



Renegotiation of financial contracts: Evidence from private credit agreements[☆]

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ARTICLE INFO

Article history:

Received 21 May 2008

Received in revised form

4 August 2008

Accepted 14 August 2008

Available online 5 May 2009

JEL classifications:

G32

G21

L14

Keywords:

Renegotiation

Bargaining

Financial contracting

ABSTRACT

Using a large sample of private credit agreements between U.S. publicly traded firms and financial institutions, we show that over 90% of long-term debt contracts are renegotiated prior to their stated maturity. Renegotiations result in large changes to the amount, maturity, and pricing of the contract, occur relatively early in the life of the contract, and are rarely a consequence of distress or default. The accrual of new information concerning the credit quality, investment opportunities, and collateral of the borrower, as well as macroeconomic fluctuations in credit and equity market conditions, are the primary determinants of renegotiation and its outcomes. The terms of the initial contract (e.g., contingencies) also play an important role in renegotiations; by altering the structure of the contract in a state contingent manner, renegotiation is partially controlled by the contractual assignment of bargaining power.

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[☆] We thank an anonymous referee, Bill Schwert (the editor), Philip Bond, Alon Brav, Judy Chevalier, Peter DeMarzo, Doug Diamond, Darrell Duffie, Mark Flannery, John Graham, Dirk Hackbarth, Mike Hertz, Andrew Metrick, Gustav Sigurdsson, Clifford Smith, Raghuram Rajan, Adriano Rampini, Morten Sorensen, Jerry Warner, Andrew Winton, Bilge Yilmaz, and Jeffrey Zwiebel for helpful comments; seminar participants at Cornell University, Dartmouth University, Duke University, Emory University, HEC Lausanne, London Business School, London School of Economics, Louisiana State University, Ohio State University, University of Arizona, University of Chicago, University of Florida, University of Illinois at Urbana-Champaign, University of North Carolina, University of Notre Dame, University of Pennsylvania, University of Rochester, University of Southern California, University of Waterloo, and Yale University; and participants at the 2007 Financial Research Association Conference, 2007 Financial Economics and Accounting Conference, and 2008 Utah Winter Finance Conference. We thank Gao Shan, Wang Yexin, and Lin Zhu for excellent research assistance. Roberts gratefully acknowledges financial support from a Rodney L. White Grant, an NYSE Research Fellowship, the Aronson, Johnson, and Ortiz Fellowship, and the Geewax-Terker Fellowship. Sufi gratefully acknowledges financial support from the Center for Research in Security Prices and the IBM Corporation.

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1. Introduction

Renegotiation plays a critical role in many corporate finance theories. For example, theories of the firm, the design of securities, and the choice of financial structure often depend crucially on whether and how agents renegotiate their agreements.¹ While theory suggests that renegotiation is an important consideration in financial contracting, there are few empirical studies that examine this phenomenon outside of default or bankruptcy. Consequently, a number of important questions remain

¹ For theories of the firm, see studies by Grossman and Hart (1986) and Hart and Moore (1990). For theories of debt as an optimal contract, see studies by Aghion and Bolton (1992), Hart and Moore (1989, 1994, 1998), and Bolton and Scharfstein (1990, 1996). For theories of security design, see studies by Berlin and Mester (1992), Rajan (1992), Gorton and Kahn (2000), and Garleanu and Zwiebel (2009). For theories of financial structure, see studies by Dewatripont and Tirole (1994), Berglöf and von Thadden (1994), Berlin and Mester (1992), Rajan (1992), Bolton and Scharfstein (1996), and Hackbarth, Hennessy, and Leland (2007).

unanswered: How often are financial contracts renegotiated? What are the primary outcomes of renegotiation? What factors trigger renegotiation? And, how is renegotiation related to the initial terms of the agreement?

In this study, we attempt to answer these questions by exploring the renegotiations observed in a sample of 1,000 private credit agreements between financial institutions (lenders) and publicly listed U.S. firms (borrowers) from 1996 to 2005. These agreements, which govern the terms of syndicated and sole-lender loans, provide a useful empirical setting to examine the implications of contract theory for several reasons. First, theory suggests that renegotiation is more likely to be relevant for securities with concentrated holdings, which mitigate collective action problems (e.g., Smith and Warner, 1979; Leftwich, 1981). Second, the loans that are governed by private credit agreements represent the largest source of external finance for corporations—in terms of flows—larger than public debt and equity combined (e.g., Gorton and Winton, 2003; Gomes and Phillips, 2007). Finally, the environment in which private credit agreements are written shares many similarities to the theoretical environments found in much of the security design literature. Therefore, our empirical analysis is performed in a setting that is closely related to the motivating theory, and our results have potentially important implications for a broad cross-section of borrowers and lenders.

Our study centers around a novel data set that records every initial renegotiation of the interest, principal, or maturity of the loan, as reported in the borrowers' Securities Exchange Commission (SEC) filings. We combine this renegotiation information with accounting data from Compustat, stock price data from the Center for Research in Security Prices (CRSP), and origination terms from Dealscan and the SEC filings in order to identify the determinants of these renegotiations and their relation to the original terms of the contract.

We begin by showing that nearly all private credit agreements in our sample are renegotiated prior to maturity. Unconditionally, 75% of the contracts have a major contract term (maturity, principal, or interest) renegotiated after origination but before the stated maturity date. This figure increases to over 90% when we focus on contracts with stated maturities in excess of one year, and to 96% when we focus on contracts with stated maturities in excess of three years. In terms of timing, renegotiations tend to occur, on average, early in the life of the loan—before less than half of the original stated maturity has elapsed.

Renegotiations also generate large changes to the terms of the initial contract. At origination, the average maturity, amount, and interest rate spread over the London Interbank Offered Rate (LIBOR) for loans in our sample are 3.3 years, \$450 million, and 162 basis points, respectively. On average, the absolute values of the changes to each of these terms that occur in renegotiation are 2.1 years, \$193 million, and 64 basis points. In other words, renegotiation generates changes relative to the initial maturity, amount, and spread of the contract on the order of 64%, 43%, and 40%, respectively. Yet, fewer than 18% of renegotiations are directly or indirectly associated

with a covenant violation or payment default. Thus, the renegotiation of private debt contracts not only occurs very frequently but also leads to significant changes in corporate capital structures.

Our analysis of what triggers renegotiation reveals that the accrual of new information concerning credit quality and outside options is a strong predictor of the incidence and outcomes of renegotiation. For example, we find that increases in borrowers' assets and decreases in their financial leverage increase the incidence of renegotiation, and, more specifically, increase the probability of receiving additional credit and lower interest rates. Likewise, decreases in the cost of equity capital, a competing source of funds, increases the probability of renegotiations that lead to lower interest rates and more credit for borrowers. These results highlight how changes in credit quality and outside options can generate surplus under the initial terms of the contract and lead to renegotiation. Further, they illustrate how the manner in which these changes occur shifts the relative bargaining powers of the borrower and lender, enabling each party to extract a relatively larger or smaller fraction of the surplus from the renegotiations.

We also find that fluctuations in credit market conditions, the financial health of lenders, and the aggregate stock market play an important role in spurring renegotiation. For example, renegotiation outcomes appear pro-cyclical, in that higher gross domestic product (GDP) growth leads to increases in credit availability, while contractions lead to reductions in credit availability and higher interest rates. Economically speaking, changes in credit and equity market conditions appear as important to renegotiation as changes in borrower conditions. These factors further highlight the importance of borrowers' outside options in altering the relative bargaining power of the contracting parties. When borrowers' alternative sources of financing—be it other lenders or other capital markets—are relatively inexpensive, their threat of exiting the agreement is more credible.

Finally, we examine how initial contract features affect the incidence and outcomes of renegotiation. Interestingly, most previously identified *ex ante* empirical proxies for renegotiation costs bear little relation to the likelihood of renegotiation even after controlling for *ex post* changes in firm, industry, and macroeconomic characteristics, as well as credit ratings. For example, the number of lenders in the lending syndicate, firm characteristics at the time of origination, and the presence of *ex ante* contingencies, such as performance pricing grids and borrowing bases, are largely unrelated to whether or not a renegotiation takes place.

While the initial terms of the contract have a limited impact on whether or not renegotiation occurs, they have a significant impact on the sensitivity of renegotiation to changes in the borrower's condition. For example, contracts that contain a pricing grid written on a measure of the borrower's cash flow are *ex post* more likely to be renegotiated for a given change in the borrower's cash flow. More specifically, borrowers with a pricing grid on cash flow are more likely to experience a renegotiation that leads to a reduction in the amount of credit and an

increase in the interest rate following an ex post decline in cash flow.

These findings suggest an alternative rationale for contingencies in the original contract, as opposed to staving off costly renegotiation. Specifically, contingencies can influence the outcome of ex post renegotiation by allocating bargaining power to either the borrower or lender in different states of the world (Aghion, Dewatripont, and Rey, 1994; Harris and Raviv, 1995). For example, an ex post reduction in cash flow leads to a situation in which the borrower is better off under the initial terms of the contract and, therefore, has little incentive to restructure the contract in a manner reflecting the ex post deterioration in credit quality. However, the presence of the pricing grid shifts the relative bargaining power to the lender by increasing the interest rate in accord with the deterioration in credit quality. In fact, pricing grids can subject borrowers to a doubling of interest rate spreads as their credit quality deteriorates. Consequently, pricing grids can incentivize borrowers to renegotiate with lenders following a decline in credit quality because these contingencies implicitly allocate bargaining power in a state contingent manner. Coupled with the frequency with which renegotiation occurs, our results suggest that an important objective of a bank loan is the contractual allocation of bargaining power.

The primary contribution of our study is to provide novel empirical evidence on renegotiation, its determinants, and its implications for financial contracting. Our paper is related to the literature examining renegotiation in the context of corporate default. Studies by Beneish and Press (1993, 1995), Chen and Wei (1993), Smith (1993), Chava and Roberts (2008), Nini, Smith, and Sufi (2009), and Roberts and Sufi (2009) study the outcome and implications of technical default, or violations of covenants other than those requiring the payment of interest and principal. Related, studies by Gilson (1990), Gilson, John, and Kang (1990), Asquith, Gertner, and Scharfstein (1994), and Benmelech and Bergman (2008) study the outcome of ex post bargaining in payment default and bankruptcy. In contrast, our study focuses on *all* renegotiations of debt contracts, the vast majority of which occur outside of default and financial distress.² Thus, our study is the first to quantify the frequency and importance of debt renegotiation, as well its empirical determinants.

Our study is also related to previous work examining why borrowers and lenders write into contracts various contingencies, such as covenants (e.g., Smith and Warner, 1979; Malitz, 1986; Begley, 1994; Goyal, 2005; Nash, Netter, and Poulson, 2003; Bradley and Roberts, 2003) and performance pricing (e.g., Beatty, Dichev, and Weber, 2002; Asquith, Beatty, and Weber, 2005). In contrast to these studies, our analysis explicitly links ex ante

contingencies to ex post renegotiation, which we show is an important aspect of understanding contract design. A key implication of our study is that security design is, to a large extent, driven by renegotiation considerations since renegotiation is all but inevitable in most private credit agreements. In other words, our evidence is consistent with theories by Aghion, Dewatripont, and Rey (1994) and Harris and Raviv (1995), where renegotiation is controlled by the contractual assignment of bargaining power.

The remainder of the paper proceeds as follows. Section 2 describes our data and examines the composition and characteristics of our sample firms and loan contracts. Section 3 motivates our study by discussing the practice of loan renegotiation and outlining the theory that guides our empirical analysis. Section 4 presents our first set of results concerning the frequency, timing, and outcome of renegotiations. Section 5 identifies the determinants of renegotiation and its outcomes. Section 6 concludes.

2. Data and sample statistics

2.1. Data and sample construction

We begin with a sample of 1,000 private credit agreements originated by financial institutions to U.S. public firms between 1996 and 2005. These contracts represent a random sub-sample of the 3,720 agreements collected directly from SEC filings by Nini, Smith, and Sufi (2009).³ We focus on only 1,000 contracts because of the time involved in gathering and recording the renegotiation data, which is described below. Contracts are sometimes referred to as “deals” or “packages”, and consist of one or more tranches or “facilities”. For example, one contract may consist of two tranches: a revolving line of credit and a term loan. Each contract is matched to Standard and Poor’s (S&P’s) Compustat for accounting information, to CRSP for stock price information, and to Reuters Loan Pricing Corporation (LPC) Dealscan for loan origination terms when available. Given certain limitations in Dealscan’s coverage of contingencies (Drucker and Puri, 2009), data on pricing grids, financial covenants, and borrowing bases are collected directly from the contracts. For ease of reference, all variable definitions and sources appear in Appendix A.

We obtain information on renegotiations by examining the SEC filings (10-Qs, 10-Ks, and 8-Ks) of each borrower after the origination of the loan. Through a variety of regulations, the SEC requires that firms detail material debt agreements, sources of liquidity, and long-term debt schedules (Johnson, 1997; Kaplan and Zingales, 1997; Sufi, 2009; Nini, Smith, and Sufi, 2009). As a result of these regulations, firms almost always give detailed explanations of their debt agreements in their SEC filings. Further, the SEC requires disclosure of any material changes to

² Kaplan and Stromberg (2003) describe the renegotiation of venture capital (VC) contracts in the context of subsequent financing rounds, though their focus is primarily on describing the VC contracts themselves. Independent of our study, a recent working paper by Ivashina and Sun (2007) examines the impact of ex post interest rate changes on institutional investor returns, using a small sample of Dealscan loans.

³ Firms are required by the SEC to file material contracts and Nini, Smith, and Sufi (2009) obtain their sample by electronically searching through SEC filings for certain terms that are common to private credit agreements. See their paper for more details on these contracts.

these debt agreements in the exhibits of company filings. By following the explanations of debt agreements through time, we can detect whether terms are amended (i.e., renegotiated).

Specifically, the first step in collecting the renegotiation data is finding the SEC filing in which the borrower mentions the origination of the loan governed by the private credit agreement. We then search each subsequent quarterly (10-Q), annual (10-K), and periodic (8-K) SEC filing for any mention of changes in the principal, interest spread, or maturity of the loan prior to the stated maturity of the loan.⁴ Implicit in this strategy is a definition of renegotiation coinciding with *any* ex post change to these terms. We employ this definition to coincide with that used throughout the theoretical contracting literature. (See the discussion below in Section 3 for details.) Of course, not all contract changes and, hence, renegotiations are alike, which motivates us to investigate heterogeneity in renegotiation outcomes.

We also note that ex post changes in the terms of the loan that are dictated by the original contract are *not* considered renegotiations. For example, if the original contract specifies that the interest rate increase when the borrower's credit rating is downgraded, then an increase in the interest rate in response to a downgrade is not recorded as a renegotiation. Likewise, Evergreen provisions providing for one-year extensions to the contract are not considered renegotiations.

When we find a renegotiation, we record the exact date of the renegotiation as described by the borrower in the SEC filing. We then record the terms of the renegotiation from one of two different sources. First, we search Dealscan to see if the database contains an observation that corresponds to the renegotiated contract. We find that many of the renegotiations (47%) generate independent observations in Dealscan, which suggests that many loans in Dealscan are renegotiations of prior agreements. Second, if the renegotiated contract is not in Dealscan, we examine the explanation in the SEC filing. Depending on whether the renegotiation is in Dealscan or not, we use either Dealscan or the renegotiation description in the SEC filing to record the terms of the renegotiation. More precisely, we record whether there is a change in principal, interest spread, or maturity as a result of the renegotiation, and whether the renegotiated deal maintains the same bank as lead arranger. In addition to the renegotiation data, for each quarter we also collect whether the borrower reports that it is in violation of financial covenants.⁵

While these data represent a new and rich source of information, practical considerations associated with their

collection impose certain limitations. First, our reliance on the SEC filings for credit agreements generates a sample of loans that are relatively large since the SEC requires reporting of only “material liabilities”. Second, we only collect the initial renegotiation of the loan and, consequently, have no information on any subsequent renegotiations of the contract. Third, as mentioned above, we focus only on renegotiations leading to changes to the amount, pricing, or maturity of the loan.

Finally, if the renegotiated loan does not generate an observation in Dealscan, then we are forced to rely only on the borrower's description of the renegotiation in the SEC filing. While borrowers almost always detail any changes in the amount or maturity of the loan, they often do not report whether there is a change in the interest spread. As a result, for 25% of the renegotiations, we know that the amount has either increased or decreased, but we do not know whether the interest spread has changed. In unreported results, we conduct two tests to assess whether this data limitation introduces any bias in our results. First, we eliminate all renegotiations for which we do *not* have Dealscan information. When we focus on this subset of renegotiations, our primary results are largely unaffected but for a slight increase in economic significance in many cases. In the second test, we limit ourselves to only SEC filing information even for renegotiations for which we have Dealscan information. When we ignore the information in Dealscan, our results weaken in terms of statistical and economic significance. Together, these findings suggest that any bias due to the data limitation for non-Dealscan renegotiations works to attenuate our results. In other words, our results would likely be stronger if we could better measure interest rate changes for non-Dealscan renegotiations.

2.2. Summary statistics

We combine the borrower, loan origination, and renegotiation data to form an unbalanced loan-quarter panel data set. The first observation for each loan corresponds to the quarter of origination and the last observation corresponds to the ultimate outcome of the loan. Broadly speaking, there are four possible outcomes to each of the 1,000 loans in our sample. Panel A of Table 1 summarizes these outcomes, their frequency, and their occurrence during the life of the loan. We see that 645 loans are renegotiated before the stated maturity, 208 mature, and 147 are right censored for two different reasons. Specifically, 95 loans have borrowers that stop filing with the SEC prior to the end of 2006 and, therefore, disappear from the sample, while 52 loans have neither matured nor been renegotiated by the end of 2006. The second and third columns provide some insight into why firms stop filing on EDGAR and, consequently, disappear from our sample; they are either acquired or go private.⁶

⁴ We do not record renegotiations where the principal, interest spread, and maturity remain unchanged. For example, we do not record amendments to covenants if the amendment does not affect any of these three loan terms. Our decision to focus on changes to principal, interest, and maturity is driven by their status as “material” changes, often requiring unanimity of lenders in order to implement. We discuss this further in Section 2.

⁵ See Nini, Smith, and Sufi (2009) and Roberts and Sufi (2009) for a description of financial covenant violation data.

⁶ This information is obtained from the Compustat footnotes. The remaining 40% of firms that disappear from our sample are also due primarily to acquisitions and going private transactions (private equity or management buyouts), as well as a number of bankruptcies, that do not appear to be recorded in the Compustat footnotes.

Table 1

Loan outcomes.

The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. The table presents the distribution of loans over the four mutually exclusive eventual loan outcomes: Renegotiation, Mature (no renegotiation), Disappear from the sample, End of sample. The last two categories correspond to censored outcomes where the borrower disappears from the EDGAR database (most often due to an acquisition) or the loan is still active at the end of the first quarter of 2007. The columns “Merge or acq.” and “Go private” present the fraction of firms that experience one of these two events, conditional on the loan outcome. The panel also presents the duration of the loan, defined as the number of days from the loan origination to the eventual loan outcome. For example, 64.5% of the loans in our sample were renegotiated. Of these loans, 2% of the borrowers merged or were acquired, none went private, and the average time until the renegotiation is 538 days, though the average stated maturity of these loans is 1367 days. Further, renegotiations occurred, on average, after 43.6% of the stated time to maturity had elapsed.

Panel A: Loan outcomes						
Loan outcome	Fraction of low loans	Merge or acq.	Go private	Loan duration (days)	Stated maturity (days)	Loan duration/stated maturity
Renegotiated	0.645	0.020	0.000	538	1,367	0.436
Matured	0.208	0.024	0.000	506	506	1.000
<i>Right censored outcomes</i>						
Disappeared	0.095	0.589	0.021	453	1,463	0.324
End of sample	0.052	0.000	0.000	784	1,747	0.459
Loans	1,000	1,000	1,000	1,000	1,000	1,000
Panel B: Loan outcomes by maturity						
	Stated maturity bin (years)					
	<1	1–3	3–5	>5		
Renegotiated	0.268	0.727	0.941	0.983		
Matured	0.732	0.273	0.059	0.017		
Loans	194	172	255	232		

The final three columns of Table 1 provide the time, or duration, until each loan outcome occurs, as well as its relation to the original stated maturity of the loan. Renegotiated loans are modified, on average, 538 days after the loan origination or after 43.6% of the stated maturity has elapsed. By definition, the duration of loans that mature is equal to the stated maturity. Likewise, the final two categories have durations that are less than the stated maturity of the loan because of the right censoring.

Temporarily putting aside the censored loans, Panel B of Table 1 illustrates more clearly the frequency of renegotiation and its close link to the stated maturity of the loan. For short-term (less than one year) loans, renegotiation is relatively infrequent, occurring in just over one-quarter of the loans. For loans with stated maturities of at least one year, we see that renegotiation is the norm. In fact, conditional on having a maturity of at least one year, the probability of experiencing a renegotiation is over 90%. Conditional on a maturity of at least three years, this probability increases to over 96%. Thus, with the exception of very short-term loans, almost every loan is renegotiated before it matures.

Table 2 presents summary statistics for the borrowers in our sample, as well as for non-financial firms in the Compustat database during the same time period, 1996–2005. Panel A presents the mean, median, and standard deviation of firm characteristics for the two samples. To mitigate the impact of outliers or coding

errors, we Winsorize all ratios at the upper and lower one-percentiles—a practice we employ for all of our analysis.⁷ We see that our loan-quarter panel contains 6,813 observations corresponding to 799 unique firms, though the number of observations with non-missing data varies depending on the particular measure. Relative to Compustat, our sample contains firms that tend to be larger, more highly levered, and more profitable. Our sample firms also have relatively more tangible assets, smaller cash balances, lower operating income volatility, and are more likely to have an S&P long-term issuer credit rating relative to the average Compustat firm. Overall, these differences are consistent with our sample selection procedure that conditions on firms entering into material credit agreements.

Panel B of Table 2 presents the distribution of borrowers and firms across industries.⁸ For our sample, we see that the distribution, while non-uniform, is not concentrated in any particular sectors. The Wholesale, retail & some services industry has the largest representation, containing approximately 18% of the borrowers. For the Compustat sample, the most popular sector is the

⁷ We also perform our analysis using data Winsorized at the upper and lower 2.5 and 5.0 percentiles. The results are qualitatively similar to those presented and are available upon request from the authors.

⁸ We thank Ken French for the use of his industry definitions, which may be obtained from his Web site at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

Table 2

Sample summary statistics—firm characteristics.

The table presents borrower summary statistics. Panel A presents means, standard deviations, and medians for firms' characteristics from two samples. The first sample (Renegotiation sample) consists of borrowers from our sample of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. Borrower characteristics for this sample are computed as an average across the four quarters prior to the deal origination date. The second sample (Compustat sample) consists of non-financial companies appearing in Compustat between 1996 and 2005. Firm characteristics for this sample are computed as a rolling four-quarter average for comparability with the Renegotiation sample. Panel B presents the distributions of firms in the Renegotiation and Compustat samples across 12 industries as classified by Fama and French. All variables are formally defined in Appendix A.

Panel A: Firm characteristics						
	Renegotiation sample			Compustat sample		
	Mean	SD	Median	Mean	SD	Median
Assets (\$Mil)	3,360	10,792	751	1,927	9,706	103
Debt/EBITDA	10.728	20.069	7.502	5.742	24.533	1.958
Book leverage	0.295	0.195	0.277	0.330	0.497	0.226
EBITDA/Assets	0.035	0.024	0.034	−0.049	0.308	0.024
Market-to-book ratio	1.734	0.986	1.424	4.026	10.199	1.600
Asset tangibility	0.339	0.232	0.286	0.293	0.248	0.212
Cash/Assets	0.076	0.099	0.038	0.187	0.231	0.082
Altman Z-Score	2.582	2.839	1.803	2.405	23.053	1.800
S&P Credit rating	0.496	0.500	0.000	0.119	0.324	0.000
EBITDA Volatility	0.019	0.021	0.012	0.063	0.155	0.021
Firm-quarter obs	6,813	6,813	6,813	297,423	297,423	297,423
Firms	799	799	799	16,952	16,952	16,952

Panel B: Distribution of firms across industries						
	Renegotiation sample			Compustat sample		
	Mean	SD	Median	Mean	SD	Median
Consumer non-durables			0.084			0.061
Consumer durables			0.034			0.028
Manufacturing			0.160			0.110
Oil, gas, & coal			0.059			0.053
Chemicals & allied products			0.030			0.024
Business equipment			0.113			0.237
Telephone & television trans.			0.056			0.054
Utilities			0.059			0.031
Wholesale, retails, & some srvs.			0.179			0.117
Healthcare, medical equip., & drugs			0.077			0.113
Everything else			0.150			0.171
Firm-quarter obs			6,813			297,423
Firms			799			16,952

Business equipment industry, which contains approximately 24% of all non-financial firms. Comparing the distributions more broadly, we see a number of similar fractions across the samples, particularly in the consumer products; Oil, gas & coal, and Telephone & television transmission industries. As with the borrower characteristics, the distribution of borrowers across industries is representative of firms entering into material private credit agreements, as opposed to all firms in general.

Table 3 presents summary statistics for the loan contracts. The average contract in our sample specifies borrowings in the amount of \$450 million, a stated maturity of 3.3 years, and an interest rate spread over a benchmark rate—typically LIBOR—of 162 basis points (bps). The average number of lenders participating in syndicates is 8.6 and approximately 26% of the credit agreements contain a term loan tranche that is often paired with a revolving line of credit. This statistic raises a subtle, but important point. In many instances, renegotia-

tions involve altering the debt capacity of the agreement, as opposed to the actual flow of capital since many of the contracts consist solely of revolving lines of credit. For example, a reduction in the amount of the loan rarely leads to an immediate repayment of part of the loan. Rather, it further restricts the allowable borrowings of the firm.

For comparison purpose, we present similar statistics for loan contracts found in Loan Pricing Corporation's (LPCs) Dealscan database. Specifically, we extract packages from Dealscan satisfying the following criteria: Borrowers must be non-financial firms located in the United States; all tranches in the package must be denominated in U.S. dollars; all tranches in the package must have non-missing information for the amount, maturity, and interest rate spread; and, all packages must have origination dates falling between 1996 and 2005 to coincide with our sample of private credit agreements. However, we emphasize that, unlike Compustat, Dealscan is neither a population nor a random sample. As noted by

Table 3

Sample summary statistics—contract characteristics.

The table presents means, standard deviations, and medians for contract characteristics from two samples, the first of which is our renegotiation sample consisting of a sample of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. The second sample consists of all dollar-denominated deals to U.S. borrowers in the Dealscan database during 1996–2005 and containing non-missing information for the amount, maturity, and pricing of each tranche in a deal. All variables are formally defined in Appendix A.

	Renegotiation sample			Dealscan sample		
	Mean	SD	Median	Mean	SD	Median
<i>Contract terms</i>						
Amount (\$Mil)	450	1,122	185	311	739	105
Spread over LIBOR (bps)	162	114	138	206	137	200
Number of lenders	8.603	8.187	6.000	6.00	7.574	3.000
Term loan in deal	0.262	0.440	0.000	0.339	0.473	0.000
Stated maturity (days)	1,217	643	1,096	1,283	6,672	1,098
<i>Contract contingencies</i>						
Pricing grid	0.726	0.446	1.000			
Any measure of cash flow	0.367	0.482	0.000			
Credit rating	0.232	0.422	0.000			
Balance sheet item	0.049	0.216	0.000			
Other measure	0.078	0.268	0.000			
Borrowing base	0.194	0.396	0.000			
Accounts receivable	0.166	0.372	0.000			
Inventory	0.134	0.341	0.000			
Other collateral	0.036	0.186	0.000			
Financial covenant	0.953	0.212	1.000			
Any measure of cash flow	0.826	0.379	1.000			
Any measure of net worth	0.449	0.498	0.000			
Balance sheet item	0.318	0.466	0.000			
Measures of liquidity	0.141	0.348	0.000			
Loans	1,000	1,000	1,000	25,326	25,326	25,326
Firms	799	799	799	12,389	12,389	12,389

previous research using Dealscan (e.g., [Carey and Hrycay, 1999](#)), this database obtains its information from SEC filings and contacts within the credit industry. In comparison to the Dealscan sample, our loans are quite similar across most dimensions, though they are slightly larger, with lower credit spreads and larger lending syndicates. These differences reflect LPCs ability to cull loans directly from contacts in the credit industry. Sufficiently small (i.e., immaterial) credit agreements need not be included in the SEC filings—a requirement for selection into our sample of loans.

We also examine contingencies, which are broken up into three groups: pricing grids, borrowing bases, and financial covenants. The first group, also referred to as a performance pricing feature ([Asquith, Beatty, and Weber, 2005](#)), makes the interest spread on outstanding borrowings a function of financial ratios or credit ratings. Approximately 73% of the contracts in our sample contain a pricing grid.⁹ For example, a typical pricing grid will specify that the interest spread increase by 25 basis points for an increase of 0.5 in the debt-to-earnings before interest, taxes, depreciation and amortization (EBITDA) ratio. The two most common measures on which pricing

grids are written are debt to cash flow and credit ratings. Pricing grids can also be written on the amount of a revolving credit facility outstanding or the leverage ratio, but these are far less common.

Another important contingency is a borrowing base, which ties the amount of available credit to the value of specific collateral. Borrowing bases are almost exclusively associated with secured loans, and approximately 20% of the loan agreements in our sample contain this contingency. The most common forms of collateral used in a borrowing base are accounts receivable and inventories. In fact, over 90% of borrowing bases in our sample are a function of these two assets. With less frequency, borrowing bases are also a function of equipment or raw materials, such as oil and gas reserves.

Perhaps the most important contingency in private credit agreements is financial covenants, which are present in over 95% of the contracts in our sample. Financial covenants specify performance and balance sheet benchmarks with which the borrower must remain compliant. Failure to comply with the financial covenant results in a technical default of the credit agreement, which gives lenders the right to accelerate the loan maturity and terminate the unused portion of revolving credit facilities. In our sample, the most common financial ratios on which covenants are written are interest coverage, debt to cash flow, and net worth. Covenants are also written on leverage and short-term liquidity ratios, but these are less common.

⁹ [Asquith, Beatty, and Weber \(2005\)](#) find that only 41% of their Dealscan loan sample contains pricing grids. This discrepancy is potentially due to a variety of reasons including: the presence of privately held borrowers in their sample, different sample periods, and incomplete coverage of contingencies by the Dealscan database.

3. Renegotiation: practice and theory

Why do renegotiations occur? The goal of this section is to answer this question from the perspective of both practice and theory in order to motivate and guide the empirical analysis that follows.¹⁰

3.1. Renegotiation in practice

In practice, contract amendments typically begin with the borrower contacting the lender, though either party can initiate the process. The motivations for amending a contract are wide-ranging, but are largely a consequence of the restrictiveness of the initial contracts. Many lenders refer to borrowers' wishing to "go outside the deal" as a motivation for an amendment. For example, a borrower may wish to increase their capital expenditures, undertake an acquisition, alter their financial policy, increase dividends, liquidate assets, transfer money to subsidiaries, change their financial reporting procedure, alter collateral, consolidate assets, merge with another company, change lines of business, or modify their charter and bylaws. All of these activities may be explicitly restricted by credit agreements (Taylor and Sansone, 2007). Financial covenants restricting various accounting measures can also spur changes to the initial contract either directly, when a covenant violation occurs, or indirectly, when a violation is anticipated. Finally, lenders also note that a frequent impetus for renegotiations is changes in market conditions, beyond changes in interest rates since most every loan offers a floating rate and many corporations engage in hedging strategies.

Of course, these renegotiations are not costless. Accompanying most every amendment is a fee that varies with the size of the deal and complexity of the amendment. Additional costs occur in the form of time and effort spent by both borrower and lender in understanding the transaction and implications for both parties. In the case of syndicated loans, amendments must be approved by a certain percentage of lenders, depending on the proposed changes. Non-material amendments and waivers usually require a simple majority ("required lenders"). Changes to the rate, amortization, term, security, or collateral are considered material changes and often require a unanimous vote, though a supermajority may be sufficient in certain cases (Standard & Poor's, 2006).

However, direct recontracting costs, such as legal fees, tend to be relatively small. Additionally, most private credit agreements do not carry any prepayment penalties, which are usually limited to institutional tranches and set on a sliding scale; for example, 2% in year one, 1% in year two (Standard & Poor's, 2006). This ease of prepayment in conjunction with viable outside alternatives makes borrowers' threats of ending the lending relationship credible, which in turn can motivate renegotiation.

3.2. Renegotiation in theory

Theoretically, renegotiation is an issue that arises largely as an out-of-equilibrium phenomenon (Maskin and Moore, 1999). When agents design a contract, they are presumably interested in ensuring Pareto-optimal outcomes, and so an equilibrium outcome of the contract will be efficient in this sense; that is, there will be no scope for renegotiation. But out of equilibrium, outcomes might be far from Pareto-optimal, leaving open the possibility that the agents simply tear up their contract and renegotiate a new one in order to realize any Pareto improvement.¹¹ Thus, renegotiation can be viewed as a game played by agents when there exists an ex post surplus under the initial terms of the contract.

Such a surplus is most likely to occur when unanticipated or non-contractable states of the world (specifying preferences, endowments, productive technology, etc.) occur. Hart and Moore (1989) show that long term-debt contracts are not renegotiation proof, a result subsequently extended by Gromb (1995). Specifically, when a high cash flow state is realized in their model, the entrepreneur may be able to negotiate down any possibly onerous or restrictive terms in the initial contract. For example, borrowers may be able to bargain for reductions in interest rates or increases in available credit. While these studies focus on cash flow, the argument applies more broadly to credit quality. In other words, a change in any factor (e.g., collateral, risk-shifting behavior, credit risk, investment opportunities, etc.) that improves credit quality should shift the relative bargaining power in favor of the borrower, who may be able to renegotiate more advantageous terms (see also Gorton and Kahn, 2000; Garleanu and Zwiebel, 2009).

In order for changes in credit quality to affect renegotiation, the borrower must have available outside options or alternative sources of financing. In other words, without a credible threat to leave their current lender, borrowers will have little bargaining power despite any improvements in their financial condition and investment opportunities. More broadly speaking, improvements in the outside options of borrowers, independent of increases in credit quality, should also impact the borrower's ability to renegotiate contracts in their favor. For example, creditors note that increased competition among lenders or general improvements in credit conditions increases the bargaining power of borrowers by increasing the credibility of any threat to switch lenders. Likewise, increases in the relative attractiveness of alternative sources of finance, such as external equity, improves the bargaining power of borrowers.

Just as improvements in a borrower's credit quality and outside options can spur renegotiation, so too can deteriorations in these factors. More precisely, deteriorations in

¹⁰ We are particularly grateful for discussions with Steven Roberts, formerly with Toronto Dominion; and Rich Walden of JP Morgan Chase & Co.

¹¹ This perspective of renegotiation as an exogenous game determined by the relative bargaining strengths of the involved parties is common throughout the financial contracting literature. For an alternative perspective where renegotiation is controlled contractually by the assignment of bargaining power, see Aghion, Dewatripont, and Rey (1994) which is also discussed below.

credit quality can lead to renegotiation when liquidation is ex post Pareto-inefficient because information accrues at an intermediate stage (e.g., von Thadden, 1995). This phenomenon is referred to as a “softening” of the budget constraint (Tirole, 2006) and is particularly acute when monetary punishments are limited because of their costs. Consider the case of a borrower whose operating performance has deteriorated. Poor performance may ideally dictate that the borrower pay penalties or fees to the lender during the relationship as compensation for additional credit risk. However, because of potentially binding financial constraints, liquidation may be the only feasible option following the revelation of bad signals concerning the borrower’s activity. While the threat of future liquidation at origination serves an important role in defining ex ante incentives, liquidation no longer serves a purpose once the relationship is underway because it is ex post Pareto-inefficient. That is, liquidation is no longer credible ex post and the parties will renegotiate away this outcome via modifications to the initial contract.

For example, deteriorating performance can lead to covenant violations, or an increased probability of covenant violations, which in turn leads to increases in interest rates and reductions in allowable borrowings in many instances (e.g., Beneish and Press, 1993, 1995). Even outside of covenant violations, deteriorating performance can lead borrowers to grant concessions to lenders. For example, to reduce commitment and usage fees, borrowers might agree to higher interest rates on their borrowings for reductions in the amount of the line of credit. Alternatively, struggling borrowers that need to liquidate assets are often restricted from doing so by the terms of the contract. To relax this restriction, borrowers can compensate lenders through other channels such as increases in interest rates, increased collateral, or even monetary compensation from the sale.

In addition to the accrual of new information and changing outside options, the original terms of the contract play an important role in renegotiation. Aghion, Dewatripont, and Rey (1994) show what happens when the parties attempt to control the renegotiation process contractually, so that, for each circumstance the parties find themselves in, the assignment of bargaining power is specified in the contract rather than being given exogenously (see also Harris and Raviv, 1995). This perspective is in contrast to other contracting studies that exogenously assume monopolistic bargaining power (Hart and Moore, 1988) or Nash bargaining (Bolton and Scharfstein, 1996). This difference is important because Aghion, Dewatripont, and Rey (1994) show that when the initial contract can impose trade unilaterally at a price prespecified in the contract, the underinvestment problem of Hart and Moore disappears. In other words, the simple use of outside options in the renegotiation game generates the correct marginal incentives to invest for both parties.

Though neither lender nor borrower can unilaterally enforce trade, there are a number of contract features that explicitly alter the default option in a state contingent manner (i.e., contingencies). Pricing grids, borrowing bases, and financial covenants all change the terms of

the contract, and consequently, allocate bargaining power across various states of the world. Thus, contingencies shape the outcome of renegotiations by altering the default option and relative bargaining power in a manner to preserve ex ante incentives.

4. Renegotiation: outcomes, timing, and frequency

4.1. What are the outcomes of renegotiation?

Table 4 presents evidence on the outcomes of renegotiations. Panel A shows that renegotiations lead to large changes to the terms of the contract. For the renegotiations for which we have Dealscan data, the average absolute value of the change to maturity is 766 days, approximately 64% that of the original stated maturity. Similarly, the allowable borrowings change by \$193 million, while the interest rate spread changes by 64 basis points. Relative to the initial terms of the contract, the magnitudes of these changes are 43% and 40%, respectively. The SD, Min, and Max columns also give some perspective on the heterogeneity of changes that occur in renegotiation.

Panel B of Table 4 presents the fraction of renegotiated loans that experience various outcomes. The most common renegotiation outcomes are: (1) a maturity extension (57% of renegotiated loans) and (2) an increase in the loan amount (56%). While seemingly similar to the automatic increases in credit found in consumer credit cards, these changes in private credit agreements are not automatic and are much costlier. Specifically, commitment fees on the undrawn portion of a credit line can be significant. Thus, in addition to the amendment fees associated with these changes, there can be a significant increase in the direct borrowing costs associated with extending the maturity and increasing the amount of the loan.

Interest spreads are either increased or decreased in just over 55% of the renegotiations. Interestingly, only 11% of renegotiations result in a change of lender (or lead arranger), a figure that declines to 8.5% when we also consider loans that mature. The fact that we rarely witness borrowers leave existing lenders before the maturity of the loan suggests that ex ante relationship-specific investments are an important component of corporate lending environments.

The bottom half of Panel B breaks out renegotiation outcomes into six mutually exclusive groups, and several subgroups. A “borrower favorable” renegotiation is an outcome where the amount increases without an increase in the interest spread, or the interest spread decreases without a decrease in the amount. A “borrower unfavorable” renegotiation is an outcome where the amount decreases without a decrease in the interest spread, or the interest spread increases without an increase in the amount. An “amount increased, not favorable” (or, amount increasing) renegotiation is an outcome where the amount increases and the interest spread change is either positive or ambiguous. An “amount decreased, not unfavorable” (or, amount decreasing) renegotiation is an

Table 4

Renegotiation summary statistics.

The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. Panel A presents summary statistics for the absolute value of the change experienced by each contract term in a renegotiation. (Note that not all contract terms are modified in a renegotiation.) Panel B presents the distribution of loans over renegotiation outcomes, conditional on a renegotiation occurring, and the fraction of the stated maturity that has elapsed until renegotiation. Borrower favorable outcomes occur when the amount of the loan is increased and the spread decreased. Borrower unfavorable outcomes occur when the amount of the loan is decreased and the spread increased.

Panel A: Changes in absolute value of contract terms due to renegotiation					
Variable	Obs	Mean	SD	Min	Max
Change in maturity (days)	296	766	528	0	2,093
Change in amount (\$Mil)	301	193	548	0	8,400
Change in spread (bps)	301	64	78	0	575
Panel B: Likelihood and timing of renegotiation outcomes conditional on renegotiation					
	Likelihood of outcome			Loan duration/stated maturity	
Renegotiation outcomes					
Amount increase		0.560		0.416	
Amount decrease		0.291		0.446	
Spread increase		0.293		0.460	
Spread decrease		0.259		0.486	
Maturity increase		0.569		0.521	
Maturity decrease		0.119		0.346	
Switch lead arranger		0.114		0.528	
Mutually exclusive outcomes					
Borrower favorable		0.284		0.455	
Amount increase, not favorable		0.336		0.392	
Amount increase, spread increased		0.161		0.426	
Amount increase, spread change ambiguous		0.175		0.360	
Amount decrease, not unfavorable		0.181		0.423	
Amount decrease, spread decreased		0.048		0.493	
Amount decreased, spread change ambiguous		0.079		0.408	
Fraction of deal amount prepaid		0.012		0.341	
Deal terminated		0.042		0.396	
Borrower unfavorable		0.152		0.496	
Only maturity increased		0.045		0.499	
Only maturity decreased		0.002		0.177	
Firm-quarter obs		645		645	

outcome where the amount is decreased and the interest spread change is either negative or ambiguous. The final two renegotiation outcomes correspond to renegotiations that change only the maturity of the loan.

A few notes on this renegotiation classification are worth mentioning. First, by definition, all observed renegotiations are (weakly) “favorable” to the contracting parties relative to the contractually specified default options. For example, borrowers can always choose to stop payment and default on the loan. Likewise, lenders can always choose to enforce the prevailing terms of the contract. That is, neither party is forced to modify the terms of the contract and, therefore, any observed change must be mutually beneficial at the time of the renegotiation.

By “borrower favorable”, we simply wish to denote the change in the terms of the contract relative to those found in the initial contract. We recognize that this, as well as “borrower unfavorable”, classification is somewhat subjective. For example, one could imagine a situation in which borrowers bargain for an increase in the amount of

the loan and a relatively moderate increase in the interest rate. This outcome may, in fact, coincide with relatively more favorable terms; however, we have chosen to take a conservative approach to defining these categories in order to remove as much ambiguity as possible. Ultimately, any remaining ambiguity will only serve to introduce noise into our analysis, making it more difficult to identify the underlying relations.

Borrower favorable and amount increasing renegotiations account for more than half of all renegotiations. Unfavorable and amount decreasing renegotiations are observed with lower frequency, though they are still quite common. Over 15% of contracts are renegotiated in a manner that is unfavorable relative to the initial terms of the contract, and over 18% are renegotiated to decrease the amount of the loan. The “fraction of deal amount prepaid” classification refers to a situation where the borrower prepays some fraction of the loan in an unscheduled manner, as explicitly noted in the footnotes. The “deal terminated” classification refers to deals which are terminated for a reason other than default.

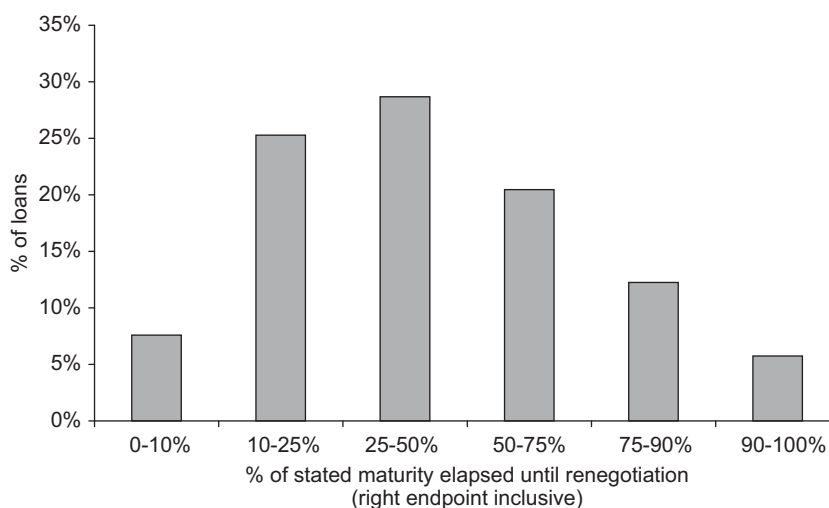


Fig. 1. When does renegotiation occur in the life of a loan? The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. We exclude 148 loans that are either still active at the end of the sample (first quarter of 2007) or that correspond to borrowers that disappear from the EDGAR database. The remaining 852 loans mature or are renegotiated prior to maturity. The figure shows the percentage of loans that are renegotiated as a fraction of the elapsed stated maturity. For example, approximately 25% of the 852 loans are renegotiated after 10% but no more than 25% of the stated maturity has elapsed. For loans that mature, 100% of the stated maturity has elapsed and these loans fall in the right-most bin.

4.2. When are contracts renegotiated?

To understand when contracts are renegotiated, we take a graphical perspective beginning with Fig. 1, which shows the distribution of loans over the fraction of stated maturity that has elapsed until renegotiation or maturity.¹² In other words, for each loan, we compute the ratio of the number of days until renegotiation to the number of days until the stated maturity. For loans that mature, this ratio is 100%. The figure shows that most loans have a duration that is between 25% and 50% that of the stated maturity. On average, loans are renegotiated just after half (57%) of the stated maturity has elapsed.

Fig. 2 gives a calendar time view of when renegotiations occur. Panel A presents the fraction of all renegotiated loans that are renegotiated and originated in each year of our sample. Focusing on the renegotiations, we see a slight cyclical pattern to renegotiations and originations. However, Panels B and C show that this aggregate view of renegotiations masks significant heterogeneity across outcomes. Panel B shows that borrower favorable outcomes are more than twice as likely in 1999 relative to 1997, 2001, and 2002, and increase seven-fold from 2002 to 2005. Amount increasing renegotiations show similar, but more moderate, patterns. The time series pattern of borrower unfavorable outcomes provides a stark contrast to the favorable outcomes in Panel B. Unfavorable outcomes are over three times more likely in 2001 relative to

the early and latter parts of the sample period. Thus, renegotiations and its outcomes appear to contain a strong cyclical component. The extent to which this component is due to cyclicity in earnings or borrower credit quality is investigated below.

4.3. Renegotiations and covenant violations

Table 5 examines renegotiations in the context of covenant violations or technical defaults. The first column, Obs, denotes the number of loans corresponding to each renegotiation classification. For amount decreasing and borrower unfavorable outcomes, we see that covenant violations are a strong predictor: 17% and 21% of these outcomes are preceded by a covenant violation in the year before renegotiation. For borrower unfavorable outcomes, we also note high propensities to violate a covenant contemporaneously and following the renegotiation. These figures are in contrast to borrower favorable and amount increasing renegotiations, which rarely occur around the time of a covenant violation.

One might ask why the figures for borrower unfavorable (or even amount decreasing) renegotiations do not add up to 100%. In other words, why would borrowers accept a reduction in the size of the allowable borrowings and an increase in the credit spread if it were not for lenders threatening to accelerate or terminate the loan in response to a covenant violation? There are several possible reasons. For example, borrowers pay commitment fees on the unused portion of any credit line and, therefore, they may have an incentive to reduce the size of the line if they do not require as much financial slack. Banks, however, may prefer firms to maintain the size of the line in order to collect larger fees, which are typically computed as a fraction of the unused portion. In this case, an increase in the spread may correspond to compensation for this reduction in fees that

¹² To ease the interpretation of the renegotiation results, we temporarily drop from the sample 148 contracts for which renegotiation outcomes are censored because either the borrower disappears from EDGAR before the stated maturity of the loan (96 contracts) or the contract is still active at the end of the first quarter of 2007 (52 contracts). In the econometric models below, we reincorporate these observations and appropriately address this censoring problem.

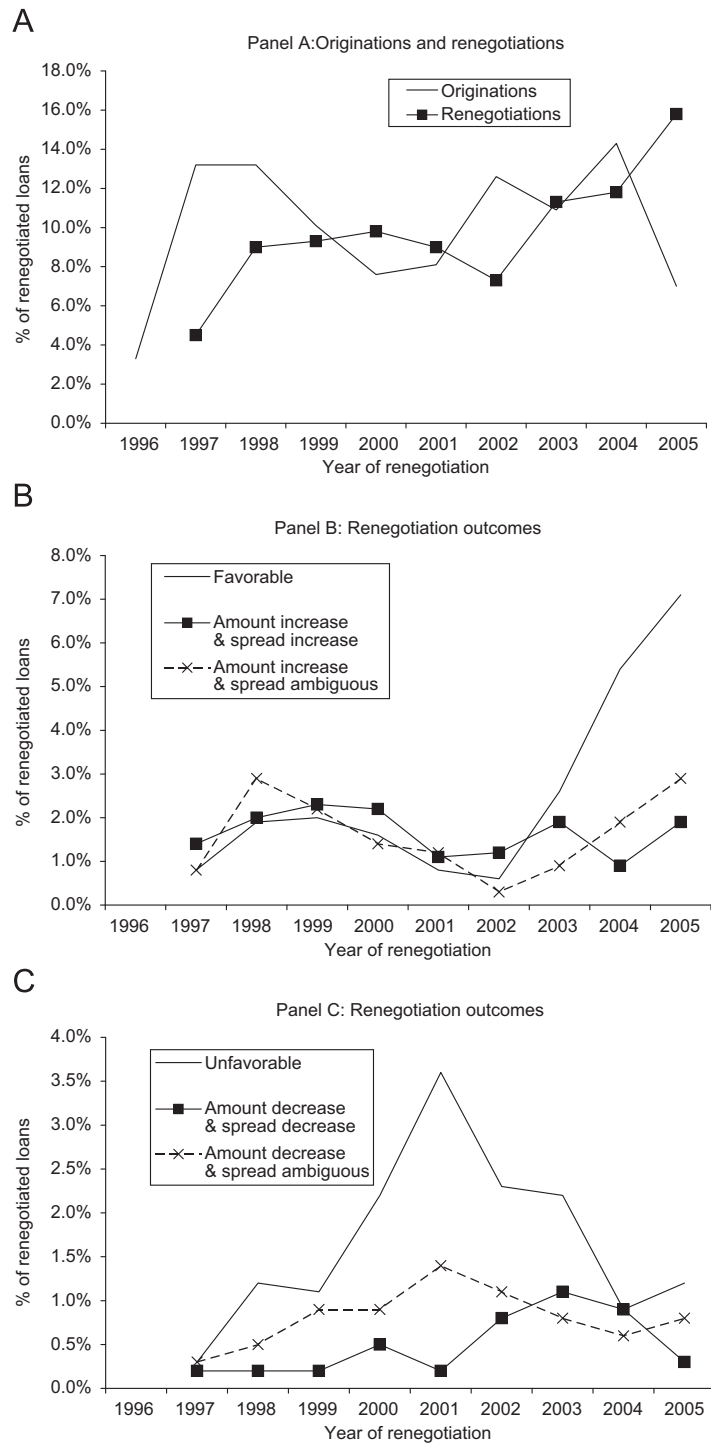


Fig. 2. Originations and renegotiations by calendar year. The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. We exclude 148 loans that are either still active at the end of the sample (first quarter of 2007) or that correspond to borrowers that disappear from the EDGAR database. The remaining 852 loans mature or are renegotiated prior to maturity. Panel A presents for each calendar year the fraction of renegotiated loans that are originated or renegotiated. Panel B presents for each calendar year the fraction of renegotiated loans that result in a favorable outcome (increase in amount and decrease in spread), increase in amount and increase in spread, or increase in amount and ambiguous change in the spread. Panel C presents for each calendar year the fraction of renegotiated loans that result in an unfavorable outcome (decrease in amount and increase in spread), decrease in amount and decrease in spread, or decrease in amount and ambiguous change in the spread.

Table 5

Renegotiation and covenant violations.

The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. For the loans that are renegotiated prior to the stated maturity, the table presents the fraction of borrowers that report a covenant violation in three different periods relative to the quarter of the renegotiation event: the preceding year, contemporaneous, or the following year. For example, for loans experiencing an unfavorable outcome, 21.4% report a covenant violation in the year leading up to the renegotiation, 12.2% report a covenant violation in the quarter of the renegotiation, and 14.3% report a covenant violation in the year following the violation.

Renegotiation outcome	Obs	Last year	Contemporaneous	Next year
Borrower favorable	183	0.049	0.016	0.022
Amount increase	217	0.041	0.032	0.042
Amount decrease	117	0.171	0.034	0.052
Borrower unfavorable	98	0.214	0.122	0.143

lenders receive. Alternatively, borrowers may receive other concessions in concert with the reduced loan size and increased interest rate spread, such as modifications to the maturity or collateral of the loan and the relaxation of other restrictions in the contract (e.g., financial covenants or restrictions on asset sales, acquisitions, capital expenditures, debt issuance, etc.). Finally, *in anticipation of* a covenant violation, borrowers and lenders may renegotiate the contract to prevent a violation from occurring. Thus, actual covenant violations are but one potential force behind borrower unfavorable and amount decreasing renegotiation outcomes.

5. The determinants of renegotiation and its outcomes

5.1. The determinants of renegotiation

We begin by examining the decision of whether or not to renegotiate. Specifically, we estimate a probit model where the dependent variable is one when a renegotiation is observed and zero otherwise. Mathematically, our model can be represented as follows:

$$\Pr(\text{Renegotiate}_{it}) = \Phi(X_{it}\beta), \quad (1)$$

where Φ is the standard normal cumulative distribution function, X is a vector of covariates, and β is the unknown parameter vector that is estimated by maximum likelihood. The indices correspond to loan (i)-quarter (t) observations. All firm characteristics are lagged one quarter relative to the renegotiation indicator variable to avoid any mechanical associations. All other variables are contemporaneous. To address concerns about within-firm dependence and heteroskedasticity, we estimate the parameter covariance matrix non-parametrically, as suggested by Petersen (2009).

Our proxies for credit quality include the following. Book assets capture the firm's ability to secure or collateralize its debt, as well as proxying for the liquidation value in distress.¹³ We use two measures of financial health: the ratio of debt-to-EBITDA and the ratio of debt to

total book assets. The former ratio is the primary leverage measure used in practice (e.g., Taylor and Sansone, 2007), while the latter is emphasized in the academic literature. To measure future investment opportunities, we use the market-to-book ratio. We examine a measure of profitability (EBITDA/Book assets) to capture the short-term liquidity necessary for repayment and profitability uncertainty (volatility of EBITDA/Book assets) to capture expectations of future renegotiation. Finally, we include the borrowers' stock returns to capture the relative cost of equity capital, which competes with credit as a source of finance.

We also examine several macroeconomic factors to represent borrowers' outside options. We use the BB–AAA credit spread on publicly traded bonds as a broad measure of credit market conditions. One interpretation of this measure is that it proxies for the liquidity of debt markets as a whole and, therefore, high spreads coincide with low demand for corporate debt and high lender bargaining power. Alternatively, this spread may capture the relative attractiveness of public bonds, to which almost 50% of our firms have access. We examine an aggregate measure of commercial bank leverage using the ratio of total liabilities to total book assets for commercial banks in the United States. We collect this data from the Federal Deposit Insurance Corporation (FDIC), expecting that the financial health of the banking sector, like the corporate sector, plays an important role in determining the willingness of creditors to concede to borrowers' renegotiation demands. Aggregate productivity is measured by GDP growth, and we measure the attractiveness of equity financing more broadly by examining the quarterly market return on the CRSP value-weighted index.

To capture the evolution of these variables from the time of origination, we measure the change in each of these variables as the difference between the current value and the value at origination. For example, if the borrower on contract i has a leverage ratio of 0.25 at the beginning of period $t = 5$ and a leverage ratio of 0.15 at the beginning of $t = 0$ (i.e., the period of origination), then the leverage ratio deviation, $\Delta\text{Book leverage}_{i5}$, would be measured as 0.10. Further, because we do not distinguish between different renegotiation outcomes, we focus on the magnitudes of changes in each variable by decomposing each change into a positive and negative component. Specifically, for each change variable, ΔX , we include $\max(\Delta X, 0)$ and $\min(\Delta X, 0)$. Doing so avoids imposing

¹³ In the empirical analysis, we use the book value of total assets; however, in unreported analysis, we use a measure of collateralizable assets consisting of the sum of net property, plant, and equipment, cash and short-term investments, receivables, and inventories. These two measures have a correlation of 0.97 and produce qualitatively similar results.

symmetry restrictions on the model effects and enables us to capture any asymmetric effects in the data.

For control variables, we incorporate Fama and French 12-industry fixed effects to capture the institutional structure of syndicated lending, which is segmented by industry, and the importance of competitive peer groups in structuring deals. Deal purpose fixed effects are included to account for any systematic differences across deals. To control for variation in credit risk, we also incorporate credit rating fixed effects. For firms without a rating, we assign them to a reference category, unrated, for estimation. To account for any level effects, we include firm characteristics at origination corresponding to the proxies for credit quality discussed above. The terms of the initial contract are included and consist of the natural logarithm of the stated maturity, the average interest rate spread in the contract weighted by the amount of each tranche, the number of lenders in the lending syndicate, and the amount of the loan relative to the total book assets of the borrower at origination. We include indicator variables for whether less than half of the stated maturity of the loan has elapsed (“Young loan”), and for the presence of a pricing grid, a borrowing base, and a financial covenant on any cash flow measure. Finally, we incorporate a time trend to capture any common trends in the data.

5.1.1. *Ex post changes*

Panel A of Table 6 presents the estimated coefficients and marginal effects, which are computed as the change in predicted probability when varying the covariate from one standard deviation (SD) above to one standard deviation below the mean value. All other covariates are held fixed at their mean values. Because of the fixed effects, the estimates reflect the marginal effect of a covariate on the probability of renegotiation for firms within an industry, credit rating, and deal type classification. For example, a positive change in log book assets (i.e., asset growth) from one SD below to one SD above the mean positive growth rate is associated with a change in the predicted probability of renegotiation equal to 1.27%.

Compared to the unconditional mean of 9.1%, given at the bottom of the table, this result suggests that asset growth has a relatively large effect on the likelihood of renegotiation.¹⁴ This is in contrast to asset contractions, which have a negligible effect on the likelihood of renegotiation. We also note that increasing leverage and declining profitability (EBITDA/Book assets) both have a large impact on the likelihood of renegotiation. These findings coincide with the importance of new information concerning the borrower’s ability to repay the loan and the creditors’ ability to recover their investment in case of default. Further, changes in the borrowers’ equity values, both positive and negative, have a significant impact on renegotiation, reflecting the importance of competing sources of funds.

Even after conditioning on changes to the borrower, as well as all of the fixed effects, changes in the macroeconomy have a large impact on the likelihood of renegotiation. For example, a 1% increase in credit spreads leads to a 1.0% increase in the likelihood of renegotiation in a given quarter. Even more important is the change in the financial health of commercial lenders. A 70 basis point decline (6 basis point increase) in the aggregate leverage ratio of U.S. banks leads to a 2.1% (0.7%) increase in the likelihood of a loan amendment, suggesting that even a relatively slight weakening (or strengthening) of lenders’ balance sheets is very influential for whether or not renegotiations occur. We find relatively weak evidence of GDP growth and aggregate equity market returns on the likelihood of renegotiation.

5.1.2. *Ex ante determinants*

Panel B of Table 6 presents the estimated coefficients and marginal effects for some of the control variables, namely, firm characteristics at origination and the deal characteristics. We present the results from two specifications: one containing the ex post changes in firm characteristics and macroeconomic factors found in Panel A, and one excluding these variables. To ease the presentation, we do not report the parameter standard errors and instead only note the statistical significance by one (5% level) or two (1% level) asterisks. Because the interest at this point is on the role of the contracting environment at origination, which does not change over the life of the loan, we collapse the loan-quarter panel data used in Panel A into a cross-section of loans, each of which is either renegotiated or not. This data manipulation accomplishes two goals. First, it ensures a reasonable interpretation of the maturity coefficient. In the panel data set, longer maturing loans take longer in absolute terms to renegotiate, which induces a spurious negative relation between the stated maturity of the loan and the likelihood of renegotiation. Second, it avoids giving additional weight to longer maturity loans simply because these loans have more observations in the panel. We note that there is no bias or inconsistency introduced into our parameter estimates, only a loss of efficiency. Regardless, the results obtained from using the full loan-quarter panel are qualitatively similar to those presented in Panel B, but for the maturity coefficient.

The results illustrate that very little about the contracting environment at origination is relevant for predicting future renegotiations. Longer maturity loans are more likely to be renegotiated, consistent with the results from Panel B in Table 1. Consistent with Fig. 1, we see that most renegotiations tend to occur relatively early in the life of a loan, as suggested by the “Young loan” indicator function equal to one if the loan is renegotiated before half of the stated maturity has elapsed. Similarly, loans containing a cash flow covenant are also more likely to be renegotiated. While this latter result may at first seem odd given the paucity of renegotiations that are related to covenant violations or anticipated violations, almost 83% of loan contracts contain a covenant restricting cash flow (see Table 3). As discussed earlier, renegotiations are motivated by a variety of actions, many of which

¹⁴ The small unconditional likelihood of renegotiation, 9.1%, is due to the panel nature of the data. While the large majority of contracts are renegotiated, the likelihood of observing a renegotiation in any particular quarter is low.

will have a direct impact on borrowers' cash flow but have little to do with distress or default (e.g., capital expenditures, acquisitions, financing, etc.). Thus, requiring the maintenance of a cash flow covenant can have much broader implications for corporate behavior than simply ensuring a sufficient level of cash flow for debt repayment.

Perhaps as important as what does predict renegotiation is what does *not* predict renegotiation. None of the

firm characteristics has a strong effect on the incidence of renegotiation. Interestingly, neither the existence of a pricing grid nor a borrowing base makes renegotiation less likely, either in a statistical or economic sense. As the side-by-side comparison reveals, the presence of a borrowing base has a significant role in predicting renegotiation because of its correlation with *ex post* changes in firm characteristics or macroeconomic factors.

Table 6

Determinants of renegotiation.

The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. The table presents estimated coefficients, marginal effects, and *t*-statistics (in parentheses) from a bivariate probit regression of whether or not renegotiation occurs. Marginal effects for each covariate are constructed as the difference in predicted probabilities for a particular outcome computed at one standard deviation above and below the mean, holding all other covariates at their mean values. Panel A presents results using the loan-quarter panel of observations and breaks out the change in each determinant, measured from the quarter prior to origination, into two pieces: a positive component ($\max(0, x)$) and a negative component ($\min(0, x)$). Panel B presents results using the cross-section of loans obtained by collapsing the panel and withholds *t*-statistics for presentation purposes. Industry fixed effects correspond to the Fama and French 38-industry classification. Credit rating fixed effects assign a null value to unrated firms and separate indicators for firms with five broad ratings classifications (see Appendix A for definition). Firm characteristics at origination are time-invariant variables measured in the quarter prior to the origination of the loan and consist of all of the variables listed under the changes in firm characteristics heading. Initial contract terms consist of the natural log of the stated maturity, the average interest rate spread in the contract, the number of lenders in the lending syndicate, the amount of the loan relative to the total assets of the borrower in the quarter before origination, and indicator variables for the presence of a pricing grid, borrowing base, or financial covenants (any cash flow, any net worth, balance sheet, liquidity). *Young loan* is an indicator equal to one if the loan is renegotiated before half of the maturity has elapsed. Statistical significance at the 5% and 1% levels is denoted by * and **, respectively. All hypothesis tests are conducted with standard errors robust to within-firm dependence and heteroskedasticity.

Panel A: *Ex post* change determinants (loan-quarter panel sample)

	Positive change		Negative change	
	Coefficient	Marginal effect (%)	Coefficient	Marginal effect (%)
<i>Change in firm characteristics</i>				
ΔLog assets	0.405* (2.256)	1.274*	0.076 (0.158)	0.062
ΔDebt/EBITDA	0.001 (0.399)	0.147	−0.003 (−1.756)	−0.560
ΔBook leverage	1.271** (2.639)	1.041**	0.190 (0.289)	0.123
ΔMarket-to-book	−0.218 (−1.633)	−0.814	0.012 (0.123)	0.082
ΔEBITDA/Assets	6.493 (1.718)	0.706	−6.256* (−2.266)	−0.918*
ΔEBITDA Volatility	−9.622 (−1.570)	−0.647	−9.735 (−1.613)	−0.742
Equity return	0.173** (2.668)	1.286**	−0.579* (−2.554)	−1.174*
<i>Change in macroeconomic factors</i>				
ΔCredit spread	0.142* (2.531)	1.021*	−0.023 (−0.454)	−0.210
ΔBank leverage	171.234* (2.035)	0.711*	−43.439** (−4.554)	−2.124**
ΔGDP Growth	9.531 (1.130)	0.451	−4.562 (−0.692)	−0.259
ΔStock market return	0.595 (1.639)	0.645	−0.066 (−0.170)	−0.068
<i>Control variables</i>				
Industry fixed effects	Yes			
Deal purpose fixed effects	Yes			
Credit ratings fixed effects	Yes			
Firm characteristics at origination	Yes			
Deal characteristics	Yes			
Time trend	Yes	.		
Pr (Renegotiation) (%)	9.131	.	.	.
Renegotiations	513	.	.	.
Firms	760	.	.	.
Loans	936	.	.	.
Obs	5,618	.	.	.
Pseudo- R^2	0.088	.	.	.

Table 6 (continued)

Panel B: Ex ante determinants (loan cross-sectional sample)

	With ex post changes		Without ex post changes	
	Coefficient	Marginal effect (%)	Coefficient	Marginal effect (%)
<i>Firm characteristics at origination</i>				
Log assets	0.077	4.189	0.080	4.772
Debt/EBITDA	0.001	0.770	−0.001	−0.730
Book leverage	−0.326	−2.040	−0.039	−0.267
Market-to-book	0.108	3.898	−0.002	−0.084
EBITDA/Assets	−1.890	−1.586	−0.891	−0.810
EBITDA Volatility	3.052	2.081	1.920	1.436
<i>Deal characteristics</i>				
Ln (Stated maturity)	1.013**	23.968**	0.767**	19.477**
IR Spread	0.000	0.341	0.001	2.180
Number of lenders	−0.013	−3.480	−0.006	−1.654
Loan amount/Assets	−0.104	−1.097	0.064	0.715
Term loan in deal	0.158	2.174	0.133	2.077
Pricing grid	0.048	0.717	0.033	0.542
Borrowing base	0.325	4.078	0.316*	4.289*
Covenant on cash flow	0.630**	8.729**	0.569**	8.240**
Young loan	0.310*	5.053*	0.309**	5.581**
<i>Control variables</i>				
Industry fixed effects	Yes		Yes	
Deal purpose fixed effects	Yes		Yes	
Credit ratings fixed effects	Yes		Yes	
Change in firm characteristics	Yes		No	
Change in macroeconomic factors	Yes		No	
Time trend	Yes		Yes	
Pr(Renegotiation) (%)	67.896	.	64.586	.
Renegotiations	497	.	600	.
Firms	622	.	751	.
Loans	732	.	929	.
Obs	732	.	929	.
Pseudo- R^2	0.310	.	0.194	.

In other words, we find no compelling evidence that the presence of ex ante contingencies, other than a cash flow covenant, reduce (or increase) the likelihood of renegotiation. Similarly, none of the other loan terms is statistically significant at the 5% level, including the number of lenders in the syndicate, which ranges from one to 61 members, and the presence of a term loan in the deal.

The results in Panel B suggest that the presence of ex ante contingencies does not reduce renegotiation. However, the insignificance of ex ante contingencies may be a consequence of an endogeneity problem where ex ante contingencies are put into contracts that are more likely to be renegotiated. If these contingencies are used to offset renegotiation and, therefore, are more frequently included in contracts where renegotiation is more likely, then our parameter estimate will be biased upwards. In other words, renegotiation would have been even more likely had the contingency not been incorporated into the contract, all else equal. Absent a compelling exogenous source of variation (e.g., instrument, natural experiment, etc.), identifying the underlying mechanism is difficult. A similar concern applies to the size of the lending syndicate, which can also change from origination because of trading in the secondary market.

However, since most long-term contracts are renegotiated, it seems unlikely that contingencies are used to mitigate the occurrence of renegotiation. In other words,

our results in Panel B of Table 6 suggest that contingencies are, in fact, weakly *positively* correlated with the likelihood of renegotiation. The endogeneity argument suggests that we are underestimating the counterfactual—there would have been even more renegotiations had the contingency not been included in the contract. But, there simply is not much scope for further renegotiation since most all of the contracts, particularly those containing contingencies, are renegotiated. Thus, contingencies are more prevalent in contracts where *observed* renegotiations are also more prevalent and, nearer to 100%. At a minimum, our results cast suspicion on the view that contingencies are contract features designed to minimize the incidence of renegotiation. We present an alternative rationale for their existence below.

With regard to the insignificance of the size of the lending syndicate, we believe that this may be a result of institutional details and the consequences under which renegotiations of private credit agreements occur. The results in Tables 4 and 5 show that the majority of renegotiations result in additional credit and a maturity extension, and that few of the renegotiations are closely related to covenant violations, respectively. In other words, most loan amendments are driven simply by changing circumstances or improvements in credit quality. Because circumstances are rarely dire in renegotiation, the incentives of syndicate members are more likely to be

aligned. Related, syndication is a repeated game for most lenders in this market, which mitigates the incentive to hold-up negotiations. Finally, most lead arrangers are commercial banks with significant experience in originating and renegotiating these contracts. For these reasons, collective-action problems may be largely mitigated in most renegotiations, where the syndicate may simply defer to the lead arranger.

5.2. The determinants of renegotiation outcomes

To examine what determines the outcomes of renegotiation, we move to a multinomial logit. The choice of categories is governed by several considerations. First, more refined categories reveal more information and, all else equal, will lead to more efficient estimates. However, more categories also increase the number of parameters

Table 7

Determinants of renegotiation outcomes.

The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. The table presents estimated marginal effects (in percent) and *t*-statistics (in parentheses) from a multinomial logit regression of renegotiation outcomes on various determinants. The baseline category consists of observations where there is no renegotiation or only the maturity of the contract is changed. Marginal effects for each covariate are constructed as the difference in predicted probabilities for a particular outcome computed at one standard deviation above and below the mean, holding all other covariates at their mean values. All changes are computed with respect to the value in the quarter prior to loan origination. Panel A presents results using a loan-quarter panel (cross-section of loans). Panel B presents results using a cross-section of loans obtained by collapsing the panel. Industry fixed effects correspond to the Fama and French 12-industry classification. Credit rating fixed effects assign a null value to unrated firms. Firm characteristics at origination are time-invariant variables measured in the quarter prior to the origination of the loan and consist of all of the variables listed under the changes in firm characteristics heading. Initial contract terms consist of the natural log of the stated maturity, the average interest rate spread in the contract, the number of lenders in the lending syndicate, the amount of the loan relative to the total assets of the borrower in the quarter before origination, and indicator variables for the presence of a pricing grid, borrowing base, or financial covenants (any cash flow, any net worth, balance sheet, liquidity). *Young loan* is an indicator equal to one if the loan is renegotiated before half of the maturity has elapsed. Statistical significance at the 5% and 1% levels is denoted by * and **, respectively. All hypothesis tests are conducted with standard errors robust to within-firm dependence and heteroskedasticity.

Panel A: Marginal effects of ex post determinants (figures in %)

	Favorable	Amount increase	Amount decrease	Unfavorable
<i>Change in firm characteristics</i>				
ΔLog assets	0.834* (2.060)	1.269** (4.092)	0.221 (0.762)	0.011 (0.549)
ΔDebt/EBITDA	−0.700* (−2.483)	0.074 (0.234)	−0.128 (−0.384)	0.012 (0.775)
ΔBook leverage	0.452 (1.357)	0.329 (1.358)	0.021 (0.116)	0.052** (3.097)
ΔMarket-to-book	−0.738 (−1.406)	0.224 (0.475)	−0.857* (−2.044)	−0.076* (−2.219)
ΔEBITDA/Assets	0.948 (1.864)	−0.071 (−0.243)	−0.271 (−1.141)	−0.059** (−3.458)
ΔEBITDA Volatility	−0.531 (−1.514)	−0.433 (−1.659)	−0.225 (−0.892)	−0.002 (−0.142)
Equity return	1.170** (3.182)	0.010 (0.089)	0.151 (0.528)	−0.034 (−0.822)
<i>Change in macroeconomic factors</i>				
ΔCredit spread	0.106 (0.343)	0.143 (0.457)	0.411 (1.145)	−0.000 (0.013)
ΔBank leverage	−1.562** (−4.310)	−0.237 (−0.769)	−0.430 (−1.348)	−0.045* (−2.350)
ΔGDP Growth	0.189 (0.625)	0.631* (2.259)	−0.293 (−0.985)	−0.031 (−1.897)
ΔStock market return	0.677* (1.975)	−0.131 (−0.418)	0.065 (0.244)	0.025 (1.469)
<i>Control variables</i>				
Industry fixed effects	Yes			
Deal purpose fixed effects	Yes			
Credit ratings fixed effects	Yes			
Firm characteristics at origination	Yes			
Deal characteristics	Yes			
Time trend	Yes			
Outcome probability (%)	2.397	3.036	1.686	1.651
Renegotiations	135	171	95	93
Firms	763	.	.	.
Loans	939	.	.	.
Obs	5,633	.	.	.
Pseudo- <i>R</i> ²	0.123	.	.	.

Table 7 (continued)

Panel B: Marginal effects of ex ante determinants (figures in %)

	Favorable	Amount increase	Amount decrease	Unfavorable
<i>Firm characteristics at origination</i>				
Log assets	−0.238	−7.295	21.961**	0.248
Debt/EBITDA	−1.778	−3.260	−1.241	0.096
Book leverage	−2.522	11.310	−10.498	−0.278
Market-to-Book	1.557	5.448	1.005	−1.419*
EBITDA/Assets	7.047	2.950	−10.425	−0.306
EBITDA volatility	4.569	−0.465	1.280	0.255
Ln (Stated maturity)	16.197**	22.195**	7.887**	2.195**
IR Spread	7.238	−17.643*	10.853	−0.402
Number of lenders	0.659	−5.291	−4.492	−0.064
<i>Deal characteristics</i>				
Loan amount/Assets	−23.805**	−0.230	16.318*	0.002
Term loan in deal	1.334	5.517	1.147	0.179
Pricing grid	1.603	2.082	0.425	−0.183
Borrowing base	3.223	1.915	6.949	−0.205
Covenant on cash flow	8.834**	3.507*	7.222**	0.255*
Young loan	16.438**	−2.604	3.925	−0.449
<i>Control variables</i>				
Industry fixed effects	Yes			
Deal purpose fixed effects	Yes			
Credit ratings fixed effects	Yes			
Change in firm characteristics	Yes			
Change in macroeconomic factors	Yes			
Time trend	Yes			
Outcome probability (%)	17.976	22.770	12.650	12.383
Renegotiations	135	171	95	93
Firms	640	.	.	.
Loans	751	.	.	.
Obs	751	.	.	.
Pseudo-R ²	0.257	.	.	.

multiplicatively and reduce statistical power. Altering the categories will also alter the interpretation of the parameters since identification requires the normalization of one category's parameters to zero (i.e., a baseline category). These considerations, as well as the focus of our study, lead us to examine four mutually exclusive categories defined above: borrower favorable, amount increase, amount decrease, and borrower unfavorable. The baseline outcome consists of loans that are not renegotiated or loans in which only the maturity is altered.

Specifically, we estimate a multinomial logit where the choice probability is specified as

$$Pr(Y_{it} = j) = \frac{\exp(\beta_j X_{it})}{\sum_{k=1}^5 \exp(\beta_k X_{it})}, \quad j = 1, \dots, 5. \quad (2)$$

As in the binary probit in Table 6, all firm characteristics are lagged one quarter relative to the renegotiation indicator function. All other variables are contemporaneous. The coefficient estimates of the multinomial logit have little meaning beyond their impact on the marginal effect of each variable. Specifically, neither the magnitude nor sign of the coefficient estimate clearly conveys information about the marginal effect, which is a complex function of all of the coefficients and covariates. As such, we suppress these estimates and, instead, report only the estimated marginal effects, computed as the difference in predicted probabilities computed at one standard deviation

above and below the mean value of the covariate, and holding all other covariates at their mean values. The corresponding *t*-statistic is obtained by inverting the confidence interval for the predicted probability differential and assuming asymptotic normality.

5.2.1. Ex post changes

The results are presented in Table 7. Beginning with Panel A, we see that increases in asset growth lead to significant increases in the probability of favorable and amount increase outcomes. In other words, increases in the asset base of the firm lead to increases in available credit and reductions in interest rate spreads. Compared to the unconditional probability of these two outcomes given at the bottom of the table, 2.4% and 3.0%, improvements in asset growth have an economically large impact on these two outcomes, highlighting the importance of collateral and liquidation values in private credit markets.

Changes in financial health also have a significant effect on the type of outcome experienced by borrowers. Specifically, an increase in the debt-to-EBITDA ratio leads to a significantly lower likelihood of a favorable outcome, whereas an increase in book leverage (i.e., the ratio of debt to book assets) leads to an increase in the likelihood of an unfavorable outcome. However, this latter result, while statistically significant, is economically small. Increasing the change in book leverage from −8% to 8.8% yields a 0.05% increase in the likelihood of an unfavorable

outcome. In contrast, increasing the change in debt-to-EBITDA ratio yields a 0.7% decrease in the probability of a favorable outcome.

In terms of magnitudes, the change in investment opportunities is the most important determinant of unfavorable outcomes. An increase in the change in market-to-book ratio equal to 1.14 leads to a decrease in the likelihood of an unfavorable outcome of 0.08%. Similarly, increases in the market-to-book ratio reduce the incidence of amount decreasing renegotiations. These results provide an interesting perspective on debt financing. Whereas lenders are willing to increase credit availability and reduce interest rates in response to increases in assets, increases in future investment opportunities only work to mitigate the probability of unfavorable outcomes. Thus, lenders value pledgeable assets more than the expectation of future growth opportunities, consistent with the incentives induced by their concave payoff function.

The impact of changing macroeconomic conditions is seen in the bottom part of Panel A in Table 7. While changing credit spreads have a significant impact on whether or not renegotiation takes place, they seem to have little effect on the individual outcomes. Instead, changes in banks' financial health have a significant impact on favorable and unfavorable outcomes. Interestingly, the effect of weakening bank balance sheets is similar, in direction, across *all* of the renegotiation outcomes. Specifically, as bank leverage increases, borrowers are less likely to experience any renegotiation outcome relative to no renegotiation. These results suggest that a financially healthy banking sector is a necessary condition for most renegotiations—a result consistent with the current economic environment in which originations and non-default renegotiations are infrequent. We also see a role for changes in aggregate productivity and the stock market in determining renegotiation outcomes, which are pro-cyclical.

In unreported results, we examine the impact of including an indicator variable identifying covenant violations that occur within the last year. The violation indicator is strongly correlated with both amount decreasing and unfavorable renegotiations. While almost all coefficients are unaffected by the specification change, the statistical significance of cash flow deviations on unfavorable renegotiations is reduced considerably. This latter finding is consistent with previous research that shows that changes in cash flow are a strong predictor of covenant violations (Sufi, 2009). These findings also suggest that covenant violations are critical to providing creditors the ability to change contract terms (Chava and Roberts, 2008; Roberts and Sufi, 2009).¹⁵

¹⁵ In unreported results, we also examine the effect of incorporating ex post changes in industry characteristics, measured by the change in the industry median value. Other than industry profitability and cash flow volatility, industry characteristics have little effect on renegotiation outcomes after controlling for ex post changes in firm characteristics and macroeconomic factors.

5.2.2. *Ex ante determinants*

Panel B of Table 7 shows that, other than the stated maturity and presence of a cash flow covenant, firm and deal characteristics at the time of origination play an insignificant role in predicting renegotiation outcomes. There are exceptions to this generalization. For example, loans to larger borrowers and loans that are a larger fraction of total book assets are more likely to experience a reduction in loan amount. These results suggest that borrowers take on excess debt capacity at origination, given the relative ease in disposing of excess capacity through future renegotiation.

In total, the results in Tables 6 and 7 provide an important insight into the contracting environment faced by lenders and borrowers. Despite the fact that private credit agreements can be made contingent on cash flow (or any other observable accounting measure), deviations in cash flow are a strong predictor of renegotiation. That is, non-contractible outcomes that are correlated with cash flow make it difficult for creditors and borrowers to specify a comprehensive set of contingencies in the original contract. For example, when creditors and borrowers write the original agreement, they understand that they are more likely to need to change the loan terms in response to a verifiable positive cash flow deviation in the future. However, they cannot identify in the *ex ante* contract *how* the contract should be changed, given other non-verifiable information that will be available when future cash flow is realized. Thus, they allow for contractual flexibility which subjects future terms to potential *ex post* renegotiation.

This interpretation is consistent with prior research on financial covenants, which finds that violations often trigger a renegotiation of the terms of the loan. However, the *ex ante* contract *never* specifies the exact changes in terms that should occur after a covenant violation. In such an environment, a key question is: why do contracts contain *ex ante* contingencies when they do not seem to reduce the probability of renegotiation? Before turning to this question, we first examine the potential implications of our findings for all renegotiations.

5.3. *Early versus late renegotiations*

As mentioned above, we only have information for the initial renegotiation of our loan agreements—a limitation dictated by the cost of data collection. This limitation implies that extrapolation of our results to subsequent renegotiations, which lenders say are quite frequent, should be made with caution. That is, because we only examine the initial renegotiation of a loan contract, there may be a bias in our results with regards to *all* renegotiations (initial and subsequent), though our inferences with respect to initial renegotiations are untainted. Specifically, faster moving variables, in terms of relative volatility, are more likely to have an impact on early renegotiations, whereas slower moving variables are more likely to have an impact on late renegotiations. For example, stock returns and cash flow change more sharply in a short period of time when compared to GDP growth.

Thus, our results may overstate the impact of faster changing variables and understate that of slower changing variables when discussing the determinants of renegotiation, more broadly.

Though we observe only initial renegotiations, we can distinguish between renegotiations occurring after a short or long period of *calendar* time has elapsed. For brevity, we refer to these categories as early and late renegotiations, respectively, and identify them using an indicator variable

(*Late*) equal to one if at least three years has elapsed since the loan origination and zero otherwise. For our loan-quarter panel, *Late* is equal to one for just under 8% of the observations, reflecting both the short average maturity of bank loans and the tendency to renegotiate early in the life of the loan. We then re-estimate the binomial probit (Panel A of Table 6) and multinomial logit (Panel A of Table 7) after including interactions between each ex post change variable and the *Late* indicator variable. The

Table 8

Early versus late renegotiation and renegotiation outcomes.

The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. Panel A presents estimated coefficients and *t*-statistics (in parentheses) from a bivariate probit regression of whether or not renegotiation occurs. Four parameter estimates are presented for each variable, which correspond to the change as measured from the quarter prior to origination: a positive component ($\max(0, x)$), a negative component ($\min(0, x)$), and the interaction of each component with a “Late” indicator variable equal to one if at least three years have elapsed from origination. Panel B presents estimated coefficients and *t*-statistics (in parentheses) from a multinomial logit regression of renegotiation outcomes on various determinants. Eight parameter estimates are presented for each variable corresponding to the four different renegotiation outcomes and each variables interaction with the “Late” indicator variable. Industry fixed effects correspond to the Fama and French 38-industry classification. Credit rating fixed effects assign a null value to unrated firms and separate indicators for firms with five broad ratings classifications (see Appendix A for definition). Firm characteristics at origination are time-invariant variables measured in the quarter prior to the origination of the loan and consist of all of the variables listed under the changes in firm characteristics heading. Initial contract terms consist of the natural log of the stated maturity, the average interest rate spread in the contract, the number of lenders in the lending syndicate, the amount of the loan relative to the total assets of the borrower in the quarter before origination, and indicator variables for the presence of a pricing grid, borrowing base, or financial covenants (any cash flow, any net worth, balance sheet, liquidity). Statistical significance at the 5% and 1% levels is denoted by * and **, respectively. All hypothesis tests are conducted with standard errors robust to within-firm dependence and heteroskedasticity.

Panel A: Binomial probit of renegotiation (estimated coefficients)

	Positive change		Negative change	
	Level coefficient	Interaction coefficient	Level coefficient	Interaction coefficient
<i>Change in firm characteristics</i>				
$\Delta \text{Log assets}$	0.472* (2.302)	−0.337 (−0.919)	−0.247 (−0.512)	1.517 (0.968)
$\Delta \text{Debt/EBITDA}$	−0.001 (−0.446)	0.001 (0.428)	−0.004* (−2.009)	0.053* (2.234)
$\Delta \text{Book leverage}$	1.344* (2.444)	0.776 (0.600)	0.020 (0.028)	−1.822 (−1.025)
$\Delta \text{Market-to-book}$	−0.141 (−1.008)	−0.348 (−0.720)	0.008 (0.070)	0.257 (1.582)
$\Delta \text{EBITDA/Assets}$	5.224 (1.285)	1.233 (0.112)	−6.435* (−2.068)	−2.902 (−0.427)
$\Delta \text{EBITDA Volatility}$	−9.269 (−1.274)	0.186 (0.011)	−12.935* (−2.111)	30.120** (2.887)
Equity return	0.181* (2.451)	−0.031 (−0.170)	−0.574* (−2.362)	−0.856 (−1.245)
<i>Change in macroeconomic factors</i>				
$\Delta \text{Credit spread}$	0.175** (2.781)	0.006 (0.027)	−0.049 (−0.935)	0.168 (0.811)
$\Delta \text{Bank leverage}$	153.464 (1.816)	104411.331* (2.176)	−40.668** (−4.107)	−90.203* (−2.304)
$\Delta \text{GDP Growth}$	11.489 (1.308)	−23.360 (−0.734)	−10.555 (−1.540)	42.179 (1.683)
$\Delta \text{Stock market return}$	0.624 (1.663)	−0.909 (−0.603)	−0.279 (−0.679)	1.442 (1.042)
<i>Control variables</i>				
Industry fixed effects	Yes			
Deal purpose fixed effects	Yes			
Credit ratings fixed effects	Yes			
Firm characteristics at origination	Yes			
Deal characteristics	Yes			
Time trend	Yes			
Pr(Renegotiation) (%)	9.131	.	.	.
Renegotiations	513	.	.	.
Firms	760	.	.	.
Loans	936	.	.	.
Obs	5,618	.	.	.
Pseudo- R^2	0.096	.	.	.

Table 8 (continued)

Panel B: Multinomial logit of renegotiation outcomes (estimated coefficients)

	Favorable		Amount increase		Amount increase		Unfavorable	
	Level coefficient	Interaction coefficient	Level coefficient	Interaction coefficient	Level coefficient	Interaction coefficient	Level coefficient	Interaction coefficient
<i>Change in firm characteristics</i>								
ΔLog assets	1.538** (2.763)	−1.383 (−1.133)	1.926** (4.108)	−0.997 (−1.366)	0.057 (0.077)	0.701 (0.700)	0.320 (0.364)	−0.749 (−0.542)
ΔDebt/EBITDA	−0.012** (−2.795)	0.019** (2.911)	0.002 (0.360)	−0.006 (−1.069)	−0.007 (−0.997)	0.021* (2.094)	−0.002 (−0.293)	0.015 (1.659)
ΔBook leverage	1.492 (1.102)	−1.844 (−0.651)	2.043 (1.764)	−5.372 (−1.881)	−0.565 (−0.326)	4.850 (1.940)	5.635** (2.662)	−0.075 (−0.018)
ΔMarket-to-book	−0.356 (−1.174)	−0.265 (−0.622)	0.014 (0.052)	0.160 (0.355)	−0.632 (−1.869)	−0.019 (−0.026)	−1.473** (−2.991)	1.530 (1.948)
ΔEBITDA/Assets	22.884* (2.094)	−22.808 (−1.360)	1.536 (0.207)	−14.218 (−1.035)	−15.475 (−1.922)	27.227 (1.469)	−36.336** (−3.051)	38.054* (2.155)
ΔEBITDA Volatility	−22.325 (−1.524)	46.775 (1.433)	−19.086 (−1.535)	35.117 (1.779)	−22.648 (−1.225)	21.064 (0.794)	−1.578 (−0.076)	−19.885 (−0.639)
ΔEquity return	0.638** (3.051)	−0.160 (−0.343)	0.064 (0.309)	−0.089 (−0.210)	0.037 (0.114)	0.407 (0.606)	−0.008 (−0.013)	−1.491 (−1.546)
<i>Change in macroeconomic factors</i>								
ΔCredit spread	0.095 (0.824)	−0.400 (−0.925)	−0.015 (−0.119)	1.108** (5.397)	0.261 (1.262)	−0.358 (−0.983)	−0.084 (−0.490)	0.596 (1.402)
ΔBank leverage	−145.105** (−4.715)	36.341 (0.555)	−37.467 (−1.135)	−55.017 (−0.938)	−61.586 (−1.348)	−42.773 (−0.509)	−101.129* (−2.389)	−244.866** (−3.778)
ΔGDP Growth	10.285 (0.605)	−18.071 (−0.280)	24.588 (1.446)	117.515** (2.916)	−21.661 (−0.956)	20.967 (0.444)	−35.459 (−1.568)	−29.284 (−0.418)
ΔStock market return	1.900* (2.136)	−0.148 (−0.052)	−0.455 (−0.569)	2.592 (1.323)	0.343 (0.302)	−0.053 (−0.021)	1.487 (1.290)	3.349 (1.158)
<i>Control variables</i>								
Industry fixed effects	Yes							
Deal purpose fixed effects	Yes							
Credit ratings fixed effects	Yes							
Firm characteristics at origination	Yes							
Deal characteristics	Yes							
Time trend	Yes							
Outcome Probability (%)	0.024	.	0.030	.	0.017	.	0.017	.
Renegotiations	135	.	171	.	95	.	93	.
Firms	763	.	.	.	.	.	.	.
Loans	939	.	.	.	.	.	.	.
Obs	5,633	.	.	.	.	.	.	.
Pseudo- R^2	0.133	.	.	.	.	.	.	.

coefficients on the interaction terms will enable us to identify whether the determinants have differential effects on renegotiations based on how much time has elapsed since origination.

The results are presented in Table 8. Panel A presents the estimated coefficients from the probit model. We see that declines in the debt-to-EBITDA ratio increase the likelihood of renegotiation in the short-run, consistent with our earlier result, but decrease the likelihood of renegotiation in the long-run. We see a similar result for changes in EBITDA volatility. One explanation for these results may lay in expected versus unexpected changes. Loan contracts are drawn up based on expectations of future performance and creditworthiness. Insofar as changes occurring early are less expected than those occurring later, we might expect to see this countervailing effect.

For changes in bank leverage, we see an amplification effect in that changes occurring after a long period of time tend to increase the likelihood of renegotiation.¹⁶ This result is also present in both positive and negative changes. Other results are largely unaffected by the inclusion of the interaction terms, and are consistent with those found in Panel A of Table 6.

Panel B of Table 8 presents the results from the multinomial logit, which is similar to that found in Panel A of Table 7 but for the inclusion of four additional columns corresponding to the interaction terms. Increases in the debt-to-EBITDA ratio in the short-run lead to a

¹⁶ We note that the large coefficient on the positive change interaction terms is due to scale: the mean positive change is near zero because of relatively few observations for which $Late = 1$.

lower probability of a borrower favorable outcome. In the long-run, this effect is eliminated, as revealed by the sum of the level and interaction coefficients (0.007), which is statistically indistinguishable from zero in an unreported chi-square test. Increases in the market-to-book ratio in the short-run lead to a lower likelihood of an unfavorable outcome for borrowers, perhaps because of the attractiveness of equity financing or improvements in investment opportunities. After three-years, this effect is eliminated, as again revealed by the insignificance of the sum of the two coefficients.

We also see that long-run increases in the credit spread lead to a greater likelihood of amount increasing renegotiating outcomes. This suggests that changing credit spreads may be capturing the attractiveness of public debt as an alternative to bank loans, as opposed to the credit market conditions more generally. As in Panel A, we see a long-run amplification effect in changing bank leverage for most renegotiation outcomes. Finally, while GDP growth leads to a greater incidence of amount increasing outcomes in our previous results, the results here show that the impact is concentrated in the long-run, consistent with slow-moving variables having a greater effect on renegotiation after more time has elapsed.

In sum, this analysis suggests that both fast and slow moving variables impact renegotiation and its outcomes. Further, several determinants have differential effects depending on the length of time between origination and renegotiation. While theory has little to say on this distinction, we hope these results will inspire further research—both theoretical and empirical.

5.4. How do *ex ante* contingencies affect *ex post* renegotiation?

The results from Panel B in Table 7 show that few of the *ex ante* contract characteristics predict renegotiation outcomes. While endogeneity is clearly a relevant concern, our discussion above questions the extent to which endogeneity explains our results regarding the role of *ex ante* contingencies. Recall that the relative frequency of renegotiation is not only near its upper limit of 100%, but also slightly *higher* when contingencies are present in the initial contract. This result contradicts the notion that a primary purpose of *ex ante* contingencies, such as pricing grids, is to reduce the incidence of costly renegotiation (Asquith, Beatty, and Weber, 2005). To provide further insight into this issue, we pose a slightly different hypothesis in this section. Specifically, we ask: For a given change in an accounting measure (e.g., cash flow or net worth), are credit agreements more or less likely to be renegotiated depending on the structure of the initial contract? That is, do contingencies *interact* with the evolution of firm characteristics to affect the outcome of renegotiation?

To answer these questions, we take an identical modeling approach to that found in Eq. (2) but for one change: the inclusion of interaction terms between contract contingencies and the deviation in accounting variable on which the contingency is written. Table 9

Table 9

Interactive effects of contract features on renegotiation outcomes.

The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. The table presents estimated coefficient estimates and *t*-statistics (in parentheses) from five multinomial logit regressions of renegotiation outcomes on various determinants. Each specification contains the same control variables, as indicated at the bottom of the table. The baseline category in each regression consists of observations where there is no renegotiation or only the maturity of the contract is changed. Statistical significance at the 5% and 1% levels is denoted by * and **, respectively. All hypothesis tests are conducted with standard errors robust to within-firm dependence and heteroskedasticity.

	Favorable	Unfavorable
<i>Model 1</i>		
Pricing grid on balance sheet Item	−0.277 (−0.520)	−0.016 (−0.038)
ΔNet worth/Assets	0.000 (0.375)	−0.001* (−2.016)
Interaction	0.000 (0.724)	−0.020** (−3.270)
<i>Model 2</i>		
Pricing grid on cash flow	0.033 (0.162)	−0.152 (−0.581)
ΔEBITDA/Assets	18.310 (1.459)	−8.203 (−0.905)
Interaction	12.993 (0.830)	−56.318** (−3.904)
<i>Model 3</i>		
Covenant on cash flow	0.401 (1.822)	0.547 (1.628)
ΔEBITDA/Assets	−7.890 (−0.697)	−9.163 (−0.496)
Interaction	36.128** (2.696)	−27.161 (−1.401)
<i>Model 4</i>		
Covenant on net worth	−0.014 (−0.068)	−0.077 (−0.335)
ΔNet worth/Assets	−0.000 (−0.190)	−0.002** (−2.588)
Interaction	0.001** (2.689)	0.003* (2.520)
<i>Control variables in each model</i>		
Change in firm characteristics	Yes	
Change in macroeconomic factors	Yes	
Time trend	Yes	

presents the coefficient estimates and *t*-statistics of four specifications differing only in the contingency and interaction terms. For example, Model 1 includes an indicator for a pricing grid on a balance sheet item (e.g., net worth), the change in net worth/book assets, and the interaction of these two variables, along with the control variables—found in all four specifications—listed at the bottom of the table.

The results for Model 1 indicate that, for unfavorable renegotiation outcomes, the presence of a pricing grid on a balance sheet measure amplifies the effect of changes in net worth on the likelihood of an unfavorable renegotiation outcome. Similarly, the results for Model 2 show that the presence of a pricing grid on cash flow amplifies the effect of changes in cash flow on the likelihood of an unfavorable renegotiation outcome.

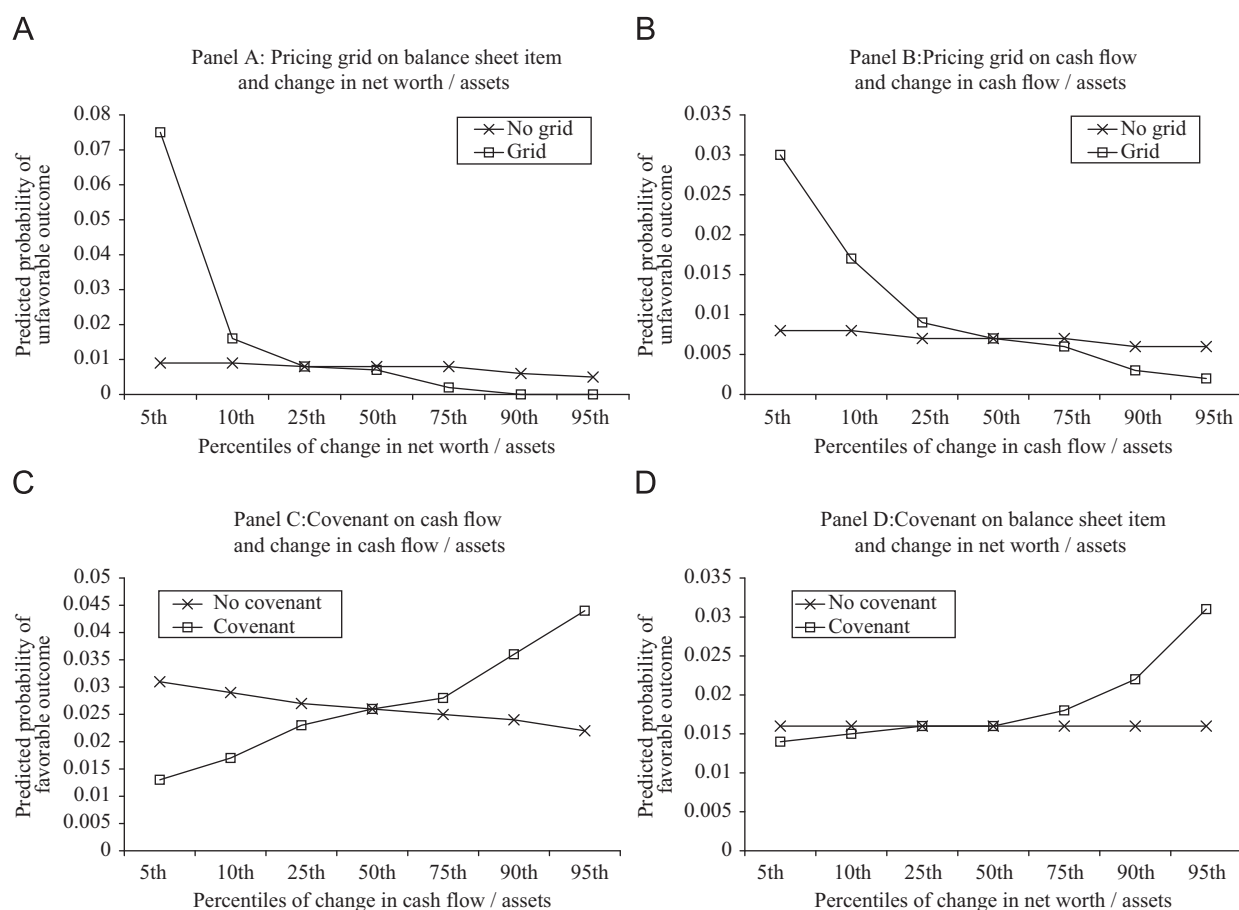


Fig. 3. Changes in firm characteristics and contingencies. The sample consists of 1,000 private credit agreements between financial institutions (lenders) and publicly traded non-financial U.S. companies (borrowers) during the period 1996–2005. Panels A and B show the predicted probability (from the multinomial logit model discussed in Table 8) of an unfavorable renegotiation outcome for two groups of loans as a function of the change in net worth/assets and cash flow/assets over the life of the loan, respectively. The two groups in each panel are loans with and without a performance pricing grid on net worth and cash flow, respectively. For example, Panel A shows that the predicted probabilities of an unfavorable renegotiation outcome following a severe deterioration in cash flow are 7.5% and 1% for loans with and without a performance pricing grid on cash flow, respectively. Panels C and D show the probability of a favorable renegotiation outcome for two groups of loans as a function of the change in cash flow/assets and net worth/assets over the life of the loan, respectively. The two groups in each panel are loans with and without a covenant on net worth and cash flow, respectively.

To provide some intuition for these results, Panels A and B of Fig. 3 plot the predicted probability of an unfavorable renegotiation across the distributions for changes in net worth and cash flow, respectively, and holding all other control variables at their mean values. Within each panel, the results are stratified by the presence of a pricing grid on the corresponding accounting measure. These specifications are motivated by the idea that ex ante contingencies are designed to reduce the probability of renegotiation. The evidence seems inconsistent with this argument. Negative deviations in cash flow for contracts without a pricing grid do not affect the probability of an unfavorable renegotiation. A similar result holds for net worth contingencies. In contrast, contracts with a pricing grid are more likely to be unfavorably renegotiated for a negative deviation in cash flow or net worth (i.e., changes falling in the lower tail of the distribution).

Models 3 and 4 in Table 9 present results for contracts containing a covenant on cash flow and net worth, respectively. The estimates show that positive deviations

in cash flow only lead to favorable renegotiation for contracts which contain a covenant on cash flow. Panels C and D of Fig. 3 illustrate these results. Positive cash flow shocks are met with a substantially higher probability (more than double) of a favorable renegotiation when a covenant restricting cash flow is in place. A similar result is found for net worth and covenants restricting net worth (or tangible net worth).

These results suggest that ex ante contingencies are not placed into loan agreements with the purpose of reducing the probability of renegotiation. Instead, renegotiation is more likely to occur for a given deviation in an underlying variable if the contract contains a contingency on that variable. That is, contingencies are designed to *shape* the renegotiation game rather than to *avoid* the renegotiation game, which is consistent with models in which specifying ex post bargaining power and renegotiation default options can improve ex ante relationship-specific investments (Hart and Moore, 1988; Aghion, Dewatripont, and Rey, 1994; Rajan and Winton, 1995).

Intuitively, these results highlight how contingencies contractually allocate bargaining power by altering the default option in a state contingent manner. To make this notion concrete, consider the results corresponding to the pricing grid on cash flow. When there is no pricing grid on cash flow and the borrower's cash flow deteriorates, they are in a better position *ex post* under the initial terms of the contract, which is unable to account for declines in cash flow—absent a covenant violation. Consequently, the borrower has little incentive to renegotiate the contract, whereas the lender would like to adjust the contract to reflect the change in credit quality. The presence of a pricing grid on cash flow incentivizes the borrower to renegotiate because the decline in cash flows is met with sharp increases in the interest rate. This increasing interest rate works to allocate bargaining power to the lender in a situation where the lender *should* have bargaining power.

As before, there is a caveat to these results that must be noted. Specifically, the presence of a pricing grid or covenant is endogenous with respect to a renegotiation outcome in that unobserved differences between loans (or borrowers and lenders) with and without a contingency may be driving the results. However, most contracts contain a pricing grid (73%) or a covenant (96%), and removing loans without these features has little effect on our results. Thus, the more relevant issue is whether the choice of accounting ratio on which to contract is endogenous with respect to a particular renegotiation outcome.

For example, assume that borrowers who choose a pricing grid on cash flow are inherently more likely to receive a borrower unfavorable outcome in renegotiation following a decline in credit quality because of unobserved differences between the borrowers (or lenders). In this case, the presence of a pricing grid on cash flow is simply proxying for a latent factor(s) that is correlated with both the cash flow pricing grid and the likelihood of receiving a borrower unfavorable outcome. However, if this is true, then we should not also see firms with a pricing grid on net worth experiencing a differential likelihood of a borrower unfavorable renegotiation following a decline in credit quality. In other words, it cannot be the case that borrowers with a pricing grid on cash flow are more likely to receive a borrower unfavorable outcome relative to borrowers with a pricing grid on net worth; and, at the same time, borrowers with a pricing grid on net worth are more likely to receive a borrower unfavorable outcome relative to borrowers with a pricing grid on cash flow. Nonetheless, without a clearly defined exogenous source of variation, we can only state that our results here are suggestive of the contractual allocation of bargaining power described above.

6. Conclusion

This study shows that the renegotiation of debt contracts is a frequent event that leads to significant changes to the terms of the contract. The accrual of new information concerning the credit quality, investment

opportunities, and collateral of the borrower leads both parties to make material changes to several features of the original contract. Further, changes in the macroeconomic environment play an instrumental role in shaping renegotiation, as well. In particular, we find that renegotiations are highly pro-cyclical and are driven by changes in credit market liquidity and the financial health of commercial banks.

In addition to shedding light on the importance of renegotiations and their determinants, our results have important implications for contract theory. In particular, our results highlight an interesting link between *ex ante* contingencies and *ex post* renegotiation. We find that rather than reducing the likelihood of costly renegotiation, *ex ante* contingencies appear to be used for the purpose of renegotiation design. That is, contingencies in the *ex ante* contract help shape renegotiation outcomes through their effect on the default outcome and the allocation of bargaining power. Our results on this dimension are consistent with a number of theories arguing that optimal contract design should appropriately allocate bargaining power in different future states of the world to maximize relationship-specific investments.

While shedding light on a number of issues, our results also raise additional questions. For example, what are the implications of frequent renegotiation for our understanding of debt maturity? How do parties determine which contract features to alter during renegotiation? And, what are the *ex ante* and *ex post* efficiency implications of renegotiation? We look forward to future research that addresses these and other related questions.

Appendix A. Variable definitions

A.1. Borrower characteristics (Compustat)

All variables are defined in terms of their Compustat data item #s. All data items are quarterly unless explicitly indicated by “anndata”. For all of the analysis, we take four-quarter averages for each variable. For example, the debt-to-EBITDA ratio for quarter *t* is computed as the average debt-to-EBITDA ratio from quarter *t*–3 to quarter *t*, inclusive. Variable changes, denoted by Δ , are computed relative to the quarter prior to origination of the loan.

Book Assets = data44
 Net Worth = data44–data54
 Tangible Net Worth = data40+data42+data43–data54
 Debt/EBITDA = (data45+data51)/data21
 Book Leverage = (data45+data51)/data44
 EBITDA/Book Assets = data21/data44
 Market-to-Book Ratio = (data54+anndata10–data52+
 (data14*data61))/data44
 Asset Tangibility = data42/data44
 Cash/Book Assets = data36/data44
 Altman Z-Score = $1.2 * ((\text{data40} - \text{data49}) / \text{data44}) + 1.4 * (\text{data58} / \text{data44}) + 3.3 * (\text{data23} / \text{data44}) + 0.6 * ((\text{data14} * \text{data61}) / \text{data54}) + 0.999 * (\text{data2} / \text{data44})$
 EBITDA Volatility = ratio of the standard deviation of the past eight earnings (data21) changes to the average

book asset (data44) size over the past eight quarters. Equity Return = is the growth rate of the firm's market capitalization (data14+data61) from the quarter prior to the origination of the loan to the current quarter.

Industry fixed effects are defined using the Fama and French classification of Standard Industrial Classification (SIC) codes. We use both the 38- and 12-industry classifications, as noted in the paper. Definitions are available from Ken French's Web site: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

A.2. Macroeconomic variables

Credit Spread = yield on BB-rated bonds from Lehman Brothers minus the yield on AAA-rated bonds from Global Financial Data.

Bank Leverage = Total Liabilities/Total Book Assets for commercial banks in the United States. (Data come from FDIC.)

GDP Growth = the growth rate of GDP in constant 1996 dollars. (Data come from Global Financial Data.)

Stock Market Return = is the quarterly return on the CRSP value-weighted index. (Data come from CRSP.)

Credit Rating Fixed Effects are defined using credit ratings from Moody's and classify firms into six categories: A-rated or better, BAA-rated, BA-rated, B-rated, CAA-rated, and unrated firms.

A.3. Loan characteristics (SEC filings and LPC Dealscan)

All loan-level information is gathered at the deal or package level, which can consist of more than one tranche.

Stated Maturity = the average maturity of all tranches in the deal, weighted by the amount of each tranche.

IR Spread = the interest rate spread over the benchmark rate, typically LIBOR. Because some deals contain multiple tranches with differing interest rate spreads, we average the spreads across the tranches, weighting each spread by the amount of its corresponding tranche.

Number of Lenders = the number of lenders in the lending syndicate (including the lead arrangers) or one if a sole-lender loan.

Loan Amount = the sum of the amounts of all tranches in each deal.

Term Loan in Deal = one if at least one tranche in the deal is a term loan; zero otherwise.

Pricing Grid = one if the deal contains a pricing grid (i.e., performance pricing feature) on at least one of the tranches; zero otherwise.

Pricing Grid on "X" = one if the deal contains a pricing grid (i.e., performance pricing feature) on accounting ratio "X" in at least one of the tranches; zero otherwise.

Borrowing Base = one if the deal contains a borrowing base on at least one of the tranches; zero otherwise.

Covenant on "X" = one if the deal contains a covenant on variable "X" (e.g., cash flow, Debt/EBITDA, etc.); zero otherwise.

Young Loan = one if the deal is renegotiated before less than half of the stated maturity of the loan has elapsed.

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