The Debt-Contracting Value of Accounting Numbers, Renegotiation, and Investment Efficiency[*]

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Abstract

This study investigates the impact of the debt-contracting value of borrowers' accounting information (DCV) on the likelihood of private debt renegotiation and the implication of renegotiation for borrowing firms' investment efficiency. DCV captures the inherent ability of firms' accounting numbers to predict future credit quality. Building on incomplete contract theory, I hypothesize that a lower DCV creates *ex post* incentives for both parties to renegotiate the terms of the initial contract, leading to a higher probability of renegotiation. During renegotiation, lenders can extract partial gains from borrowers' investments according to their bargaining positions. Borrowers' anticipation of the high probability of renegotiation reduces their investment incentives *ex ante*, thereby inducing underinvestment. Using a sample of 3,720 private debt contracts, I find that firms with a higher DCV have a lower probability of renegotiation and less underinvestment. Moreover, the impact of DCV on investment increases with lenders' bargaining power.

Keywords: debt-contracting value of accounting numbers; renegotiation; incomplete contract; hold-up problem; underinvestment
JEL Classification: M40, G30

1. Introduction

Accounting information plays a crucial role in the structure of debt contracts in an incomplete contracting environment.[1] Debt contractual features, such as debt covenants and performance pricing provisions, utilize accounting numbers as state-contingent signals to map borrower credit conditions to the allocation of control rights and the pricing of debt (Smith and Warner 1979; Aghion and Bolton 1992; Dichev and Skinner 2002; Asquith et al. 2005; Ball et al. 2008). Although imperfectly related to contracting constructs such as future credit quality, accounting numbers are widely used in debt contracting both because they are verifiable and because alternative contracting mechanisms, such as credit-rating-based provisions and collateral requirements, are overly costly by comparison (Kraft 2011; Christensen and Nikolaev 2012).

Although a considerable proportion of private debt contracts are renegotiated before their stated maturity (Roberts and Sufi 2009a), there is very little empirical work on the role of accounting quality in debt *renegotiation* (Armstrong et al. 2010).[2] Consequently, many key questions regarding accounting quality and debt contracts remain unanswered. For instance, how does the quality of accounting numbers affect the probability of debt renegotiation? What are the real investment effects, if any, that arise from the impact of accounting quality on debt renegotiation?

This paper investigates the extent to which the debt-contracting value of borrowers' accounting numbers affects the likelihood of private debt renegotiation and the extent to which debt-contracting value influences investment efficiency through renegotiation. By debt-contracting value, I mean the inherent ability of firms' accounting numbers to predict future

[1] If the parties to an agreement could specify their respective rights and duties for every possible future state of the world, the contract would be complete and accounting data would be irrelevant for contracting purposes. Incomplete contracts arise from unforeseen contingencies, writing costs, enforcement costs and complexity. See, for example, Dye (1985), Segal (1999) and Tirole (1999).

[2] Numerous accounting studies examine the effect of borrowers' accounting quality on the design of *initial* debt contracts. In contrast, my focus is on how the quality of accounting numbers influences debt contract *renegotiation*, and how *ex post* renegotiations affects *ex ante* incentives regarding investment. Of course, the possibility of *ex post* renegotiations also affects *ex ante* design so that my analysis also has implications for *ex ante* design. But, the latter is not the focus of this paper.

credit quality (Ball et al. 2008). More specifically, when a shock to future credit quality occurs, the debt-contracting value of accounting numbers captures the extent to which contracted accounting numbers are able to reflect the new information at the time of the shock.[3]

I initially examine the impact of the debt-contracting value of accounting on the likelihood of renegotiation. The debt-contracting value of accounting potentially affects the likelihood of renegotiation through two interrelated channels. First, the debt-contracting value of accounting numbers influences the initial contract design choice (Ball et al. 2008; Christensen and Nikolaev 2012). Second, debt-contracting value of accounting numbers influences the scope of subsequent renegotiations (Roberts and Sufi 2009a; Nikolaev 2012). As the first relation is already well-documented in the literature, I hold constant the initial design choice by controlling for loan characteristics in the regression analyses and focus my study on the second channel. Specifically, given the use of accounting-based features in debt contracts, the debt-contracting value directly affects the likelihood of renegotiations. When the initially contracted-upon accounting numbers fail to capture new information about future credit quality *ex post*, there is room for Pareto-improving renegotiations. The contracting parties trade off the gains from writing a more suitable contract against the costs of renegotiation. The higher the debt-contracting value of accounting, the less there is to gain for the parties involved by replacing the old contract. Therefore, the incentives to renegotiate should decrease. Thus, I hypothesize that firms with a higher debt-contracting value of accounting are less likely to renegotiate debt contracts.

I further explore the real effects of the debt-contracting value on borrowers' investment in the presence of renegotiation. While borrowers completely bear the costs of investment, lenders partially share the gains from borrowers' investment arising from renegotiated interest rates, covenants, and/or other contractual terms. Therefore, a higher anticipated probability of

[3] For example, consider a firm whose sole asset is a bond traded in deep and liquid markets. New information will be reflected in the bond's carrying value by mark-to-market accounting (high debt-contracting value) but not by historical-cost accounting (low debt-contracting value).

renegotiation reduces the investment incentives of the borrowers *ex ante*. In these circumstances, incomplete contract theory predicts that the borrowing firm will underinvest, a phenomenon also known as the hold-up problem (Williamson 1975, 1979; Klein et al. 1978; Aivazian and Callen 1980; Grossman and Hart 1986; Hart and Moore 1988, 1990).[4] The degree of distortion depends on the perceived probability of renegotiation and the relative bargaining power of the parties involved. Lenders with more bargaining power can extract more gains, thereby amplifying the negative impact of renegotiation on underinvestment. Thus, I hypothesize that firms with higher debt-contracting value of accounting numbers will exhibit less underinvestment due to the lower perceived probability of renegotiation. Furthermore, I hypothesize that higher debt-contracting value of accounting numbers has a greater impact on decreasing underinvestment when the firms' lenders have more bargaining power.

Private debt contracting provides a desirable empirical setting for investigating the implications of debt-contracting value of accounting on renegotiation and investment efficiency for several reasons. First, private debt contracts frequently use accounting-based contractual features. For example, 98% of the contracts in my sample contain accounting-based contractual terms.[5] Second, banks gather proprietary information from borrowers during the lending process. Therefore, the hold-up problem is more significant due to the informational advantage of incumbent lenders about borrowers over outside lenders (Rajan 1992; Gilson and Warner 1998). Finally, private debt has lower renegotiation costs than public bonds (Smith and Warner 1979), which allows me to observe a sizeable number of renegotiations.

[4] Renegotiation must generate mutual benefits for both parties. If one party becomes worse off, it can just refuse to renegotiate and stay with the original contract. Note that the hold-up problem only reduces the *ex ante* investment incentives and does not conflict with borrowing firms' *ex post* incentives to renegotiate contracts as long as lenders do not appropriate all of the gains from renegotiation.

[5] My sample period is from 1996 to 2005. Covenant-lite loans with few maintenance covenants emerged in the U.S. in 2006. According to Standard & Poor's Leveraged Commentary & Data, covenant-lite loans represent 32% of overall loan issuance during the first six months of 2007. However, between the summer of 2007 and late 2010, almost no covenant-lite loans were issued (Tett 2011).

I estimate a direct proxy for the debt-contracting value of accounting by modifying the approach in Ball et al. (2008).[6] My measure is a goodness-of-fit statistic from an Ordered Probit Model where the levels of credit ratings are modeled as a function of lagged earnings, interest coverage ratios, leverage ratios, and net worth, all of which are frequently used in accounting-based contractual terms. The debt-contracting value of accounting is calculated at the industry level to capture how well accounting numbers predict future credit ratings. To measure relative bargaining power, initially I use two characteristics of lenders, the proportion of institutional loans in a lead lender's total portfolio and the proportion of a syndicated loan deal held by foreign lenders (Rajan 1992; Sufi 2009). Subsequently, I use two characteristics of borrowing firms, financial constraints and asset tangibility (Bergman and Callen 1991; Benmelech and Bergman 2008). A comprehensive explanation of these variables follows in Section 4.

After tracking 3,720 private loan agreements originated from 1996 to 2005 for 1,939 U.S. public firms, I find that 76% of the loan contracts have at least one major contract term (maturity, principal amount, interest rate, or accounting-based term) renegotiated before maturity, and more importantly, that 75% of these renegotiations involve changes in the accounting-based contractual features. The results of cross-sectional analyses show that after *controlling for* the loan characteristics, increasing the debt-contracting value of accounting numbers from the first quartile to the third quartile decreases the probability of renegotiation by 8%.

Next, I explore the implications of renegotiation for investment efficiency. Focusing on the period after firms enter a private debt agreement but before renegotiation (or maturity when renegotiation does not occur *ex post*), I find significantly less investment in capital expenditures and R&D by borrowing firms than would be expected based on investment fundamentals. Additional tests suggest that sample firms invest less than the firms themselves in the same period lagged by one year and relative to control group peers matched by year, industry, and sales growth. Lower investment by sample firms leads to poorer future operating performance.

[6] Nevertheless, using the original debt-contracting value measure of Ball et al. (2008) does not affect my inferences.

Furthermore, I find that a positive shift in the debt-contracting value of accounting increases borrowers' investment, and that the increase is larger when lenders have more bargaining power. These findings are robust to numerous specifications and a battery of alternative explanations.

This study makes several contributions. First, this paper extends the literature on the choice of accounting numbers/rules in private debt contracts. Innovative recent studies focus on how accounting variables are chosen and adjusted through negotiated measurement rules in debt contracting, arguing that the most useful accounting numbers/rules are chosen in debt *originations* to avoid costly renegotiation *ex ante* (Frankel and Litov 2007; Frankel et al. 2008; Beatty et al. 2008; Li 2010; Armstrong et al. 2010; Christensen and Nikolaev 2010). However, there is little if any evidence to date showing that higher quality accounting numbers *actually* reduce the probability of renegotiation. Drawing upon incomplete contract theory, I provide large-sample evidence of the negative relation between the debt-contracting value of accounting and the likelihood of renegotiation. Armstrong et al. (2010) state that "[t]here has been relatively little research on the role of accounting reports in the renegotiation process." This study fills this gap, and to the best of my knowledge is one of the first to investigate the cross-sectional impact of accounting quality on debt renegotiations. While my paper is related to Nikolaev (2012), who studies the influence of the contracting environment and contract design choices on the time to renegotiation, he does not examine the debt-contracting value of accounting or investment efficiency.

Second, by addressing the hold-up problem, my study provides a new avenue to address one of the fundamental questions in accounting research: Does financial reporting quality affect investment efficiency? Generally, the prior literature claims that higher quality of accounting numbers mitigates moral hazard and adverse selection problems and facilitates project identification, thus enhancing investment efficiency (Kanodia and Lee 1998; Bushman and Smith 2001; Bens and Monahan 2004; Biddle and Hilary 2006; Hope and Thomas 2008; McNichols and Stubben 2008; Biddle et al. 2009; Beatty et al. 2010a; Chen et al. 2011b). This

study identifies a different channel by which a higher quality of accounting numbers (i.e., higher debt-contracting value of accounting numbers) improves investment efficiency—by reducing the probability of renegotiation. Incomplete contract theory predicts that *ex post* renegotiation reduces the incentive for *ex ante* investment, resulting in underinvestment. Consistent with this prediction, I find that higher debt-contracting value of accounting mitigates the underinvestment problem by reducing the probability of renegotiation. Moreover, this effect is stronger as lenders' bargaining power increases. The interaction effect of debt-contracting value and bargaining power on investment cannot be explained by the other channels mentioned above.

Finally, this study extends Roberts and Sufi (2009a) by identifying a key *ex ante* determinant of the probability of renegotiation, namely, the debt contracting value of accounting numbers. By contrast, in their Probit analyses, none of their *ex ante* firm variables measured at loan origination are statistically significant in predicting renegotiations.[7] This study argues that one of the incentives for *ex post* renegotiation arises from lower quality contracted accounting numbers, and finds that higher debt-contracting value of accounting numbers significantly decreases the likelihood of renegotiation.

In the following section, I develop the testable hypotheses. Section 3 discusses descriptive statistics on renegotiations. Section 4 explains the research design choice. Section 5 presents evidence on the relation among the debt-contracting value of accounting, the likelihood of renegotiation, and investment efficiency. Section 6 discusses additional robustness tests, and Section 7 concludes.

2. Background and Hypotheses Development

2.1. Accounting-Based Contractual Features

Debt contracts typically contain financial covenants, performance pricing, and/or borrowing bases, all of which are usually based on accounting numbers. Accounting-based

[7] Their variables include total assets, debt-to-EBITDA, book leverage, market-to-book, EBITDA/assets, and EBITDA volatility.

covenants transfer certain decision rights to creditors in states of deteriorating financial performance, in which borrowers have greater incentives to take actions detrimental to firm values (Aghion and Bolton 1992; Nini et al. 2009b; Tan 2013). Performance pricing allows both parties *ex ante* to commit to adjust the interest rate on the debt contract following changes in the borrower's credit quality, thereby reducing the potential for renegotiation costs, hold-up problems, and other potential conflicts (Asquith et al. 2005; Armstrong et al. 2010). A borrowing base is a type of credit line, for which fund availability is tied to the borrower's accounts receivable, inventory, etc. It allows lenders' actual exposure to vary with the borrowers' success (Flannery and Wang 2011).

2.2. Debt-Contracting Value and Contract Design

When designing a debt contract, the parties take into consideration the debt-contracting value of accounting numbers in two respects. First, the contracting parties can reduce reliance on accounting numbers with low debt-contracting value and use alternative contracting mechanisms. For example, Ball et al. (2008) find that when loans include performance pricing provisions, a lower debt-contracting value decreases the likelihood of using an accounting ratio rather than a credit rating as the performance measure. Similarly, Christensen and Nikolaev (2012) document that the use of capital covenants which align debtholder-shareholder interests by ensuring that the value of the collateral (assets-in-place) exceeds a minimum threshold, is negatively associated with the ability of accounting information to explain firms' credit risk, which they refer to as contractibility. However, the alternative mechanisms also impose costs. For example, Kraft (2011) finds that borrowers with rating-based performance pricing provisions receive more favorable treatment in the rating process. Christensen and Nikolaev (2012) argue and find that capital covenants impose costly restrictions on the capital structure. In my sample, 98% of the contracts contain accounting-based terms, suggesting considerable costs of using alternative contracting mechanisms.

Second, to improve contracting efficiency, contracting parties tend to systematically adjust the accounting numbers under GAAP (Leftwich 1983; Beatty et al. 2008; Li 2010). Although the adjustments help to refine the contractual accounting numbers, they cannot completely offset the imperfections. Contracting on customized accounting numbers involves the costs of ascertaining the optimal contracting variables and additional costs of monitoring with more complicated measurement rules. In fact, the costs are so high *ex ante* that contracting parties deliberately accept accounting-based terms that are adjusted imperfectly.

2.3. Debt-Contracting Value and Renegotiation

The debt-contracting value of accounting affects the likelihood of renegotiation through two potential channels. First, the debt-contracting value of accounting numbers influences the initial contract design choice (Ball et al. 2008; Christensen and Nikolaev 2012). Second, debt-contracting value of accounting numbers influences the scope of subsequent renegotiations (Roberts and Sufi 2009a; Nikolaev 2012). As the first relation is already well-documented in the literature, I hold constant the initial design choice by controlling for loan characteristics in the regression analyses and focus my study on the second channel. Specifically, given the use of accounting-based features in debt contracts, once the contracted accounting numbers fail to reflect *ex post* new relevant information for debt contracting, thereby indicating inefficient actions (e.g., transferring control rights to creditors unnecessarily), borrowers and lenders have incentives to renegotiate the contractual terms.[8] They trade off the gains from writing a more

[8] Fleetwood, of Riverside, Calif., was the nation's largest manufacturer of recreational vehicles and a leading producer and retailer of manufactured housing. Its business woes began in early 2000. To meet debt contract requirements, Fleetwood needed to have EBITDA of $17.7 million in the second quarter, and this figure was not going to be met. On December 10, 2001, the company successfully renegotiated a new contract with Bank of America. The EBITDA covenant was replaced by a free cash flow covenant which took into account a whole range of factors, including capital expenditure and service on junior subordinated debt. Fleetwood gradually recovered the following year. In contrast, if Bank of America had refused to renegotiate, the subsequent EBITDA covenant violation (a false alarm) should have transferred control rights to the lenders. Because Bank of America did not have the expertise to manage Fleetwood, letting the lender intervene may not be better than waiting for the recovery.

suitable contract against the costs of renegotiation.[9] The gains from renegotiating a more suitable contract can arise from fewer false alarms of covenant violations (Gigler et al. 2009), a more flexible environment in which to explore future investment opportunities (Roberts and Sufi 2009a), and better incentives for managers to make subsequent optimal decisions (Gorton and Kahn 2000). Of course, renegotiations are not costless, and both parties need to spend time and effort.

A higher debt-contracting value of accounting numbers helps to incorporate news into contracts directly, thereby reducing the potential gains from renegotiations.[10]

This yields my first hypothesis:

H1: Ceteris paribus, firms with a higher debt-contracting value of accounting numbers have a lower likelihood of renegotiating their private debt contracts.

2.4. Debt-Contracting Value, Hold-up, and Underinvestment

In the renegotiation process, borrowers and lenders discover how to improve the original contracts and split the incremental gains from the new contract according to their relative bargaining power. Since either party can simply reject a renegotiation proposal as long as the party has a better alternative, the relative bargaining power is a function of the outside options for both contracting parties (Rubinstein 1982).

On the borrowers' side, their outside option of finding a refinancing source is significantly reduced by incumbent banks' informational advantage about the borrowers relative to outside banks (Sharpe 1990; Rajan 1992). When competing with incumbent lenders in bidding

[9] There may be an informational wedge between borrowers and lenders. However, lenders require private information about borrowers before making lending decisions, and they require periodic reporting of private information after a loan has been made (Standard & Poor's 2007). Moreover, renegotiation is usually initiated by borrowers, and they have an incentive to provide more information to minimize the informational wedge (Taylor and Sansone 2007).

[10] Arguably, higher debt-contracting value of accounting may ease the renegotiation process and lower the costs. This could also motivate H1, but the effect of debt-contracting value should not depend on the magnitude of the credit quality shocks according to this argument. See section 5.3 for tests to rule out this possibility.

for their clients, outside lenders face a "Winner's Curse," which prevents perfect competition in the credit market and grants monopoly power to incumbent banks. Empirical studies document evidence consistent with the theory of information monopoly (Houston and James 1996; Bharath et al. 2008; Santos and Winton 2008; Hale and Santos 2008; Schenone 2010; Ioannidou and Ongena 2010).

On the lenders' side, their outside option is reduced when borrowers' liquidation value is low, as selling the repossessed assets is not attractive (Bergman and Callen 1991; Benmelech and Bergman 2008). For example, Benmelech and Bergman (2008) find that airlines successfully renegotiate their lease obligations downward when the liquidation value of their fleet is low.

Due to the fear of lenders' extracting rent in renegotiations, borrowers will underinvest before the renegotiation (Williamson 1975, 1979; Klein et al. 1978; Aivazian and Callen 1980; Grossman and Hart 1986; Hart and Moore 1988, 1990).[11] The extent of the distortion depends on the magnitude of the expected rent extraction, which is the product of the perceived probability of renegotiation and the creditors' bargaining power. Therefore, decreasing the perceived probability of renegotiation reduces the underinvestment, and this effect is stronger when creditors have more bargaining power. The above discussion yields my second set of hypotheses:

H2a: Ceteris paribus, firms with a higher debt-contracting value of accounting exhibit less underinvestment.

H2b: Ceteris paribus, the impact of the debt-contracting value of accounting on investment increases when lenders have more bargaining power.

3. Data and Sample Statistics

3.1. Renegotiation Data

[11] The underinvestment problem cannot be solved by both parties committing to not renegotiate initial contracts, because the commitment is not *credible* and *enforceable* due to the *ex post* mutual benefit for both parties. In other words, *ex post* renegotiation for Pareto improvement can induce *ex ante* inefficiency.

My initial sample consists of 3,720 original debt contracts extracted from SEC filings by Nini et al. (2009a).[12] I merge the contract data with Compustat through GVKEY and with DealScan through DealScan name and date given in the dataset. Borrower characteristics and loan characteristics are obtained from Compustat and DealScan, respectively. As Drucker and Puri (2009) find that financial covenants are not recorded for a portion of loan facilities in DealScan, I manually collect financial covenants from the original contracts. Panels A and B of Table 1 present summary statistics for the borrowers and the loans, respectively. The median deal amount of $190 million is about twice the value reported in Dichev and Skinner (2002) for the DealScan-Compustat intersection sample. This indicates that my sample is biased toward large loan contracts, which is not surprising given that debt contracts are required to be filed only when the debt amounts are material (exceed 10% of total assets). In my sample, 95.8%, 50.1%, and 19.7% of debt contracts have financial covenants, accounting-based performance pricing, and accounting-based borrowing bases, respectively. Panels C and D of Table 1 present the distribution of deals across years and industries, respectively.

I obtain information on renegotiations by examining the SEC filings of each borrower after the loan origination. Regulation S-K item 601 requires all material contracts and amendments to be filed in an 8-K, 10-K, or 10-Q. I first randomly pick 100 contracts, and manually search the borrowers' 10-K, 10-Q, and 8-K after the initiation of each contract for any mention of changes to major contractual terms, including principal, interest, maturity, and accounting-based contractual terms. Accounting-based contractual terms include financial covenants, accounting-based performance pricing, and accounting-based borrowing bases. My search strategy implicitly defines renegotiation as any *ex post* change to these terms. Focusing on the first amendment, I find that 67% of contracts are renegotiated.

[12] Nini et al. (2009a) begin with a sample of loans from Reuters LPC's DealScan database that is matched to firm financial variables from Standard & Poor's Compustat for the years 1996 to 2005. Then they use text-search programs to scan SEC filings in Edgar for loan contracts and match the contracts to DealScan based on the dates of the loan agreements and the names of the companies. Their final sample consists of 3,720 loan agreements for 1,939 borrowers. They further show that the search algorithm does not lead to any meaningful bias.

Next, I download all filings containing amendments or renegotiated contracts and develop a search algorithm using *Perl* based on the 67 manually collected filings. I then apply the algorithm to the 10-K, 10-Q, and 8-K filings of borrowing firms for the remaining 3,620 contracts. The algorithm captures all 67 renegotiation cases in my pilot sample. However, it also raises many false alarms. Therefore, after extracting blocks of texts, I read through each of them to make sure that they truly represent debt contract renegotiations.

Using this search strategy, I identify 2,819 contracts that are renegotiated before maturity. This finding is consistent with Roberts and Sufi's (2009a) estimate and Liu and Ryan's (1995) claim that commercial loans are frequently renegotiated. Yet, only 17% of renegotiation cases in my sample are triggered directly by covenant violations (Beneish and Press 1993; Chen and Wei 1993; Chen et al. 2011a).[13] Of the contracts that parties did not renegotiate, 355 stopped filing before maturity. By searching Compustat footnotes and the Internet, I find that most disappear owing to mergers and acquisitions, Chapter 11 bankruptcy protection, or going private.[14]

Panel A of Table 2 presents an analysis of the composition of renegotiations after comparing the 2,819 amendment files with the original contracts. I provide both the unconditional and the conditional probability estimates. Unconditionally, 75.8% of contracts are renegotiated with respect to major contractual terms. I calculate the incidences conditional on three events (Event A, B, and C). Given that any major contractual term is renegotiated (Event A), 74.7% of the renegotiations involve changes in accounting-based contractual terms. In contrast, given Event A, 47.2%, 46.4%, and 43.7% of renegotiations involve changes in maturity, principal, and interest, respectively (untabulated). This pattern is consistent with Roberts (2010), who finds that the most frequently changed items in loan contracts are covenants that use accounting measures. Within the renegotiations related to changes in accounting-based terms

[13] I use the violation data from Nini et al. (2009b). They identify covenant violations of each firm-quarter by searching keywords from SEC filings. The violation cases could be underreported if firms have "cured" the violation (or creditors have waived it) by the end of the fiscal quarter; in such cases, borrowers are not required to report it. Nevertheless, my results are robust to excluding renegotiations triggered by covenant violations.

[14] Deleting them or using a hazard model to correct the right-censoring bias does not affect my results.

(Event B), 90.7%, 34.8%, and 10.4% of renegotiations involve amendments to accounting-based covenants, accounting-based performance pricing, and accounting-based borrowing bases, respectively (see Appendix I for five examples). The sum of the percentages in column *Pr(.|B)* is greater than one because more than one term is often changed in a renegotiation. Since performance pricing and borrowing bases are less frequently used than financial covenants, I also calculate the percentage of renegotiation conditional on the existence of the contractual term in the corresponding row (Event C). For example, conditional on a contract having an accounting-based borrowing base, there is a 30.1% chance of amending this borrowing base subsequently.

Panel B of Table 2 breaks down the renegotiations of accounting-based covenants by type. The top three frequently amended financial covenants (debt-to-earnings, fixed charge coverage, and interest coverage) use accounting numbers from the income statement. This pattern parallels the findings from Li (2010) and Demerjian (2011) that the adjustment of accounting numbers from the income statement in *initial* contracts is more frequent than that from the balance sheet. The probability of renegotiating each financial covenant conditional on the existence of that particular covenant ranges from 12.9% to 44.6% and is presented in column *Pr(.|C)*.

Panel C of Table 2 classifies the accounting-related renegotiation cases by action. In particular, 72.4% of the cases simply change the threshold (see Appendix I, Example 2), and 41.9% of them redefine the accounting-based contractual terms (see Appendix I, Example 1). Adding and deleting financial covenants are also adopted in 21% and 19% of the cases, respectively (see Appendix I, Example 3). The results in Table 2 are very similar if I exclude the renegotiations that were directly triggered by covenant violations.

3.2. Other Data

I also use other data sources, including CRSP, I/B/E/S and Thomson Reuters to calculate control variables (see Appendix II for details). The number of observations for each regression varies due to the availability of some variables.

4. Research Design

4.1. Measure of Debt-Contracting Value of Accounting Numbers

I conceptualize the debt-contracting value of accounting as the ability of contracted accounting numbers to capture future states of the firm, particularly future credit-rating levels. The original debt-contracting value from Ball et al. (2008) captures how well lagged seasonally adjusted changes in earnings predict future credit rating downgrades. Since I am interested in the explanatory power of variables actually used in contracts (i.e., the contracting role of accounting numbers), and since accounting-based contractual terms are written in terms of levels, I choose to use the level specification. Table 2 shows that besides earnings, various coverage ratios, leverage, and net worth are used and amended in covenants. Therefore, I augment the model by adding coverage ratios, leverage ratios, and net worth. To estimate the debt-contracting value of accounting numbers (*DCV*) for year *t*, using all Compustat firms, I estimate an Ordered Probit Model using quarterly data over the past five years for each Fama-French industry (48 categories):

$$P(Rating_{q,i} \le N) = \Phi(\sum_{n=1}^{N} \mu_n + \sum_{k=1}^{4} \alpha_k E_{q-k,i} + \sum_{k=1}^{4} \beta_k COV_{q-k,i} + \sum_{k=1}^{4} \gamma_k LEV_{q-k,i} + \sum_{k=1}^{4} \delta_k NW_{q-k,i}) \qquad (1)$$

where $Rating_{q,i}$ is assigned 1 to companies with the highest S&P credit rating in quarter *q*, 2 to companies with the second-highest credit rating, and so on. $E_{q-k,i}$ is EBITDA divided by total assets in quarter *q-k*. $COV_{q-k,i}$ is interest coverage (EBITDA divided by total interest expense). $LEV_{q-k,i}$ is long-term debt divided by total assets in quarter *q-k*. $NW_{q-k,i}$ is net worth divided by total assets. Specifically, quarter *q* starts with the first quarter in year *t-4* and ends with the last quarter in year *t*. Each regression requires at least 100 firm-quarter observations. *DCV* is

measured as Somers'D a goodness-of-fit statistic.[15] The higher the *DCV*, the higher is the predictive ability of accounting numbers for credit ratings.[16] The oil and gas industry is in the lowest tercile of the distribution, which is not surprising given the significant uncertainty and accounting discretion in the industry (Malmquist 1990; Aboody 1996).

Contracting parties normally choose their own measurement rules for accounting-based terms, as the use of GAAP variables could induce noise. Li (2010, 2011) closely examines the same agreements sample as I use in this study and finds that the most frequently excluded terms in net income are extraordinary items (23% of contracts), and that the most frequently excluded accrual items are long-term accruals (96% of contracts with debt-to-earnings covenants). Therefore, I use earnings *before* extraordinary items, depreciation, and amortization in the regression. Section 6.2 presents a test that takes into account all contractual adjustments for a small sample.

4.2. Measures of Bargaining Power

To capture contracting parties' relative bargaining power, I use two characteristics of lenders, the proportion of institutional loans in a lead lender's portfolio and the proportion of a syndicated loan deal held by foreign lenders, and two characteristics of borrowing firms, financial constraint and asset tangibility.

First, for each loan tranche, I identify the lead lender and calculate the proportion of institutional loans in the lead lender's portfolios over the past five years, multiplied by minus one (*INSTLP*). This variable is aggregated to the deal level by taking an average, weighted by the

[15] Beatty (2008) points out that Somers' D depends on the true underlying probability of default in each estimation group. I include both Altman's z-score and credit ratings fixed effects in the main analyses. In addition, my main results are robust to using pseudo R^2 instead of Somers' D.

[16] Somers' D is a statistic of association between observed ratings and model predicted ratings. Specifically, it is calculated as $(n_c-n_d)/t$, where t is the total number of paired observations with different responses in the sample (i.e., different ratings), n_c (n_d) is the number of concordant (discordant) pairs. A pair of observations is said to be concordant (discordant) if the observation with the lower ordered response value has a lower (higher) predicted mean score than the observation with the higher ordered response value. The predicted mean score of an observation is the sum of the ordered values minus one, weighted by the corresponding predicted probability of each ordered value.

amount of each tranche.[17] Institutional loans are a type of loan originated for sale on the secondary market (Wittenberg-Moerman 2008). When lenders hold a large proportion of institutional loans, they have fewer incentives to acquire information and monitor borrowers (Pennacchi 1988; Gorton and Pennacchi 1995). Moreover, if the lead lender's portfolio largely consists of institutional loans, the lead lender is likely an institutional investor (rather than a bank) and has a weak information monopoly relative to outside lenders. The higher the value that *INSTLP* takes, the more bargaining power lenders have.

Second, I use the proportion of the syndicated loan deal held by foreign lenders multiplied by minus one (*FLENDER*). A larger proportion of the syndicated loan owned by foreign lenders leads to fewer incentives for lead lenders to collect borrowers' information (Sufi 2009). Therefore, the information monopolistic position of incumbent banks is weakened. As such, a higher value of *FLENDER* suggests that lenders possess more bargaining power.

Third, I use the Kaplan-Zingales index of financial constraint (Kaplan and Zingales 1997) as another measure (*KZIND*). Since most private debt agreements do not carry considerable prepayment penalties (Roberts and Sufi 2009a), the ease with which borrowers can find alternative sources of financing significantly reduces lenders' bargaining power. Therefore, lenders' bargaining power increases when borrowing firms are more financially constrained, i.e. with higher value of *KZIND* (Tan 2013).[18]

Finally, I calculate the asset tangibility (*TANG*) of borrowers following Berger et al.'s (1996) formula to proxy for lenders' bargaining power under renegotiation (Bergman and Callen 1991; Benmelech and Bergman 2008). The lower the value of *TANG*, the less bargaining power that lenders have, as lenders' outside option—selling the repossessed assets—is not very attractive.

[17] For *INSTLP*, I focus on the lead lender of a particular loan tranche, as the lead lender is frequently the administrative agent that has the fiduciary duty to other syndicate participants to provide timely information about the borrower (Taylor and Sansone 2007).

[18] Using Hadlock and Pierce's (2012) measure of financial constraint based on firm size and age does not affect my inferences.

4.3. Tests of H1: Ex Ante Determinants of Probability of Renegotiation

I create an indicator variable *RENEG* that takes the value of one if any major terms of a contract are renegotiated before maturity. Using the cross-sectional sample of 3,720 debt contracts, I estimate the following Probit model:

$$P(RENEG = 1) = \Phi(\alpha_0 + \beta_1 DCV + \mathrm{X}'\zeta) \quad (2)$$

where *DCV* is the debt-contracting value of accounting numbers measured before loan the initiation, and **X** contains other *ex ante* determinants of renegotiation calculated using data before the loan initiation including firm characteristics, loan characteristics, lender characteristics, industry characteristics, deal purpose fixed effects, year fixed effects, and credit rating fixed effects.

As controls for firm characteristics, I include log of assets (*LNASSET*), debt-to-EBITDA ratio (*DTE*), book leverage (*LEV*), return on assets (*ROA*), market-to-book ratio (*MTB*), return on assets volatility (*STDROA*), Altman's z-score (*ZSCORE*), asset tangibility (*TANG*), and the Kaplan-Zingales financial constraint index (*KZIND*).

Motivated by prior literature, I choose the loan characteristics that are potentially related to both the quality of accounting numbers and the scope of renegotiation (Huberman and Kahn 1988; Ball et al. 2008; Bharath et al. 2008; Graham et al. 2008; Roberts and Sufi 2009a; Costello and Wittenberg-Moerman 2011; Kim et al. 2011; Christensen and Nikolaev 2012; Nikolaev 2012). Specifically, I include log of stated maturity (*LNMATURITY*), loan spread (*SPREAD*), number of lenders (*NLENDER*), log of deal amount scaled by assets (*DAMOUNT*), an indicator variable equal to one for the presence of a revolving line of credit (*REVLV*), an indicator variable equal to one if a tranche contains accounting-based performance pricing (*PPACC*), an indicator variable equal to one if a tranche contains rating-based performance pricing (*PPRAT*), an indicator variable equal to one for the presence of a borrowing base (*BOWBASE*), number of income-statement-based covenants (*NCOVIS*), number of balance-sheet-based covenants

(*COVBS*), an indicator equal to one if collateral is required (*COLL*), and lending relationship intensity (*RELINT*). All of the variables at the tranche level (*LNMATURITY*, *SPREAD*, *REVLV*, *PPACC*, *PPRAT*, *BOWBASE*, *COLL*, and *RELINT*) are aggregated to the deal level by taking an average that is weighted by the amount of each tranche.

I include two lender characteristics, the proportion of institutional loans in lead lenders' portfolios, multiplied by minus one (*INSTLP*), and the proportion of a syndicated loan deal held by foreign lenders, multiplied by minus one (*FLENDER*). Finally, I control for two industry characteristics: the dispersion of credit ratings (*DISPRAT*) and the dispersion of sales (*DISPSALE*). All of the variables are defined in Appendix II. Since some firms may have multiple deals and, therefore, appear in my sample multiple times, I calculate the standard errors clustered by firm. Clustering by industry does not affect my inferences. If the hypothesis (H1) that a higher *DCV* reduces the likelihood of renegotiation is true, I expect $\beta_1 < 0$.

4.4. Tests of H2: Impact of Debt-Contracting Value of Accounting on Investment

To test my second hypothesis, I first examine whether the sample firms underinvest. Starting from the quarter after signing the debt contract and ending with the quarter before renegotiation or before maturity in cases where there is no renegotiation, I take the average of quarterly capital expenditures plus R&D scaled by total assets to measure firm investment (*INVEST*).[19]

I identify abnormal investment as investment that differs from the amount that would be predicted given the firm's investment opportunities, using a model motivated by the finance and economics literature on optimal investment. I calculate *INVEST* for all other Compustat firms in the same period and 2-digit SIC industry as each sample firm. I then pool the sample firm together with the Compustat firms and estimate the regression: $INVEST=\theta_1+\theta_2 Q+\theta_3 CF+u$,

[19] Deleting non-renegotiation cases in investment analyses yields similar results.

where u is a zero mean error term, Q is Tobin's Q, and CF indicates cash flow. Abnormal investment is measured as the residual from this regression.

In addition, I examine the sensitivity of my findings to two alternative estimates of expected investment: (1) the investment of the same firm during the same period lagged by one year, and (2) the investment of a control firm during the same period. Specifically, for each sample firm, I look at the year before the debt agreement, and choose a control firm with the closest sales growth to the sample firm among all firms in the same year and industry (2-digit SIC). I expect the abnormal investment of my sample firms to be negative given the hold-up problem discussed earlier.

To emphasize that the impact on investment is through the perceived probability of renegotiation, I calculate the predicted probability of non-renegotiation driven by the debt-contracting value of accounting (*RENEGDCV*). This value is computed as one minus the predicted value by plugging *DCV* and the means of other independent variables into equation (2) using the estimated coefficients. Thus, the variation of *RENEGDCV* is only driven by *DCV*. The higher the *RENEGDCV*, the less likely it is that there will be a renegotiation. To test if higher *DCV* increases corporate investment (H2a), I estimate the following regression:[20]

$$INVEST = \gamma_0 + \delta_1 RENEGDCV + Y'\eta + \varepsilon \qquad (3)$$

where ***Y*** contains *ex ante* determinants calculated using data before the loan initiation, including investment opportunities (*Q*), cash flow (*CF*), governance variables, firm characteristics, deal purpose fixed effects, year fixed effects, and credit rating fixed effects.

In terms of governance variables, I include institutional ownership (*INSTHOLD*), analyst following (*ANALYF*), Gompers' gscore (*INVGS* for the original score multiplied by minus one and an indicator variable *GSCORED* equal to one for observations with a missing gscore), and CAPEX covenants (*CAPEXREST*). I also include eight firm characteristics: log of assets (*LNASSET*), investment through lease (*LEASE*), return on assets volatility (*STDROA*), standard

[20] The results are similar, if I use the raw *DCV*.

deviation of investment (*STDINVEST*), Altman's z-score (*ZSCORE*), firm ages (*AGE*), sales growth (*SALEG*), and debt overhang correction (*RK*), which is the product of long-term debt scaled by the capital stock, the recovery ratio, and the value of the claim paying one dollar at default (Hennessy et al. 2007). The standard errors are clustered by firm. According to H2a that a higher *DCV* reduces underinvestment, I expect $\delta_1 > 0$.

To test whether the effect of *DCV* on investment is an increasing function of lenders' bargaining power (H2b), I add an interaction term to equation (3):

$$INVEST = \gamma_0 + \delta_1 RENEGDCV + \delta_2 BARGPOW \times RENEGDCV + \delta_3 BARGPOW + Y'\eta + \varepsilon \quad (4)$$

where *BARGPOW* is equal to *INSTLP*, *FLENDER*, *KZIND*, or *TANG*. I expect $\delta_2 > 0$.

5. Empirical Results

5.1. Estimation of Debt-Contracting Value of Accounting Numbers

Using all Compustat firms from 1990–2005, for each year starting from 1995, I estimate equation (1) by Fama-French industry (48 categories) using the past five years of data. Table 3 tabulates the distribution of the coefficients. The Fama-MacBeth *t*-statistics suggest that all of the lagged earnings and leverage ratios significantly explain future credit ratings. Additionally, some lagged coverage ratios and lagged net worth also explain borrowers' future credit quality.

The ability of accounting numbers to predict future credit ratings could depend on the volatility of firms' fundamentals. I calculate the dispersion of sales (*DISPSALE*) and the dispersion of credit ratings (*DISPRAT*) for each Ordered Probit regression. The Spearman correlation between *DCV* and *DISPSALE* is relatively high (-0.29 with *p*-value<0.001), suggesting that more volatile fundamentals reduce the ability of accounting values to predict future credit ratings. *DCV* is also significantly correlated with *DISPRAT* (0.20 with *p*-value<0.001). Therefore, I *control* for the dispersion of credit ratings and sales in the regression analyses.

5.2. Summary Statistics

Table 4 presents descriptive statistics of the variables used in the cross-sectional analyses. All of the continuous variables are winsorized at the top and bottom 1% level. The average quarterly investment (*INVEST*) between contract initiation and renegotiation/maturity is about 2% of total assets. The mean (median) firm in the sample has a *DCV* of 0.572 (0.562). On a univariate basis, *DCV* is negatively correlated with *RENEG* with a value of -0.03 (*p*-value=0.05), and positively correlated with *INVEST* with a value of 0.06 (*p*-value<0.01). Debt overhang correction (*RK*) is negatively and significantly correlated with *INVEST*, consistent with prior findings (Hennessy et al. 2007).

5.3. Ex Post Shocks, Debt-Contracting Value, and Renegotiation

Although Table 2 shows that most renegotiation cases involve changes in accounting-based terms, it remains unclear whether the renegotiations are due to the inability of accounting numbers to reflect *ex post* shocks. To examine this issue, I combine the borrower, loan origination, and renegotiation data to form an unbalanced loan-quarter panel data set consisting of 19,282 loan-quarter observations. The first observation for each loan corresponds to the quarter of origination, and the last observation corresponds to the ultimate outcome of the loan (it matures, is renegotiated, or the borrower stops filing with the SEC). *DCV* is calculated using data prior to the loan initiation, while shocks are measured as the absolute value of changes in the default distance using Hillegeist et al.'s (2004) market-based measure (*DD*).[21] The change for quarter *q* is calculated by subtracting the *DD* in the quarter before loan origination from the *DD* in quarter *q+1*. For each loan-quarter, I create an indicator variable *RENEGQ*, which is equal to one if there is any renegotiation during that loan-quarter.

[21] Specifically, Hillegeist et al. (2004) estimate the default distance based on Black-Scholes-Merton option-pricing model at firm-year level. I compute this measure at firm-quarter level by replacing their yearly variables with quarterly variables (i.e., equity volatility, risk-free rate, market value, long-term debt, and dividend yield.) Since 68% of loan-quarter observations do not have changes in credit ratings, I choose not to use credit ratings.

In Table 5 Panel A, I split the sample above and below medians of *DCV* and the magnitude of the shocks. The mean of *RENEGQ* is compared across the subgroups. For the full sample, firms with a high *DCV* have a 12.1% probability of renegotiation when the shock is high, which is significantly less than a 14% probability of renegotiation for firms with a low *DCV*. The difference of 1.8% is economically significant relative to the unconditional mean of *RENEGQ* (12.3%). This relation does not hold when the shock is low. The difference in the probability of renegotiation for high and low *DCV* firms when the shock is low is only 0.4%, which is statistically insignificant. Similarly, firms with high shocks have a higher probability of renegotiation than firms with low shocks, and the difference is significant only when *DCV* is low. Partitioning the sample based on the nature of the shock (i.e., positive or negative changes) does not change the results (Table 5 Panels B and C).[22]

This pattern sheds light on the mechanism through which *DCV* affects renegotiation. In the next subsection, I do not include *ex post* shocks to explain the incidence of renegotiation, because the purpose of the analyses is to identify variables that determine the probability of renegotiation before firms make any investment decisions and not to maximize explanatory power.

5.4. Ex Ante Determinants of Probability of Renegotiation

Table 6 reports the marginal effects for my Probit analysis of hypothesis H1. I find evidence that *DCV* is negatively associated with the likelihood of renegotiation; that is, the estimated coefficients on *DCV* are negative and statistically significant. The *t*-statistic is 2.69. In

[22] Here is an example of how the inability of accounting numbers to reflect good news can trigger renegotiation. Warnaco is a textile/apparel corporation, whose products are sold under several brand names, including Calvin Klein, Speedo, Chaps, etc. In 2005, Warnaco's net revenues rose by 5.6% to $1.5 billion and net income increased 22% to $52.1 million. However, a debt-to-earnings-based performance pricing provision did not fully incorporate this good news and provided an undesirable interest rate. Warnaco renegotiated with the lender, Citigroup, and successfully reduced the interest rate. In the same amendment file, a fixed charge coverage ratio covenant was tightened. Consistent with Dichev et al.'s (2002) argument that performance pricing provisions are typically designed to handle credit improvements, this case suggests that the inability of variables used in these provisions to reflect credit improvements could trigger renegotiation.

terms of the economic significance, the marginal effect of *DCV* is -0.439. In other words, a positive change in *DCV* from the first quartile to the third quartile is associated with a change in the predicted probability of renegotiation of 6.3%. Given that the mean probability of renegotiation is 75.8%, this effect represents a decrease of 8%. These findings provide consistent support for H1.

Similarly to Roberts and Sufi (2009a), firm characteristics do not load in my regression. In terms of loan characteristics, I find that loans with longer maturities are more likely to be renegotiated, consistent with Roberts and Sufi (2009a).[23] I do not make a prediction on the sign of the coefficient on deal amount (*DAMOUNT*) as, on one hand, the gains could be larger for amending larger lending deals; on the other hand, renegotiation may be more costly for both parties because of the complexity of renegotiating large transactions. The results show that *DAMOUNT* loads positively, suggesting that the first argument dominates. The coefficient on *REVLV* is positive and significant, implying that revolving loans are more likely to be renegotiated. The coefficients on *PPACC*, *PPRAT*, *BOWBASE,* and *NCOVIS* are all positive and significant, which is similar to Roberts and Sufi's (2009a). These results suggest that the presence of *ex ante* contingent contractual features (performance pricing and borrowing bases) does not reduce renegotiation. It is possible that contingencies are put into contracts that are more likely to be renegotiated *ex ante*. If these contractual features are used to reduce renegotiation and, therefore, are more frequently included in contracts where renegotiation is more likely, then my parameter estimate will be biased upwards. In other words, renegotiation would have been even more likely had the contingent features not been incorporated into the contract, all else equal.

For industry characteristics, I find that firms in industries with greater dispersion of sales are more likely to renegotiate. More importantly, the results on *DCV* continue to support H1

[23] Roberts and Sufi (2009a) observe that over 90% of long-term debt contracts are renegotiated, suggesting that there is little variation in *RENEG* for long-term contracts. However, after deleting contracts with a maturity period shorter than three years, I continue to find results supporting my main conclusion.

even after controlling for the two industry factors. Additionally, deleting renegotiations that do not involve changes in accounting-based contractual terms yields similar results (untabulated).

5.5. Impact of Debt-Contracting Value on Investment

Table 7 provides evidence on underinvestment. Panel A columns (1) and (2) present the mean and median of abnormal investment, which is the difference between actual investment and the investment predicted by Tobin's Q and cash flow *CF*. On average, the firms in my sample underinvest by 0.00591 or 30% relative to the mean of *INVEST* (0.020).

Panel A columns (3) to (6) present the distribution of matched-pair investment differences. The sample firms invest less relative to their own investment levels in the same period lagged by one year, and relative to peers matched by year, industry, and sales growth. Nini et al. (2009a) find that capital expenditure covenants effectively reduce the *CAPEX* investment level. Bearing that in mind, I delete sample firms that have *CAPEX* covenants. The magnitude of underinvestment in Panel B is smaller, consistent with Nini et al. (2009a). However, I continue to observe both statistical and economic significance for underinvestment.

Since the negative matched-pair investment differences could also imply overinvestment for benchmark groups, next I choose to only use the sample firms. Panel C presents the implication of *INVEST* on *ROA* for the next one, two, and three years. I control for *Q*, *CF*, *STDROA*, *LNASSET*, and past *ROA* averages over the same horizon as the dependent variables (*LAGROA*), industry fixed effects, and year fixed effects. The positive coefficients of *INVEST* suggest that a higher level of investment is associated with a higher future rate of return, consistent with the underinvestment story.

Before testing my second hypotheses, I calculate the predicted probability of renegotiation estimated in Table 6,[24] correlate the predicted probability with *INVEST*, and find a correlation coefficient of 0.133 (p-value<0.001). This correlation suggests that a higher

[24] Note that this variable is not equivalent to *RENEGDCV*, because the variation of this variable is not only driven by *DCV*.

perceived probability of renegotiation induces lower investment. Table 8 column (1) reports the results for my tests of H2a. I find evidence that *RENEGDCV* is positively and significantly associated with *INVEST* (*t*-statistic=1.81). In terms of economic significance, increasing *RENEGDCV* from the first quartile to the third quartile increases the investment (or improves the underinvestment problem) by approximately 0.0013, or 22% relative to 0.00591 in Table 7 Panel A column (1).

Table 8 columns (2) to (5) present the results after adding the interaction terms between *RENEGDCV* and the proxies for lenders' bargaining power (*INSTLP*, *FLENDER*, *KZIND*, and *TANG*). The interaction terms are significant in all cases, and the signs are consistent with my predictions. The results support H2b and show that the impact of the debt-contracting value of accounting on investment increases with lenders' bargaining power.[25] Prior studies have identified three mechanisms linking reporting quality and investment efficiency. Specifically, a better quality of accounting information increases investment efficiency by mitigating adverse selection or moral hazard or by facilitating project identification (Kanodia and Lee 1998; Bushman and Smith 2001; Bens and Monahan 2004; Biddle and Hilary 2006; Hope and Thomas 2008; McNichols and Stubben 2008; Biddle et al. 2009; Beatty et al. 2010a; Chen et al. 2011b). However, none of the mechanisms has a clear prediction for the interaction effects.[26] The results suggest that a higher debt-contracting value of accounting enhances investment efficiency by reducing the perceived probability of renegotiation.

Beatty et al. (2010b) find that poor accounting quality firms tend to lease rather than buy their assets. As such, I control for *LEASE*, a potential omitted correlated variable, which is calculated as the estimated investment through leasing. The results are robust to including this

[25] I create an indicator for whether each bargaining power variable is above the median. My results are robust to the use of the indicator variables.

[26] Higher values of *INSTLP* and *FLENDE*R may also indicate less adverse selection and moral hazard through better bank monitoring. However, if that is the case, I should observe that the impact of the debt-contracting value of accounting on investment *decreases* with *INSTLP* and *FLENDER*.

control. Consistent with the findings in Nini et al. (2009a) and Chava and Roberts (2008), the covenants of capital expenditure (*CAPEXREST*) significantly reduce the level of investment.

6. Additional Analyses

Up to this point, my analyses conclude that firms with a higher debt-contracting value of accounting are less likely to renegotiate their private debt contracts and have less underinvestment, and that the impact of the debt-contracting value of accounting on investment increases when lenders have more bargaining power. In this section, I further examine the robustness of my results.

6.1. Alternative Debt-Contracting Value Measures

Original Debt-Contracting Value: I calculate Ball et al.'s (2008) original debt-contracting value, which is measured as Somers' D, a goodness-of-fit statistic, from the following Probit regression for each 2-digit SIC industry group with at least 20 firms:[27]

$$P(Downgrade_{q,i}=1) = f(\alpha_0 + \alpha_1 \Delta E_{q-1,i} + \alpha_2 \Delta E_{q-2,i} + \alpha_3 \Delta E_{q-3,i} + \alpha_4 \Delta E_{q-4,i})$$

where $Downgrade_{q,i}$ is an indicator variable equal to one if firm i's credit rating is downgraded in quarter q,[28] and $\Delta E_{q-k,i}$ is the seasonally adjusted change in quarterly earnings before extraordinary items scaled by total assets in the k^{th} quarter prior to quarter q. Using this alternative measure does not change my inferences.[29]

[27] Ball et al. (2008) also estimate another measure by adding five additional variables: change in sales, change in sales of the largest business segment, change in the number of business segments, change in cash from operations divided by total debt, and change in leverage. Among them, the last two variables are often used in accounting-based contracting terms. Including all five of these variables or just the last two variables in the estimation of the original debt-contracting value does not change the results.

[28] In their footnote 18, Ball et al. (2008) indicate that including upgrades in the estimation of *DCV* does not change their inference. My results are also robust to this specification.

[29] In the model for estimating the original debt-contracting value, the dependent variable captures the deteriorations in borrower credit worthiness. To strengthen the interpretation of the results using the original debt-contracting value measure, for each loan contract, I first calculate the difference in the default distance (*DD*) between the quarter after loan initiation and the quarter after renegotiation or after maturity in cases where there is no renegotiation. I then split the loan sample above and below the median of the differences, and rerun the analysis on the probability of renegotiation for each subsample. The group with high (low) differences contains firms with improvements

Accounting Quality: I also adopt the measure of accounting quality (*AQ*) estimated from the Modified Dechow-Dichev model (McNichols 2002; Francis et al. 2005). I estimate the following equation for each of Fama and French's (1997) 48 industry groups with at least 20 firms in year *t*:

$$TCA_{j,i} = \phi_0 + \phi_1 CFO_{j,t-1} + \phi_2 CFO_{j,t} + \phi_3 CFO_{j,t+1} + \phi_4 \Delta REV_{j,t} + \phi_5 PPE_{j,i} + v_{j,t}$$

AQ is calculated as the standard deviation of firm *j*'s residuals, $v_{j,t}$ over years *t-4* through *t*, multiplied by minus one. This measure is a firm-level measure, capturing how well accounting numbers map into past, current, and future realized operating cash flows. Replacing *DCV* with *AQ* does not change my inferences.[30]

6.2. Additional Analyses on Renegotiation

Renegotiation Caused by Underinvestment: Prior research has shown that improved accounting quality reduces underinvestment (Bushman and Smith 2001; Biddle et al. 2009; Chen et al. 2011b). If a higher debt-contracting value of accounting directly reduces underinvestment and underinvestment increases the likelihood of renegotiation, then *DCV* would appear to directly decrease renegotiation. This explanation suggests that the relation between the debt-contracting value of accounting and the probability of renegotiation should only hold for firms experiencing bad news. However, Table 5 shows that renegotiation also occurs for firms experiencing good news. To further rule out this alternative explanation, I add the abnormal investment calculated in section 4.6 to equation (2) and re-estimate the Probit model. The results are presented in Table 9 column (1). The abnormal investment does not load and my results continue to hold.

(deteriorations) in borrower credit worthiness. Consistent with my expectation, the coefficient of the original debt-contracting value is only significant for the group with credit deteriorations.

[30] I further decompose the accounting quality measure into innate and discretionary parts by regressing *AQ* on firm size, standard deviation of operating cash flow, standard deviation of sales, length of operating cycle and incidence of negative earnings (Francis et al. 2005). Both components load negatively in explaining the probability of renegotiation.

Intensity of Renegotiation Related to Accounting Numbers: To capture the intensity of renegotiations related to accounting issues, I first create an indicator variable for a change in each covenant listed in Table 2 Panel B, a change in accounting-based performance pricing, and a change in accounting-based borrowing base. The intensity is calculated by summing the indicators for each renegotiation. I then estimate a negative binomial model of this new variable. Table 9 column (2) shows that firms with higher *DCV* are less likely to have renegotiations involving changes in accounting-based contractual terms.

Accounting Adjustment in Original Contracts: Li (2010, 2011) finds that the contracts in my sample use adjusted accounting numbers, which are systematically different from GAAP numbers. To some extent, I have taken the adjustments into account when calculating *DCV*. To further rule out the possibility that some special contractual adjustments drive the main results, I focus on a subsample where the contractual definition of earnings is exactly the same as the definition of earnings used in calculating *DCV*. Specifically, using the data from Li (2011), I identify contracts with debt-to-earnings covenants (referred to as the DCF sample hereafter). Li (2011) finds that 96.4% of the contracts in the DCF sample exclude depreciation and amortization (long-term accruals). Within these contracts, I further require that there are no other adjustments such as excluding non-cash expense, non-cash income, etc., which yields 1,058 observations.[31] I then estimate a Probit model, in which the dependent variable is an indicator that captures whether the debt-to-earnings covenant is amended or not. The explanatory variables include *DCV* and other factors in Table 6. The results are tabulated in Table 9 column (3). No inferences are affected.

Mandatory GAAP Changes: If a contract uses rolling GAAP as a starting point to define the contractual accounting numbers, then mandatory accounting changes might create incentives for renegotiation to shield the impact of the changes (Beatty et al. 2002). In addition,

[31] Li (2011) focuses on three samples: contracts with debt-to-earnings covenants, contracts with interest coverage covenants, and contracts with fixed charge coverage covenants. I do not use the other two samples because of the small sample sizes (267 and 519 observations, respectively) after imposing my requirements.

Christensen and Nikolaev (2010) identify a new contracting practice that gives the contracting parties an option to exclude the effect of accounting changes (mutual-option-to-freeze GAAP). I read the definition of GAAP in detail for 100 randomly picked contracts, and I find that 37%, 30%, and 33% of them use rolling, frozen, and mutual-option-to-freeze GAAP respectively. The *t*-tests across any two groups of *RENEG* are never significant, suggesting that the GAAP rules chosen in the initial contracts do not play a significant role in *ex post* renegotiation. However, these results should be interpreted with caution because of the small sample size.

Redacted Disclosure: Despite the strict requirement of Regulation S-K, there are some exemptions. Verrecchia and Weber (2006) find that the SEC allows firms to request that the proprietary information contained within contracts be withheld, if it "covers trade secrets and commercial or financial information obtained from a person and privileged or confidential information." Therefore, the contracts identified as non-renegotiation could be because the borrowing firms file the amendment privately with the SEC. Following Verrecchia and Weber (2006), I search the exhibit lists of my sample firms' 10-K forms using the phrase "confidential treatment" between the debt initiation date and maturity date. I create an indicator variable equal to one if there is any confidential treatment during that period. I find that the contracts with renegotiation are even more likely to have redacted disclosure (21%) than without renegotiation (19%) (*t*-statistic=1.60). This finding suggests that non-renegotiation cannot be explained by redacted disclosure. The bias, if any, works against my findings.

Replacing Original Contracts: Among 2,819 cases of renegotiation, there are 372 cases in which firms initiate a new loan to replace an old loan right before it matures. For example, Alcoa Inc had a loan with J.P. Morgan with a maturity date of April 26, 2003. A new loan was initiated on April 25, 2003 to repay the old one. Obviously, replacing original contracts is not driven by accounting issues. Therefore, I conduct two analyses. First, I exclude the cases in which loans were replaced, and I rerun the Probit regression. All results still hold. Second, I only

keep only the replacing cases and non-renegotiation cases and rerun the tests. *DCV* loses significance, consistent with my expectation.

Mergers and Acquisitions: I check whether more M&A occurred in the window between loan initiation and renegotiation than in the window with the same length preceding the loan initiation. Then I create an indicator variable equal to one if the firm engages in a merger and acquisition as per the SDC Platinum M&A database. I do not find a significant difference between these two windows.

Control for Endogeneity: I acknowledge that it is challenging to establish causality between the debt-contracting value of accounting and the likelihood of renegotiation. However, I have implemented research design features to at least partially alleviate endogeneity concerns. First, I test the effect of *DCV* before signing the debt contract on the likelihood of renegotiation after signing the debt contract. Second, I include control variables motivated by prior research, and introduce a number of additional controls. Finally, I consider a simultaneous equations model estimated by the maximum likelihood method. To model cross-sectional variation in *DCV*, I include all control variables from Table 6 and add a variable that reflects the strength of the relation between the firm and suppliers. Extant research (e.g., Bowen et al. 1995; Raman and Shahrur 2008; Dou et al. 2011) shows that a firm's suppliers affect the firm's financial reporting quality. The instrument (*SRD*) is an industry-level measure of suppliers' R&D investment intensity motivated by Raman and Shahrur (2008). For each industry, *SRD* is constructed as the average of the supplier industries' R&D investment, weighted by the input bought from each supplier industry. *SRD* is significantly correlated with *DCV* but is not significantly correlated with the incidence of renegotiation. The results in Table 9 columns (4) and (5) show that no inferences are affected after controlling for potential endogeneity of *DCV* through this simultaneous equation estimation.

6.3. Additional Analyses on Investment

Growth Opportunities: When calculating investment, I include both capital expenditures and R&D. Smith and Watts (1992) and Skinner (1993) argue that accounting numbers are poorer performance measures for firms with relatively more growth opportunities because of the need for objective and verifiable numbers for recognition. In particular, R&D is one of the proxies for growth opportunities in Skinner (1993). The relation that I document between *DCV* and investment, which includes R&D, could be driven by this growth opportunities argument. I exclude R&D expense from my investment measure, and then rerun all of the tests related to investment. The results are similar.

The Debt-Contracting Value and Information Monopoly: Incumbent creditors' information monopoly could be further enhanced when outside creditors cannot learn about the borrower from its accounting numbers. Therefore, the bargaining power of inside lenders might well be reduced by borrowers' higher *DCV*, thereby increasing the *ex ante* incentive of investment. However, this explanation cannot generate the interaction effect from H2b. Nevertheless, if higher *DCV* can unwind the information monopoly to some extent, one should observe that firms with higher *DCV* are more likely to obtain favorable renegotiation outcomes favorable to the borrowers. Following Massoud et al. (2010), I define borrower favorable loan amendments as those amendments with at least one favorable loan contract term change, but with no unfavorable loan contract term changes, entailing a smaller principal, a higher interest rate or a shorter maturity. A value of one is assigned to borrower favorable outcomes and zero otherwise. I estimate a Probit model of the renegotiation outcomes on *DCV* controlling for all the factors in Table 6. The coefficient of *DCV* is negative and insignificant, suggesting that the communication between borrowers and outside lenders through accounting information is not effective. The results should be interpreted with caution because of the difficulty of determining whether renegotiation is borrower favorable, even in simple cases (consider the tightening of a financial covenant coupled with a decrease in interest).

7. Conclusion

Accounting numbers are broadly used in debt contracting to incorporate news and hence facilitate the lending process. This paper focuses on the contracting role of accounting numbers, and on the real effects of accounting on corporate investment. Specifically, I investigate the impact of the debt-contracting value of accounting numbers on the likelihood of *ex post* private debt renegotiation, and the implication of renegotiation for investment efficiency. The extent to which accounting numbers reflect shocks to future states of the firm determines the magnitude of gains from renegotiation. A higher debt-contracting value of accounting information indicate that news is incorporated into contracts in a more direct and timely manner, thereby reducing the probability of renegotiation. Moreover, during the renegotiation, lenders can extract benefits from borrowers' investment. As such, a higher probability of renegotiation reduces the investment incentives of borrowers *ex ante* and leads to the underinvestment problem.

Using a large sample of private debt renegotiations, I find that firms with a higher debt-contracting value of accounting have a lower probability of renegotiation and less underinvestment. Moreover, the effect of the debt-contracting value of accounting on investment increases when lenders have more bargaining power. By exploring the role of accounting numbers in private debt agreement renegotiation, this paper identifies a specific channel through which a better quality of accounting numbers (i.e., a higher debt-contracting value of accounting) improves contracting and investment efficiency.

Appendix I: Excerpts from Amendment Files

Example 1: CSK Auto Inc. Renegotiation on February 17, 2000
Subsection 1.1 of the Credit Agreement is hereby amended by deleting in its entirety the definitions of … "Consolidated Net Income" and substituting in lieu thereof, respectively, the following:

"Consolidated Net Income": for any period, net income of the Company and its Subsidiaries, determined on a consolidated basis in accordance with GAAP; provided that: (i) the net income (but not loss) of any Person that is not a Subsidiary or that is accounted for by the equity method of accounting shall be included only to the extent of the amount of dividends or distributions paid in cash to the Company or a wholly-owned Subsidiary, **provided, further, that the non-cash charges associated with losses attributable to the PartsAmerica Investment shall be excluded,** (ii) the net income of any Person acquired in a pooling of interests transaction for any period prior to the date of such acquisition shall be excluded and (iii) net income of any Subsidiary shall be excluded to the extent that the declaration or payment of dividends or similar distributions by that Subsidiary of that net income is prohibited or not permitted at the date of determination.

The corresponding part from the original contract
"Consolidated Net Income": for any period, net income of the Company and its Subsidiaries, determined on a consolidated basis in accordance with GAAP; provided that: (i) the net income (but not loss) of any Person that is not a Subsidiary or that is accounted for by the equity method of accounting shall be included only to the extent of the amount of dividends or distributions paid in cash to the Company or a wholly-owned Subsidiary, (ii) the net income of any Person acquired in a pooling of interests transaction for any period prior to the date of such acquisition shall be excluded and (iii) net income of any Subsidiary shall be excluded to the extent that the declaration or payment of dividends or similar distributions by that Subsidiary of that net income is prohibited or not permitted at the date of determination.

Example 2: Heidrick & Struggles International Inc. Renegotiation on March 25, 2002
1.10. Section 6.12.1 of the Credit Agreement is amended and restated to read as set forth below:

SECTION 6.12.1. Minimum Consolidated EBITDA. The Borrower will not permit at any time Consolidated EBITDA, determined as of the end of each of its fiscal quarters set forth below for the applicable measurement period set forth below ending with the end of such fiscal quarter to be less than the applicable amount set forth below:

FISCAL QUARTER ENDING	MEASUREMENT PERIOD THEN ENDING	CONSOLIDATED EBITDA SHALL NOT BE LESS THAN:
March 31, 2002	**1 fiscal quarter**	**$ (4,000,000)**
June 30, 2002	**1 fiscal quarter**	**$ 4,000,000**
September 30, 2002	**2 fiscal quarters**	**$ 12,000,000**
December 31, 2002	**3 fiscal quarters**	**$ 17,000,000**
March 31, 2003	4 fiscal quarters	$ 25,000,000
June 30, 2003	4 fiscal quarters	$ 25,000,000
September 30, 2003	4 fiscal quarters	$ 35,000,000
December 31, 2003	4 fiscal quarters	$ 35,000,000

March 31, 2004 and each fiscal quarter thereafter	4 fiscal quarters	$ 45,000,000

The corresponding part from the original contract

SECTION 6.12.1. Minimum Consolidated EBITDA. The Borrower will not permit at any time Consolidated EBITDA, determined as of the end of each of its fiscal quarters set forth below for the applicable measurement period set forth below ending with the end of such fiscal quarter to be less than the applicable amount set forth below:

FISCAL QUARTER ENDING	MEASUREMENT PERIOD THEN ENDING	CONSOLIDATED EBITDA SHALL NOT BE LESS THAN:
December 31, 2001	**4 fiscal quarters**	**$20,000,000**
March 31, 2002	**1 fiscal quarter**	**$4,000,000**
June 30, 2002	**2 fiscal quarters**	**$8,000,000**
September 30, 2002	**3 fiscal quarters**	**$16,000,000**
December 31, 2002	**4 fiscal quarters**	**$20,000,000**
March 31, 2003	4 fiscal quarters	$ 25,000,000
June 30, 2003	4 fiscal quarters	$ 25,000,000
September 30, 2003	4 fiscal quarters	$ 35,000,000
December 31, 2003	4 fiscal quarters	$ 35,000,000
March 31, 2004 and each fiscal quarter thereafter	4 fiscal quarters	$ 45,000,000

Example 3: Fleetwood Enterprises Inc. Renegotiation on December 4, 2001

1.5 AMENDMENT TO SECTION 7.24 SECTION 7.24 of the Credit Agreement is deleted in its entirety and replaced with the following:

7.24 FREE CASH FLOW. On a consolidated basis, Fleetwood shall have Free Cash Flow, calculated for the periods set forth below, of at least the amounts set forth below opposite each such Fiscal Quarter:

PERIOD	FREE CASH FLOW
Fiscal Quarter ended on the last Sunday in October 2001	$(5,000,000)
Two Fiscal Quarters ended on the last Sunday in January 2002	$(21,000,000)
Three Fiscal Quarters ended on the last Sunday in April 2002	$(14,000,000)
Four Fiscal Quarters ended on the last Sunday in July 2002	$(3,000,000)

"FREE CASH FLOW" means, with respect to any fiscal period for Fleetwood on a consolidated basis, (a) EBITDA; PLUS (b) any New Capital Proceeds Amount; plus (c) an amount of not more than $7,350,000 paid or accrued prior to the end of the January 2002 Fiscal Quarter in connection with the settlement of the class action lawsuit BRISTOW ET. AL V. FLEETWOOD ENTERPRISES, INC.; LESS (d) the sum of (i) the difference (but in no event less than zero) of (x) Federal, state, local and foreign income taxes paid in cash MINUS (y) to the extent such amounts are included in clause (x), taxes paid in cash as a result of any gain recognized in connection with the Subordinated Debt Exchange and any cash tax refunds received in respect of Federal, state, local and foreign taxes previously paid; (ii) interest expense paid in cash; (iii) Capital Expenditures (excluding Capital Expenditures funded with Debt other than the Revolving Loans); (iv) scheduled principal payments of Debt; (v) Distributions paid in cash by Fleetwood or the Fleetwood Trust; and (vi) without duplication of clause (v), payments made in cash on the Subordinated Debt.

The corresponding part from the original contract

7.24 EBITDA.

(a) On a consolidated basis, Fleetwood shall have EBITDA for the portion of the Fiscal Year 2002 then

elapsed of not less than the amount set forth below opposite each such Fiscal Quarter:

PERIOD ENDING	EBITDA
On the last Sunday in October 2001	$15,000,000
On the last Sunday in January 2002	$25,000,000
On the last Sunday in April 2002	$55,000,000

"EBITDA" means, with respect to any fiscal period, Adjusted Net Earnings from Operations, PLUS, to the extent deducted in the determination of Adjusted Net Earnings from Operations for that fiscal period, interest expenses, Federal, state, local and foreign income taxes, depreciation and amortization.

Example 4: Warnaco Inc. Renegotiation on September 15, 2005

Amendment to the definition of "Applicable Margin" in Article I (Definitions, Interpretation and Accounting Terms). The definition of "Applicable Margin" is hereby amended by deleting the table set forth therein and inserting the following new table in its place:

LEVERAGE RATIO	BASE RATE LOANS	EURODOLLAR RATE LOANS
Greater than or equal to 1.5 to 1	0.75%	1.75%
Less than 1.5 to 1 and equal to or greater than 1.25 to 1	0.50%	1.50%
Less than 1.25 to 1 and equal to or greater than 1.00 to 1	0.50%	1.50%
Less than 1.0 to 1	0.25%	1.25%

The corresponding part from the original contract

LEVERAGE RATIO	BASE RATE LOANS	EURODOLLAR RATE LOANS
Greater than or equal to 1.5 to 1		
In the event no Margin Reduction Event has occurred	1.50%	2.50%
From and after the occurrence of the Margin Reduction Event	1.25%	2.25%
Less than 1.5 to 1 and equal to or greater than 1.0 to 1	1.25%	2.25%
Less than 1.0 to 1	1.00%	2.00%

Example 5: Encore Medical Corp. Renegotiation on May 7, 2002

Section 3.2 Amendment to Annex A of the Credit Agreement. Effective as of the Amendment Date, the definition of "Borrowing Base" in Annex A of the Credit Agreement is hereby amended and restated in its entirety to read as follows:

"Borrowing Base" means, at any time, an amount equal to (a) the sum of (i) eighty-five percent (85.0%) of the Net Amount of Eligible Accounts; plus (ii) (A) prior to August 7, 2002, sixty percent (60.0%) of the lower of cost (on a first-in, first-out basis) or market value of Eligible Finished Goods Inventory and **(B) from August 7, 2002 and thereafter the lesser of (1) sixty percent (60.0%) of the lower of cost (on a first-in, first-out basis) or market value of Eligible Finished Goods Inventory or (2)** seventy-five percent (75.0%) of the Orderly Liquidation Value of Finished Goods Inventory plus (iii) **(A) prior to August 7, 2002**, thirty-five percent (35.0%) of the lower of cost (on a first-in, first-out basis) or market value of Eligible Generic Raw Materials Inventory and (B) from August 7, 2002 and thereafter the lesser of (1) thirty-five percent (35.0%) of the lower of cost (on a first-in, first-out basis) or market value of Eligible Generic Raw Materials Inventory or (2) seventy-five percent (75.0%) of the Orderly Liquidation Value of Generic Raw Materials Inventory, minus **(b) from August 7, 2002 and thereafter**, $500,000, minus (c) Reserves from time to time established by the Agent in its reasonable credit judgment.

The corresponding part from the original contract

"Borrowing Base" means, at any time, an amount equal to (a) the sum of (i) eighty-five percent

(85.0%) of the Net Amount of Eligible Accounts; plus (ii) the lesser of (A) sixty percent (60.0%) of the lower of cost (on a first-in, first-out basis) or market value of Eligible Finished Goods Inventory or (B) seventy-five percent (75.0%) of the Orderly Liquidation Value of Finished Goods Inventory plus (iii) the lesser of (A) thirty five percent (35%) of the lower of cost (on a first-in, first-out" basis) or market value of Eligible Generic Raw Materials Inventory or (B) seventy-five percent (75.0%) of the Orderly Liquidation Value of Generic Raw Materials Inventory, minus (b) $500,000, minus (c) Reserves from time to time established by the Agent in its reasonable credit judgment.

Appendix II: Variable Definitions and Data Sources

Variable	Description	Data Source
Dependent Variables		
RENEG	An indicator variable that takes the value of one if any major contracting term is renegotiated before maturity. Major contracting terms include principal, interest, maturity, and accounting-based contractual features (i.e., financial covenants, accounting-based performance pricing, and accounting-based borrowing bases).	SEC Edgar Filings
INVEST	The average of quarterly capital expenditures (#capxq) plus R&D (#xrdq) scaled by total assets (#atq) starting with the quarter after signing the debt contract and ending with the quarter before renegotiation or before maturity in cases where there is no renegotiation.	Compustat
ROAn	Average ROA over the next *n* years.	Compustat
Test Variables		
DCV	The debt-contracting value of accounting numbers. For any given year *t*, I estimate an Ordered Probit Model using quarterly data in the past five years for each Fama-French industry (48 categories): $$P(Rating_{q,i} \le N) = \Phi(\sum_{n=1}^{N} \mu_n + \sum_{k=1}^{4} \alpha_k E_{q-k,i} + \sum_{k=1}^{4} \beta_k COV_{q-k,i} + \sum_{k=1}^{4} \gamma_k LEV_{q-k,i} + \sum_{k=1}^{4} \delta_k NW_{q-k,i})$$ where $Rating_{q,i}$ is assigned 1 to companies with the highest S&P credit rating in quarter q, 2 to companies with the second-highest credit rating, and so on. $E_{q-k,i}$ is EBITDA divided by total assets ((#ibq+#xintq+#txtq+#dpq)/#atq) in quarter *q-k*. $COV_{q-k,i}$ is interest coverage (EBITDA (#ibq+#xintq+#txtq+#dpq) divided by total interest expense (#xintq)). $LEV_{q-k,i}$ is long-term debt divided by total assets (#dlttq/#atq) in quarter *q-k*. $NWq_{-k,i}$ is net worth divided by total assets (#ceqq/#atq). Specifically, quarter *q* starts from the first quarter in year *t-4* and ends with the last quarter in year *t*. Each regression requires at least 100 firm-quarter observations. *DCV* is measured as Somers'D a goodness-of-fit statistic.	Compustat
RENEGDCV	One minus the predicted probability of renegotiation by imputing *DCV* and the means of other independent variables into equation (2) using the estimated coefficients.	Table 6
Firm Characteristics Variables		
LNASSET	The average of natural log of book assets (#atq) over quarter *q–3* to *q*.	Compustat
DTE	The average of debt (#dlcq+#dlttq) to EBITDA (#oibdpq) ratio over quarter *q–3* to *q*.	Compustat
LEV	The average of debt (#dlcq+#dlttq) to book assets (#atq) ratio over quarter *q–3* to *q*.	Compustat
ROA	The average of EBITDA (#oibdpq) to book assets (#atq) ratio over quarter *q–3* to *q*.	Compustat
MTB	The average of (#ltq+#pstkl-#txditcq+#prccq*#cshoq/#atq) market-to-book over quarter *q–3* to *q*.	Compustat

ZSCORE	The average of z-score over quarter *q–3* to *q*. z-score=1.2*((#actq-#lctq)/#atq)+1.4*(#req/#atq) +3.3*(#piq/#atq)+0.6*(#prccq*#cshoq/#ltq)+0.999*(#saleq/#atq).	Compustat
STDROA	The standard deviation of EBITDA (#oibdpq) to book assets (#atq) ratio over the past eight quarters.	Compustat
Q	The ratio of market value (#at+#prcc f*#csho-#ceq-#txdb) to book assets (#at).	Compustat
CF	The cash ow (#ib+#dp) scaled by total assets (#at).	Compustat
RK	Debt overhang correction defined as in Hennessy et al. (2007). More precisely, this measure is the product of long-term debt scaled by the capital stock, recovery ratio, and the value of the claim paying one dollar at default.	Compustat
KZIND	The financial constraint index from Kaplan and Zingales (1997).	Compustat
TANG	The liquidation value ((#che+0.715*#rect+0.547*#invt +0.535*#ppent)/#at) following Berger et al. (1996).	Compustat
LEASE	The capitalized lease expenditure (lagged #mrc1 *10) scaled by total assets (#at).	Compustat
LAGROA	Past ROA average over the same horizon as the dependent variables.	Compustat
STDINVEST	The standard deviation of investment (#capx+#xrd) scaled by total assets (#at) over past five years.	Compustat
AGE	The number of years since IPO.	Compustat
SALEG	The growth of sales (#sale) relative to last year.	Compustat
Lender Characteristics Variables		
INSTLP	For each tranche, the fraction of Type B, Type C, or Type D loans in the portfolio of the lead lender over past five years, multiplied by -1. This variable is aggregated to the deal level by taking an average, weighted by the amount of each tranche.	DealScan
FLENDER	The proportion of the syndicated loan deal held by foreign lenders, multiplied by -1.	DealScan
Loan Characteristics Variables		
LNMATURITY	The natural log of the average maturity of all tranches in the deal, weighted by the amount of each tranche.	DealScan
DAMOUNT	The natural log of the sum of the amounts of all tranches in each deal scaled by total assets.	DealScan
SPREAD	The average all-in-drawn spread over LIBOR of all tranches in the deal, weighted by the amount of each tranche.	DealScan
NLENDER	The number of lenders in the lending deal.	DealScan
REVLV	The average of indicators for all tranches in the deal, weighted by the amount of each tranche. For each tranche, the indicator is equal to one if the tranche is a revolving line of credit.	DealScan
PPACC	The average of indicators for all tranches in the deal, weighted by the amount of each tranche. For each tranche, the indicator is equal to one if the tranche contains rating-based performance pricing.	DealScan
PPRAT	The average of indicators for all tranches in the deal, weighted by the amount of each tranche. For each tranche, the indicator is equal to one if	DealScan

	the tranche is a revolving line of credit.	
BOWBASE	The average of indicators for all tranches in the deal, weighted by the amount of each tranche. For each tranche, the indicator is equal to one if the tranche contains a borrowing base.	DealScan
NCOVIS	The number of income-statement-based covenants including debt-to-earnings ratio, fixed charge coverage, interest coverage, earnings, senior debt to earnings ratio, other coverage, and debt service coverage.	Sufi's Website
NCOVBS	The number of balance-sheet-based covenants including net worth, tangible net worth, debt to capitalization, debt to net worth, current ratio, quick ratio, working capital, shareholder's equity, other liquidity, and other balance sheet ratios.	Sufi's Website
COLL	The average of indicators for all tranches in the deal, weighted by the amount of each tranche. For each tranche, the indicator is equal to one if the tranche is secured	DealScan
RELINT	The average relationship intensity with the current lead lenders of all tranches in the deal, weighted by the amount of each tranche. Relationship intensity is the dollar value of prior tranches lent by the current lead lenders divided by the maximum dollar value of loans observed for the borrowing firms in past five years.	DealScan
Industry Characteristics Variables		
DISPRAT	The standard deviation of quarterly credit ratings for a Fama-French industry (48 categories) over past five years	Compustat
DISPSALE	The standard deviation of quarterly sales (#saleq) scaled by total assets (#atq) for a Fama-French industry (48 categories) over past five years	Compustat
Governance Variables		
INSTHOLD	The percentage of firm shares held by institutional investors.	Reuters
ANALYF	The number of analysts following the firm.	I/B/E/S
INVGS	The measure of anti-takeover protection created by Gompers et al. (2003).	Metrick's Website
GSCORE	An indicator variable that takes the value of one if *INVGS* is missing.	
CAPEXREST	An indicator variable that takes the value of one if the contract contains a *CAPEX* covenant.	Sufi's Website
Shock		
DD	The default distance is calculated using the SAS code from Hillegeist et al. (2004), adapted to quarterly measurement. $$DD = \frac{\ln \frac{V_A}{X} + (\mu - \delta - \frac{\sigma_A^2}{2})T}{\sigma_A \sqrt{T}}$$ where V_A is the current market value of assets. X is the face value of debt maturing at time T. μ is the expected return on assets. δ is the dividend rate expressed in terms of V_A. σ_A is the standard deviation of asset returns.	Compustat/CRSP

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Table 1 Descriptive Statistics

This table presents summary statistics for firm and loan characteristics and the distribution of contracts across years and industries. The sample includes 3,720 private loan agreements for 1,939 borrowers from Nini et al. (2009a). These agreements are collected from the SEC's Edgar electronic filing system over the period 1996–2005. All borrower characteristics are measured for the fiscal year prior to the agreement date.

Panel A: Firm Characteristics	N	Mean	Std	P25	Median	P75
Total Assets ($ Millions)	3,720	3268.2	10157.1	208.4	675.9	2154.1
Market Value of Equity ($ Millions)	3,671	2918.8	9172.9	166.7	608.7	1955.2
Sales ($ Millions)	3,720	2609.5	6262.9	204.0	643.5	2126.5
Net Income ($ Millions)	3,720	48.6	1718.8	0.1	17.8	80.3
Loss Indicator	3,720	0.2	0.4	0.0	0.0	0.0
Capital Expenditure ($ Millions)	3,720	177.7	584.5	8.6	34.1	122.9
Research and Development ($ Millions)	3,720	33.9	195.0	0.0	0.0	5.3
Investment (R&D + Capex) ($ Millions)	3,720	211.6	656.3	11.5	42.5	154.4
Panel B: Loan Characteristics	N	Mean	Std	P25	Median	P75
Deal Amount ($ Millions)	3,682	441.4	967.4	69.5	190.0	450.0
Maturity (Month)	3,682	43.8	20.4	33.0	42.0	60.0
Interest Spread (Basis Points above LIBOR)	3,682	169.2	116.6	75.0	150.0	240.6
Financial Covenant Indicator	3,720	95.8%	0.2	1.0	1.0	1.0
Income Statement based Covenant Indicator	3,720	84.4%	0.4	1.0	1.0	1.0
Balance Sheet based Covenant Indicator	3,720	66.7%	0.5	0.0	1.0	1.0
Accounting-Based Performance Pricing Indicator	3,682	50.1%	0.5	0.0	1.0	1.0
Accounting-Based Borrowing Base Indicator	3,682	19.7%	0.4	0.0	0.0	0.0
Panel C: Deal Distribution by Initiation Years					Freq.	Percent
1996					111	3.0
1997					441	11.9
1998					403	10.8
1999					390	10.5
2000					361	9.7
2001					361	9.7
2002					419	11.3
2003					399	10.7
2004					473	12.7
2005					362	9.7
Panel D: Deal Distribution by Fama-French 12 Industries					Freq.	Percent
Consumer Nondurables					276	7.4
Consumer Durables					108	2.9
Manufacturing					593	15.9
Oil, Gas, and Coal Extraction and Products					307	8.3
Chemicals and Allied Products					125	3.4
Business Equipment					454	12.2
Telephone and Television Transmission					192	5.2
Utilities					226	6.1
Wholesale, Retail, and Some Services					533	14.3
Healthcare, Medical Equipment, and Drugs					255	6.9
Other					651	17.5

Table 2 Composition of Renegotiation Cases

This table presents the percentages of renegotiations related to accounting-based terms. Major terms include principal, interest, maturity, and accounting-based contractual terms. Panel A breaks down the renegotiations by provision (i.e., covenants, performance pricing, and borrowing base). Panel B breaks down the renegotiations of financial covenants by type. Panel C breaks down the renegotiations of accounting-based contractual terms by action.

Event A: Any Major Terms Renegotiated
Event B: Any Accounting-based Terms Renegotiated
Event C: Existence of the Accounting-based Term in the Corresponding Row

Panel A: Renegotiations of Accounting-based Contractual Terms

	Full Sample (N=3,720)			
	Pr(.)	*Pr(.| A)*	*Pr(.| B)*	*Pr(.| C)*
Any Major Terms Renegotiated (Event A)	0.758	1		
Any Accounting-based Terms Renegotiated (Event B)	0.566	0.747	1	
Accounting-based Covenant	0.513	0.678	0.907	0.529
Accounting-based Performance Pricing	0.197	0.260	0.348	0.365
Accounting-based Borrowing Base	0.059	0.078	0.104	0.301

Panel B: Renegotiations of Accounting-based Covenants by Type

		Pr(.)	*Pr(.| A)*	*Pr(.| B)*	*Pr(.| C)*
IS Covenants:	Debt to Earnings	0.281	0.370	0.495	0.446
	Fixed Charge Coverage	0.164	0.216	0.289	0.378
	Interest Coverage	0.151	0.199	0.267	0.331
	Cash Flow/Earnings	0.089	0.117	0.157	0.444
	Senior Debt to Cash Flow/Earnings	0.055	0.072	0.097	0.419
	Other Coverage	0.026	0.034	0.046	0.291
	Debt Service Coverage	0.013	0.017	0.023	0.228
BS Covenants:	Net Worth	0.108	0.143	0.191	0.344
	Tangible Net Worth	0.071	0.093	0.125	0.329
	Debt to Capitalization	0.060	0.079	0.105	0.233
	Debt to Net Worth	0.020	0.027	0.035	0.211
	Other Liquidity	0.016	0.021	0.028	0.183
	Current Ratio	0.014	0.018	0.024	0.133
	Other BS Ratio	0.010	0.013	0.018	0.129
	Quick Ratio	0.006	0.009	0.011	0.225
	Working Capital	0.005	0.007	0.009	0.232
	Shareholder's Equity	0.004	0.005	0.007	0.250
Other Covenants:	Capital Expenditure	0.112	0.148	0.197	0.283

Panel C: Renegotiations of Accounting-based Contractual Terms by Action

	Pr(.)	*Pr(.| A)*	*Pr(.| B)*	*Pr(.| C)*
Threshold Renegotiated			0.724	
Redefining Accounting Terms			0.419	
Adding Accounting-based Covenants			0.211	
Deleting Accounting-based Covenants			0.193	

Table 3 Estimation of Debt-Contracting Value of Accounting Numbers

This table presents the distribution of coefficients in equation (1) using Compustat firms from 1990-2005. Specifically, for each year starting from 1995, equation (1) is estimated by Fama-French industry (48 categories) using the data over the past five years. E_{q-k} is EBITDA divided by total assets in quarter q-k. COV_{q-k} is interest coverage divided by total interest expense. LEV_{q-k} is long-term debt divided by total assets. NW_{q-k} is net worth divided by total assets. Each regression requires at least 100 firm-quarter observations. Fama-MacBeth t-statistics are presented in parentheses.

	Dependent Variable=$Rating_t$			
	Mean	P25	Median	P75
E_{q-1}	5.396*	-1.913	2.827	6.658
	(1.82)			
E_{q-2}	5.317***	0.426	4.020	7.794
	(2.59)			
E_{q-3}	6.196***	-0.204	3.755	7.028
	(2.59)			
E_{q-4}	4.368**	0.181	2.913	6.517
	(2.58)			
COV_{q-1}	0.062***	-0.003	0.004	0.047
	(4.35)			
COV_{q-2}	0.020	-0.004	0.001	0.019
	(1.56)			
COV_{q-3}	0.025**	-0.002	0.002	0.027
	(2.21)			
COV_{q-4}	0.038***	-0.002	0.003	0.032
	(3.82)			
LEV_{q-1}	-1.101***	-2.334	-0.681	0.620
	(3.30)			
LEV_{q-2}	-0.865**	-1.433	-0.454	0.189
	(2.52)			
LEV_{q-3}	-2.369***	-1.334	-0.502	0.142
	(4.32)			
LEV_{q-4}	-0.672*	-2.682	-1.277	-0.023
	(1.86)			
NW_{q-1}	0.855**	-0.508	0.522	2.293
	(2.51)			
NW_{q-2}	-0.451	-1.157	-0.101	0.626
	(1.12)			
NW_{q-3}	0.418	-1.018	-0.188	0.370
	(0.99)			
NW_{q-4}	0.275	-1.312	0.058	1.268
	(0.95)			

Table 4 Summary Statistics for Multivariate Analyses

This table presents summary statistics of variables used in the cross-sectional analyses. Variables are defined in Appendix II.

Variable	N	Mean	Std	P10	P25	Median	P75	P90
Panel A: Dependent and Test Variables								
DCV	3,625	0.572	0.068	0.488	0.506	0.562	0.650	0.665
RENEGDCV	3,625	0.246	0.017	0.225	0.230	0.243	0.266	0.270
INVEST	3,700	0.020	0.018	0.004	0.008	0.014	0.027	0.050
Panel B: Firm Characteristics								
LNASSET	3,720	6.574	1.732	4.402	5.357	6.510	7.679	8.926
DTE	3,718	7.849	95.079	0.000	2.707	7.655	14.641	24.255
LEV	3,720	0.305	0.208	0.042	0.154	0.288	0.423	0.556
ROA	3,720	0.034	0.029	0.008	0.021	0.033	0.046	0.063
MTB	3,719	1.784	1.389	0.941	1.112	1.422	1.987	2.914
ZSCORE	3,719	2.852	10.324	0.330	0.892	1.700	3.019	5.620
STDROA	3,719	0.018	0.024	0.004	0.006	0.011	0.021	0.036
Q	3,671	1.778	1.580	0.919	1.095	1.411	1.968	2.915
CF	3,720	0.071	0.134	-0.013	0.044	0.080	0.121	0.170
RK	3,576	0.114	0.246	0.000	0.006	0.029	0.127	0.328
KZIND	3,671	-21.271	4.975	-27.574	-26.491	-21.349	-16.116	-14.913
TANG	3,720	0.452	0.122	0.279	0.374	0.470	0.536	0.587
LEASE	3,715	0.204	0.391	0.000	0.029	0.090	0.216	0.491
STDINVEST	3,409	0.161	0.462	0.008	0.015	0.031	0.080	0.244
AGE	3,720	20.361	15.957	5.000	7.000	14.000	32.000	47.500
SALEG	3,697	0.517	10.357	-0.112	0.005	0.106	0.286	0.659
Panel C: Lender Characteristics								
INSTLP	3,564	-0.049	0.053	-0.101	-0.067	-0.039	-0.017	-0.001
FLENDER	3,682	-0.206	0.229	-0.524	-0.375	-0.143	0.000	0.000
Panel D: Industry Characteristics								
DISPRAT	3,625	3.569	0.645	2.661	3.123	3.500	3.952	4.369
DISPSALE	3,625	0.343	0.378	0.118	0.154	0.200	0.331	0.808
Panel E: Loan Characteristics								
RELINT	3,564	0.754	0.273	0.318	0.556	0.848	1.000	1.000
LNMATURITY	3,682	3.628	0.621	2.485	3.497	3.738	4.094	4.174
SPREAD	3,682	169.208	116.552	42.000	75.000	150.000	240.625	318.421
NLENDER	3,682	8.211	8.309	1.000	2.000	6.000	12.000	18.000
DAMOUNT	3,682	-1.435	1.000	-2.722	-2.057	-1.367	-0.741	-0.245
REVLV	3,682	0.710	0.375	0.000	0.426	1.000	1.000	1.000
PPACC	3,682	0.474	0.487	0.000	0.000	0.131	1.000	1.000
PPRAT	3,682	0.249	0.428	0.000	0.000	0.000	0.500	1.000
BOWBASE	3,682	0.196	0.397	0.000	0.000	0.000	0.000	1.000
NCOVIS	3,682	1.622	1.057	0.000	1.000	2.000	2.000	3.000
NCOVBS	3,682	0.907	0.824	0.000	0.000	1.000	1.000	2.000
COLL	3,682	0.538	0.496	0.000	0.000	1.000	1.000	1.000
Panel F: Governance Variables								
INSTHOLD	3,720	0.488	0.274	0.058	0.266	0.528	0.713	0.828
ANALYF	3,720	7.899	8.065	0.000	1.000	6.000	12.000	19.000
INVGS	3,720	-0.025	0.128	-0.076	-0.054	-0.028	0.000	0.017
GSCORED	3,720	0.065	0.247	0.000	0.000	0.000	0.000	0.000
CAPEXREST	3,720	0.326	0.469	0.000	0.000	0.000	1.000	1.000

Table 5 *Ex Post* Shocks, Debt-Contracting Value, and Renegotiation

This table presents the results of the interaction effect between *DCV* and shocks on the probability of renegotiation. The sample consists of 19,282 loan-quarter observations. The first observation for each loan corresponds to the quarter of origination and the last observation corresponds to the ultimate outcome of the loan (it matures, is renegotiated, or the borrower stops filing with the SEC). *RENEGQ* is an indicator variable that is equal to one if there is any renegotiation during that loan-quarter. Shocks are measured as the absolute value of changes in Hillegeist et al.'s (2004) default distance (*DD*) in quarter *q+1* for any particular quarter *q* relative to the quarter prior to loan origination. Negative (positive) shocks mean negative (positive) changes in *DD*. I partition *DCV* and shocks into values above and below the median.

$Shock_{q,i} = |DD_{q+1,i} - DD_{1,i}|$
Variable = *RENEGQ*

Panel A:		Full Sample		
		High Shock	Low Shock	Diff.
Low *DCV*	Mean	0.140	0.122	0.018 **
		(N=4909)	(N=4709)	(t=2.562)
High *DCV*	Mean	0.121	0.118	0.003
		(N=4849)	(N=4815)	(t=0.468)
	Diff.	0.018 ***	0.004	.
		(t=2.710)	(t=0.590)	.

Panel B:		Negative Shocks Sample		
		High Shock	Low Shock	Diff.
Low *DCV*	Mean	0.143	0.125	0.018 *
		(N=2577)	(N=2427)	(t=1.858)
High *DCV*	Mean	0.123	0.123	0.006
		(N=2452)	(N=2480)	(t=0.669)
	Diff.	0.020 **	0.003	.
		(t=2.132)	(t=0.284)	.

Panel C:		Positive Shocks Sample		
		High Shock	Low Shock	Diff.
Low *DCV*	Mean	0.136	0.119	0.017 *
		(N=2332)	(N=2282)	(t=1.750)
High *DCV*	Mean	0.120	0.113	0.006
		(N=2397)	(N=2335)	(t=0.669)
	Diff.	0.016 *	0.005	.
		(t=1.669)	(t=0.558)	.

Table 6 *Ex Ante* Determinants of Probability of Renegotiation

This table presents estimation results of pooled Probit regressions for the full sample and the sample after deleting renegotiations not involving changes in accounting-based terms. The dependent variable in all regressions is an indicator variable (*RENEG*) that is equal to one if the contract is renegotiated before maturity. Deal purpose fixed effects correspond to four categories (general corporate purpose, recapitalization, acquisition, and others). Year fixed effects correspond to the loan initiation years. Credit rating fixed effects correspond to six categories (A-rated or better, BAA-rated, BA-rated, B-rated, CAA-rated, and unrated firms). All variables are defined in Appendix II. Continuous variables are winsorized at the 1st and 99th percentiles. Clustered *z*-statistics by firm are presented in parentheses. * Significant at 0.10; ** Significant at 0.05; *** Significant at 0.01 (two-sided test).

	Pred.	*RENEG*
Test Variables		
DCV	**-(H1)**	-0.439***
		(2.69)
Firm Characteristics		
LNASSET		0.008
		(0.72)
DTE		-0.001
		(0.79)
LEV		-0.037
		(0.62)
ROA		-0.081
		(0.17)
MTB		-0.003
		(0.51)
STDROA		-0.242
		(0.81)
ZSCORE		-0.004
		(1.09)
TANG		-0.069
		(0.95)
KZIND		-0.000
		(0.19)
Loan Characteristics		
LNMATURITY		0.068***
		(4.34)
SPREAD		0.000
		(0.25)
NLENDER		0.002
		(1.45)
DAMOUNT		0.049***
		(4.13)

(Table 6 continued on next page)

Table 6 *Ex Ante* Determinants of Probability of Renegotiation—*continued*

	Pred.	*RENEG*
REVLV		0.061**
		(2.53)
PPACC		0.057***
		(2.76)
PPRAT		0.049*
		(1.79)
BOWBASE		0.090***
		(4.21)
NCOVIS		0.022**
		(2.48)
NCOVBS		0.008
		(0.79)
COLL		-0.001
		(0.04)
RELINT		0.021
		(0.70)
Lender Characteristics		
INSTLP		-0.283*
		(1.69)
FLENDER		0.038
		(0.92)
Industry Characteristics		
DISPRAT		-0.018
		(1.32)
DISPSALE		0.048**
		(2.26)
Deal Purpose FE		YES
Year FE		YES
Credit Rating FE		YES
Observations		3431
Log Likelihood		-1755.813

Table 7 Underinvestment

This table provides evidence of the underinvestment problem. The investment *INVEST* is the average of quarterly capital expenditures plus R&D scaled by total assets starting with the quarter after signing the debt contract and ending with the quarter before renegotiation or before maturity in cases where there is no renegotiation. For each sample firm, I calculate *INVEST* in the same period as the sample firm for other Compustat firms in the same 2-digit SIC industry. I then pool the sample firm with the Compustat firms and regress *INVEST* on Tobin's *Q* and cash flow to obtain the residuals as the abnormal investment. Panel A columns (1) and (2) present the mean and median of the abnormal investment for my sample firms. Columns (3) to (6) of Panel A present the means and medians of the differences in investment between my sample firms and matched firms. I select the matched firms in two ways: (1) I use the same firm in the same period, lagged by one year; (2) for each sample firm, in the year before entering the debt agreement, I choose the firm with the closest sales growth among firms in the same year and 2-digit SIC industry. Panel B deletes the sample firms with CAPEX covenants. Panel C presents the results of OLS regressions of average ROA over the next one, two, or three years on *INVEST* controlling for other determinants. Industry fixed effects correspond to the Fama-French 12-industry classification. Year fixed effects correspond to the loan initiation years. Control variables are defined in Appendix II. Continuous variables are winsorized at the 1st and 99th percentiles. For mean tests, clustered *t*-statistics by firm are presented in parentheses. For median tests, *z*-statistics are presented in parentheses. * Significant at 0.10; ** Significant at 0.05; *** Significant at 0.01 (two-sided test).

Panel A: Full Sample

			Matched-Pair Difference of the Investment			
			Same Firm Same Period Lagged by One Year		Same Year-Industry with Closest Sales Growth	
	Abnormal Investment					
	Mean	Median	Mean	Median	Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)
Diff	-0.00591***	-0.00577***	-0.00156***	-0.00038***	-0.00568***	-0.00107***
Statistics	(12.41)	(26.60)	(8.37)	(4.92)	(9.11)	(3.69)
N	3503	3503	3696	3696	3672	3672

Panel B: Sample after Deleting Treatment Firms with CAPEX Covenants

			Matched-Pair Difference of the Investment			
			Same Firm Same Period Lagged by One Year		Same Year-Industry with Closest Sales Growth	
	Abnormal Investment					
	Mean	Median	Mean	Median	Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)
Diff	-0.00512***	-0.00523***	-0.00106***	-0.00030***	-0.00437***	-0.00070*
Statistics	(8.91)	(18.27)	(4.59)	(3.36)	(5.78)	(1.88)
N	2383	2383	2490	2490	2479	2479

(Table 7 continued on next page)

Table 7 Underinvestment—*continued*

Panel C: Impact on Future Operating Performance

	(1)	(2)	(3)
	ROA1	*ROA2*	*ROA3*
INVEST	0.457***	0.463**	0.439**
	(3.25)	(2.24)	(2.13)
Q	-0.004	-0.008	-0.008
	(1.22)	(1.16)	(1.19)
CF	0.014	0.041	0.023
	(0.41)	(1.09)	(0.66)
STDROA	0.018	-0.094	-0.508***
	(0.13)	(0.70)	(2.58)
LNASSET	0.004***	0.002*	0.004***
	(3.24)	(1.73)	(2.83)
LAGROA	0.681***	0.608***	0.680***
	(5.50)	(4.73)	(6.37)
Constant	0.005	0.019	-0.002
	(0.28)	(1.17)	(0.10)
Industry FE	YES	YES	YES
Year FE	YES	YES	YES
Observations	2950	2705	2384
Adj. R-squared	0.404	0.440	0.453

Table 8 Impact of Debt-Contracting Value of Accounting Numbers on Investment

This table presents estimation results of OLS regressions of *INVEST* on the perceived probability of renegotiation interacted with bargaining power variables. *INVEST* is the average of quarterly capital expenditures plus R&D scaled by total assets starting with the quarter after signing the debt contract and ending with the quarter before renegotiation or before maturity in cases where there is no renegotiation. *RENEGDCV* is one minus the predicted value by plugging *DCV* and the means of other independent variables into equation (2) using the estimated coefficients in Table 6. *INSTLP* is the fraction of Type B, Type C, or Type D loans in the portfolio of the lead lender in the past five years, multiplied by -1. *FLENDER* is the proportion of the syndicated loan held by foreign (i.e., non-US) lenders, multiplied by -1. *KZIND* is the financial constraint index from Kaplan and Zingales (1997). *TANG* is the liquidation value from Berger et al. (1996). Deal purpose fixed effects correspond to four categories (general corporate purpose, recapitalization, acquisition, and others). Year fixed effects correspond to the loan initiation years. Credit rating fixed effects correspond to six categories (A-rated or better, BAA-rated, BA-rated, B-rated, CAA-rated, and unrated firms). Control variables are defined in Appendix II. Continuous variables are winsorized at the 1st and 99th percentiles. Clustered *t*-statistics by firm are presented in parentheses. * Significant at 0.10; ** Significant at 0.05; *** Significant at 0.01 (two-sided test).

			BARGPOW=			
			INSTLP	*FLENDER*	*KZIND*	*TANG*
	Pred.	(1)	(2)	(3)	(4)	(5)
Test Variables						
RENEGDCV	**+(H2a)**	0.036*	0.069**	0.071***	0.173*	-0.067
		(1.81)	(2.45)	(2.69)	(1.93)	(1.07)
RENEGDCV	**+(H2b)**		0.670*	0.177**	0.007*	0.323**
×*BARGPOW*			(1.83)	(2.08)	(1.66)	(2.10)
BARGPOW			-0.164*	-0.054**	-0.001	-0.040
			(1.80)	(2.53)	(1.41)	(1.04)
Traditional Controls						
Q		0.001*	0.001*	0.001*	0.001*	0.001*
		(1.86)	(1.76)	(1.86)	(1.90)	(1.85)
CF		0.013***	0.013***	0.012***	0.013***	0.012***
		(3.09)	(2.97)	(3.01)	(3.05)	(2.87)
Governance Variables						
INSTHOLD		-0.002	-0.002	-0.002	-0.002	-0.002
		(1.30)	(1.17)	(1.35)	(1.36)	(1.06)
ANALYF		0.001***	0.001***	0.001***	0.001***	0.000***
		(9.55)	(9.60)	(9.36)	(9.30)	(8.33)
INVGS		0.003**	0.003**	0.003**	0.003**	0.003***
		(2.46)	(2.49)	(2.51)	(2.49)	(3.27)
GSCORED		0.001	0.001	0.001	0.002	0.001
		(0.70)	(0.58)	(0.51)	(1.10)	(0.63)
CAPEXREST		-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
		(4.99)	(4.70)	(5.00)	(4.91)	(4.86)

(Table 8 continued on next page)

Table 8 Impact of Debt-Contracting Value of Accounting Numbers on Investment— *continued*

			BARGPOW=			
			INSTLP	*FLENDER*	*KZIND*	*TANG*
	Pred.	(1)	(2)	(3)	(4)	(5)
Firm Characteristics						
LNASSET		-0.002***	-0.003***	-0.003***	-0.002***	-0.001***
		(5.64)	(5.66)	(6.73)	(5.24)	(3.51)
LEASE		-0.001	-0.001	-0.000	-0.001	-0.001
		(0.73)	(0.93)	(0.28)	(0.74)	(0.82)
STDROA		0.080**	0.069**	0.079**	0.080**	0.050*
		(2.38)	(2.10)	(2.42)	(2.41)	(1.75)
STDINVEST		0.004***	0.004***	0.004***	0.004***	0.004***
		(5.30)	(5.35)	(5.44)	(5.20)	(5.04)
ZSCORE		0.000*	0.000*	0.000*	0.000	0.000
		(1.83)	(1.69)	(1.84)	(0.95)	(0.58)
AGE		0.000	0.000	0.000	0.000	-0.000
		(0.03)	(0.08)	(0.38)	(0.22)	(1.42)
SALEG		0.000	0.000	0.000	0.000	0.000*
		(1.06)	(0.98)	(0.86)	(1.13)	(1.80)
RK		0.001	0.000	0.000	0.001	0.001
		(0.31)	(0.11)	(0.26)	(0.66)	(0.56)
Constant		0.016***	0.009	0.009	-0.014	0.021
		(2.59)	(1.09)	(1.21)	(0.60)	(1.29)
Deal Purpose FE		YES	YES	YES	YES	YES
Year FE		YES	YES	YES	YES	YES
Credit Rating FE		YES	YES	YES	YES	YES
Observations		3164	3071	3164	3164	3164
Adj. R-squared		0.210	0.206	0.222	0.212	0.267

Table 9 Additional Analyses on Renegotiation

In column (1), I add abnormal investment to the Probit analysis. Abnormal investment is calculated in the same way as described in Table 7. Column (2) presents a negative binomial regression of the intensity of accounting-related renegotiation on *DCV*. Column (3) shows the result of Probit estimation in a sample with debt-to-earnings covenants where earnings used in debt-to-earnings covenants are equivalent to EBITDA. The dependent variable is an indicator variable that equals one if the debt-to-earnings covenant is renegotiated. Column (4) presents the estimation using *SRD* as an instrument variable, and in column (5) the predicted *DCV* from column (4) is used as an explanatory variable. *SRD* is an industry-level measure of suppliers' R&D investment intensity following Raman and Shahrur (2008). For each industry, *SRD* is constructed as the average of the supplier industries' R&D investment, weighted by the input bought from each supplier industry. Deal purpose fixed effects correspond to four categories (general corporate purpose, recapitalization, acquisition, and others). Year fixed effects correspond to the loan initiation years. Credit rating fixed effects correspond to six categories (A-rated or better, BAA-rated, BA-rated, B-rated, CAA-rated, and unrated firms). Control variables are defined in Appendix II. Continuous variables are winsorized at the 1st and 99th percentiles. * Significant at 0.10; ** Significant at 0.05; *** Significant at 0.01 (two-sided test).

		Number of Accounting	*Debt to Earnings*	*IV Approach*	
	RENEG	*Related Changes*	*Renegotiation*	*DCV*	*RENEG*
	(1)	(2)	(3)	(4)	(5)
Test Variables					
DCV	-0.432***	-0.458**	-0.685***		-0.468***
	(2.65)	(2.08)	(2.63)		(3.79)
Additional Variables					
Abnormal	0.857				
investment	(1.27)				
SRD				2.755***	
				(10.01)	
Firm Characteristics	YES	YES	YES	YES	YES
Loan Characteristics	YES	YES	YES	YES	YES
Lender Characteristics	YES	YES	YES	YES	YES
Industry Characteristics	YES	YES	YES	YES	YES
Deal Purpose FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Credit Rating FE	YES	YES	YES	YES	YES
Observations	3277	3431	1058	3431	
Log Likelihood	-1739.725	-4053.927	-493.087	3576.059	