firms to reorganize and creating opportunities for consolidation within an industry. Therefore, relative to the non-distressed M&A literature, we focus on financing liquidity of bankrupt targets relative to potential acquirers and examine positive and negative industry shocks separately as drivers of M&A activity in bankruptcy.

Appendix Table A-7 shows a similar result using an indicator for DIP loans that are “roll-ups” with prepetition secured debt. Results for the secured debt ratio are also robust to the inclusion of an indicator for milestones in the DIP financing (suggesting it is likely that a sale is anticipated at the time of the DIP credit agreement) and for non-bank (hedge fund) DIP lenders.

Kahl (2002) provides theoretical justification for why firms emerge from bankruptcy with higher leverage ratios than their peers.
In the second specification of Table 4, we add variables for the cost of financing a stand-alone reorganization relative to a potential acquirer’s cost of capital ($B – BBB\ Spread$) and indicators for positive and negative industry shocks. We define positive (negative) shocks as when the firm’s industry median sales growth or cumulative stock return for the year prior to filing are in the highest (lowest) sample quartile and neither variable is in the lowest (highest) sample quartile. These regressions show that sales are 8.1% larger relative to book assets with a one standard deviation increase in $B – BBB\ Spread$; the likelihood of a sale also increases by 0.03, but this effect is not statistically significant with a Z-statistic of 1.3. With respect to both positive and negative industry shocks, sales are marginally less likely and smaller, but the coefficients are not statistically significant. In sum, we find evidence of a positive direct effect between sales and higher credit spreads for bankrupt targets vs. potential acquirers, but no significant relationship for industry shocks.

Harford (2005) suggests that it is important to consider the interaction effect between financing liquidity and industry shocks on M&A for non-distressed firms. Extending this intuition to firms in bankruptcy, in the third specification of Table 4, we allow for an interaction effect between our measures of financing liquidity and industry shocks. We find that when financing for a target firm is relatively expensive compared to the cost of a potential acquirer’s cost of capital (i.e., a higher $B - BBB\ Spread$), and when there are either positive or negative industry shocks, sales are significantly more likely. In the probit model, the interaction effect is highly statistical significant with Z-statistics greater than three. Although the interaction effect in the tobit model is not significant, the direction of the effect is also positive. These results show that, consistent with prior literature, both financial conditions and liquidity are important in explaining M&A activity – but in bankruptcy, the direction of these effects differs importantly.

Appendix Table A-5 provides further description of the industry shock variable. As expected, there is a clustering of filings in industries with negative shocks in 2002, 2008, and 2009, but bankruptcy filings also occur frequently in years of positive industry shocks. Our results throughout our analysis are robust to alternative specifications of this variable, such as a principal component of a larger number of industry performance measures, as in Harford (2005).
As a benchmark for comparison, we report in Appendix Table A-4 specifications that more closely follow Harford (2005), in that we include the *C&I Spread* as the measure of financing liquidity along with industry shocks and interacted variables. Interestingly, the probability of asset sales is again increasing when the *C&I Spread* is interacted with both positive or negative shocks. This positive coefficient contrasts with the significant negative effect documented by Harford (2005), meaning that when financing costs are higher, sales are more likely regardless of the sign of the shock. This finding is related to our description that Section 363 sales are counter-cyclical, in contrast to the pro-cyclical behavior of broader merger waves. However, the key factor in our setting is not simply the cost to an acquirer of funding an acquisition, but also the bankrupt firm’s alternative of financing the reorganized firm. The results in Appendix Table A-4 are largely similar to those in Table 4.

In the fourth specification of Table 4, we add explanatory variables for industry structure, including industry dependence on external finance and industry concentration. We measure industry dependence on external finance following Rajan and Zingales (1997) and measure industry concentration using a Herfindahl-Hirschman Index based on industry sales in Compustat. With respect to industry financial dependence, we find that the combination of high industry financial dependence and a higher *B - BBB Spread* leads to a significantly higher likelihood of a sale and greater size of sales in bankruptcy. In other words, the relative cost of financing a stand-alone reorganization versus an acquirer’s cost of capital is an especially important determinant of M&A in bankruptcy when the industry of the target is also more dependent on external sources of capital. With respect to industry concentration, we find that bankruptcies in highly concentrated industries experiencing negative industry shocks are less likely to have sales. In highly concentrated industries, there are fewer natural acquirers for the bankrupt firm’s assets, and when combined with poor growth prospects during a negative industry shock, firms in these industries are also less likely to acquire a bankrupt target. These results show that high financial
dependence and high concentration of the bankrupt firm’s industry amplify the effects of financial liquidity and industry shocks on sales in bankruptcy.

Finally, all specifications in the regressions in Table 4 include proxies for the complexity of liabilities, economic vs. financial distress, and liquidity of assets. With respect to complexity of liabilities, we find evidence that the presence of a defined benefit pension is associated with 8% to 9% larger sales to book assets in bankruptcy, but the effect on the likelihood of a sale is not different from zero. This result suggests that complexity added by a pension plan is only relevant to relatively larger sales. We also test whether court busyness is related to sales using a measure based on Iverson (2014) using the number and type of cases filed in the same district and year. However, we find that court busyness has an economically small effect on sales and is not statistically different from zero. This analysis also helps to rule out that our financing liquidity and industry shock measures are simply a proxy for times when overall filing rates are high.

With respect to financial vs. economic distress, a key finding is that firms that are more financially distressed, as measured by higher book leverage, are significantly less likely to undertake any asset sales. This finding is consistent with Lemmon, Ma, and Tashjian (2009) who find that firms that are financially but not economically distressed largely restructure their liabilities but not their assets in Chapter 11. Although sales are less likely when firms are financially distressed, our analysis indicates that the likelihood of sales is unrelated to the severity of firms’ economic distress; the coefficient on EBITDA/Assets (measured in the year prior to filing for bankruptcy) is insignificant in all specifications. Loadings on alternative measures of pre-bankruptcy operating profitability are also insignificant. Thus, when firms have “good assets and a bad balance sheet,” the reduction in liabilities that occurs in a reorganization can be sufficient to resolve financial distress. Another possible interpretation of this effect is that when book leverage is higher, creditors face larger potential write-downs of their claims, making them less willing to compromise, and exacerbating inter-creditor conflicts. In such circumstances, asset
sales may be less conducive to reaching a settlement than a conventional reorganization, which allows a plan to be “crammed down” on dissenting creditors.28

Finally, we examine how the liquidity of the firm’s assets is related to sales in bankruptcy. Cash and other liquid assets available to the firm can be used to fund a reorganization, but we find no significant effect in Table 4. To the extent PP&E reflects less liquid assets, or higher asset specificity (Acharya, Bharath, and Srinivasan (2007)), sales are significantly less likely. Interestingly, within our sample, PP&E/Total Assets has a very low correlation (-0.013) with the secured debt ratio (Appendix Table A-3). We also control for firm size using log of book assets in all regressions, which not surprisingly is associated with a higher incidence (but not magnitude) of sales.

B. Going Concern Sales versus Liquidations

While the statistical relationship between the secured debt ratio and the occurrence of Section 363 sales is clear in Table 4, the regressions in Table 5 provide a somewhat different economic interpretation. These regressions use a multinomial logit model that enables us to separately consider effects related to sales of all assets, where the business is preserved as a going concern, from cases where there is no ongoing business (which we have termed a liquidation or piecemeal sale). Specifically, the dependent variable takes one of three outcomes: 1) all of the firm's assets are sold in 363 sales, where substantially all of the assets are preserved as a going concern (from Table 1, 75 cases of Sale of All Assets as a going concern), 2) the firm's assets are liquidated or sold piecemeal in Section 363 sales (38 cases of Liquidation or Piecemeal Sale), or 3) the firm completes a reorganization plan (237 cases, the base outcome). In other words, the key difference is that although all types of Chapter 11 cases can involve Section 363 sales, in contrast

28Creditor resistance may be less of a barrier to the piecemeal sale of a single asset or smaller package of assets, because the sale can be approved by the bankruptcy judge without requiring a vote of the affected creditors. When the firm proposes to sell all or substantially all of its assets, bypassing a formal vote of creditors may be more difficult because the transaction could be challenged as a sub rosa reorganization plan.
to Table 4 which seeks to explain whether any such sales occur, the regressions in Table 5 distinguish whether a going concern is preserved in these sales.

Regardless of the specification, the clear result from Table 5 is that the secured debt ratio is positively associated with cases where all assets are sold as a going concern (versus reorganized), but the coefficient is insignificant for liquidation and piecemeal sales (versus reorganizations). For example, from the first specification, a one standard deviation increase in the secured debt ratio implies that the firm is 1.428 times more likely to sell all assets as a going concern rather than reorganize. At the same time, the regression shows no significant relationship between the secured debt ratio and the choice to liquidate versus reorganize.

Appendix Table A-6 alternatively uses probit regressions to make this point – when we categorize the 75 cases of a sale of all assets (as a going concern) along with liquidation outcomes (38 cases), the coefficient for the secured debt ratio is positive and significant. When we consider only the 38 true liquidations versus the 237 cases of reorganization, the coefficient changes sign and is no longer significant. Though the power of tests comparing liquidations/piecemeal sales to reorganization is lower than that for sales as a going concern, the economic magnitude of any effect based on the reported coefficients is also small. Thus, our interpretation is that while secured debt is associated with a higher incidence of sales of all assets, it is not linked to a loss of going concern value – i.e. excessive liquidation.29

Comparing other coefficients for the sale of all assets (vs. reorganizations) and the liquidations (vs. reorganizations), the relative financing costs (B-BBB Spread) are less relevant for liquidations/piecemeal sales; still, the interaction with positive industry shocks remains positive. Higher book leverage is associated with less sales, but even more strongly for the liquidations. Firm size (log of book assets) is a strong determinant of liquidations/piecemeal sales.

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29 Our evidence is also related to that of Eckbo and Thorburn (2008) who examine bankruptcy auctions in Sweden, finding that only assets sold piecemeal (implying no going concern value) are sold at a discount.
C. Robustness and Endogeneity of Secured Debt Ratio and Case Outcomes

An obvious endogeneity issue arises in the interpretation of the coefficient for the secured debt ratio. The primary concern is that the degree of economic distress drives both the amount of secured debt incurred prior to bankruptcy (if weaker firms are not able to borrow on an unsecured basis) and the outcome of sales. We address this concern in several ways: (1) In unreported results, we show that the amount of secured debt at filing, as well as the increase in secured debt prior to filing, are not statistically related to the firm’s performance in the two years leading to filing. (2) The relationship is strong when we use multinomial logit regressions in Table 5, directly comparing cases of a sale of all assets as a going concern to reorganizations – in both outcomes, an arguably viable business is preserved. Similarly, we report further regressions (explained below) which exclude liquidations, such that we only compare cases where the assets reach the same economic outcome.\(^{30}\) (3) We use an IV approach in to further demonstrate the robustness of this result.

Table 6 reports regressions using approaches (2) and (3) above. For approach (2), we also exploit the level of overcollateralization of the secured debt. Several prior papers (as noted in Section 1) exploit a non-monotonic relationship between the level of security supporting the debt and the potential influence of those creditors. When secured creditors are overcollateralized, they will almost certainly be paid in full in the bankruptcy, and so are expected to have less voice in a negotiated outcome.\(^{31}\) We report simple probit regressions for the incidence of a significant Section 363 sale within the bankruptcy case as defined in Table 4 (Regressions 1 and 2), and for the incidence of sales of all assets as a going concern as in Table 5 (Regressions 4 and 5). For the latter regressions, we exclude liquidations/piecemeal sales from the sample. Firms with a high secured debt ratio are indicated with the variable \(\geq 50\% \text{ Secured}\), meaning more than 50% of their

\(^{30}\) Note that this approach is useful to the extent endogeneity concerns extend to other explanatory variables beyond the secured debt levels.

\(^{31}\) These are also cases where it is possible to “prime” the pre-petition secured lender, meaning that a DIP lender can gain a lien on assets already pledged to those lenders because they are “adequately protected” by the collateral pledged to them.
pre-petition debt outstanding is secured. Notably, the coefficient for the interaction of $\geq 50\%$ secured and overcollateralized is negative and significant, and Section 363 sales of any kind, including sales of all assets, are less likely. This non-monotonic relationship would not be predicted if greater economic distress led to both a higher level of secured debt and more asset sales.

Table 6 also shows the result of the IV approach, using two instruments for the secured debt ratio that are suggested by prior research. The first instrument measures the ratio of aggregate debt issued by leveraged U.S. firms in (secured) loans relative to (unsecured) bonds in the three-years before filing. Notably, increased use of securitization in the years leading up to the financial crisis fueled a dramatic rise in secured loans to leveraged firms, growing to three times the size of the high yield bond market in 2007 (Osborn (2014)). This measure serves as a proxy for the relative supply of secured versus unsecured debt financing before filing. The second instrument, motivated by Faulkender and Petersen (2006), measures whether the pre-bankruptcy firm has public bond market access; as in their study, we use an indicator based on whether the firm has an issuer-level credit rating from S&P or Moody's in the second year prior to filing. Regression 3a shows that both significantly explain the incidence of asset sales with the expected signs; Regression 6a shows that the first variable has a similar coefficient in explaining the case outcomes. The second stage regressions (3b, 6b) show the instrumented variable remains strongly significant.

Overall, the relationship between the level of secured debt and sales of going concern businesses appears quite robust, and it seems unlikely that economic distress can explain both. The richness of our dataset permits us to consider other measures of potential control of senior lenders, which we report in Appendix Table A-7. We replicate our basic regression specifications from Tables IV and V including additional proxies for senior creditor control, and find that that the coefficient for the variable indicating firms with higher levels of secured debt remains positive and significant. Specifically, as we describe in Section II, the roll-up of the DIP financing
into pre-petition debt has been suggested to reflect creditors’ influence, and a dummy variable indicating these cases is significantly positively related to the incidence of sales. Interestingly, a variable indicating non-bank lenders, typically hedge funds, have provided DIP financing is negatively related to the sale outcomes. In sum, our results are consistent with the influence of senior creditors on asset sales, but do not support concerns of inefficient liquidations of assets.

VI. Expedited Asset Sales: The Melting Ice Cube Hypothesis

The sale of a business will preserve more value relative to a reorganization if it can be completed in less time, thereby reducing financial distress costs. The economic benefit of selling assets should be especially large for firms that have high distress costs and complex liabilities that cannot be restructured quickly. Practitioners cite greater the speed of redeployment of the assets as one of the advantages of the Section 363 sale process. Critics have objected, however, that a sale does not provide the opportunity for creditors to verify the value of a reorganization alternative, i.e. to perform a valuation of a potentially reorganized firm. Still, Section 363 requires the court to approve bidding procedures for a sale, and creditors can object to the sale. Empirically, our key interest is whether proxies for greater senior creditor control, higher expected costs of financial distress, and complexity of liabilities are associated with a faster time to asset sales.

Table 7 reports Cox proportional hazard models that relate the relative speed of a 363 sale in bankruptcy to various firm and industry characteristics. The survival time to a sale in the model is based on the time to the first sale of a business division or all assets through a 363 sale. In cases where a sale event does not occur before confirmation of a plan (i.e., censored observations in the model), the survival time is equal to the number of days from filing until confirmation of a plan. Coefficients from the models are reported as hazard ratios, where

\[ \text{Hazard Ratio} = \exp(\beta) \]

coefficients greater than one indicate an increasing rate of sales and coefficients between zero and one indicate a decreasing rate of sales. We include controls for prepackaged bankruptcies in Regressions 1 through 3, and exclude prepacks from the sample in Regressions 4 through 6.

The secured debt ratio has a strongly positive and significant coefficient in Regressions 1 through 3. For example, from Regression 3, when the secured debt ratio increases by one standard deviation, the rate of asset sales increases by 23.9%. These results indicate that asset sales take place sooner after firms file for bankruptcy when senior secured lenders have more control. When we exclude prepacks (rather than controlling for them), the coefficient for the secured debt ratio is similar in magnitude but not significant once market borrowing costs are considered (models 5 and 6). Other measures of senior creditor influence (not reported), such as whether the debtor receives DIP financing and whether the DIP financing is a rollup with pre-petition debt, are positive but of much smaller magnitude and significance. Overall, the evidence weakly supports the idea that greater senior secured creditor control leads to expedited sales.

Interpreting the industry market to book ratio as a proxy for financial distress costs, the regressions do not support the prediction that asset sales occur sooner after filing when these costs are higher; the coefficients on Industry Market to Book are positive but insignificant in all six regressions. We also use the bankruptcy filing announcement return as an alternative proxy for expected bankruptcy costs, which should be correlated with the measure used by Davydenko, Strebulaev, and Zhao (2012); we find similarly insignificant results using this measure.

One reason the proxies for distress costs may not have an effect is that the decision to sell assets may be dominated by whether the firm has assets which are relatively liquid and easier to value, and hence more easily converted into cash. Firms with less firm-specific assets such as patents or working capital are arguably more liquid and less difficult to evaluate than firms with mostly firm-specific assets such as PP&E that appear on the firm’s balance sheet. Consistent with this explanation, firms with greater PP&E/Assets sell assets less quickly (hazard ratio significant
and less than 1.0). Further, the significant positive coefficients for \( \text{Cash Holdings/Assets} \) and \( \text{Non-cash Current Assets/Assets} \) suggest that firms with more cash and working capital more often engage in quick sales.

**VII. Recovery Rates and Post-bankruptcy Survival**

Creditor recoveries provide an indication of how much value has been lost, relative to the time the firm borrowed from lenders or bondholders. Table 8 reports regressions following the specifications of Acharya et al. (2007) and others, who argue that industry conditions are an important determinant of recoveries. We also include our proxies for senior debtholders’ control, and indicators for whether the case was resolved using Section 363 sales. We use the ultimate recoveries, based on the value of distributions at the end of the Chapter 11 case, as available from Moody’s Ultimate Recovery Database.

Of key interest, the coefficient for the secured debt ratio is positive and significant for the overall recovery; the sign is opposite to that which would be expected if greater control by secured debtholders leads to more destruction of value. An alternative explanation is that senior lenders force the firm to file sooner, and therefore value has not declined as far at the time of filing (Jensen). The result is not sensitive to the exclusion of liquidations from the sample, and is also robust to other measures of senior creditors’ control.

To the extent that a greater proportion of the pre-petition debt is secured, the secured debt also bears the losses of more junior creditors and the recovery will mechanically be lower – thus the coefficient for secured debt in regressions (4) through (6) is negative and significant as expected. More relevant is the coefficient for the regressions explaining the unsecured recovery (7 through 9); here, there is no significant relationship between the secured debt ratio and the unsecured recovery. The junior debt is frequently held by specialized distressed debt investors

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33 The regressions do not support the alternative that if higher PP&E/Assets proxies for firm or industry specificity (such that the assets are harder to redeploy), discounts on sales would be greater and so sales would be more difficult. We further consider this effect in regressions explaining recovery rates in Section 7.
such as hedge funds (Hotchkiss & Mooradian (1997) and Jiang, Li, and Wang (2012). Overall, the analysis of recovery rates does not suggest that recoveries either as a whole or to unsecured creditors are lower in cases where senior debtholders potentially have greater control.

Table 8 also shows that recoveries to secured creditors are lower when the firm’s industry is more concentrated and more dependent on external financing. Negative industry shocks appear relatively important in explaining unsecured recoveries. We do not find the effect of asset specificity (PP&E/Assets) documented by Acharya, Bharath, and Srinivasan (2007) for our sample. We view the additional variables in these regressions largely as controls suggested by prior literature, and overall the results demonstrate the robustness of the relationship between the secured debt ratio and recovery rates. Thus, while our evidence in the prior section does not support the hypothesis that senior lender control leads to inefficient liquidations (in the sense of destruction of going concern value), the analysis of recovery rates does not suggest that fire-sale prices in Section 363 sales lead to lower overall creditor recoveries.

In Table 9 we provide further evidence suggestive of the efficiency implications of Section 363 sales by examining post-reorganization and post-sale of assets survival rates. A firm, or an operating division of a firm, is deemed to ‘survive’ if it remains an independent legal/operating entity without subsequently being acquired or filing for bankruptcy. We first report the post-bankruptcy outcomes for 228 firms that are reorganized and emerge from Chapter 11 as independent operating companies. Prior studies of post-bankruptcy performance typically include only firms that are reorganized and continue to file financial statements with the SEC (Hotchkiss, 1995). Many reorganized companies remain privately held, sometimes by distressed debt funds, and firms sold to financial buyers typically remain private. Therefore, we use news searches and firm web sites to determine whether the firm still operates independently, is subsequently acquired, or ceases operations as of one, two, and three years after emergence. Two years after emergence from bankruptcy as an independent company under a plan of reorganization, 84.2% of firms are still independent entities, while 9.5% have been acquired and
6.3% have refilled for bankruptcy; three years after reorganization, the corresponding percentages are 74.7%, 14.1%, and 11.3%.

We also determine the survival rates for 75 cases where the bankrupt firm either sells a business division to a financial buyer, or sells all of its assets as a whole going concern to a financial buyer. Of these 75 sales, 52 are a sale of an operating division and 23 (shown separately in Table 9) are sales of all assets to a single financial buyer. Survival rates for all 75 sales of a going concern are slightly higher than for firms that are reorganized, e.g., 89.3% and 80.0%, two and three years after the sale, respectively. Survival rates are very close to those of the reorganized firms for the subsample of 23 firms sold as a whole to financial buyers (82.6% and 73.9%). None of these differences are statistically significant, based on a test for differences in odds ratios between each asset sale subsample and the base sample of reorganized firms. Although tests of differences between reorganizations and sales to financial buyers are based on a relatively small sample size, the overall results suggest that asset sales do not lead to less economically efficient outcomes than traditional reorganizations.

VIII. Conclusions

We provide a new perspective on the increased use of M&A for resolving financial distress in bankruptcy. Contrary to concerns that the Chapter 11 process has shifted toward excessive liquidation of viable firms, we highlight that M&A in bankruptcy often achieves a similar economic outcome when compared to a traditional reorganization. Most bankruptcy cases involving M&A transfer the firm’s assets as a going concern to new owners while leaving (mostly cash) consideration from the sale for creditors to recover under a liquidating plan. In this sense, the rise of M&A in bankruptcy has blurred traditional distinctions between “reorganization” and “liquidation”.

Within a large sample of Chapter 11 cases, we investigate the economic drivers of M&A in bankruptcy. In contrast with M&A for non-distressed firms, M&A in bankruptcy is counter-cyclical and is more likely in periods when the cost of financing a potential stand-alone
reorganization is expensive relative to the cost of selling the firm’s assets to an acquirer with internally generated funds or a lower cost of capital. Moreover, when firms face a high cost of financing a reorganization versus a sale, we find that the likelihood of a sale is pronounced for firms in financially dependent industries and during positive or negative industry shocks. We also find a robust positive relationship between secured creditor control in the case and the use of M&A in bankruptcy. However, we argue that this result does not reflect a “liquidation bias” of secured creditors: we find a positive relationship only for cases that preserve going concern value of the firm. Finally, we show that overall creditor recovery rates are higher, and unsecured creditor recoveries and post-bankruptcy survival rates are not different, when bankrupt firms sell businesses as going concerns.

References


Ivashina, Victoria, Benjamin Iverson, and David Smith (2013). The ownership and trading of debt claims in Chapter 11 restructurings. Working paper.


This figure illustrates trends in bankruptcy outcomes and assets sales prior to confirmation of a plan by year of filing for our sample of 350 Chapter 11 cases. In Panel A, the number of filings in each year are broken out into three broad outcomes: 1) filings that result in a reorganization of the firm’s assets under a plan (prepackaged plans and non-prepackaged plans are broken out separately in the figure), 2) filings that result in a sale of all assets of the firm, where a majority of assets are sold as a going concern, and 3) filings where the firm otherwise liquidates or is sold piecemeal through 363 sales, where a majority of assets are not sold as a going concern. On the right axis, we plot the percentage of filings in each year that result in a sale of all assets of the firm, where a majority of assets are sold as a going concern. In Panel B, we categorize the extent of asset sales in 363 sales prior to confirmation of a plan into four categories: 1) “No Sales” are cases with no 363 sales, 2) “Sale of Business Division” are cases that involve a 363 sale of a whole business division or core block of assets, and 3) “Sales of Other Assets” are cases that involve a 363 sale of tangible or intangible assets but do not include a sale of a business division or core asset. On the right axis, we plot the percentage of filings in each year where the total proceeds from all 363 sales exceed 5 percent of the firm’s pre-petition book assets.
Table 1
Bankruptcy-Level Descriptive Statistics

This table provides summary statistics for the sample of 350 Chapter 11 bankruptcy cases and pre-petition firm characteristics. All variables are defined in Appendix Table A-1. Across the columns, we categorize outcomes of the cases as "Going Concern Preserved" or "Liquidation or Piecemeal Sale." "Going Concern Preserved" means that the firm (1) reorganizes under a plan or (2) sells all assets through 363 sales, where substantially all assets are sold as a going concern. "Liquidation or Piecemeal Sale" (3) means the firm is otherwise liquidated or sold piecemeal through 363 sales, where a majority of assets are not sold as a going concern. In Panel A, we further report the incidence and types of Section 363 sales within each case outcome category: 1) "No Sales" are cases with no 363 sales, 2) "Sale of Business Division" are cases that involve a 363 sale of a whole business division or core block of assets, and 3) "Sale of Other Assets" are cases that involve a 363 sale of tangible or intangible assets but do not include a sale of a business division or core asset. In Panel B, we present means and medians for pre-petition firm characteristics, the time to bankruptcy resolution, and the time to asset sales. The "time to confirmation" is the number of years from filing to a reorganization plan confirmation, a liquidating plan following a sale of assets, or conversion to a Chapter 7 case. The "time to 363 sale" is measured as the number of years from filing to the closing date of the first 363 sale of a business division or core asset, based on 184 cases that involve a sale. [File] corresponds to the period as close as possible to filing, either at filing (using data from Moody's) or from the 10-Q within one year prior to filing; [t-1] corresponds to the period between one and two years prior to filing.

Panel A: Bankruptcy Case Outcomes

<table>
<thead>
<tr>
<th></th>
<th>All Filings</th>
<th>Going Concern Preserved</th>
<th>Liquidation Piecemeal Sale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>All Filings</td>
<td>350</td>
<td>237</td>
<td>67.7%</td>
</tr>
<tr>
<td>Year of Filing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002-2003</td>
<td>144</td>
<td>97</td>
<td>67.4%</td>
</tr>
<tr>
<td>2004-2005</td>
<td>54</td>
<td>40</td>
<td>74.1%</td>
</tr>
<tr>
<td>2006-2007</td>
<td>27</td>
<td>20</td>
<td>74.1%</td>
</tr>
<tr>
<td>2008-2009</td>
<td>93</td>
<td>55</td>
<td>59.1%</td>
</tr>
<tr>
<td>2010-2011</td>
<td>32</td>
<td>25</td>
<td>78.1%</td>
</tr>
<tr>
<td>Filing Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Prepackaged</td>
<td>226</td>
<td>119</td>
<td>52.7%</td>
</tr>
<tr>
<td>Prepackaged</td>
<td>124</td>
<td>118</td>
<td>95.2%</td>
</tr>
<tr>
<td>363 Sales</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Sales</td>
<td>166</td>
<td>160</td>
<td>96.4%</td>
</tr>
<tr>
<td>Sale of Business Division</td>
<td>147</td>
<td>52</td>
<td>35.4%</td>
</tr>
<tr>
<td>Sale of Other Assets</td>
<td>37</td>
<td>25</td>
<td>67.6%</td>
</tr>
</tbody>
</table>
Table 1 (Continued)

Bankruptcy-Level Descriptive Statistics

Panel B: Firm Characteristics and Time to Resolution of Chapter 11 Cases

<table>
<thead>
<tr>
<th>Firm Characteristics</th>
<th>All Filings</th>
<th>Going Concern Preserved</th>
<th>Liquidation or Piecemeal Sale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>Mean</td>
</tr>
<tr>
<td>$\text{Book Assets [t-1]}$</td>
<td>$2,852$</td>
<td>$719$</td>
<td>$2,817$</td>
</tr>
<tr>
<td>$\text{Secured Debt Ratio File}$</td>
<td>0.553</td>
<td>0.530</td>
<td>0.516</td>
</tr>
<tr>
<td>$\text{EBITDA / Assets [t-1]}$</td>
<td>0.070</td>
<td>0.083</td>
<td>0.084</td>
</tr>
<tr>
<td>$\text{EBITDA Volatility [t-1]}$</td>
<td>0.026</td>
<td>0.014</td>
<td>0.024</td>
</tr>
<tr>
<td>$\text{Book Leverage [t-1]}$</td>
<td>0.593</td>
<td>0.541</td>
<td>0.657</td>
</tr>
<tr>
<td>$\text{PP&amp;E / Assets [t-1]}$</td>
<td>0.356</td>
<td>0.335</td>
<td>0.370</td>
</tr>
<tr>
<td>$\text{Non-cash Current Assets / Assets [t-1]}$</td>
<td>0.271</td>
<td>0.235</td>
<td>0.243</td>
</tr>
<tr>
<td>$\text{Cash Holdings / Assets [t-1]}$</td>
<td>0.077</td>
<td>0.030</td>
<td>0.071</td>
</tr>
<tr>
<td>$\text{Sales Growth [t-1]}$</td>
<td>0.190</td>
<td>0.002</td>
<td>0.187</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time to Confirmation (years)</th>
<th>All Filings</th>
<th>Non-Prepackaged</th>
<th>Prepackaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1.02</td>
<td>1.35</td>
<td>0.42</td>
</tr>
<tr>
<td>Median</td>
<td>0.77</td>
<td>1.08</td>
<td>0.37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time to 363 Sale (years)</th>
<th>All Filings [184 cases with sales]</th>
<th>Non-Prepackaged</th>
<th>Prepackaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.60</td>
<td>0.63</td>
<td>0.36</td>
</tr>
<tr>
<td>Median</td>
<td>0.38</td>
<td>0.40</td>
<td>0.21</td>
</tr>
</tbody>
</table>

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### Table 2
Sale-Level Descriptive Statistics

This table provides a transaction-level summary for 270 sale transactions from our full sample of 350 bankruptcy filings as well as subsamples of cases where a going concern is preserved. Panel A presents incidence of sale characteristics including the type of buyer, the identity of bidders and measures of bidding competition. We report the number and percent of sale transactions where the characteristic applies ("Count Yes" and "Percent Yes") and, where applicable, the number and percent where the characteristic applies to the winning bidder ("Count Winner" and "Percent Winner"). Where data are not available for the whole sample, numbers in brackets next to the variable names indicate the number of sales where we can verify information. Panel B presents statistics for the consideration paid in the sale.

**Panel A: Incidence of 363 Sale Characteristics**

<table>
<thead>
<tr>
<th>Type of Buyer</th>
<th>Count Yes</th>
<th>Percent Yes</th>
<th>Count Winner</th>
<th>Percent Winner</th>
<th>Cases with Going Concern Preserved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reorganization (237 cases)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sale of All Assets (75 cases)</td>
</tr>
<tr>
<td></td>
<td>270 Sales</td>
<td>237 Sales</td>
<td>75 cases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategic Buyer</td>
<td>180</td>
<td>66.9%</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Financial Buyer</td>
<td>89</td>
<td>33.1%</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>DIP Lender Bid</td>
<td>31</td>
<td>11.5%</td>
<td>27</td>
<td>10.0%</td>
<td></td>
</tr>
<tr>
<td>Prepetition (Non-DIP) Lender Bid</td>
<td>24</td>
<td>8.9%</td>
<td>18</td>
<td>6.7%</td>
<td></td>
</tr>
<tr>
<td>Management Bid</td>
<td>21</td>
<td>7.8%</td>
<td>21</td>
<td>7.8%</td>
<td></td>
</tr>
<tr>
<td>Stalking Horse Bid [165 Sales]</td>
<td>127</td>
<td>77.0%</td>
<td>98</td>
<td>59.4%</td>
<td></td>
</tr>
<tr>
<td>Competing Bidders [154 Sales]</td>
<td>80</td>
<td>52.0%</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Stalking Horse &amp; Competing Bids [147 Sales]</td>
<td>68</td>
<td>46.3%</td>
<td>40</td>
<td>27.2%</td>
<td>67.2%</td>
</tr>
<tr>
<td>Bid Increase [114 Sales]: Zero</td>
<td>50</td>
<td>43.9%</td>
<td>-</td>
<td>-</td>
<td>50.0%</td>
</tr>
<tr>
<td>&gt;0 to 10%</td>
<td>13</td>
<td>11.4%</td>
<td>-</td>
<td>-</td>
<td>3.3%</td>
</tr>
<tr>
<td>&gt;10 to 25%</td>
<td>25</td>
<td>21.9%</td>
<td>-</td>
<td>-</td>
<td>23.3%</td>
</tr>
<tr>
<td>&gt;25%</td>
<td>26</td>
<td>22.8%</td>
<td>-</td>
<td>-</td>
<td>23.3%</td>
</tr>
<tr>
<td>Credit Bid [254 Sales]</td>
<td>17</td>
<td>6.7%</td>
<td>15</td>
<td>5.9%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

**Panel B: Consideration Paid in 363 Sales**

<table>
<thead>
<tr>
<th>Deal Size</th>
<th>Mean</th>
<th>Median</th>
<th>Mean</th>
<th>Median</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Consideration Value [Mil.]</td>
<td>$664</td>
<td>$50</td>
<td>$144</td>
<td>$40</td>
<td>$1,128</td>
<td>$66</td>
</tr>
<tr>
<td>Total Consideration to Book Assets</td>
<td>0.172</td>
<td>0.051</td>
<td>0.067</td>
<td>0.009</td>
<td>0.257</td>
<td>0.136</td>
</tr>
<tr>
<td>Consideration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash / Total Consideration</td>
<td>82.8%</td>
<td>100.0%</td>
<td>91.9%</td>
<td>100.0%</td>
<td>76.4%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% Assumed Liabilities / Total Consideration (includes Credit Bid)</td>
<td>14.6%</td>
<td>0.0%</td>
<td>5.1%</td>
<td>0.0%</td>
<td>21.2%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
Table 3
Pre-Petition Debt and Debtor-in-Possession Financing

This table describes the prepetition debt structure and debtor-in-possession (DIP) financing for the sample of 350 Chapter 11 filings. All variables are defined in Appendix Table A-1. Panel A shows the level and changes in secured debt and its two main components (drawn revolvers and term loan debt) leading up to filing. Panel B presents a summary of pre-petition debt and DIP financing characteristics. The table reports the number and percent of total cases where the characteristic applies ("Count Yes" and "Percent Yes"), based on the full sample of 350 filings, unless indicated (in brackets) for variables where data are available for a smaller number of cases. DIP financing characteristics are based on the 248 firms which have such financing. The table further breaks out cases with high (≥ 50%) and low (< 50%) pre-petition secured debt ratios (counts are omitted to preserve space). We also report odds ratios indicating the relative likelihood of the characteristic for a firms with high versus low secured debt ratios. We present significance levels of a test against an odds ratio of one (indicating the characteristic is equally likely in both groups). ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively. [File] corresponds to the period as close as possible to filing, either at filing (using data from Moody's) or from the 10-Q within one year prior to filing; [t-1] corresponds to the period between one and two years prior to filing; [t-2] corresponds to the period between two and three years prior to filing.

Panel A: Pre-Petition Debt Structure

<table>
<thead>
<tr>
<th></th>
<th>Pre-Petition Debt Ratios</th>
<th>Pre-Petition Change</th>
<th>All Filings</th>
<th>≥ 50% Secured</th>
<th>&lt; 50% Secured</th>
<th>Relative Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[t-2]</td>
<td>[t-1]</td>
<td>[File]</td>
<td>Δ [t-2, File]</td>
<td>Test for Zero Null</td>
<td></td>
</tr>
<tr>
<td>Secured Debt Ratio</td>
<td>Mean</td>
<td>0.45</td>
<td>0.47</td>
<td>0.55</td>
<td>0.11</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>0.41</td>
<td>0.46</td>
<td>0.53</td>
<td>0.04</td>
<td>***</td>
</tr>
<tr>
<td>Revolver Debt Ratio</td>
<td>Mean</td>
<td>0.15</td>
<td>0.17</td>
<td>0.21</td>
<td>0.06</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>0.04</td>
<td>0.06</td>
<td>0.13</td>
<td>0.03</td>
<td>***</td>
</tr>
<tr>
<td>Term Loan Debt Ratio</td>
<td>Mean</td>
<td>0.18</td>
<td>0.20</td>
<td>0.22</td>
<td>0.04</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>0.00</td>
<td>0.04</td>
<td>0.11</td>
<td>0.00</td>
<td>***</td>
</tr>
</tbody>
</table>

Panel B: Debt Characteristics

| Has Public Bond Access (Pre-Petition) | 237 | 67.7% | 60.9% | 75.8% | 0.51 | *** |
| Has DIP Financing (in Bankruptcy)    | 248 | 70.9% | 78.8% | 62.4% | 2.27 | *** |

Pre-Petition Secured Debt Characteristics:

- ≥ 50% Non-Bank Lenders [312 Cases]: 86, 27.6% | 27.2% | 28.0% | 0.96 |
- Over-Collateralized [260 Cases]: 123, 47.3% | 21.4% | 73.6% | 0.10 | *** |
- Collateralized by: [311 Cases]
  - All Assets: 203, 65.3% | 64.6% | 66.4% | 0.94 |
  - Current: 40, 12.9% | 16.8% | 8.7% | 2.12 | ** |
  - PP&E: 32, 10.3% | 13.0% | 7.4% | 1.90 |
  - Other: 14, 4.5% | 5.0% | 4.0% | 1.25 |

DIP Financing Characteristics (for 248 Cases):

- ≥ 50% Non-Bank Lenders: 115, 46.4% | 47.6% | 44.7% | 1.13 |
- Pre-petition Rollup [233 Cases]: 162, 69.5% | 75.7% | 60.8% | 2.01 | ** |
- Milestone for Plan [206 Cases]: 38, 18.5% | 23.3% | 12.2% | 2.18 | ** |
- Milestone for 363 Sale [208 Cases]: 37, 17.8% | 23.7% | 10.0% | 2.80 | ** |
- 363 Sale Process Control [207 Cases]: 32, 15.5% | 16.2% | 14.4% | 1.15 |
- Priming Lien [214 Cases]: 74, 34.6% | 36.1% | 32.6% | 1.17 |
### Table 4
Determinants of Section 363 Sales

This table reports regressions for the occurrence of a Section 363 sale during the bankruptcy case. The dependent variable for probit regressions (1 = 363 Asset Sale) is an indicator variable equal to one when the firm sells at least five percent of pre-petition book value of assets through a 363 sale. Coefficients from the probit regressions are reported as marginal probabilities, evaluated at the sample means. The dependent variable for Tobit regressions (Sale Proceeds to Assets) is the ratio of total deal value for all 363 sales prior to plan confirmation (or final liquidation) divided by pre-petition book assets (censored at zero). Continuous variables are de-meaned and normalized by their standard deviation. The independent variables are defined in Appendix Table A-1 and are dated at the time of the bankruptcy filing or within the second year prior to the bankruptcy filing (where [t-1] is noted next to the explanatory variable). ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by year of filing. Z-statistics are reported in parentheses or omitted for brevity.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Incidence of Sales [Probit]</th>
<th>Magnitude of Sales [Tobit]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 = 363 Asset Sale</td>
<td>Sale Proceeds to Assets</td>
</tr>
<tr>
<td>Secured Debt Ratio</td>
<td>0.071***</td>
<td>0.070***</td>
</tr>
<tr>
<td></td>
<td>(5.858)</td>
<td>(5.492)</td>
</tr>
<tr>
<td>B - BBB Spread</td>
<td>0.030</td>
<td>-0.076</td>
</tr>
<tr>
<td></td>
<td>(1.316)</td>
<td>(-1.560)</td>
</tr>
<tr>
<td>Negative Shock (Industry)</td>
<td>-0.076</td>
<td>-0.075</td>
</tr>
<tr>
<td></td>
<td>(-0.997)</td>
<td>(-1.428)</td>
</tr>
<tr>
<td>Positive Shock (Industry)</td>
<td>-0.061</td>
<td>-0.067</td>
</tr>
<tr>
<td></td>
<td>(-0.997)</td>
<td>(-1.329)</td>
</tr>
<tr>
<td>Neg. Shock (Ind) * (B - BBB Spread)</td>
<td>0.188***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.232)</td>
<td>(3.738)</td>
</tr>
<tr>
<td>Pos. Shock (Ind) * (B - BBB Spread)</td>
<td>0.155***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.518)</td>
<td>(4.518)</td>
</tr>
<tr>
<td>Industry Financial Dependence</td>
<td>-0.011</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.304)</td>
<td></td>
</tr>
<tr>
<td>Ind. Financial Dep. * (B - BBB Spread)</td>
<td>0.021***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.083)</td>
<td></td>
</tr>
<tr>
<td>Industry Concentration (HHI)</td>
<td>-0.060</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.195)</td>
<td></td>
</tr>
<tr>
<td>Neg. Shock (Ind) * HHI</td>
<td>-0.067***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.685)</td>
<td></td>
</tr>
<tr>
<td>Pos. Shock (Ind) * HHI</td>
<td>0.045</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.655)</td>
<td></td>
</tr>
<tr>
<td>Defined Benefit Pension</td>
<td>-0.010</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.020)</td>
<td></td>
</tr>
<tr>
<td>Court Busyness</td>
<td>-0.011</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.003)</td>
<td></td>
</tr>
<tr>
<td>Industry Market to Book</td>
<td>-0.024</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.005)</td>
<td></td>
</tr>
<tr>
<td>EBITDA / Assets [t-1]</td>
<td>-0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.005)</td>
<td></td>
</tr>
<tr>
<td>Book Leverage [t-1]</td>
<td>-0.131**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.133)</td>
<td></td>
</tr>
<tr>
<td>Sales Growth [t-1]</td>
<td>-0.012</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.012)</td>
<td></td>
</tr>
<tr>
<td>Log of Book Assets [t-1]</td>
<td>0.047**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-cash Current Assets / Assets [t-1]</td>
<td>0.043</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash Holdings / Assets [t-1]</td>
<td>0.029</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PP&amp;E / Assets [t-1]</td>
<td>-0.070***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Effects [F-F 49]</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Court and Pre-Pack Effects</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>Unconditional Probability</td>
<td>0.323</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.323</td>
<td>0.323</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.386</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.391</td>
<td>0.410</td>
</tr>
</tbody>
</table>
### Table 5
Bankruptcy Case Outcomes

This table reports multinomial logit regressions for the bankruptcy case outcome. The dependent variable takes one of three outcomes: 1) all of the firm’s assets are sold in 363 sales, where a majority of the assets are preserved as a going concern (Sale of All Assets as Going Concern), 2) the firm’s assets are liquidated or sold piecemeal in 363 sales (Liquidation or Piecemeal Sale), or 3) the firm completes a reorganization plan (the base outcome). Coefficients from the multinomial logit regressions are reported as relative risk ratios, interpreted as the increase in probability of the given outcome divided by increase in probability of a reorganization for a unit change in the independent variable. Continuous variables are de-meaned and normalized by their standard deviation. The independent variables are defined in Appendix Table A-1 and are dated at the time of the bankruptcy filing or in the second year prior to the bankruptcy filing (where [t-1] is noted next to the explanatory variable). ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by year of filing. Z-statistics are reported in parentheses.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Sale of All Assets as Going Concern</th>
<th>Liquidation or Piecemeal Sale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Secured Debt Ratio</strong></td>
<td>1.428***</td>
<td>1.375***</td>
</tr>
<tr>
<td></td>
<td>(3.906)</td>
<td>(3.133)</td>
</tr>
<tr>
<td><strong>B - BBB Spread</strong></td>
<td>1.432***</td>
<td>0.777</td>
</tr>
<tr>
<td></td>
<td>(3.112)</td>
<td>(-1.243)</td>
</tr>
<tr>
<td><strong>Negative Shock (Industry)</strong></td>
<td>0.873</td>
<td>0.913</td>
</tr>
<tr>
<td></td>
<td>(-0.221)</td>
<td>(-0.146)</td>
</tr>
<tr>
<td><strong>Positive Shock (Industry)</strong></td>
<td>1.095</td>
<td>1.284</td>
</tr>
<tr>
<td></td>
<td>(0.169)</td>
<td>(0.619)</td>
</tr>
<tr>
<td><strong>Neg. Shock (Ind) * (B - BBB Spread)</strong></td>
<td>2.195***</td>
<td>2.827***</td>
</tr>
<tr>
<td></td>
<td>(2.889)</td>
<td>(3.527)</td>
</tr>
<tr>
<td></td>
<td>(3.391)</td>
<td>(5.126)</td>
</tr>
<tr>
<td><strong>Industry Financial Dependence</strong></td>
<td>1.629**</td>
<td>1.028</td>
</tr>
<tr>
<td></td>
<td>(2.379)</td>
<td>(0.079)</td>
</tr>
<tr>
<td><strong>Ind. Financial Dep. * (B - BBB Spread)</strong></td>
<td>1.970***</td>
<td>1.394</td>
</tr>
<tr>
<td></td>
<td>(3.984)</td>
<td>(1.554)</td>
</tr>
<tr>
<td><strong>Industry Concentration (HHI)</strong></td>
<td>0.931</td>
<td>1.660</td>
</tr>
<tr>
<td></td>
<td>(-0.634)</td>
<td>(1.336)</td>
</tr>
<tr>
<td><strong>Neg. Shock (Ind) * HHI</strong></td>
<td>0.636*</td>
<td>0.568</td>
</tr>
<tr>
<td></td>
<td>(-1.761)</td>
<td>(-1.206)</td>
</tr>
<tr>
<td><strong>Pos. Shock (Ind) * HHI</strong></td>
<td>1.548*</td>
<td>0.789</td>
</tr>
<tr>
<td></td>
<td>(1.948)</td>
<td>(-0.509)</td>
</tr>
<tr>
<td><strong>Defined Benefit Pension</strong></td>
<td>1.008</td>
<td>0.944</td>
</tr>
<tr>
<td><strong>Court Busyness</strong></td>
<td>1.094</td>
<td>1.148</td>
</tr>
<tr>
<td><strong>Industry Market to Book</strong></td>
<td>1.202</td>
<td>1.392</td>
</tr>
<tr>
<td><strong>EBITDA / Assets [t-1]</strong></td>
<td>1.036</td>
<td>1.036</td>
</tr>
<tr>
<td><strong>Book Leverage [t-1]</strong></td>
<td>0.447***</td>
<td>0.428***</td>
</tr>
<tr>
<td><strong>Sales Growth [t-1]</strong></td>
<td>0.850*</td>
<td>0.848**</td>
</tr>
<tr>
<td><strong>Log of Book Assets [t-1]</strong></td>
<td>0.775</td>
<td>0.746*</td>
</tr>
<tr>
<td><strong>Non-cash Current Assets / Assets [t-1]</strong></td>
<td>1.327**</td>
<td>1.330**</td>
</tr>
<tr>
<td><strong>Cash Holdings / Assets [t-1]</strong></td>
<td>1.383*</td>
<td>1.366</td>
</tr>
<tr>
<td><strong>PP&amp;E / Assets [t-1]</strong></td>
<td>0.748*</td>
<td>0.753**</td>
</tr>
</tbody>
</table>

| Industry Effects [F-F 12] | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Court and Pre-Pack Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **N** | 350 | 350 | 350 | 350 | 350 | 350 | 350 | 350 |
| **Unconditional Probability** | 0.214 | 0.214 | 0.214 | 0.214 | 0.109 | 0.109 | 0.109 | 0.109 |
| **Pseudo R-Squared** | 0.258 | 0.269 | 0.288 | 0.313 | 0.258 | 0.269 | 0.288 | 0.313 |
Table 6
Pre-Petition Debt Structure and Asset Sales in Bankruptcy

This table reports probit and bivariate probit regressions for the incidence of Section 363 sales and the bankruptcy case outcome. The first dependent variable (1=Asset Sales) is an indicator variable equal to one when the firm sells assets valued at least five percent of pre-petition book value through a 363 sale. The second dependent variable (1=Sale of All Assets as Going Concern) is an indicator variable equal to one when the firm sells all assets through 363 sales and a majority of assets are preserved as a going concern. Coefficients are reported as marginal probabilities, evaluated at the sample means. Continuous variables are demeaned and normalized by their standard deviation. The independent variables are defined in the Appendix Table A-1 and are dated at the time of the bankruptcy filing or in the second year prior to the bankruptcy filing (where [t-1] is noted next to the explanatory variable). Specifications 3a and 6a (3b and 6b) correspond to the first (second) stage of the bivariate probit model. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by year of filing. Z-statistics are reported in parentheses.

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>363 Sales in Bankruptcy</th>
<th>Case Outcome Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 = Asset Sales</td>
<td>1 = Sale of All Assets as Going Concern</td>
</tr>
<tr>
<td>≥ 50% Secured [Filing]</td>
<td>0.071** (2.072)</td>
<td>0.106* (1.800)</td>
</tr>
<tr>
<td>Over-Collateralized</td>
<td>-0.008 (-0.130)</td>
<td>-0.008 (-0.067)</td>
</tr>
<tr>
<td>≥ 50% Secured * Over-Coll.</td>
<td>-0.124** (-2.396)</td>
<td>-0.149*** (-2.617)</td>
</tr>
<tr>
<td>Loan vs. Bond Mkt. Issuance [3 Yr]</td>
<td>0.022*** (4.993)</td>
<td></td>
</tr>
<tr>
<td>Public Bond Market Access [t-1]</td>
<td>-0.045*** (-3.773)</td>
<td></td>
</tr>
<tr>
<td>EBITDA / Assets [t-1]</td>
<td>0.007 (0.202)</td>
<td>0.001 (0.022)</td>
</tr>
<tr>
<td>EBITDA Volatility [t-1]</td>
<td>-0.001 (1.295)</td>
<td>0.036 (-0.091)</td>
</tr>
<tr>
<td>Book Leverage [t-1]</td>
<td>-0.119*** (-2.685)</td>
<td>-0.074*** (-3.858)</td>
</tr>
<tr>
<td>PP&amp;E / Assets [t-1]</td>
<td>-0.058** (-2.110)</td>
<td>-0.063** (-2.011)</td>
</tr>
<tr>
<td>Non-cash Current Assets / Assets [t-1]</td>
<td>0.032 (0.979)</td>
<td>0.055 (1.579)</td>
</tr>
<tr>
<td>Cash Holdings [t-1]</td>
<td>0.018 (-0.443)</td>
<td>-0.029 (0.364)</td>
</tr>
<tr>
<td>Log of Book Assets [t-1]</td>
<td>0.011 (0.593)</td>
<td>0.029 (1.083)</td>
</tr>
<tr>
<td>Sales Growth [t-1]</td>
<td>-0.019 (-1.219)</td>
<td>-0.018 (-0.749)</td>
</tr>
<tr>
<td>Industry Effects [F-F 12]</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Court and Pre-Pack Effects</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Exclude Liquidation/PiecemealSale</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>N</td>
<td>350</td>
<td>260</td>
</tr>
</tbody>
</table>
**Table 7**

**Time from Filing to Asset Sales in Bankruptcy**

This table reports proportional hazard models for the relative speed of a 363 sale in bankruptcy. The survival time to a sale in the model is based on the time to the first sale of a business division or all assets through a 363 sale. In cases where a sale event does not occur before confirmation of a plan (i.e., censored observations in the model), the survival time is equal to the number of days from filing until confirmation of a plan. Coefficients from the models are reported as hazard ratios, where coefficients greater than one indicate an increasing rate of sales and coefficients between zero and one indicate a decreasing rate of sales. Continuous variables are de-meaned and normalized by their standard deviation. The specifications in columns [1]-[3] control for cases with pre-packaged plans while the specifications in columns [4]-[6] exclude cases with pre-packaged plans from the regression sample. The independent variables are defined in the Data Appendix Table A-1 and are dated at the time of the bankruptcy filing or in the second year prior to the bankruptcy filing (where [t-1] is noted next to the explanatory variable). ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by year of filing. Z-statistics are reported in parentheses.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Cox Proportional Hazard Rate of Sales in Bankruptcy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secured Debt Ratio</td>
<td>1.239***</td>
</tr>
<tr>
<td></td>
<td>(3.413)</td>
</tr>
<tr>
<td>Industry Market to Book</td>
<td>1.200</td>
</tr>
<tr>
<td></td>
<td>(1.612)</td>
</tr>
<tr>
<td>Industry Concentration (HHI)</td>
<td>0.978</td>
</tr>
<tr>
<td></td>
<td>(-0.206)</td>
</tr>
<tr>
<td>Industry Financial Dependence</td>
<td>1.079</td>
</tr>
<tr>
<td></td>
<td>(1.189)</td>
</tr>
<tr>
<td>Negative Shock (Industry)</td>
<td>0.738</td>
</tr>
<tr>
<td></td>
<td>(-0.737)</td>
</tr>
<tr>
<td>Positive Shock (Industry)</td>
<td>1.070</td>
</tr>
<tr>
<td></td>
<td>(0.275)</td>
</tr>
<tr>
<td>B - BBB Spread</td>
<td>1.208*</td>
</tr>
<tr>
<td></td>
<td>(1.761)</td>
</tr>
<tr>
<td>HHI * (B - BBB Spread)</td>
<td>1.037</td>
</tr>
<tr>
<td></td>
<td>(0.536)</td>
</tr>
<tr>
<td>Ind. Financial Dep. * (B - BBB Spread)</td>
<td>1.446*</td>
</tr>
<tr>
<td></td>
<td>(1.951)</td>
</tr>
<tr>
<td>Neg. Shock (Ind) * (B - BBB Spread)</td>
<td>1.453*</td>
</tr>
<tr>
<td></td>
<td>(1.902)</td>
</tr>
<tr>
<td>Pos. Shock (Ind) * (B - BBB Spread)</td>
<td>1.288</td>
</tr>
<tr>
<td></td>
<td>(0.886)</td>
</tr>
<tr>
<td>Defined Benefit Pension</td>
<td>1.090</td>
</tr>
<tr>
<td></td>
<td>(0.602)</td>
</tr>
<tr>
<td>Court Busyness</td>
<td>1.062</td>
</tr>
<tr>
<td></td>
<td>(0.462)</td>
</tr>
<tr>
<td>EBITDA / Assets [t-1]</td>
<td>1.009</td>
</tr>
<tr>
<td>EBITDA Volatility [t-1]</td>
<td>0.792</td>
</tr>
<tr>
<td>Book Leverage [t-1]</td>
<td>0.780</td>
</tr>
<tr>
<td>PP&amp;E / Assets [t-1]</td>
<td>0.698**</td>
</tr>
<tr>
<td>Non-cash Current Assets / Assets [t-1]</td>
<td>1.228</td>
</tr>
<tr>
<td>Cash Holdings / Assets [t-1]</td>
<td>1.327***</td>
</tr>
<tr>
<td>Log of Book Assets [t-1]</td>
<td>1.185*</td>
</tr>
<tr>
<td>Sales Growth [t-1]</td>
<td>1.094</td>
</tr>
<tr>
<td>Industry Effects [F-F 49]</td>
<td>Yes</td>
</tr>
<tr>
<td>Year of Filing Effects</td>
<td>Yes</td>
</tr>
<tr>
<td>Court Effects</td>
<td>Yes</td>
</tr>
<tr>
<td>Pre-Packaged Cases</td>
<td>Control</td>
</tr>
<tr>
<td>N</td>
<td>349</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.047</td>
</tr>
</tbody>
</table>
Table 8
Creditor Recoveries

This table reports OLS regressions for creditor recoveries (discounted recoveries from Moody’s URD database). The first dependent variable represents the overall recovery to all pre-petition debtholders as a proportion of principal owed at filing. The second (third) dependent variable represents the recovery to pre-petition secured (unsecured) debtholders as a proportion of secured (unsecured) debt at filing. Continuous variables are de-meaned and normalized by their standard deviation. The independent variables are defined in Appendix Table A-1 and are dated at the time of the bankruptcy filing or in the second year prior to the bankruptcy filing (where [t-1] is noted next to the explanatory variable). ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by year of filing. T-statistics are reported in parentheses or omitted for brevity.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Overall Recovery</th>
<th>Secured Recovery</th>
<th>Unsecured Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale of All Assets (GC)</td>
<td>-0.028</td>
<td>-0.055</td>
<td>-0.058</td>
</tr>
<tr>
<td></td>
<td>(-0.477)</td>
<td>(-1.015)</td>
<td>(-1.049)</td>
</tr>
<tr>
<td>Liquidation or Piecemeal Sale</td>
<td>0.046</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.589)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secured Debt Ratio</td>
<td>0.065***</td>
<td>0.074***</td>
<td>-0.144***</td>
</tr>
<tr>
<td></td>
<td>(3.962)</td>
<td>(3.880)</td>
<td>(-5.373)</td>
</tr>
<tr>
<td>Industry Market to Book</td>
<td>0.005</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.153)</td>
<td>(0.940)</td>
<td></td>
</tr>
<tr>
<td>Industry Concentration (HHI)</td>
<td>-0.048</td>
<td>-0.054</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.039)</td>
<td>(-1.290)</td>
<td></td>
</tr>
<tr>
<td>Industry Financial Dependence</td>
<td>-0.025</td>
<td>-0.007</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.505)</td>
<td>(-0.172)</td>
<td></td>
</tr>
<tr>
<td>Negative Shock (Industry)</td>
<td>-0.130**</td>
<td>-0.119**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.930)</td>
<td>(-3.030)</td>
<td></td>
</tr>
<tr>
<td>Positive Shock (Industry)</td>
<td>0.089</td>
<td>0.080</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.646)</td>
<td>(1.454)</td>
<td></td>
</tr>
<tr>
<td>B - BBB Spread</td>
<td>0.020</td>
<td>0.018</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.649)</td>
<td>(0.674)</td>
<td></td>
</tr>
<tr>
<td>HHI * (B - BBB Spread)</td>
<td>0.062*</td>
<td>0.029*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.122)</td>
<td>(2.048)</td>
<td></td>
</tr>
<tr>
<td>Ind. Financial Dep. * (B - BBB Spread)</td>
<td>0.006</td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.856)</td>
<td>(0.441)</td>
<td></td>
</tr>
<tr>
<td>Neg. Shock (Ind) * (B - BBB Spread)</td>
<td>0.030</td>
<td>0.037</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.678)</td>
<td>(1.009)</td>
<td></td>
</tr>
<tr>
<td>Pos. Shock (Ind) * (B - BBB Spread)</td>
<td>-0.097</td>
<td>-0.076</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.800)</td>
<td>(-1.649)</td>
<td></td>
</tr>
<tr>
<td>Defined Benefit Pension</td>
<td>0.014</td>
<td>-0.009</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.222)</td>
<td>(-0.124)</td>
<td></td>
</tr>
<tr>
<td>Court Busyness</td>
<td>0.013</td>
<td>0.016</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.498)</td>
<td>(0.538)</td>
<td></td>
</tr>
<tr>
<td>EBITDA / Assets [t-1]</td>
<td>0.046*</td>
<td>0.029</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBITDA Volatility [t-1]</td>
<td>-0.047*</td>
<td>-0.044*</td>
<td></td>
</tr>
<tr>
<td>Book Leverage [t-1]</td>
<td>0.006</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>PP&amp;E / Assets [t-1]</td>
<td>0.003</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Non-cash Current Assets / Assets [t-1]</td>
<td>0.042</td>
<td>0.009</td>
<td></td>
</tr>
<tr>
<td>Cash Holdings / Assets [t-1]</td>
<td>-0.009</td>
<td>-0.017</td>
<td></td>
</tr>
<tr>
<td>Log of Book Assets [t-1]</td>
<td>0.023</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>Sales Growth [t-1]</td>
<td>0.027**</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Industry Effects [F-F 49]</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Court and Pre-Pack Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Excl. Liquidation/Sold Piecemeal</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>N</td>
<td>244</td>
<td>244</td>
<td>260</td>
</tr>
<tr>
<td>Adjusted R-Squared</td>
<td>-0.003</td>
<td>0.133</td>
<td>0.140</td>
</tr>
</tbody>
</table>
Table 9
Post-Bankruptcy Survival

This table compares post-bankruptcy survival outcomes for firms that emerge from bankruptcy through a Section 363 sale to a financial buyer, such as a private equity firm, to firms that emerge under a reorganization plan. For up to three years from the closing date of the sale or bankruptcy exit (for reorganizations), we show post-bankruptcy outcomes according to whether 1) the firm is maintained as an independent going concern, 2) the firm is subsequently merged with another operating company, or 3) the firm refiles for bankruptcy. Across the columns, we show survival outcomes for reorganizations compared with sales to financial buyers. Of the 75 sales to financial buyers, 52 are a sale of an operating division and 23 (shown separately) are sales of all assets to a single financial buyer. We compare the relative odds of survival outcomes at each horizon for sales to a financial buyer relative to a reorganization. Next to each odds ratio, we show the p-value of a test against an odds ratio of one (indicating the characteristic is equally likely in both groups). Counts reported for the three year horizon exclude 15 observations where less than three years of survival history are available.

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Survival Outcome</th>
<th>Reorganization (Base Group)</th>
<th>Sale of All Assets or Business Division as Going Concern</th>
<th>Sale of All Assets as Going Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incidence Count</td>
<td>Incidence Count</td>
<td>Equal Odds Test Odds Ratio</td>
<td>P-Value</td>
</tr>
<tr>
<td>Total Observations</td>
<td>228</td>
<td>75</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>1 Year</td>
<td>Independent 215</td>
<td>71</td>
<td>1.07</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>Merger 9</td>
<td>3</td>
<td>1.01</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>Refiles 4</td>
<td>1</td>
<td>0.76</td>
<td>0.80</td>
</tr>
<tr>
<td>2 Years</td>
<td>Independent 186</td>
<td>67</td>
<td>1.58</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>Merger 21</td>
<td>5</td>
<td>0.68</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>Refiles 14</td>
<td>3</td>
<td>0.62</td>
<td>0.46</td>
</tr>
<tr>
<td>3 Years</td>
<td>Independent 159</td>
<td>60</td>
<td>1.36</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Merger 30</td>
<td>8</td>
<td>0.73</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>Refiles 24</td>
<td>7</td>
<td>0.81</td>
<td>0.64</td>
</tr>
</tbody>
</table>

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### Table A-1

Data Appendix: Bankruptcy Event Level Database

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-packaged</td>
<td>Yes/No</td>
<td>The firm has a pre-negotiated reorganization plan at filing.</td>
</tr>
<tr>
<td>Reorganization</td>
<td>Yes/No</td>
<td>The firm reorganizes in Chapter 11 and emerges as an independent going concern.</td>
</tr>
<tr>
<td>Sale of All Assets</td>
<td>Yes/No</td>
<td>The firm sells substantially all assets through 363 sales, where a majority of assets are sold as a going concern.</td>
</tr>
<tr>
<td>Liquidation or Sold Piecemeal</td>
<td>Yes/No</td>
<td>The firm is liquidated under a plan or sold piecemeal through 363 sales prior to confirmation of a plan, where a majority of assets are not preserved as a going concern.</td>
</tr>
<tr>
<td>Sale of Business Division</td>
<td>Yes/No</td>
<td>The firm sells an operating business division, core asset, or substantially all assets through a 363 sale prior to confirmation of a plan.</td>
</tr>
<tr>
<td>Sale of Other Assets</td>
<td>Yes/No</td>
<td>The firm sells some other tangible or intangible assets through a 363 sale.</td>
</tr>
<tr>
<td>Sale Proceeds to Assets</td>
<td>Ratio</td>
<td>Proceeds from 363 Sales / Pre-Petition Book Assets  The ratio of total consideration paid (including cash, stock, debt, assumed liabilities, and credit bids) for all 363 sales prior to plan confirmation divided by book assets from Compustat (ATQ) in the first available quarter prior to the bankruptcy filing date.</td>
</tr>
<tr>
<td>Time to Confirmation</td>
<td>Value</td>
<td>The number of years from filing to confirmation of a reorganization plan, a liquidating plan following a sale of assets, or conversion to a Chapter 7 case.</td>
</tr>
<tr>
<td>Time to First Sale</td>
<td>Ratio</td>
<td>The number of years from filing to closing of the first 363 sale of a business division or core asset prior to plan confirmation.</td>
</tr>
</tbody>
</table>
| Secured Debt Ratio                 | Ratio    | Secured Debt Outstanding / Debt Principal Outstanding  

The ratio of debt principal secured by collateral divided by total debt principal outstanding. For calculating the secured debt ratio at filing, where available, we first use the ratio of secured debt principal to total principal from Moody’s. Where we are missing the Moody’s data, we fill in the secured debt ratio using the first available 10-K filing prior to the bankruptcy filing date (up to 2 years). The secured debt ratio at the 10-K filing is obtained from CapitalIQ’s Debt Structure database or hand-collected from the 10-K footnotes. Where the secured debt ratio from Moody’s URD and pre-petition 10-K filings are both available, the correlation coefficient is greater than 0.9. |
| Revolver Debt Ratio                | Ratio    | Drawn Revolver Debt Outstanding / Debt Principal Outstanding  

The ratio of debt principal drawn from bank credit lines divided by total debt principal outstanding. For calculating the revolver debt ratio at filing, we use the same methodology described for the Secured Debt Ratio field. |
| Term Loan Debt Ratio               | Ratio    | Drawn Term Loan Debt Outstanding / Debt Principal Outstanding  

The ratio of debt principal drawn from bank or institutional term loans divided by total debt principal outstanding. For calculating the term loan debt ratio at filing, we use the same methodology described for the Secured Debt Ratio field. |
| ≥ 50% Non-Bank Lenders            | Yes/No   | A majority of lenders in the primary syndicates of all outstanding loans were non-bank lenders, such as CLOs, mutual funds, or hedge funds. |
| Loan vs Bond Market Issuance      | Ratio    | Aggregate issuance of (secured) loans to aggregate issuance volume of (unsecured) high yield bonds from U.S. firms rated B or BB over the prior 3 years. |
| Public Bond Market Access         | Yes/No   | The firm has an issuer-level credit rating from S&P or Moody’s in the second year prior to filing. |
| Collateral                        | Category | The type of collateral backing the secured debt of the firm: 1) all assets, 2) current assets (e.g., accounts receivable or inventory), 3) PP&E or 4) other assets. |
| Over-Collateralized               | Yes/No   | The value of the collateral was likely greater than the claims of the secured creditors. We code this field as “Yes” if the overall ex-post recovery to creditors was more than 5 percent higher than the pre-petition Secured Debt Ratio. |
| Has DIP Financing                 | Yes/No   | The firm obtained debtor-in-possession financing. |
| Milestone for Plan                | Yes/No   | The DIP lender set a deadline for approval of a disclosure statement or plan confirmation. We code this field as “Yes” if it is an event of default under the DIP credit agreement not to have a disclosure statement or plan approved by a certain date. |

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## Table A-1

**Data Appendix: Bankruptcy Event Level Database**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milestone for 363 Sale</td>
<td>Yes/No</td>
<td>The DIP lender set terms that dictated a potential 363 sale. We code this field as &quot;Yes&quot; if it was an event of default under the DIP credit agreement not to have an order approving a sale or bidding procedures by a certain date.</td>
</tr>
<tr>
<td>363 Process Control</td>
<td>Yes/No</td>
<td>The DIP lender controlled the process of a 363 sale of assets. For example, the DIP agreement required the firm to seek approval for bidding procedures.</td>
</tr>
<tr>
<td>Pre-Petition Rollup</td>
<td>Yes/No</td>
<td>The DIP financing was provided by a pre-petition lender, who refinanced an existing pre-petition claim with the new DIP financing.</td>
</tr>
<tr>
<td>Priming Lien</td>
<td>Yes/No</td>
<td>The DIP financing is granted super-senior priority in the capital structure above the priority of pre-petition secured lenders.</td>
</tr>
<tr>
<td>B - BBB Spread</td>
<td>Value (bps)</td>
<td>Aggregate mean spread (in basis points) between yield to maturity at issuance for bonds with a B credit rating and bonds with a BBB credit rating.</td>
</tr>
<tr>
<td>C&amp;I Spread</td>
<td>Value (bps)</td>
<td>Aggregate mean spread (in basis points) between commercial and industrial loan rates (calculated by Federal Reserve) and the federal funds rate.</td>
</tr>
<tr>
<td>Industry Market to Book</td>
<td>Ratio</td>
<td>Industry Median: Market Value of Assets / Book Assets Compustat: [ATQ(t) - CEQQ(t) - TXDITCQ(t) + (PRCCQ(t) x CSHOQ(t))] / ATQ(t)</td>
</tr>
<tr>
<td>Industry Concentration</td>
<td>Ratio</td>
<td>Herfindahl–Hirschman Index of industry concentration. The index is calculated as the sum of the squared market shares across all firms within an industry. We measure market shares using firms’ sales relative to total sales for the industry in Compustat.</td>
</tr>
<tr>
<td>Industry Financial Dependence</td>
<td>Ratio</td>
<td>Measure from Rajan and Zingales (1998), calculated as the industry median of Compustat: [CAPXQ(t, t-39) - OANCFQ(t, t-39)] / CAPXQ(t, t-39)</td>
</tr>
<tr>
<td>Negative/Positive Shock</td>
<td>Yes/No</td>
<td>For negative (positive) industry shock variable, median industry sales growth or median industry cumulative stock return for the year prior to filing are in the lowest (highest) sample quartile and neither variable is in the highest (lowest) sample quartile.</td>
</tr>
<tr>
<td>Defined Benefit Pension</td>
<td>Yes/No</td>
<td>Projected pension defined benefit obligation is greater than 5 percent of book assets.</td>
</tr>
<tr>
<td>Court Busyness</td>
<td>Ratio</td>
<td>The number of Chapter 11 filings received by the same court in the same quarter, de-meaned and normalized by the standard deviation of filings per quarter in the same court over the sample period (2002-2011).</td>
</tr>
<tr>
<td>Book Assets</td>
<td>$ in Mill.</td>
<td>Book Assets Compustat: ATQ(t)</td>
</tr>
<tr>
<td>EBITDA / Assets</td>
<td>Ratio</td>
<td>EBITDA / Lagged Book Assets Compustat: Four-Quarter Rolling Average of OIBDPQ(t, t-3) / ATQ(t-4)</td>
</tr>
<tr>
<td>EBITDA Volatility</td>
<td>Ratio</td>
<td>3-year Standard Deviation of EBITDA / Lagged Book Assets Compustat: 3-year Standard Deviation of ΔOIBDPQ(t) / ATQ(t-1)</td>
</tr>
<tr>
<td>Book Leverage</td>
<td>Ratio</td>
<td>Total Book Debt / Book Assets Compustat: [DLTTQ(t) + DLCQ(t)]/ATQ(t)</td>
</tr>
<tr>
<td>PP&amp;E / Assets</td>
<td>Ratio</td>
<td>PP&amp;E / Book Assets Compustat: PPENTQ(t) / ATQ(t)</td>
</tr>
<tr>
<td>Non-cash Current Assets</td>
<td>Ratio</td>
<td>[Current Assets - Cash] / Book Assets Compustat: [ACTQ(t) - CHEQ(t)] / ATQ(t)</td>
</tr>
<tr>
<td>Cash Holdings / Assets</td>
<td>Ratio</td>
<td>Cash / Book Assets Compustat: CHEQ(t) / ATQ(t)</td>
</tr>
<tr>
<td>Sales Growth</td>
<td>Ratio</td>
<td>Δ Sales / Lagged Sales Compustat: Four-Quarter Rolling Average of [REVTQ(t) / REVTQ(t-4)] - 1</td>
</tr>
<tr>
<td>Overall Recovery</td>
<td>Ratio</td>
<td>Real recoveries to all creditors, weighted by principal outstanding at the time of filing (Family Recovery Rate from Moody’s)</td>
</tr>
<tr>
<td>Secured Recovery</td>
<td>Ratio</td>
<td>Real recoveries to secured creditors, weighted by secured principal outstanding at the time of filing (based on instrument-level Moody’s recoveries)</td>
</tr>
<tr>
<td>Unsecured Recovery</td>
<td>Ratio</td>
<td>Real recoveries to unsecured creditors, weighted by unsecured principal outstanding at the time of filing (based on instrument-level Moody’s recoveries)</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Debtor</th>
<th>Court</th>
<th>Filing Date</th>
<th>Type of 363 Sale</th>
<th>Case Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Broadcasting</td>
<td>SD NY</td>
<td>2/13/2009</td>
<td>No Sales</td>
<td>There are no asset sales during the case. Under a plan of reorganization, pre-petition lenders swap a $338 million claim for $75 million in new term notes and all of Young Broadcasting’s common stock. Young Broadcasting is publicly-traded prior to the bankruptcy filing, but becomes privately owned by its senior lenders upon exit from bankruptcy.</td>
</tr>
<tr>
<td>Anchor Glass Container</td>
<td>FL MD</td>
<td>4/15/2002</td>
<td>No Sales</td>
<td>There are no asset sales during the case. Under a pre-packaged plan of reorganization, Anchor Glass restructures its bonds and receives a $100 million equity infusion from private equity investor Cerberus Capital Management.</td>
</tr>
<tr>
<td>Dura Automotive</td>
<td>DE</td>
<td>10/30/2006</td>
<td>Sale of Business Division</td>
<td>Dura Automotive sells their Atwood Mobile Products business to stalking horse bidder Insight Equity (a private equity investor) for an uncontested offer of $160 million in cash. In a separate sale, Dura sells their jack and tool kit business to Autoline Industries (a competing auto parts manufacturer) for $1 million in cash. Dura reorganizes its remaining operating assets under a plan where senior noteholders convert their claims into 95 percent of the new common stock.</td>
</tr>
<tr>
<td>Footstar</td>
<td>SD NY</td>
<td>3/2/2004</td>
<td>Sale of Business Division</td>
<td>Footstar sells its Footaction business to Foot Locker (a competing retailer) for $225 million in cash. Foot Locker makes an initial stalking horse offer of $160 million, but raises its offer when rival Finish Line and others submit competing bids at the auction. Footstar reorganizes around its remaining discount shoe business.</td>
</tr>
<tr>
<td>Tribune Company</td>
<td>DE</td>
<td>12/8/2008</td>
<td>Sale of Business Division</td>
<td>Tribune sells the Chicago Cubs baseball team to Ricketts Family Foundation for $845 million in total consideration, including $740 million in cash. Tribune’s remaining assets are reorganized under a plan where senior lenders exchange debt claims for a substantial equity stake. Oaktree (a private equity investor) becomes the largest shareholder with a 22 percent stake.</td>
</tr>
<tr>
<td>Mattress Discounters</td>
<td>MD</td>
<td>10/22/2002</td>
<td>Sale of Other Assets</td>
<td>Mattress Discounters sells 32 stores to Mattress Gallery and Mattress World (two competing retailers) for $2 million in cash. With over 100 stores remaining, the bankruptcy court approves a plan of reorganization where unsecured creditors receive all of Mattress Discounters’ new common stock.</td>
</tr>
</tbody>
</table>

**Outcome (2): Going Concern Preserved - Sale of All Assets [75 Cases]**

<table>
<thead>
<tr>
<th>Debtor</th>
<th>Court</th>
<th>Filing Date</th>
<th>Type of 363 Sale</th>
<th>Case Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blockbuster</td>
<td>SD NY</td>
<td>9/23/2010</td>
<td>Sale of Business Division</td>
<td>Blockbuster sells substantially all operating assets to Dish Network for $320 million ($228 million in cash and $92 million in assumed liabilities). Cobalt Video (controlled by Carl Icahn) is the stalking horse bidder with an initial offer of $290 million. A liquidating plan distributes the sale proceeds to creditors.</td>
</tr>
<tr>
<td>General Motors</td>
<td>SD NY</td>
<td>6/1/2009</td>
<td>Sale of Business Division</td>
<td>Substantially all of General Motor’s operating assets are sold to Vehicle Acquisition Holdings (a group represented by the U.S. Treasury, the Canadian government and other parties) for $28.8 billion in cash plus other consideration including a $24.2 billion credit bid. After the sale, the remaining estate include the sale proceeds and certain residual assets. A liquidating plan distributes the value of the remaining estate to creditors.</td>
</tr>
<tr>
<td>Milacron</td>
<td>OH SD</td>
<td>3/10/2009</td>
<td>Sale of Business Division</td>
<td>Substantially all of Milacron’s operating assets are sold to stalking horse bidder DDJ Capital (a private equity investor) for $181 million, including $175 million in cash and a credit bid of pre-petition secured notes for $6 million. After the sale, the case is converted to a Chapter 7 liquidation that distributes the sale proceeds to creditors.</td>
</tr>
</tbody>
</table>
### Table A-2

**Bankruptcy Case Outcome Examples**

<table>
<thead>
<tr>
<th>Debtor</th>
<th>Court</th>
<th>Filing Date</th>
<th>Type of 363 Sale</th>
<th>Case Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Steel</td>
<td>IL ND</td>
<td>3/6/2002</td>
<td>Sale of Business Division</td>
<td>Substantially all of National Steel’s operating assets are sold to U.S. Steel Corp (a competing steel producer) for $1.05 billion ($850 million in cash and $200 million in assumed liabilities). The debtor rejects a higher cash bid of $925 million from AK Steel Holding because the offer does not include an agreement with unionized workers. A liquidating plan distributes the sale proceeds to creditors.</td>
</tr>
<tr>
<td>Tokheim Corp</td>
<td>DE</td>
<td>11/21/2002</td>
<td>Sale of Business Division</td>
<td>Substantially all of Tokheim’s operating assets are sold in three separate sales: 1) Private equity firm AXA sponsors a management buyout of Tokheim’s international operations for $162 million in cash, 2) First Reserve Corp acquires Tokheim’s MSI division for $18 million, and 3) Danaher Corp acquires Tokheim’s Gosboy International division for $28 million. A liquidating plan distributes the sale proceeds to creditors.</td>
</tr>
<tr>
<td>Archibald Candy</td>
<td>IL ND</td>
<td>1/28/2004</td>
<td>Sale of Business Division</td>
<td>Substantially all of Archibald’s operating assets are sold in three separate sales: 1) Alpine Confections acquires Archibald’s Fannie May Confections business for $39 million in cash (a premium of $21 million to its original stalking horse offer), 2) Van Buren &amp; Aberdeen acquires real estate assets for $12 million, and 3) liquidators Gordon Brothers and EG Capital acquire the remaining assets for $20.86 (outbidding M&amp;M Meat Shops in an auction). Sale proceeds are distributed under a liquidating plan.</td>
</tr>
<tr>
<td>Jacobson Stores</td>
<td>MI ED</td>
<td>1/15/2002</td>
<td>No Sales</td>
<td>Jacobson Stores attempts to sell itself in bankruptcy but is unable to find a buyer. There are no other asset sales during the case. Without a buyer, Jacobson’s operations are discontinued and a liquidating plan is confirmed.</td>
</tr>
<tr>
<td>Trico Marine Services</td>
<td>DE</td>
<td>8/25/2010</td>
<td>Sale of Other Assets</td>
<td>Substantially all of Trico Marine’s assets are sold in piecemeal sales. There are nine different sales of marine vessels that raise $66 million in total proceeds. Sale proceeds are distributed under a liquidating plan.</td>
</tr>
<tr>
<td>Finlay Enterprises</td>
<td>NY SD</td>
<td>8/5/2009</td>
<td>Sale of Other Assets</td>
<td>Substantially all of Finlay’s assets are sold to Gordon Brothers (a liquidator) for $116 million in cash. Competing bids increase the price from Gordon Brother’s initial stalking horse offer of $105.5 million. Sale proceeds to creditors are distributed under a liquidating plan.</td>
</tr>
<tr>
<td>Logix Communications</td>
<td>TX SD</td>
<td>2/28/2002</td>
<td>Sale of Business Division</td>
<td>A portion of Logix’s operating assets are sold to an investor group for $24 million in cash. With the sale, the Logix name and most of its 350 employees are moved to a newly formed company. The value of the assets not included in the sale and the proceeds from the sale are distributed to creditors under a liquidating plan.</td>
</tr>
<tr>
<td>FLYi</td>
<td>DE</td>
<td>11/7/2005</td>
<td>Sale of Other Assets</td>
<td>FLYi sells some of its gates to Northwest (a competing airline) for $2 million in cash. Subsequently, the airline discontinues its operations. Proceeds are distributed under a liquidating plan.</td>
</tr>
<tr>
<td>Crown Pacific</td>
<td>AZ</td>
<td>6/29/2003</td>
<td>Sale of Other Assets</td>
<td>Crown Pacific sells sawmill assets to International Forest Products for $74 million ($57 million in cash and $17 million in assumed liabilities). The court approves a plan to liquidate the remaining assets, which include an arrangement to transfer land assets to Cascade Timberlands (a company owned by Crown’s creditors).</td>
</tr>
</tbody>
</table>

**Outcome (3): Liquidation or Piecemeal Sale [38 Cases]**
This table presents pair-wise correlations between firm characteristics used in the main empirical analysis. The variables are defined in Appendix Table A-1 and are dated at the time of the bankruptcy filing or in the second year prior to the bankruptcy filing (where \([t-1]\) is noted next to the explanatory variable).

<table>
<thead>
<tr>
<th>Firm Characteristic</th>
<th>Secured Debt Ratio</th>
<th>EBITDA / Assets ([t-1])</th>
<th>EBITDA Volatility ([t-1])</th>
<th>Book Leverage ([t-1])</th>
<th>PP&amp;E / Total Assets ([t-1])</th>
<th>Non-cash Current/ Total Assets ([t-1])</th>
<th>Cash / Total Assets ([t-1])</th>
<th>Log of Book Assets ([t-1])</th>
<th>Sales Growth ([t-1])</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secured Debt Ratio</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBITDA to Assets ([t-1])</td>
<td>0.047</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBITDA Volatility ([t-1])</td>
<td>0.027</td>
<td>0.034</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book Leverage ([t-1])</td>
<td>-0.022</td>
<td>0.368</td>
<td>0.369</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PP&amp;E / Total Assets ([t-1])</td>
<td>0.013</td>
<td>0.082</td>
<td>-0.032</td>
<td>0.086</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-cash Current / Total Assets ([t-1])</td>
<td>0.199</td>
<td>0.162</td>
<td>-0.004</td>
<td>-0.083</td>
<td>-0.403</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash / Total Assets ([t-1])</td>
<td>-0.202</td>
<td>-0.465</td>
<td>0.168</td>
<td>-0.113</td>
<td>-0.085</td>
<td>-0.312</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log of Book Assets ([t-1])</td>
<td>-0.127</td>
<td>0.068</td>
<td>-0.178</td>
<td>-0.191</td>
<td>0.073</td>
<td>-0.214</td>
<td>-0.022</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Sales Growth ([t-1])</td>
<td>-0.073</td>
<td>-0.265</td>
<td>0.196</td>
<td>-0.117</td>
<td>0.022</td>
<td>-0.257</td>
<td>0.349</td>
<td>0.070</td>
<td>1.000</td>
</tr>
</tbody>
</table>
Table A-4
C&I Spread: Asset Sales and Bankruptcy Resolution Outcomes

This table reproduces the analyses in Tables 4 and 5, replacing the B-BBB Spread variable with the C&I Spread variable. In Panel A, coefficients from the probit regressions are reported as marginal probabilities, evaluated at the sample means. In Panel B, coefficients from the multinomial logit regressions are reported as relative risk ratios, interpreted as the increase in probability of the given outcome divided by increase in probability of a reorganization for a unit change in the independent variable. Continuous variables are de-meaned and normalized by their standard deviation. The independent variables are defined in Appendix Table A-1 and are dated at the time of the bankruptcy filing or in the second year prior to the bankruptcy filing (where [t-1] is noted next to the explanatory variable). Asterisks next to the coefficients denote statistical significance with heteroskedasticity-robust standard errors and clustering by year of filing: *** denotes a 1 percent significance level, ** denotes a 5 percent significance level, and * denotes a 10 percent significance level. We report the corresponding z-statistics in parentheses below each of the main coefficients.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Incidence of Sales</th>
<th>Magnitude of Sales</th>
<th>Bankruptcy Resolution Type [Multi-Logit]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secured Debt Ratio</td>
<td>0.056***</td>
<td>0.046***</td>
<td>0.055**</td>
</tr>
<tr>
<td></td>
<td>(4.196)</td>
<td>(3.818)</td>
<td>(2.194)</td>
</tr>
<tr>
<td>C&amp;I Spread</td>
<td>-0.069</td>
<td>-0.049</td>
<td>0.059</td>
</tr>
<tr>
<td></td>
<td>(-1.617)</td>
<td>(-1.575)</td>
<td>(1.236)</td>
</tr>
<tr>
<td>Negative Shock (Industry)</td>
<td>-0.074</td>
<td>-0.059</td>
<td>-0.017</td>
</tr>
<tr>
<td></td>
<td>(-1.213)</td>
<td>(-1.232)</td>
<td>(-0.159)</td>
</tr>
<tr>
<td>Positive Shock (Industry)</td>
<td>-0.056</td>
<td>-0.033</td>
<td>-0.025</td>
</tr>
<tr>
<td></td>
<td>(-1.027)</td>
<td>(-0.743)</td>
<td>(-0.567)</td>
</tr>
<tr>
<td>Neg. Shock (Ind) * (C&amp;I Spread)</td>
<td>0.199***</td>
<td>0.164***</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(4.158)</td>
<td>(4.470)</td>
<td>(-0.148)</td>
</tr>
<tr>
<td>Pos. Shock (Ind) * (C&amp;I Spread)</td>
<td>0.168***</td>
<td>0.145***</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>(2.701)</td>
<td>(3.148)</td>
<td>(0.766)</td>
</tr>
<tr>
<td>Industry Financial Dependence</td>
<td>0.040</td>
<td>0.211**</td>
<td>1.641***</td>
</tr>
<tr>
<td></td>
<td>(1.219)</td>
<td>(2.566)</td>
<td>(2.950)</td>
</tr>
<tr>
<td>Ind. Financial Dep. * (C&amp;I Spread)</td>
<td>0.042</td>
<td>0.143***</td>
<td>2.388***</td>
</tr>
<tr>
<td></td>
<td>(1.179)</td>
<td>(2.737)</td>
<td>(3.082)</td>
</tr>
<tr>
<td>Industry Concentration (HHI)</td>
<td>-0.043</td>
<td>0.092**</td>
<td>0.918</td>
</tr>
<tr>
<td></td>
<td>(-0.975)</td>
<td>(2.066)</td>
<td>(-0.746)</td>
</tr>
<tr>
<td>Neg. Shock (Ind) * HHI</td>
<td>-0.039</td>
<td>-0.037*</td>
<td>0.782</td>
</tr>
<tr>
<td></td>
<td>(-1.573)</td>
<td>(-1.756)</td>
<td>(-0.919)</td>
</tr>
<tr>
<td>Pos. Shock (Ind) * HHI</td>
<td>0.031</td>
<td>-0.043</td>
<td>1.430</td>
</tr>
<tr>
<td></td>
<td>(0.494)</td>
<td>(-0.797)</td>
<td>(1.441)</td>
</tr>
<tr>
<td>Defined Benefit Pension</td>
<td>-0.030</td>
<td>-0.014</td>
<td>0.085**</td>
</tr>
<tr>
<td></td>
<td>0.907</td>
<td>0.909</td>
<td>1.229</td>
</tr>
<tr>
<td>Court Busyness</td>
<td>-0.005</td>
<td>0.000</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>1.069</td>
<td>1.142</td>
<td>0.774</td>
</tr>
<tr>
<td>Industry Market to Book</td>
<td>-0.009</td>
<td>-0.007</td>
<td>0.064**</td>
</tr>
<tr>
<td></td>
<td>1.330</td>
<td>1.360</td>
<td>0.748</td>
</tr>
<tr>
<td>EBITDA / Assets [t-1]</td>
<td>-0.013</td>
<td>-0.012</td>
<td>0.067</td>
</tr>
<tr>
<td></td>
<td>1.044</td>
<td>0.985</td>
<td>0.867</td>
</tr>
<tr>
<td>Book Leverage [t-1]</td>
<td>-0.142*</td>
<td>-0.119*</td>
<td>-0.131**</td>
</tr>
<tr>
<td></td>
<td>0.419***</td>
<td>0.344***</td>
<td>0.553**</td>
</tr>
<tr>
<td>Sales Growth [t-1]</td>
<td>-0.017</td>
<td>-0.010</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>0.839*</td>
<td>0.814**</td>
<td>0.899</td>
</tr>
<tr>
<td>Log of Book Assets [t-1]</td>
<td>0.066***</td>
<td>0.048***</td>
<td>0.042</td>
</tr>
<tr>
<td></td>
<td>0.787</td>
<td>0.761</td>
<td>0.452**</td>
</tr>
<tr>
<td>Non-cash Current Assets / Assets [t-1]</td>
<td>0.058</td>
<td>0.037</td>
<td>0.052**</td>
</tr>
<tr>
<td></td>
<td>1.450**</td>
<td>1.248</td>
<td>1.668</td>
</tr>
<tr>
<td>Cash Holdings / Assets [t-1]</td>
<td>0.016</td>
<td>0.014</td>
<td>0.045</td>
</tr>
<tr>
<td></td>
<td>1.408**</td>
<td>1.351**</td>
<td>1.519*</td>
</tr>
<tr>
<td>PP&amp;E / Assets [t-1]</td>
<td>-0.077***</td>
<td>-0.067***</td>
<td>-0.015</td>
</tr>
<tr>
<td></td>
<td>0.798</td>
<td>0.616**</td>
<td>1.103</td>
</tr>
<tr>
<td>Industry Effects [F-F 49]</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Court and Pre-Pack Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>350</td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>Unconditional Probability</td>
<td>0.323</td>
<td>0.323</td>
<td>-</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.418</td>
<td>0.425</td>
<td>0.307</td>
</tr>
</tbody>
</table>

Incidence of Sales  Magnitude of Sales  Bankruptcy Resolution Type [Multi-Logit]
### Table A-5

#### Description of Industry Shock Variable

This table summarizes the industry shock variable used in the main empirical analysis. The negative (positive) industry shock variable is an indicator that the firm's industry median sales growth or cumulative stock return for the year prior to filing are in the lowest (highest) sample quartile and neither variable is in the highest (lowest) sample quartile. Percentages sum to 100 percent across each row. Panel A breaks out the industry shocks according to the year of filing. Panel B shows the distribution of shocks by industry where there are at least five cases in the sample. The industries are sorted by the number of total filings in descending order.

<table>
<thead>
<tr>
<th></th>
<th>Negative Shock</th>
<th>Positive Shock</th>
<th>No Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td>All Filings</td>
<td>350</td>
<td>118</td>
<td>32.3%</td>
</tr>
</tbody>
</table>
| Panel A: Industry Shocks by Year of Filing
<table>
<thead>
<tr>
<th>Year</th>
<th>Count</th>
<th>Percent</th>
<th>Count</th>
<th>Percent</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>85</td>
<td>52.9%</td>
<td>10</td>
<td>11.8%</td>
<td>30</td>
<td>35.3%</td>
</tr>
<tr>
<td>2003</td>
<td>59</td>
<td>5.1%</td>
<td>33</td>
<td>55.9%</td>
<td>23</td>
<td>39.0%</td>
</tr>
<tr>
<td>2004</td>
<td>31</td>
<td>0.0%</td>
<td>28</td>
<td>90.3%</td>
<td>3</td>
<td>9.7%</td>
</tr>
<tr>
<td>2005</td>
<td>23</td>
<td>4.4%</td>
<td>8</td>
<td>34.8%</td>
<td>14</td>
<td>69.9%</td>
</tr>
<tr>
<td>2006</td>
<td>17</td>
<td>11.8%</td>
<td>7</td>
<td>41.2%</td>
<td>8</td>
<td>47.1%</td>
</tr>
<tr>
<td>2007</td>
<td>10</td>
<td>0.0%</td>
<td>3</td>
<td>30.0%</td>
<td>7</td>
<td>70.0%</td>
</tr>
<tr>
<td>2008</td>
<td>27</td>
<td>48.2%</td>
<td>2</td>
<td>7.4%</td>
<td>12</td>
<td>44.4%</td>
</tr>
<tr>
<td>2009</td>
<td>66</td>
<td>81.8%</td>
<td>6</td>
<td>9.1%</td>
<td>6</td>
<td>9.1%</td>
</tr>
<tr>
<td>2010</td>
<td>17</td>
<td>0.0%</td>
<td>8</td>
<td>47.1%</td>
<td>9</td>
<td>52.9%</td>
</tr>
<tr>
<td>2011</td>
<td>15</td>
<td>0.0%</td>
<td>8</td>
<td>53.3%</td>
<td>7</td>
<td>46.7%</td>
</tr>
</tbody>
</table>
| Panel B: Industry Shocks by Industry
<table>
<thead>
<tr>
<th>Industry</th>
<th>Count</th>
<th>Percent</th>
<th>Count</th>
<th>Percent</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications</td>
<td>51</td>
<td>49.0%</td>
<td>16</td>
<td>31.4%</td>
<td>10</td>
<td>19.6%</td>
</tr>
<tr>
<td>Retail</td>
<td>27</td>
<td>29.6%</td>
<td>8</td>
<td>29.6%</td>
<td>11</td>
<td>40.7%</td>
</tr>
<tr>
<td>Steel</td>
<td>21</td>
<td>33.3%</td>
<td>11</td>
<td>52.4%</td>
<td>3</td>
<td>14.3%</td>
</tr>
<tr>
<td>Transportation</td>
<td>21</td>
<td>4.8%</td>
<td>7</td>
<td>33.3%</td>
<td>13</td>
<td>61.9%</td>
</tr>
<tr>
<td>Automotive</td>
<td>17</td>
<td>41.2%</td>
<td>3</td>
<td>17.7%</td>
<td>7</td>
<td>41.2%</td>
</tr>
<tr>
<td>Entertainment</td>
<td>13</td>
<td>30.8%</td>
<td>2</td>
<td>15.4%</td>
<td>7</td>
<td>53.9%</td>
</tr>
<tr>
<td>Rubber &amp; Plastic</td>
<td>13</td>
<td>23.1%</td>
<td>7</td>
<td>53.9%</td>
<td>3</td>
<td>23.1%</td>
</tr>
<tr>
<td>Oil &amp; Gas</td>
<td>12</td>
<td>66.7%</td>
<td>2</td>
<td>16.7%</td>
<td>2</td>
<td>16.7%</td>
</tr>
<tr>
<td>Chemicals</td>
<td>11</td>
<td>45.5%</td>
<td>6</td>
<td>54.6%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Business Services</td>
<td>11</td>
<td>36.4%</td>
<td>1</td>
<td>9.1%</td>
<td>6</td>
<td>54.6%</td>
</tr>
<tr>
<td>Paper &amp; Office Supplies</td>
<td>10</td>
<td>60.0%</td>
<td>3</td>
<td>30.0%</td>
<td>1</td>
<td>10.0%</td>
</tr>
<tr>
<td>Textiles</td>
<td>9</td>
<td>0.0%</td>
<td>6</td>
<td>66.7%</td>
<td>3</td>
<td>33.3%</td>
</tr>
<tr>
<td>Hotel &amp; Restaurant</td>
<td>9</td>
<td>0.0%</td>
<td>6</td>
<td>66.7%</td>
<td>3</td>
<td>33.3%</td>
</tr>
<tr>
<td>Food &amp; Grocery</td>
<td>8</td>
<td>0.0%</td>
<td>4</td>
<td>50.0%</td>
<td>4</td>
<td>50.0%</td>
</tr>
<tr>
<td>Apparel</td>
<td>8</td>
<td>37.5%</td>
<td>3</td>
<td>37.5%</td>
<td>2</td>
<td>25.0%</td>
</tr>
<tr>
<td>Machinery</td>
<td>8</td>
<td>37.5%</td>
<td>2</td>
<td>25.0%</td>
<td>3</td>
<td>37.5%</td>
</tr>
<tr>
<td>Printing &amp; Publishing</td>
<td>7</td>
<td>71.4%</td>
<td>1</td>
<td>14.3%</td>
<td>1</td>
<td>14.3%</td>
</tr>
<tr>
<td>Household Products</td>
<td>7</td>
<td>28.6%</td>
<td>1</td>
<td>14.3%</td>
<td>4</td>
<td>57.1%</td>
</tr>
<tr>
<td>Building Materials</td>
<td>7</td>
<td>14.3%</td>
<td>2</td>
<td>28.6%</td>
<td>4</td>
<td>57.1%</td>
</tr>
<tr>
<td>Construction</td>
<td>7</td>
<td>57.1%</td>
<td>2</td>
<td>28.6%</td>
<td>1</td>
<td>14.3%</td>
</tr>
<tr>
<td>Utilities</td>
<td>7</td>
<td>28.6%</td>
<td>2</td>
<td>28.6%</td>
<td>3</td>
<td>42.9%</td>
</tr>
<tr>
<td>Software</td>
<td>7</td>
<td>28.6%</td>
<td>1</td>
<td>14.3%</td>
<td>4</td>
<td>57.1%</td>
</tr>
<tr>
<td>Wholesale</td>
<td>7</td>
<td>28.6%</td>
<td>3</td>
<td>42.9%</td>
<td>2</td>
<td>28.6%</td>
</tr>
<tr>
<td>Fabricated Products</td>
<td>6</td>
<td>16.7%</td>
<td>5</td>
<td>83.3%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Electrical</td>
<td>6</td>
<td>50.0%</td>
<td>1</td>
<td>16.7%</td>
<td>2</td>
<td>33.3%</td>
</tr>
<tr>
<td>Personal Services</td>
<td>6</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>6</td>
<td>100.0%</td>
</tr>
<tr>
<td>Electronics</td>
<td>5</td>
<td>60.0%</td>
<td>2</td>
<td>40.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
Table A-6

Alternative Definitions of Liquidation

This table reports probit regressions for two alternative definitions of a liquidation outcome. Coefficients are reported as marginal probabilities evaluated at the sample means. Continuous variables are de-meaned and normalized by their standard deviation. The independent variables are defined in Appendix Table A-1 and are dated at the time of the bankruptcy filing or in the second year prior to the bankruptcy filing (where "[t-1]" is noted next to the explanatory variable). ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by year of filing. Z-statistics are reported in parentheses.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Incidence of Liquidation [Probit]</th>
<th>1 = Liquidation or Piecemeal Sale, or Sale of All Assets</th>
<th>1 = Liquidation or Piecemeal Sale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secured Debt Ratio</td>
<td>0.045***</td>
<td>0.099***</td>
<td>0.076***</td>
</tr>
<tr>
<td></td>
<td>(2.614)</td>
<td>(4.901)</td>
<td>(3.052)</td>
</tr>
<tr>
<td>Industry Market to Book</td>
<td>0.003</td>
<td>-0.059*</td>
<td>-0.044</td>
</tr>
<tr>
<td></td>
<td>(0.067)</td>
<td>(-1.697)</td>
<td>(-0.890)</td>
</tr>
<tr>
<td>Industry Concentration (HHI)</td>
<td>0.008</td>
<td>0.066</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>(0.330)</td>
<td>(1.524)</td>
<td>(0.604)</td>
</tr>
<tr>
<td>Industry Financial Dependence</td>
<td>0.019</td>
<td>0.072</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>(0.531)</td>
<td>(1.384)</td>
<td>(1.471)</td>
</tr>
<tr>
<td>Negative Shock (Industry)</td>
<td>-0.060</td>
<td>0.053</td>
<td>0.078</td>
</tr>
<tr>
<td></td>
<td>(-1.057)</td>
<td>(0.579)</td>
<td>(1.033)</td>
</tr>
<tr>
<td>Positive Shock (Industry)</td>
<td>0.056</td>
<td>0.071</td>
<td>0.084</td>
</tr>
<tr>
<td></td>
<td>(0.582)</td>
<td>(0.582)</td>
<td>(0.912)</td>
</tr>
<tr>
<td>B - BBB Spread</td>
<td>0.050</td>
<td>-0.079</td>
<td>-0.005</td>
</tr>
<tr>
<td></td>
<td>(-1.595)</td>
<td>(-1.476)</td>
<td>(-0.447)</td>
</tr>
<tr>
<td>HHI * (B - BBB Spread)</td>
<td>0.040</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.933)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ind. Financial Dep. * (B - BBB Spread)</td>
<td>0.028</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.415)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neg. Shock (Ind) * (B - BBB Spread)</td>
<td>0.184**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.141)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pos. Shock (Ind) * (B - BBB Spread)</td>
<td>0.308***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.058)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defined Benefit Pension</td>
<td>-0.020</td>
<td>0.021</td>
<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>(-0.387)</td>
<td>(0.422)</td>
<td>(-0.105)</td>
</tr>
<tr>
<td>Court Busyness</td>
<td>-0.047</td>
<td>-0.002</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(-1.159)</td>
<td>(-0.049)</td>
<td>(0.047)</td>
</tr>
<tr>
<td>EBITDA to Assets [t-1]</td>
<td>-0.016</td>
<td>-0.014</td>
<td>-0.014</td>
</tr>
<tr>
<td>EBITDA Volatility [t-1]</td>
<td>0.059</td>
<td>0.058</td>
<td>0.060</td>
</tr>
<tr>
<td>Book Leverage [t-1]</td>
<td>-0.129***</td>
<td>-0.200***</td>
<td>-0.206***</td>
</tr>
<tr>
<td>PP&amp;E / Assets [t-1]</td>
<td>-0.039</td>
<td>-0.057*</td>
<td>-0.064*</td>
</tr>
<tr>
<td>Non-cash Current Assets / Assets [t-1]</td>
<td>0.049</td>
<td>0.112***</td>
<td>0.122***</td>
</tr>
<tr>
<td>Cash Holdings / Assets [t-1]</td>
<td>0.059**</td>
<td>0.110***</td>
<td>0.108***</td>
</tr>
<tr>
<td>Log of Book Assets [t-1]</td>
<td>-0.055*</td>
<td>-0.060*</td>
<td>-0.065*</td>
</tr>
<tr>
<td>Sales Growth [t-1]</td>
<td>-0.048**</td>
<td>-0.048</td>
<td>-0.058</td>
</tr>
<tr>
<td>Industry Effects [F-F 49]</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Court and Pre-Pack Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>350</td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>Unconditional Probability</td>
<td>0.323</td>
<td>0.323</td>
<td>0.323</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.288</td>
<td>0.398</td>
<td>0.418</td>
</tr>
</tbody>
</table>

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**Table A-7**  
**Alternative Measures of Creditor Control**

This table reports probit regressions for the incidence asset sales and bankruptcy outcome on alternative proxies for senior creditor control. The dependent and independent variables are defined in Appendix Table A-1 and are dated at the time of the bankruptcy filing or in the second year prior to the bankruptcy filing (where "[t-1]" is noted next to the explanatory variable). Coefficients from the probit regressions are reported as marginal probabilities, evaluated at the sample means. Continuous variables are de-meaned and normalized by their standard deviation. Asterisks next to the coefficients denote statistical significance with heteroskedasticity-robust standard errors and clustering by year of filing: *** denotes a 1 percent significance level, ** denotes a 5 percent significance level, and * denotes a 10 percent significance level. We report the corresponding z-statistics in parentheses below each of the main coefficients.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Incidence of Asset Sales and Bankruptcy Outcome [Probit]</th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 = 363 Asset Sale</td>
<td>1 = Sale of All Assets as Going Concern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 50% Secured [Filing]</td>
<td>0.021</td>
<td>0.340**</td>
<td>0.329***</td>
<td>0.150***</td>
<td>0.142***</td>
<td>0.031***</td>
</tr>
<tr>
<td></td>
<td>(0.212)</td>
<td>(2.498)</td>
<td>(3.211)</td>
<td>(2.685)</td>
<td>(3.422)</td>
<td>(3.113)</td>
</tr>
<tr>
<td>Has DIP Financing</td>
<td>-0.079</td>
<td></td>
<td></td>
<td>-0.067</td>
<td>(-1.470)</td>
<td>(-0.989)</td>
</tr>
<tr>
<td></td>
<td>(-1.470)</td>
<td></td>
<td></td>
<td>(-0.989)</td>
<td>(-1.493)</td>
<td></td>
</tr>
<tr>
<td>Has DIP x ≥ 50% Secured</td>
<td>0.098</td>
<td></td>
<td></td>
<td>-0.066</td>
<td>(0.908)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.908)</td>
<td></td>
<td></td>
<td>(-1.493)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-petition Rollup</td>
<td>0.278**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.563)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-pet. Rollup x ≥ 50% Secured</td>
<td>-0.296</td>
<td></td>
<td>-0.043***</td>
<td></td>
<td>(-1.312)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.312)</td>
<td></td>
<td>(-2.859)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milestone for Plan or Sale</td>
<td>0.506**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.563)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milestone x ≥ 50% Secured</td>
<td>-0.311</td>
<td></td>
<td>-0.006***</td>
<td></td>
<td>(-1.599)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.599)</td>
<td></td>
<td>(-3.253)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 50% Non-Bank Lenders [DIP]</td>
<td></td>
<td>-0.188***</td>
<td></td>
<td></td>
<td>(-2.923)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.923)</td>
<td></td>
<td></td>
<td>(-2.775)</td>
<td></td>
</tr>
<tr>
<td>≥ 50% Non-Bank x ≥ 50% Secured</td>
<td>0.120</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td></td>
<td>(1.162)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Effects [F-F 49]</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year of Filing Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm and Case Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Excluding Liq./Piecemeal Sales</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>350</td>
<td>233</td>
<td>206</td>
<td>248</td>
<td>312</td>
<td>210</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.407</td>
<td>0.479</td>
<td>0.491</td>
<td>0.475</td>
<td>0.486</td>
<td>0.520</td>
</tr>
</tbody>
</table>
Chapter 3 – Analyst Promotions within Credit Rating Agencies: Bias or Skill?

Co-authored with Darren Kisgen and Jonathan Reuter

I. Introduction

The potential conflicts of interest in the credit rating process have been well documented. Rating agencies are paid directly by the firms they rate rather than by investors, calling into question their objectivity. Exacerbating this potential problem is the widespread integration of credit ratings into rules and regulations on investments by banks, pension funds, insurance companies and other institutions. These regulations provide inherent value to ratings regardless of quality (Behr, Kisgen, and Taillard (2015)). These previous studies however do not evaluate the inner workings of a rating agency. In particular, how are credit rating analysts within a rating agency incentivized? Are they rewarded for providing timely accurate ratings or are they rewarded for providing overly optimistic ratings to clients?

In this paper we examine the promotion decisions within Moody’s to determine whether rating analysts are rewarded for their accuracy or whether they are rewarded or punished for any systematic biases (being optimistic or pessimistic in their ratings). We hand collected data on analyst names and positions from over 40,000 "announcement" and "ratings action" reports on corporate debt between 2002 and 2011. Our final sample includes 183 Moody's analysts covering 1,843 firms. We identify five main analyst titles and track analysts over time to see if they are promoted or depart the firm. Arguably ratings agencies that are interested in quality should prioritize accuracy in determining promotions and ignore any bias (assuming the bias leads to more accuracy). However, if conflicts of interest are prevalent, we expect to find that analysts who rate firms negatively get punished by rating agencies and accuracy is largely ignored.

In our first set of tests, we find that ratings agencies reward accuracy. We define a Moody’s analyst as being accurate if, in the cases in which his rating diverges from S&P’s rating on the same company, the S&P analyst is subsequently more likely to conform to the Moody’s rating (disagreement occurs in 77.9% of analyst-year observations in our sample). In this regard,
the Moody’s analyst’s divergent ratings were validated since S&P eventually followed the Moody’s analyst. This measure is also likely correlated with other measures of accuracy such as subsequent changes in yields or default likelihoods for which data is less available (for our sample, actual default outcomes are too infrequent to provide any reasonable measure of accuracy).

We then examine whether analysts who are more accurate are more likely to be promoted and less likely to depart the firm. We find that an analyst that has greater than the median number of accurate ratings is approximately 1.4 times as likely to be promoted compared to other analysts. This result is evident throughout analyst levels, but is especially prevalent for lower level analysts. Accurate analysts are also significantly less likely to resign from the firm. While we think promotions and resignations are interesting outcomes for analysis, the paper prioritizes promotions since they are clearly positive outcomes. While we believe a resignation is more likely to be a negative outcome, not all resignations are negative.

Our next set of tests evaluates whether promotions are more likely depending on the bias of the analyst. In these tests we find that negative bias appears to be punished by Moody’s. We measure negative bias in several ways, but our main approach is to evaluate the frequency that each analyst downgrades away from the S&P rating on a firm (59.1% of analysts downgrade or upgrade at least 10% of his rated assets in a given year). Consider a firm that has a BBB rating from both Moody’s and S&P. We define a Moody’s analyst to have a negative bias if the analyst downgraded the rating to BBB-, departing negatively from the current S&P rating. Using S&P as a benchmark implicitly controls for firm fundamentals, removing some concerns about analyst selection bias. And using changes in ratings instead of levels of ratings reduces concerns about a Moody’s fixed effect or industry-analyst fixed effects. We show however that our findings do not change if we conduct tests in levels or evaluating downgrades generally without a benchmark. Using this measure of negative bias, we find that analysts with negative bias are less likely to get
promoted and more likely to depart the firm. We do not find any differential effects for an analyst that has an upward bias.

We also look at whether downgrades that are particularly harmful for a firm are punished more by Moody’s. If Moody’s is catering to its clients, we would expect those downgrades that are associated with significant negative equity returns to be most harmful to client relationships. On the other hand, downgrades that have substantial returns associated with them could be viewed as the most informative ratings changes, and Moody’s might reward analysts for identifying flaws in a firm that the market has not identified. We limit our sample for these tests to the subset of analyst-year observations for which we observe a downgrade and can calculate a 3-day announcement return and we define a low abnormal return as -10 percent or below. We find that analysts generating a low abnormal return in year t-1 are significantly less likely to be promoted in year t. This result reinforces the previous results showing that Moody’s punishes downgrading analysts generally.

Our final set of tests attempt to reconcile these seemingly contradictory set of results. That is, Moody’s rewards accuracy but punishes negative bias. We examine this by running both variables jointly in a predictive regression for promotions together with interactions between the two. In these tests, both measures remain predictive for promotions. Overall, our findings are consistent with Moody’s valuing accuracy, but also wanting its analysts to avoid downgrades that are likely to generate negative returns and media attention for its issuers.

II. Hypothesis Development and Related Literature

We test two distinct hypotheses in this paper regarding the incentive systems within rating agencies. The first is that rating agencies reward analysts who are more accurate. Rating agencies are primarily information providers and rely on their reputations for accurate information to drive their business. If the desire for accuracy is paramount to rating agencies, they will reward analysts who provide more accurate ratings on a timely basis. The null hypothesis is that ratings agencies do not care about accuracy due to a lack of significant
competition in the rating industry as well as the ratings payment model of issuer pay. Regulations in the rating industry both increase barriers to entry and provide a guaranteed client base since many regulations for institutional bond investment depend on ratings. Kisgen and Strahan (2010) find that regulations based on ratings affect a firm’s cost of capital, implying firms have a material reason to care about their credit rating absent any information content of those ratings. These regulations therefore might lead rating agencies to place little weight on analyst accuracy in promotion and firing decisions. Similarly, Cornaggia and Cornaggia (2013) show that ratings agencies that are paid directly by investors provide ratings that are more timely with regard to default likelihoods.

The other hypothesis we test is that ratings agencies instead reward optimistic ratings and punish pessimistic ratings. To attract new business, rating agencies might forgo accuracy and offer positive ratings to encourage a firm to choose that agency. Some contend that optimist ratings on mortgage backed securities contributed to the recent financial crisis (Griffin and Tang (2012)). Behr, Kisgen and Taillard (2015) find that entrenchment due to ratings regulations first established in 1975 led to ratings inflation. Bongaerts, Cremers and Goetzmann (2006) find that firms shop for the best rating they can get, especially if the already have split ratings from Moody’s and S&P around the investment grade rating distinction. Fracassi, Petry and Tate (2015) examine analyst bias and determine that some analysts’ ratings are systematically optimistic or pessimistic. They also show this affects corporate decision making, consistent with the implications of Kisgen (2006). Blume, Lim, and MacKinlay (1998) and Alp (2013) show that ratings standards have changed over time. While all of these studies suggest that rating standards shift and rating analysts may contribute to that shifting, none of them examine whether or how any bias by ratings analysts affects their career outcomes.

We test these two hypotheses using two primary outcome variables to examine career outcomes: promotions and resignations. Promotions are a clear positive outcome for an analyst. Resignations we view as largely negative, although we recognize that not all departures from a
rating agency are negative. For example, Cornaggia, Cornaggia and Xia (2015) find that some ratings analysts leave a rating agency to go work for the bank they rated (favorably). While this may occur, we would view this as a unique case. In general, losing one’s job on average can be reasonably assumed to be a negative outcome. However because we recognize this is not guaranteed, we provide results excluding resignations from the analysis as well. If Moody's values accurate corporate bond ratings, we expect those analysts issuing more accurate ratings to be promoted within Moody's. Alternatively, if Moody's expects optimistic corporate bond ratings to increase revenues, we expect those analysts issuing more optimistic and less pessimistic ratings to be promoted.

III. Data

We analyze hand-collected data on Moody’s analyst coverage, ratings, promotions and departures. Our data come from over 40,000 ‘announcement’ and ‘rating action’ reports published on Moody’s website between 2002 and 2011. Each report is linked to a firm and typically includes the names and current titles of two credit rating analysts (e.g., “John Smith, Senior Analyst”). Aggregating this analyst information across all firms, we are able to infer the timing of promotions within Moody’s and departures from Moody’s. Our review of all Moody’s reports linked to Compustat firms during the sample period yields 342 unique analysts. From this initial list, we limit our sample to analysts with at least one year of tenure at Moody’s and at least five analyst reports, where the analyst-rank spell begins in 2001 or later. We further limit our

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1 We assume an analyst covers a firm if they have signed at least one of the last two analyst reports specific to the firm. We deem a report specific to the firm, as opposed to a broader industry comment, if the same report is linked to fewer than four firms. An analyst’s coverage status expires after two years of inactivity on the firm or when the firm leaves the Compustat database.

2 We assume that analysts are promoted on the date of the first report where the analyst lists a new title. We do not find any instances of apparent analyst demotions in the data (i.e., an analyst assumes a lower rank subsequent to obtaining a higher rank). We assume that analysts leave Moody’s on January 1 of the calendar year immediately after the year in which we last observe the analyst name.

3 Moody’s began publishing analyst reports on their website in 2000. Because we cannot determine the history of analyst-rank spells in effect at the start of the sample, we include only analyst-rank spells that begin in 2001 or later in our sample for analysis. This allows us to condition promotion and resignation decisions on time in rank.
sample to analyst-years with at least one firm-level credit rating. The final sample consists of 183 unique analysts covering 1,843 firms across 801 analyst-years and 9,557 firm-years.

We supplement our hand-collected data with firm- and event-level information from other standard sources. We obtain Moody’s credit ratings data from Moody’s Default Risk Service database. We then match each firm to Compustat, where we obtain firm-level financial information and the corresponding S&P ratings for each firm. We compare Moody’s rating for each firm to S&P’s rating by converting both rating scales to a numeric index, ranging from 1 (Ca/CC or lower) to 20 (Aaa/AAA). For this index, ratings of 11 (Baa3/BBB-) or greater are considered investment-grade, whereas ratings numbered 10 (Ba1/BB+) or less are considered speculative-grade. Finally, using daily stock return data from CRSP, we calculate three-day abnormal stock returns around the dates of ratings actions by analysts in the sample.

Since analysts typically cover several firms simultaneously, we aggregate all firm- and event-level data to the analyst-year level for our main empirical analysis as described below.

To understand how Moody’s assigns coverage of firms across its analyst ranks, Table 1 reports analyst-level summary statistics by rank. The five ranks (listed from most junior to most senior) are Analyst, Senior Analyst, Senior Credit Officer, Senior Vice President, and Managing Director. The average Moody’s analyst rates 14.6 firms representing $160 billion in aggregate firm assets. However, the number and average size of firms covered increases significantly with rank. The average Analyst covers 7.4 firms with an average firm size of $11.4 billion in assets, while the average Managing Director covers 28.3 firms with an average firm size of $24.6 billion in assets. Aggregate firm assets covered increases from $34 billion for Analysts to $383 billion for Managing Directors. These statistics reveal that analysts assume significantly broader firm

\[4\] We use Moody’s long term issuer rating. If unavailable, we use the Moody’s Corporate Family rating.
\[5\] We calculate abnormal stock returns around downgrades, upgrades, and new ratings using a Fama-French three factor model estimated using the prior three years of returns.
coverage responsibility as they move up the ranks within Moody’s. The average (and median) rating is consistently above the investment-grade cutoff, but also increases slightly with analyst rank. The fact that the average difference in ratings between Moody’s and S&P is negative confirms existing evidence that ratings issued by Moody’s are slightly lower, on average, than those issued by S&P.

Table 2 presents firm-level summary statistics for the 9,557 firm-year observations. We sort the sample separately by Moody’s credit rating and firm size. In Panel A, we find that firms with higher ratings have the lowest average leverage and highest average profitability. This is to be expected. However, in Panel B, we also find that these firms are disproportionately assigned to Moody’s most senior analysts. For instance, a Managing Director is the most senior rank assigned to 82 percent of firms rated A or higher, but only 56 percent of firms rated B or lower. Likewise, a Senior Vice President or higher is the most junior rank for 27 percent of firms rated A or higher, but only 14 percent of firms rated B or lower. Similar patterns hold for larger versus smaller firms. In other words, Moody’s tends to assign its most senior analysts to cover potentially valuable relationships with larger, less risky firms (e.g., blue chips) while its most junior analysts are assigned to smaller, riskier firms (e.g., junk issuers).

Table 3 summarizes the frequency of Moody’s analyst promotions and resignations. We classify analyst $i$ as having been promoted in year $t$ if the analyst’s title changing from, for example, Analyst to Senior Analyst during year $t$ (or between year $t-1$ and year $t$). We classify analyst $i$ as having resigned from Moody’s in year $t$ if the analyst signed one or more credit reports in year $t-1$ but does not sign any credit reports in year $t$ or later. Across the full sample, we observe promotion and resignation in 12.4 percent and 10.1 percent of analyst-years,

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6 Note that while the typical credit report is signed by both a junior and a senior analyst, the average number of analysts covering each firm is 2.4. The average is greater than two because we are focusing on the number of distinct analysts who covered firm $j$ in calendar year $t$ and there is turnover in analysts within each calendar year.
respectively. Of the 183 unique analysts in the sample, 42.1 percent receive at least one promotion and 44.3 percent leave Moody’s during the sample period.

The rate of both promotion and resignation is highest in the two most junior positions, at a 14.8 and 14.1 percent rate for an Analyst and 17.5 and 11.1 percent rate for a Senior Analyst. Sorting the data by calendar year for all levels (Panel A), we do not observe any discernable time-series patterns with respect to either promotions or resignations. Sorting by number of years in position across all levels (Panel B), we find that the likelihood of promotion is highest in the fourth and fifth years at 23.0 and 21.6 percent compared to 8.5 and 7.1 percent in the first and second years. In our empirical tests below, we control for the current rank, the number of years served in this rank, and calendar year effects.

IV. Results

A. Measures of accuracy and bias

Our goal is to determine how ratings accuracy and bias influences the careers of Moody’s analysts. Evaluating these relations empirically requires us to distinguish accurate ratings from inaccurate ratings and positive bias from negative bias. However, studying Moody’s analysts’ ratings in isolation raises serious measurement issues. For instance, an analyst’s propensity to downgrade or upgrade firms may simply reflect relative performance of the firms and industries that the analyst covers. To address these types of concerns, we compare Moody’s analyst ratings to the corresponding ratings from S&P. Evaluating Moody’s analyst ratings for the same firm relative to S&P helps alleviate concerns of selection bias and eliminates firm or industry fixed effects.

To measure accuracy, we focus on situations where Moody’s and S&P publish different ratings for firm $i$ in year $t$. When the S&P analyst’s next rating change reduces or eliminates this difference in ratings (i.e., S&P follows Moody’s), we classify the Moody’s analyst’s rating of firm $i$ in year $t$ as being accurate. When S&P’s ratings converge to Moody’s ratings for at least 15 percent of the analyst’s rated firm assets in year $t$, we set the “Accurate” dummy variable
equal to one for that Moody’s analyst in year \( t \). By this approach, accuracy could reflect one accurate rating for a relatively large firm or several accurate ratings for relatively small firms. On the other hand, we set the accuracy dummy variable equal to zero if S&P’s ratings do not converge toward Moody’s ratings, or if S&P’s and Moody’s ratings differ for less than 10 percent of the analyst’s rated firm assets. Based on this measure, 318 of the 801 analyst-year observations involve an accurate analyst.

To measure bias, we focus on the frequency that each analyst upgrades or downgrades relative to the S&P rating on a firm. Consider a firm that has a BBB rating from S&P and a (comparable) Baa2 rating from Moody’s. If the Moody’s analyst lowers the rating below Baa2 in year \( t \), we classify the rating change as a downgrade. If the analyst downgrades ratings on at least 10 percent of rated firm assets, we set the “Downgrader” dummy variable equal to one for that analyst in year \( t \). Similarly, if the analyst upgrades ratings on at least 10 percent of rated firm assets, we set the “Upgrader” dummy variable equal to one in year \( t \). Based on this approach, 239 of the 815 analyst-year observations involve downgraders and 242 involve upgraders. (Although a given analyst can be classified as both an “Upgrader” and a “Downgrader” in the same calendar year, this is rare.)

Table 4 presents univariate evidence on the link between accuracy or bias and career outcomes. Focusing on the full sample of analysts, we find that Accurate analysts are more likely to be promoted (16.3% versus 12.3%) and less likely to resign (6.0% versus 12.8%). These differences suggest that, everything else equal, Moody’s values accuracy. When we shift our focus to Downgraders and Upgraders, however, we also find suggestive evidence that Moody’s rewards bias. Downgraders are less likely to be promoted (10.9% versus 15.3%) and more likely to resign (11.9% versus 9.2%). The patterns are qualitatively similar for Upgraders, who are more likely to be promoted and less likely to resign, but the differences are smaller in magnitude. When we focus on promotion and resignation outcomes within a given analyst rank, we find
larger effects of accuracy on the outcomes of more senior analysts, who we have shown to cover more and larger firms.

B. Does accuracy or bias influence Moody’s analyst career path?

Table 5 explores the effect of accuracy on promotions and resignations. In Panel A, we report the odds ratios from an ordered logit that classifies promotions as positive outcomes and resignations as negative outcomes. Because we recognize that resignations need not be negative outcomes, in Panel B, we report the odds ratios from logits that predict whether the analyst is promoted in year $t$ or not. Standard errors are clustered on analyst.

In the univariate specifications that relate accuracy in year $t-1$ to outcomes in year $t$, we find strong evidence that accurate analysts are more likely to be promoted and less likely to resign. The magnitude ranges from 69.0 percent in the ordered logit to 38.8 percent in the logit. When we control for the level of assets rated, current rank, years in current rank, and calendar year (specification [2]) and limit the sample to the three most junior analyst ranks (specification [3]), we continue to find strong evidence that accuracy is rewarded, but only in the ordered logit specifications that consider both promotions and resignations. The odds ratios in the logit specifications predicting promotions decline slightly and are no longer statistically significant at conventional levels.

We have already seen that more senior analysts cover more and larger firms. If Moody’s allocates more assets to the most promising analysts within each rank (defined either as those who are the most accurate or the most biased), we should find a positive relation between the (log) level of assets covered and subsequent career outcomes. Indeed, that is what we find, and the magnitudes are economically significant. For example, increasing the (log) level of assets covered by junior analysts by one point increases the probability of promotion by 45.2 percent.

C. Accuracy and career path with negative versus positive bias

In Table 6, we switch our focus from accuracy to bias. Panels A and B are the same as in Table 5 except the accuracy dummy variable has been replaced with dummy variables that
indicate whether analyst $i$ was an upgrader or a downgrader in year $t-1$. We find, across all six specifications, that downgraders are significantly more likely to be promoted and significantly less likely to resign than other analysts. In univariate specifications, the odds ratio range between 0.676 and 0.685. When we include controls and limit the sample to junior analysts, the odds ratios range between 0.556 and 0.592, and remain statistically significant at the 5-percent level. Interestingly, there is little evidence that upgraders are more likely to be promoted or less likely to resign.

So far, our findings suggest that Moody’s rewards accuracy but punishes downgrades. These patterns beg the question of whether downgrader are systematically less accurate than upgrader. In Panel C, we estimate another set of logit regressions intended to answer this question. The dependent variable is accuracy in year $t-1$, the sample is limited to upgraders or downgraders in year $t-1$, and the independent variable of interest is downgrader year $t-1$. We find that downgraders are significantly more accurate than upgraders, at least when we focus on the sample that includes junior and senior analysts.

**D. Does diverging or converging to S&P influence Moody’s analyst career path?**

In Table 7, we refine our measures of upgrades and downgrades. To begin, we distinguish ratings changes that cause Moody’s ratings to diverge from S&P from ratings changes that cause Moody’s ratings to converge to S&P. When we focus on promotions, in Panel B, we find that divergers are approximately 30 percent less likely to be promoted while convergers are approximately 20 percent more likely to be promoted. These patterns suggest that analysts are rewarded for following S&P and punished for diverging. While the patterns are qualitatively similar in Panel A, only one of the four odds ratios is statistically significant when we focus on promotions and departures. In the remaining specifications, we consider four ratings changes: downgrades that diverge from S&P, upgrades that diverge from S&P, downgrades that converge to S&P, and upgrades that converge to S&P. We find evidence in both panels that Moody’s punishes downgrades that diverge from S&P (odds ratios between 0.545 and 0.646, all significant
at the 5-percent level) and weak evidence in panel B that Moody’s rewards upgrades that converge to S&P (odds ratios between 1.226 and 1.378, two of which are significant at the 10-percent level).

E. **Do stock reactions to rating decisions influence Moody’s analyst career path?**

In Table 8, we ask whether the stock market announcement returns in the three days around a credit report in year $t-1$ predict analyst promotions or resignations in year $t$. On the one hand, analysts may be rewarded for reports that convey new information about default risk to market participants, even if that information is negative. On the other hand, analysts may be punished for reports that significantly reduce the market capitalization of Moody’s clients. To distinguish between this two possibilities, we focus on the most negative announcement returns.

The independent variables and specifications mirror those in Tables 5 and 6. The dependent variable of interest equals one if at least one of the analyst’s announcement returns was in the bottom quartile of all announcement returns in our sample (-9.7 percent and below). The sample sizes are smaller than in earlier tables because we limit the sample to analysts that downgraded at least one firm during the prior calendar year. We find that low abnormal announcement returns are associated with significantly lower probabilities of promotion. In Panel B, the odds ratio is 0.487 without controls and 0.485 with controls. (Both coefficients are statistically significant at the 1-percent level.) These findings suggest that Moody’s punishes analysts for downgrades that generate large negative returns.

In unreported tests, we considered another event that may affect analyst promotions: the decision to downgrade a firm from investment grade to speculative grade. This event is rare. Within our sample, only 5 percent of analyst-years involve at least one ratings downgrade that crosses this threshold. Given the findings in Table 8, we predicted that these downgrades would reduce the probability of promotion and increase the probability of resignations. To test this prediction, we estimated a version of Table 8 that replaced the low abnormal return dummy variable with a dummy variable equal to one if analyst $i$ downgraded at least one firm from
investment grade to speculative grade in year $t-1$. Although the odds ratios tended to be less than one, none of them were statistically significant at conventional levels. Although this test may be of lower power than the test in Table 8, these findings weaken the evidence of bias.

F. Does Moody’s value accuracy, bias, or both?

Table 9 asks whether Moody’s values accuracy, bias, or both by combining the specifications from Tables 5 and 6. The independent variables include Accurate, Downgrader, Upgrader, and interactions of Accurate with the other two variables. Overall, our findings are consistent with Moody’s valuing both accuracy and bias, although few of the odds ratio are statistically significantly different from one when we limit the sample to junior analysts. In Panel A, we find that downgraders are significantly less likely to be promoted and more likely to resign, and that the interaction term with Accurate has an odds ratio close to one. In Panel B, we find that accurate downgraders are less likely to be promoted and that downgrader has an odds ratio close to one; we also find weak evidence that accurate upgraders are more likely to be promoted.

V. Conclusions

We examine how accuracy and bias influences career paths of corporate credit rating analysts within Moody’s. We find that accurate analysts, as measured by the tendency for S&P to conform to the Moody’s analyst ratings, are more likely to be promoted overall. However, we also find that Moody’s is less likely to promote analysts that tend to downgrade firms relative to the corresponding S&P rating, despite being more accurate than analysts that tend to upgrade firms relative to S&P. This bias effect is driven by analysts that tend to downgrade firms while diverging further away from S&P’s rating (i.e., become more pessimistic relative to S&P). As further evidence that Moody’s punishes negative bias, we find analysts that generate large negative announcement returns are less likely to be promoted. We do not find a statistically significant relationship between analyst promotion and downgrades that breach the investment-speculative grade threshold. We conclude that Moody’s rewards accurate analysts but also punishes analysts for negative bias.
References


### Table 1

**Analyst-Level Summary Statistics**

This table summarizes analyst-level observations of firm coverage statistics. Across the columns, statistics are reported for all analyst-years and then for each (beginning of year) rank within Moody’s, where "Analyst" is the most junior rank and "Managing Director" is the most senior rank. The table reports means and medians for the number of firms covered with an issuer-level Moody’s credit rating, the average asset size of rated firms, the aggregate asset size of rated firms, as well as the average rating level and ratings notch difference from S&P. Credit rating notch levels are measured numerically ranging from 1 (Ca or lower) to 20 (Aaa), where 10 is equivalent to a Ba1 Moody’s rating.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Analyst Rank</th>
<th>All Levels</th>
<th>Analyst (AVP)</th>
<th>Senior Analyst (VP)</th>
<th>Sr. Credit Officer (VP)</th>
<th>Senior Vice President</th>
<th>Managing Director</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N = 801</td>
<td>N = 149</td>
<td>N = 235</td>
<td>N = 161</td>
<td>N = 170</td>
<td>N = 86</td>
</tr>
<tr>
<td>Number Rated Firms</td>
<td>Mean</td>
<td>14.6</td>
<td>7.4</td>
<td>9.3</td>
<td>9.9</td>
<td>25.8</td>
<td>28.3</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>8.0</td>
<td>7.0</td>
<td>9.0</td>
<td>8.0</td>
<td>13.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Mean Firm Assets [Mill. $]</td>
<td>Mean</td>
<td>$20,727</td>
<td>$11,374</td>
<td>$17,670</td>
<td>$30,366</td>
<td>$22,219</td>
<td>$24,557</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>$8,109</td>
<td>$2,988</td>
<td>$6,738</td>
<td>$10,087</td>
<td>$9,302</td>
<td>$13,453</td>
</tr>
<tr>
<td>Aggregate Rated Assets [Mill. $]</td>
<td>Mean</td>
<td>$160,206</td>
<td>$33,776</td>
<td>$92,851</td>
<td>$120,157</td>
<td>$293,276</td>
<td>$382,624</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>$64,378</td>
<td>$17,662</td>
<td>$52,483</td>
<td>$79,581</td>
<td>$159,836</td>
<td>$230,509</td>
</tr>
<tr>
<td>Moody’s Credit Rating</td>
<td>Mean</td>
<td>9.2</td>
<td>8.6</td>
<td>8.9</td>
<td>10.1</td>
<td>8.9</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>9.0</td>
<td>8.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Mean Difference from S&amp;P</td>
<td>Mean</td>
<td>-0.22</td>
<td>-0.16</td>
<td>-0.29</td>
<td>-0.23</td>
<td>-0.15</td>
<td>-0.24</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>-0.20</td>
<td>-0.20</td>
<td>-0.29</td>
<td>-0.20</td>
<td>-0.13</td>
<td>-0.13</td>
</tr>
</tbody>
</table>
### Table 2

**Firm-Level Summary Statistics**

This table summarizes firm-level observations of rated issuers covered by the analysts in the main regression sample for the period 2002-2011. Across the columns, we present statistics separately for subsets of firms across the credit rating spectrum and firm asset size quartiles. Panel A reports means for the number of Moody’s analysts covering the firm along with firm characteristics. Panel B summarizes the distribution of Moody’s analyst rank according to the most senior analyst and most junior analyst assigned to cover the firm (percentages sum to 100 percent within columns for each sub-section).

<table>
<thead>
<tr>
<th>Firm Credit Rating</th>
<th>Firm Asset Size Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st Quartile</td>
</tr>
<tr>
<td>B or Lower</td>
<td>2.3</td>
</tr>
<tr>
<td>Baa</td>
<td>580</td>
</tr>
<tr>
<td>Ba</td>
<td>624</td>
</tr>
<tr>
<td>A or Higher</td>
<td>1,53</td>
</tr>
</tbody>
</table>

#### Panel A: Mean Firm Characteristics

<table>
<thead>
<tr>
<th></th>
<th>All Firm-Years</th>
<th>N = 9,557</th>
<th>N = 3,081</th>
<th>N = 2,067</th>
<th>N = 716</th>
<th>N = 523</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Analysts</td>
<td>2.4</td>
<td>2.4</td>
<td>2.4</td>
<td>2.2</td>
<td>2.2</td>
<td>2.3</td>
</tr>
<tr>
<td>Book Assets [Mill. $]</td>
<td>8,864</td>
<td>2,381</td>
<td>4,915</td>
<td>14,390</td>
<td>54,520</td>
<td>0.56</td>
</tr>
<tr>
<td>Sales [Mill. $]</td>
<td>6,659</td>
<td>1,882</td>
<td>4,162</td>
<td>8,793</td>
<td>34,517</td>
<td>1.53</td>
</tr>
<tr>
<td>Book Leverage</td>
<td>0.40</td>
<td>0.56</td>
<td>0.35</td>
<td>0.31</td>
<td>0.26</td>
<td>0.15</td>
</tr>
<tr>
<td>Market to Book</td>
<td>1.49</td>
<td>1.35</td>
<td>1.46</td>
<td>1.35</td>
<td>1.85</td>
<td>0.07</td>
</tr>
<tr>
<td>Operating Profitability</td>
<td>0.20</td>
<td>0.16</td>
<td>0.20</td>
<td>0.24</td>
<td>0.26</td>
<td>0.07</td>
</tr>
<tr>
<td>Sales Growth</td>
<td>0.09</td>
<td>0.10</td>
<td>0.11</td>
<td>0.05</td>
<td>0.07</td>
<td>0.22</td>
</tr>
<tr>
<td>CapEx to PP&amp;E</td>
<td>0.20</td>
<td>0.21</td>
<td>0.22</td>
<td>0.15</td>
<td>0.17</td>
<td>0.20</td>
</tr>
</tbody>
</table>

#### Panel B: Distribution of Analyst Promotion Levels

**Most Senior Analyst:**
- Managing Director: 69.7% 55.5% 66.7% 88.3% 81.5%
- Senior Vice President: 27.5% 39.2% 31.4% 9.6% 16.8%
- SCO or Lower: 2.9% 5.4% 1.9% 2.1% 1.7%

**Most Junior Analyst:**
- SVP or Higher: 18.4% 14.0% 17.3% 20.5% 27.2%
- Senior Credit Officer: 24.3% 19.8% 20.4% 25.4% 31.4%
- Senior Analyst: 39.3% 42.4% 43.2% 42.7% 29.6%
- Analyst or Lower: 18.1% 23.8% 19.1% 11.3% 11.9%
This table summarizes the frequency of promotion and resignation for Moody’s analysts. The column “% Promoted” reports the percent of analyst-years with a promotion to a higher rank. The column “% Resigned” reports the percent of analyst-years where the analyst resigns from Moody’s during the year. Across the columns, promotion and resignation percentages are reported for all analyst-years and then for each (beginning of year) rank within Moody’s, where “Analyst” is the most junior rank and “Managing Director” is the most senior rank. Down the rows, Panel A breaks out the percentages by calendar year. Panel B breaks out the percentages by the number of years the analyst has remained in the current rank.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Analyst-Years</th>
<th>Total Analysts</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
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<td>18.2%</td>
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<td>11.8%</td>
<td>11.8%</td>
<td>6.5%</td>
<td>12.9%</td>
<td>21.4%</td>
<td>7.1%</td>
<td>5.9%</td>
<td>0.0%</td>
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<td></td>
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</tr>
<tr>
<td>2007</td>
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<td>86</td>
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<td>2008</td>
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<td>12.5%</td>
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</tr>
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<td>17.7%</td>
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<td>15.4%</td>
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<td>2011</td>
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<td>8.3%</td>
<td>10.3%</td>
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<td>17.7%</td>
<td>19.2%</td>
<td>3.9%</td>
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</table>

### Panel B: By Time In Level

<table>
<thead>
<tr>
<th>Time In Level</th>
<th>Total Analyst-Years</th>
<th>Total Analysts</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
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<th>% Promoted</th>
<th>% Resigned</th>
<th>% Promoted</th>
<th>% Resigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year</td>
<td>130</td>
<td>801</td>
<td>8.5%</td>
<td>7.7%</td>
<td>16.7%</td>
<td>16.7%</td>
<td>4.6%</td>
<td>13.6%</td>
<td>11.8%</td>
<td>9.8%</td>
<td>9.1%</td>
<td>3.0%</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Years</td>
<td>211</td>
<td>149</td>
<td>7.1%</td>
<td>10.9%</td>
<td>0.0%</td>
<td>12.8%</td>
<td>8.2%</td>
<td>12.3%</td>
<td>20.5%</td>
<td>10.3%</td>
<td>3.1%</td>
<td>6.3%</td>
<td>10.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Years</td>
<td>158</td>
<td>235</td>
<td>12.7%</td>
<td>9.5%</td>
<td>7.7%</td>
<td>12.8%</td>
<td>21.8%</td>
<td>12.7%</td>
<td>16.0%</td>
<td>8.0%</td>
<td>3.9%</td>
<td>3.9%</td>
<td>0.0%</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Years</td>
<td>122</td>
<td>161</td>
<td>23.0%</td>
<td>9.8%</td>
<td>23.3%</td>
<td>20.0%</td>
<td>43.2%</td>
<td>8.1%</td>
<td>11.1%</td>
<td>5.6%</td>
<td>13.0%</td>
<td>0.0%</td>
<td>14.3%</td>
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<td></td>
</tr>
<tr>
<td>5 Years</td>
<td>74</td>
<td>170</td>
<td>21.6%</td>
<td>12.2%</td>
<td>50.0%</td>
<td>5.6%</td>
<td>16.7%</td>
<td>5.6%</td>
<td>18.2%</td>
<td>18.2%</td>
<td>11.8%</td>
<td>5.9%</td>
<td>40.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6+ Years</td>
<td>106</td>
<td>86</td>
<td>8.5%</td>
<td>11.3%</td>
<td>22.2%</td>
<td>22.2%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>5.9%</td>
<td>5.9%</td>
<td>7.7%</td>
<td>12.8%</td>
<td>9.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total Analyst-Years | 801 | 12.4% | 10.1% | 14.8% | 14.1% | 17.5% | 11.1% | 14.3% | 9.3% | 7.7% | 5.9% | 10.5% |
| Total Analysts     | 183 | 42.1% | 44.3% | 40.7% | 38.9% | 47.1% | 29.9% | 39.0% | 25.4% | 31.0% | 23.8% | 37.5% |
Table 4
Measures of Accuracy and Bias

This table summarizes the frequency of Moody’s analyst promotion and resignation for variations in measures of accuracy and bias. Across the columns, statistics are reported for all analyst-years and then for each (beginning of year) rank within Moody’s, where "Analyst" is the most junior rank and "Managing Director" is the most senior rank. Panel A (Panel B) reports the percent of analyst-years where analysts are promoted (resign from Moody’s) at each value of the accuracy and bias measures. Analysts at the Managing Director level are excluded from Panel A because they are not eligible to be promoted. "Accurate" means S&P converges toward the Moody’s analyst rating at the next available rating change for at least 15 percent of the analyst’s rated firm assets. "Downgrader" ("Upgrader") means the Moody's analyst downgrades (upgrades) relative to the corresponding S&P rating for at least 10 percent of the analyst’s rated firm assets.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
<th>All Levels</th>
<th>Analyst [AVP]</th>
<th>Senior Analyst [VP]</th>
<th>Sr. Credit Officer [VP]</th>
<th>Senior Vice President</th>
<th>Managing Director</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Promotion [N = 715]</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accurate [t-1]</td>
<td>Yes [N = 283]</td>
<td>16.3%</td>
<td>17.2%</td>
<td>21.2%</td>
<td>18.0%</td>
<td>6.2%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>No [N = 432]</td>
<td>12.3%</td>
<td>13.2%</td>
<td>14.7%</td>
<td>12.0%</td>
<td>8.6%</td>
<td>-</td>
</tr>
<tr>
<td>Downgrader [t-1]</td>
<td>Yes [N = 239]</td>
<td>10.9%</td>
<td>14.3%</td>
<td>12.1%</td>
<td>10.6%</td>
<td>6.7%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>No [N = 476]</td>
<td>15.3%</td>
<td>15.0%</td>
<td>20.4%</td>
<td>15.8%</td>
<td>8.2%</td>
<td>-</td>
</tr>
<tr>
<td>Upgrader [t-1]</td>
<td>Yes [N = 242]</td>
<td>14.9%</td>
<td>8.7%</td>
<td>21.3%</td>
<td>17.8%</td>
<td>9.9%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>No [N = 473]</td>
<td>13.3%</td>
<td>17.5%</td>
<td>15.5%</td>
<td>12.9%</td>
<td>6.1%</td>
<td>-</td>
</tr>
<tr>
<td><strong>Panel B: Resignation [N = 801]</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Accurate [t-1]</td>
<td>Yes [N = 318]</td>
<td>6.0%</td>
<td>10.3%</td>
<td>10.1%</td>
<td>1.6%</td>
<td>0.0%</td>
<td>5.7%</td>
</tr>
<tr>
<td></td>
<td>No [N = 483]</td>
<td>12.8%</td>
<td>16.5%</td>
<td>11.8%</td>
<td>14.0%</td>
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<td>13.7%</td>
</tr>
<tr>
<td>Downgrader [t-1]</td>
<td>Yes [N = 270]</td>
<td>11.9%</td>
<td>14.3%</td>
<td>14.5%</td>
<td>14.9%</td>
<td>5.0%</td>
<td>9.7%</td>
</tr>
<tr>
<td></td>
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<td>14.0%</td>
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<td>10.9%</td>
</tr>
<tr>
<td>Upgrader [t-1]</td>
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<td>10.9%</td>
<td>12.5%</td>
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<td>4.2%</td>
<td>8.8%</td>
</tr>
<tr>
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<td>No [N = 531]</td>
<td>10.7%</td>
<td>15.5%</td>
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<td>9.5%</td>
<td>7.1%</td>
<td>11.5%</td>
</tr>
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</table>
Table 5
Does Accuracy Influence Moody’s Analyst Career Path?

This table reports logistic regressions of Moody’s analyst accuracy on career outcomes. Panel A estimates an ordered logit model for promotion and resignation outcomes on the full sample. Panel B estimates a binary logit model for promotion for the subset of analysts junior to Managing Director (below the most senior rank). "Accurate" means S&P converges toward the Moody's analyst rating at the next available rating change for at least 15 percent of the analyst's rated firm assets. Columns 3 and 6 report regression results after excluding Moody's most senior analysts from the sample (Senior Vice President and Managing Director). Coefficients are reported as odds ratios. Z-statistics are reported below the coefficients, where ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by analyst.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Panel A: Career Path</th>
<th>Panel B: Promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ordered Logit: Career Path [t]</td>
<td>Logit: Promoted [t]</td>
</tr>
<tr>
<td></td>
<td>{ Promoted = 1, Resigned = -1, Otherwise = 0 }</td>
<td>{ Promoted = 1, Otherwise = 0 }</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate [t-1]</td>
<td>1.690***</td>
<td>1.502**</td>
<td>1.513**</td>
<td>1.388**</td>
<td>1.215</td>
<td>1.352</td>
</tr>
<tr>
<td></td>
<td>(3.047)</td>
<td>(2.189)</td>
<td>(2.044)</td>
<td>(2.430)</td>
<td>(1.022)</td>
<td>(1.606)</td>
</tr>
<tr>
<td>Log of Rated Assets [t-1]</td>
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<td></td>
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<tr>
<td></td>
<td>1.163**</td>
<td>1.228**</td>
<td></td>
<td>1.388***</td>
<td>1.448***</td>
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</tr>
<tr>
<td></td>
<td>(2.387)</td>
<td>(2.349)</td>
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<td>(3.365)</td>
<td>(2.672)</td>
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<tr>
<td>Promotion Level Effects</td>
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<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year Effects [2002-2011]</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Years in Position Effects</td>
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<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>801</td>
<td>801</td>
<td>545</td>
<td>715</td>
<td>715</td>
<td>545</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.008</td>
<td>0.038</td>
<td>0.038</td>
<td>0.004</td>
<td>0.084</td>
<td>0.081</td>
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</tbody>
</table>
Table 6
Does Bias Influence Moody’s Analyst Career Path?

This table reports logistic regressions of Moody’s analyst bias measures on career outcomes and accuracy. Panel A estimates an ordered logit model for promotion and resignation outcomes on the full sample. Panel B estimates a binary logit model for promotion for the subset of analysts junior to Managing Director (below the most senior rank). Panel C reports logistic regressions that compare Moody’s analyst accuracy and career outcomes for analysts with negative bias versus positive bias. For the explanatory variables, “Downgrader” ("Upgrader") means the Moody’s analyst downgrades (upgrades) relative to the corresponding S&P rating for at least 10 percent of the analyst’s rated firm assets. Columns 3, 6, and 9 report regression results after excluding Moody’s most senior analysts from the sample (Senior Vice President and Managing Director). Coefficients are reported as odds ratios. Z-statistics are reported below the coefficients, where ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by analyst.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Panel A: Career Path</th>
<th>Panel B: Promotion</th>
<th>Panel C: Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downgrader [t-1]</td>
<td>0.685**</td>
<td>0.606**</td>
<td>0.556**</td>
</tr>
<tr>
<td></td>
<td>(-2.085)</td>
<td>(-2.567)</td>
<td>(-2.562)</td>
</tr>
<tr>
<td>Upgrader [t-1]</td>
<td>1.130</td>
<td>1.135</td>
<td>1.006</td>
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<td></td>
<td>(0.752)</td>
<td>(0.733)</td>
<td>(0.029)</td>
</tr>
<tr>
<td>Log of Rated Assets [t-1]</td>
<td>1.208***</td>
<td>1.269***</td>
<td>1.393***</td>
</tr>
<tr>
<td></td>
<td>(3.109)</td>
<td>(2.791)</td>
<td>(3.767)</td>
</tr>
<tr>
<td>Promotion Level Effects</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year Effects [2002-2011]</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Years in Position Effects</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Junior Analysts Only</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Downgrader/Upgrader Only</td>
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<td>No</td>
<td>No</td>
</tr>
<tr>
<td>N</td>
<td>801</td>
<td>801</td>
<td>545</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.005</td>
<td>0.041</td>
<td>0.043</td>
</tr>
</tbody>
</table>
Table 7
Does Diverging from or Converging to S&P Influence Moody’s Analyst Career Path?

This table reports logistic regressions of the direction of Moody’s analyst bias relative to S&P on career outcomes. Panel A estimates an ordered logit model for promotion and resignation outcomes on the full sample. Panel B estimates a binary logit model for promotion for the subset of analysts junior to Managing Director (below the most senior rank). For the explanatory variables in specifications 1 and 2, “Ratings Diverge from S&P” (“Ratings Converge to S&P”) means the Moody’s analyst ratings move away from (toward) the corresponding S&P rating for at least 10 percent of the analyst’s rated firm assets. In specifications 3 and 4, we separate out the measure for downgrades and upgrades relative to S&P, using a threshold of at least 10 percent of the analyst’s rated firm assets for each measure. Coefficients are reported as odds ratios. Z-statistics are reported below the coefficients, where *** *, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by analyst.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Panel A: Career Path</th>
<th>Panel B: Promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ordered Logit Dependent Var: Career Path [t] { Promoted = 1, Resigned = -1, Otherwise = 0 }</td>
<td>Logit Dependent Var: Promoted [t] { Promoted = 1, Otherwise = 0 }</td>
</tr>
<tr>
<td>Ratings Diverge from S&amp;P [t-1]</td>
<td>[1] 0.780*** (-1.406)</td>
<td>[1] 0.726* (-1.678)</td>
</tr>
<tr>
<td>Downgrades Diverge from S&amp;P [t-1]</td>
<td>[2] 0.629** (-2.284)</td>
<td>[2] 0.646** (-2.085)</td>
</tr>
<tr>
<td>Upgrades Diverge from S&amp;P [t-1]</td>
<td>[3] 0.545*** (-2.851)</td>
<td>[3] 0.574** (-2.219)</td>
</tr>
<tr>
<td>Ratings Converge to S&amp;P [t-1]</td>
<td>[4] 0.693** (-1.977)</td>
<td>[4] 0.663** (-2.016)</td>
</tr>
<tr>
<td>Downgrades Converge to S&amp;P [t-1]</td>
<td>(0.018) 1.004</td>
<td>(0.007) 0.760</td>
</tr>
<tr>
<td>Upgrades Converge to S&amp;P [t-1]</td>
<td>(0.909) 1.171</td>
<td>(0.744) 1.144</td>
</tr>
<tr>
<td>Analyst Controls</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Year Effects [2002-2011]</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Years in Position Effects</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>801</td>
<td>801</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.002</td>
<td>0.038</td>
</tr>
</tbody>
</table>
Table 8
Do Stock Reactions to Rating Decisions Influence Moody’s Analyst Career Path?

This table reports logistic regressions of abnormal issuer returns around ratings changes on analyst career outcomes. Panel A estimates an ordered logit model for promotion and resignation outcomes on the full sample (where stock return data are available). Panel B estimates a binary logit model for promotion for the subset of analysts junior to Managing Director (below the most senior rank). The explanatory variable is equal to one when the analyst’s lowest return during the year around a rating decision falls in the lowest sample quartile (a decline of 9.7 percent). Abnormal returns are calculated using a Fama-French three factor model and a three day trading window around the event. Coefficients are reported as odds ratios. Z-statistics are reported below the coefficients, where ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by analyst.

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Panel A: Career Path</th>
<th>Panel B: Promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Abnormal Return [t-1]</td>
<td>0.678*</td>
<td>0.487***</td>
</tr>
<tr>
<td></td>
<td>(-1.892)</td>
<td>(-3.304)</td>
</tr>
<tr>
<td>Analyst Controls</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Year Effects [2002-2011]</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Baseline: Years in Position Effects</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>N</td>
<td>613</td>
<td>544</td>
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<tr>
<td>Pseudo R-Squared</td>
<td>0.004</td>
<td>0.011</td>
</tr>
</tbody>
</table>
Table 9
Does Accuracy or Bias Influence Moody's Analyst Career Path?

This table reports logistic regressions with interactions of Moody’s analyst accuracy and bias measures on career outcomes. Panel A estimates an ordered logit model for promotion and resignation outcomes on the full sample. Panel B estimates a binary logit model for promotion for the subset of analysts junior to Managing Director (below the most senior rank). For the explanatory variables, “Accurate” means S&P converges toward the Moody’s analyst rating at the next available rating change for at least 15 percent of the analyst’s rated firm assets. “Downgrader” ("Upgrader") means the Moody’s analyst downgrades (upgrades) relative to the corresponding S&P rating for at least 10 percent of the analyst's rated firm assets. Columns 3 and 6 report regression results after excluding Moody's most senior analysts from the sample (Senior Vice President and Managing Director). Coefficients are reported as odds ratios. Z-statistics are reported below the coefficients, where ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively, using heteroskedasticity-robust standard errors and clustering by analyst.

<table>
<thead>
<tr>
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<th>Panel A: Career Path</th>
<th>Panel B: Promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ Promoted = 1, Resigned = -1, Otherwise = 0 ]</td>
<td>[ Promoted = 1, Otherwise = 0 ]</td>
</tr>
<tr>
<td>Accurate [t-1]</td>
<td>1.923**</td>
<td>1.655*</td>
</tr>
<tr>
<td></td>
<td>(2.494)</td>
<td>(1.835)</td>
</tr>
<tr>
<td>Downgrader [t-1]</td>
<td>0.609*</td>
<td>0.542*</td>
</tr>
<tr>
<td></td>
<td>(-1.682)</td>
<td>(-1.902)</td>
</tr>
<tr>
<td>Accurate x Downgrader [t-1]</td>
<td>0.866</td>
<td>0.921</td>
</tr>
<tr>
<td></td>
<td>(-0.372)</td>
<td>(-0.202)</td>
</tr>
<tr>
<td>Upgrader [t-1]</td>
<td>0.888</td>
<td>0.895</td>
</tr>
<tr>
<td></td>
<td>(-0.490)</td>
<td>(-0.445)</td>
</tr>
<tr>
<td>Accurate x Upgrader [t-1]</td>
<td>1.214</td>
<td>1.299</td>
</tr>
<tr>
<td></td>
<td>(0.535)</td>
<td>(0.689)</td>
</tr>
<tr>
<td>Log of Rated Assets [t-1]</td>
<td>1.180***</td>
<td>1.242**</td>
</tr>
<tr>
<td></td>
<td>(2.654)</td>
<td>(2.537)</td>
</tr>
<tr>
<td>Promotion Level Effects</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Year Effects [2002-2011]</td>
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<td>Yes</td>
</tr>
<tr>
<td>Years in Position Effects</td>
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<td>Yes</td>
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<tr>
<td>Junior Analysts Only</td>
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<td>No</td>
</tr>
<tr>
<td>N</td>
<td>801</td>
<td>801</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.017</td>
<td>0.049</td>
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</table>